# Flexible Labor Contracts, Firm-specific Pay, and Wages

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March 28, 2024

**Abstract**

In this paper, we use comprehensive employer-employee data for the Netherlands to investigate the labor income effects of flexible labor contracts in two different settings: wage determination as in the AKM model, and an analysis of earnings losses after job displacement. In both settings, we find that flexible contracts lead to lower wages, but that workers with flexible contracts primarily earn less because they work at or join lower paying firms. This implies that the negative effect of flexible contracts on wage income is overstated, if firm-specific pay differentials are not taken into account. This is an important insight for any policy discussion of the pros and cons of flexible contracts.

**Keywords**: job displacement, flexible contracts, alternative work arrangements, earning losses, firm-specific wage premiums, income disparities, labor market.
**JEL Codes**: E32, J22, J31, J41, J63, R23

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# 1 Introduction

In contemporary labor markets, the prevalence and impact on labor market outcomes of flexible contracts have become a key concern for policymakers. To protect workers, in 2020 the Netherlands enacted the Balanced Labour Market Act (WAB), which, among other measures, mandates more equal pay for flexible workers compared to their permanent counterparts.[1] Underlying this policy initiative is the view that flexible contracts are responsible for considerably worse pay for workers. Using comprehensive Dutch administrative data, however, we find evidence that the adverse wage effects of flexible contracts are relatively small. We confirm that workers with flexible contracts tend to be paid considerably less, but we find that this is primarily due to the fact that they are employed by worse-paying firms. Similarly, we find that displaced workers who enter into flexible labor contracts after re-employment receive considerably lower wages, but this mainly reflects that they have moved to lower-paying firms. Overall, our results suggest that flexible contracts signal materially lower wages, but that they are not the main cause of this.

Applying the model of Abowd et al. (1999) (AKM) which allows for unobserved worker and firm heterogeneity, we estimate the impact of flexible contracts on wages and several other labor market outcomes. We find that flexible workers experience relatively lower hourly wages, a greater volatility in worked hours, and an increased likelihood of becoming unemployed, which confirms previous findings on the detrimental effects of flexible contracts on labor market outcomes (Goldschmidt and Schmieder, 2017; Lambert et al., 2014; Mas and Pallais, 2020; Scheer et al., 2022). Specifically, we estimate that a flexible contract lowers a worker's pay by 4.5%, which is a relatively small effect. However, using the estimated firm fixed effects in the AKM framework, we calculate that workers with flexible contracts additionally receive 5% lower wages, because they tend to work at lower-paying firms. Adding these two effects, we see that flexible workers receive significantly lower wages by 9.5%, but that the greater part of this pay differential is due to the fact that they tend to work at worse-paying firms rather than to the flexible contract per se.

Workers' earnings losses after job displacement offer a different setting where we can analyze the effects of being offered a flexible contract after displacement and of transitioning to possibly lower-paying firms. In the literature on the earnings losses of displaced workers, it is standard to estimate employer-specific wage premiums of displaced workers relative to matched control workers (Lachowska et al., 2020). We extend this approach to calculate

[1] According to Statistics Netherlands, the Netherlands had a share of flexible workers of 29% in 2019, which put it in fourth place in the EU after Spain, Poland and Greece. See https://www.cbs.nl/nl-nl/dossier/dossier-flexwerk/hoofdcategorieen/flexwerk-in-nederland-en-de-eu.

the changes in firm-specific wage premiums (relative to the control workers) separately for workers who transition to jobs with flexible and permanent contracts. Especially workers with ex post flexible contracts are shown to transition to worse-paying firms: for them the average firm-specific wage premium falls by 12.3%, compared to a fall of 4.4% for ex post permanent workers. Workers with ex post flexible contracts on average experience an estimated overall wage decline of 15.1%, compared to a much smaller decline of 2.1% for permanent workers. The large overall wage decline for flexible workers, however, mainly reflects that these workers tend to transition to lower-paying firms, leaving only a small part of their wage decline to be explained by receiving a flexible contract.

To study the effects of job displacement, we follow the literature by assuming that when a firm contracts by 30 percent or more (i.e., is experiencing a mass layoff), then a worker who separates from the firm is a displaced worker (Krolikowski, 2018; Lachowska et al., 2020). We use propensity score matching to match displaced workers with control workers following the methodology of Schmieder et al. (2023) and Bertheau et al. (2023), which enables us to estimate the causal effect of job displacement on earnings by using Difference-in-Differences (DiD). Given the nature of job displacement (namely, varying displacement times, with possibly varying dynamic subsequent effects), we adopt the approach developed by Borusyak et al. (2022).

In both AKM wage equations and in an analysis of earnings losses of displaced workers, we find that flexible workers receive lower wages primarily because they work at or join lower-paying firms. This implies that the negative effect of flexible contracts on wage income is overstated, if firm-specific pay differentials are not taken into account. This is an important new insight regarding the impact of flexible contracts.

# 2 Data

We obtain wage income and contract information for the entire Dutch labor market from SPOLIS, which is an administrative data set. The wage income can be decomposed into a fixed part and a variable part, which includes overtime pay and bonuses. The contract information includes the type of contract and weekly working time. We have firm-level information on the Standard Industrial Classification (SBI), the number of workers, and the municipality of location. The data in SPOLIS are used to calculate unemployment benefits, and they cover all legal employment in the Netherlands. Workers and firms are anonymized, and Statistics Netherlands (CBS) provides identifiers to track workers and firms over time.

Workers have either permanent of flexible contracts. As identified in the data source, we distinguish three types of flexible contracts: on-call contracts (arrangements that do not guarantee any hours of work), temporary-agency contracts (arrangements where the worker is formally employed by a temporary-work agency), and fixed-term and other contracts (other contracts include flexible contracts where the duration reflects a particular project or a temporary replacement).[2] The distinction between permanent and flexible contracts based on the Dutch data is technically equivalent to the dichotomy between insecure and secure contracts in, for example, Wiengarten et al. (2021). On-call and temporary-agency jobs are frequently called *alternative work arrangements* in the literature, as these contracts tend to be associated with nontraditional jobs (Katz and Krueger, 2017, 2019; Mas and Pallais, 2020).

Following Lachowska et al. (2020), we focus on the hourly wage. We create two measures of the hourly wage: the fixed hourly wage and the full hourly wage. The fixed hourly wage is computed as the sum of the fixed or base wage income divided by the sum of the fixed worked hours during the year. The full hourly wage instead also reflects overtime pay, bonuses and other compensation, and overtime hours. In case a worker has multiple labor contracts during a year, we compute the worker's hourly wages for the largest contract in terms of yearly gross wage income.

We complement the hourly wage data with demographic information on age and gender. In addition, we classify a worker's highest education achieved by 2018 as either low education or high education.[3] Finally, we restrict our sample to workers of ages between 25 and 55 years. The resulting dataset has $53,781,869$ worker-year observations covering the years $2006-2019$.

# 3 Labor Market Consequences of Flexible Contracts

In this section, we analyze the consequences of flexible contracts for wages. In addition, we consider two indicators of job insecurity, namely the volatility of worked hours per year and the likelihood of unemployment in the next year. Flexible contracts are represented

[2]Payroll contracts are included in the category fixed term and other contracts.

[3]Low education corresponds to the Dutch educational categories of primary education, practical education, VMBO (preparatory secondary vocational education), MBO (middle level applied education), VWO (senior general secondary education), and HAVO (university preparatory education) as the highest level of education completed. High education includes those who have a Bachelor's degree, a Master's degree or a PhD as the highest obtained degree. Bachelor's and Master's degrees can be obtained from either the HBO (universities of applied sciences) or the WO (academic universities).

**Table 1:** Flexible contracts and labor market outcomes.

| | Log fixed hourly wage (1) | Log full hourly wage (2) | Vol. worked hours (3) | Unempl. (4) |
|---|---|---|---|---|
| Flexible contract | -0.0382*** | -0.0448*** | 0.148*** | 0.0278*** |
| | (0.000178) | (0.000192) | (0.000252) | (0.000260) |
| **Disaggregated** | | | | |
| -On-call | -0.0329*** | -0.0372*** | 0.196*** | 0.0737*** |
| | (0.000435) | (0.000455) | (0.000511) | (0.000726) |
| -Temporary-agency | -0.0379*** | -0.0479*** | 0.244*** | 0.0475*** |
| | (0.000598) | (0.000632) | (0.000758) | (0.00100) |
| -Fixed term and other | -0.0386*** | -0.0453*** | 0.141*** | 0.0237*** |
| | (0.000180) | (0.000195) | (0.000254) | (0.000260) |
| Mean $y$ (permanent workers) | 2.914 | 3.040 | 0.150 | 0.029 |
| *Observations* | 53,781,869 | 53,781,869 | 53,781,869 | 48,179,486 |

**Notes:** This table indicates how labor market outcomes vary with contract type. We run the following regression: $W_{i,t} = \phi Q_{i,t}^{Flex} + \boldsymbol{X}\boldsymbol{\beta} + \alpha_i + \psi_{J(i,t)} + \lambda_t + \epsilon_{i,t}$ where $W_{i,t}$ may be any of the following variables: log of the fixed hourly wage, log of the full hourly wage, volatility of worked hours within a year, and a dummy variable for being unemployed the next year. $Q_{i,t}^{Flex}$ is either a dummy variable for having a flexible contract or a categorical variable for the type of flexible contract: permanent (baseline), on-call, temporary-agency, and fixed term and other. $\boldsymbol{X}$ includes a polynomial term on age (normalized to 40 years old), number of months under a flexible contract within a year, gender-age fixed effects, and industry-year fixed effects. $\alpha_i$ are worker fixed effects. $\psi_{J(i,t)}$ are firm fixed effect where $J(i,t)$ is the main employer of worker $i$ in year $t$. $\lambda_t$ are year fixed effects. Finally, $\epsilon_{i,t}$ is the error term. Standard errors are clustered at the worker level. t-statistics are in parentheses.

by a flexible contract dummy variable or alternatively by indicator variables for the three subcategories of flexible contracts, i.e., on-call contracts, temporary-agency contracts, and fixed term and other contracts. To account for unobserved worker and firm heterogeneity, we use the modeling approach of Abowd et al. (1999) (AKM) as follows:

$$W_{i,t} = \phi Q_{i,t}^{Flex} + \boldsymbol{X}\boldsymbol{\beta} + \alpha_i + \lambda_t + \psi_{J(i,t)} + \epsilon_{i,t}, \tag{1}$$

where $W_{i,t}$ is the log of the fixed hourly wage, log of the full hourly wage, the volatility of worked hours within a year, or a dummy variable for unemployment in the next year. $Q_{i,t}^{Flex}$ is either a dummy variable for a flexible contract or a categorical variable for the three types of flexible contracts. $\boldsymbol{X}$ includes a polynomial term in age (normalized to 40 years old), the number of months under a flexible contract within a year, gender-age fixed effects, and industry-year fixed effects. In addition, $\alpha_i$ are worker fixed effects, $\psi_{J(i,t)}$ are firm fixed effects where $J(i,t)$ is the main employer of worker $i$ in year $t$, and $\lambda_t$ are year fixed effects. Finally, $\epsilon_{i,t}$ is the error term.

Conceptually, in the AKM framework worker fixed effects are identified by observing the

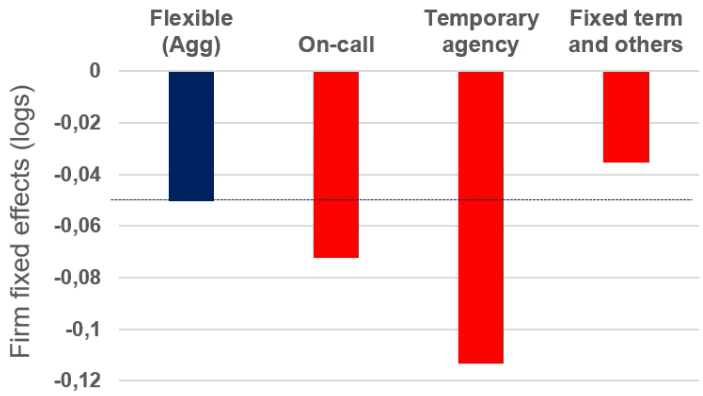
same worker in different time periods, and firm fixed effects are identified by observing the same worker at different firms. Thus, the estimation of firm fixed effects relies on worker mobility between firms, and Abowd et al. (2012) show that only fixed effects for those firms with some worker mobility can be identified that make up the so-called largest connected set.[4]

Table 1 presents estimation results based on Equation (1). In Column 1, we find that the fixed hourly wage is 3,8% lower for workers with flexible contracts. When we consider the type of flexible contract, we observe that on-call workers, temporary-agency workers, and fixed term and other workers have 3.3%, 3.8%, and 3.9% lower hourly wages compared to permanent workers, respectively. These hourly wage differences increase when we include the variable part of labor income, as in Column 2 the full hourly wage is 4.5% lower for workers with flexible contracts. Taking into account the type of flexible contract, we see that on-call workers, temporary-agency workers, and fixed term and other workers receive 3.7%, 4.8%, and 4.5% lower hourly wages than permanent workers.

Jobs with flexible contracts are often considered insecure, because the uncertainty of working hours and job tenure can result in earning volatility with negative consequences for workers and their families (Mas and Pallais, 2017; Wiengarten et al., 2021). In our setting, we consider the impact of flexible contracts on the volatility of worked hours in a year, and the likelihood of subsequent unemployment. The yearly volatility of worked hours for a worker is calculated as the standard deviation of monthly worked hours where we assume zero worked hours for workers who are unemployed in a particular month. In Column 3, we find that flexible workers experience a 15% higher volatility of worked hours compared to workers with permanent workers. Specifically, on-call workers, temporary-agency workers, and fixed term and other workers face a 20%, 24%, and 14% higher volatility of worked hours than permanent workers. In column 4, we consider the unemployment risk of workers proxied by not having a job in the next year. We observe that, on average, the unemployment probability in one year for workers with flexible contracts is 2.8% higher compared to workers with permanent contracts. The unemployment risks for on-call workers, temporary-agency workers, and fixed terms and other contract workers are 7.4%, 4.8%, and 2.4% higher than for permanent workers.

[4]This concept is explained by Abowd et al. (2002) (page 3) as follows: "When a group of persons and firms is connected, the group contains all the workers who ever worked for any of the firms in the group and all the firms at which any of the workers were ever employed. In contrast, when a group of persons and firms is not connected to a second group, no firm in the first group has ever employed a person in the second group, nor has any person in the first group ever been employed by a firm in the second group"

**Figure 1:** Firm-specific wage premiums for workers with flexible contracts relative to permanent contracts.




**Notes:** This figure shows firm-specific wage premiums for workers with flexible contracts compared to permanent contracts. We estimate firm-specific wage premiums from a regressions such as Equation (1), and the take the average firm fixed effect by type of contract. "Agg" stands for aggregate effect. Flexible contracts are divided into three categories: on-call, temporary-agency, and fixed term and other.

Workers with flexible contracts receive lower wages on account of the contract type as shown in Table 1, but they could in addition receive lower wages if they tend to work at lower-paying firms. Focusing on the full hourly wage, we next consider how important a worker's flexible contract status is compared to unobserved firm-specific wage premiums, as estimated by firm fixed effects, in lowering the hourly wage. As seen in Figure 1, workers with flexible contracts on average work at firms with firm-specific wage premiums that imply a 5% lower full hourly wage. This effect is larger than the estimated 4.5% reduction in the wage stemming from the flexible contract per se. The figure similarly shows average firm-specific wage premiums that are relatively negative for workers with on-call and temporary-agency contracts. Overall, Figure 1 shows that workers with flexible contracts tend to work at lower-paying firms, with generally more negative effects on wages than stemming from the flexible contract per se.

# 4 Flexible Contracts in a Job Displacement Setting

In the literature on the job displacement effects on labor earnings, it is standard to estimate firm-specific wage premiums, and to calculate the change in firm-specific wage premiums for displaced workers relative to matched control workers (Lachowska et al., 2020). Leveraging this approach, we estimate the average change in firm-specific wage premiums separately for the groups of workers with ex post flexible and permanent contracts. This enables us to decompose the drops in wages experienced by displaced workers

with different contract types into parts due to the contract type per se and to changes in firm-specific wages premiums.

## 4.1 Construction of the Displaced Worker Sample

We denote the year prior to displacement by $d$. We construct a sample of displaced workers using four criteria. First, a displaced worker was employed by the same primary employer for at least three years (i.e., in years $d$, $d-1$, and $d-2$). Second, such a worker is separated from her primary employer in a year in which the employer experiences a mass layoff (i.e., between years $d$ and $d+1$). An employer is considered to have a mass layoff in year $d+1$, if employment drops by 30 percent or more compared to year $d$. We only consider establishments with at least 30 employees, as is standard in the literature. Third, to remain in the sample we require a displaced worker to have at least one year with positive earnings after displacement. Here we assume that a person is employed, if they have any positive labor earnings during the year. If the person is non-employed in a given year, we impute zero earnings for that particular year (see, for example, Bertheau et al., 2023). Fourth, we follow the literature in restricting our sample to workers aged 25-55. We do not require our displaced groups to have the same number of post-displacement years.[5] In the end, we analyze a sample $30,174$ displaced workers who are displaced in $2009-2017$, whose wages are observed in $2006-2018$.[6]

To match each displaced worker to one worker selected from the pool of potential control workers, we follow Schmieder et al. (2023) and Bertheau et al. (2023). We divide workers into cells defined by year and gender. Within each cell or exact match, we then implement propensity score matching via a probit model of the likelihood of being displaced. The model includes earnings observed in years $d-1$ and $d-2$, age, type of contract, tenure, industry, and employer size in year $d$. We then apply a $1:1$ nearest neighbor matching algorithm without replacement to assign one control worker to each displaced worker.

Our matching approach ensures that displaced workers and non-displaced workers are comparable before the mass layoff. However, they may still differ in many ways that could make it difficult to estimate the causal effect of displacement. Therefore, we additionally apply a data processing method called entropy balancing over the pre-displacement value of covariates.[7] Table A1 in the Appendix displays descriptive statistics of variables for the

[5] For instance, we observe five years after displacement for a worker displaced in 2014, but only one year for a worker displaced in 2018. In the Appendix, we show the distribution of the number of years that a worker is observed after job displacement (Figure A2).

[6] In the Appendix, we show the number of workers displaced by year (Figure A1).

[7] The goal of entropy balancing is to adjust the covariate distribution for the control group by reweight-

displaced group and the control group for both the unweighted and weighted sample. We observe that most variables are relatively balanced for the displaced and control group, especially when comparing the displaced and weighted control group.

## 4.2 Earnings Losses by Type of Contract

We estimate earnings losses resulting from job displacement as indicated by the full hourly wage for the overall sample of displaced workers and by the post-displacement type of contract. Displacement for different workers takes place at different times, with possibly different dynamic implications for wages depending on the displacement time. To be able to account for these varying effects, we adopt the Difference-in-Differences (DiD) approach developed by Borusyak et al. (2022).[8]

Table 2 shows the results. The top panel, labeled "Overall", displays the estimated effects for all displaced workers regardless of the subsequent contract type. The second and third panels present the results disaggregated by whether permanent or flexible contracts materialize. The "Average treatment effect" row reports the weighted average (by group, i.e. year, size) of all available group-time average treatment effects for two control samples: unweighted (baseline) and weighted. The 'Group-specific effects ($g$)" row summarizes average treatment effects by selected displacement years, indexed by $g$. The "Event study" row reports average treatment effects by the length of exposure to job displacement, indexed by $d$.

The "Overall" panel of Table 2 confirms that workers experience significant earnings losses from job displacement, with an estimated average treatment effect in the baseline sample of around 13%.[9] This finding aligns with those reported for other European countries (Bertheau et al., 2023).[10] The event study estimates imply a drop in earnings of about

ing or discarding units such that it becomes more similar to the covariate distribution for the treatment group (Hainmueller, 2012; Hainmueller and Xu, 2013). We find that this re-weighting does not materially affect our results, which is also observed by Flaaen et al. (2019).

[8]This method has three advantages over the standards dynamic two-way fixed effects (TWFE) regressions that are common in the job displacement literature: it allows for cleaner comparisons between treated and untreated units, it can provide more accurate estimates of treatment effects, and it calculates the overall effect of job displacement across all groups where groups are defined by the year of job displacement (Roth et al., 2022).

[9]However, there is considerable heterogeneity in these losses for different years of job displacement as indicated by the estimated group-specific effects. For instance, workers who lost their jobs in 2013 during the European crisis experienced earnings losses of approximately 25%, while those who lost their jobs in 2016 experienced only a 4% decrease in earnings. These results are largely consistent with Schmieder et al. (2023) who show that in the case of Germany losses in annual earnings after displacement are large, persistent, and highly cyclical, nearly doubling in size during downturns.

[10]Bertheau et al. (2023) investigate the consequences of job displacement on earnings for a range of

18% in the first year, followed by earnings losses that stay at around 10%. A partial recovery of earnings losses after displacement is also documented by (Lachowska et al., 2020).

The following two panels show that workers who enter into flexible contracts after displacement suffer relatively larger earnings losses. Specifically, workers with ex post flexible contracts experience an average earnings loss of around 15 percent, compared to 2 percent for workers with later permanent contracts. It is important to note that these numbers apply to workers who obtain either permanent or flexible contracts for the entire period under consideration, and who thus do not belong to the majority of workers who change contract types after job displacement. The particularly large earnings losses experienced by workers who enter into flexible controls can potentially be explained by them transitioning to lower-paying firms as we explore below.

## 4.3 Flexible Contracts and Firm-Specific Wage Premiums

We have shown that obtaining a flexible contract is a significant source of earnings losses for displaced workers, while in the literature the transition to worse-paying firms is the leading explanation of earnings losses after job displacement in European countries (Bertheau et al., 2023). This raises the question to what extent the lower wages received by workers who obtain flexible contracts can be explained by the fact that they move to worse-paying firms. In this section, we address this question, making use of estimated firm-specific wage premiums as derived from the AKM framework following Bertheau et al. (2023) and Lachowska et al. (2020).

Specifically, in Equation (1) the term $\psi_{J(i,t)}$ represents the firm fixed effects that can be interpreted as firm-specific wage premiums. After running the AKM regression, we calculate $\hat{\psi}_{J(i,t)}$ and we use $\hat{\psi}_{J(i,t)}$ as an outcome variable. This enables us to calculate the change in the firm-specific wage premiums for displaced workers relative to their matched control workers, $d$ years following displacement. Subsequently, we take the ratio of the average job displacement effect stemming from firm-specific wage premiums relative to the overall job displacement effect on the log of the full hourly wage, for all displaced workers and separately for those who obtain permanent and flexible contracts. This gives us a measure of the share of earning losses explained by changes in firm-specific wage

European countries. They find that displaced workers in Northern European countries experience around a 10% earnings loss in total earnings five years after displacement, whereas workers in Southern European countries experience a 30% loss. Our findings are in line with the former, as displaced workers in the Netherlands continue to experience a 10% loss in total earnings five years after displacement as shown in Table 2.

**Table 2:** Job displacement effects on earnings.

| | Unweighted | Weighted | | | |
|---|---|---|---|---|---|
| **Overall** | | | | | |
| Average treatment effect | -0.129 | -0.125 | | | |
| | (0.00346) | (0.00340) | | | |
| Group-specific effects ($g$) | 2010 | 2013 | 2016 | | |
| | -0.091 | -0.247 | -0.041 | | |
| | (0.00763) | (0.00797) | (0.00954) | | |
| Event study ($d$) | $d=1$ | $d=2$ | $d=3$ | $d=4$ | $d=5$ |
| | -0.176 | -0.131 | -0.108 | -0.111 | -0.102 |
| | (0.00301) | (0.00339) | (0.00412) | (0.00481) | (0.00560) |
| **Permanent contract** | | | | | |
| Average treatment effect | -0.021 | -0.017 | | | |
| | (0.00238) | (0.00231) | | | |
| Event study ($d$) | $d=1$ | $d=2$ | $d=3$ | $d=4$ | $d=5$ |
| | -0.003 | -0.023 | -0.020 | -0.034 | -0.0314 |
| | (0.00158) | (0.00238) | (0.00372) | (0.00481) | (0.00473) |
| **Flexible contract** | | | | | |
| Average treatment effect | -0.151 | -0.145 | | | |
| | (0.00501) | (0.00504) | | | |
| Event study ($d$) | $d=1$ | $d=2$ | $d=3$ | $d=4$ | $d=5$ |
| | -0.073 | -0.174 | -0.167 | -0.182 | -0.191 |
| | (0.00505) | (0.00580) | (0.00729) | (0.00919) | (0.00955) |
| Observations | 482,834 | | | | |

**Notes:** This table reports aggregated treatment effects parameters. We apply the approach of Borusyak et al. (2022) who report the aggregated treatment effects parameters using an imputation approach. We cluster at the worker level. The row "Average treatment effect" reports the weighted average (by group size) of all available group-time average treatment effects and two samples: unweighted and weighted (i.e., after entropy balancing). The row Group-specific effects ($g$) summarizes average treatment effects by the timing of the job displacement. $g$ indexes the year that a worker is first treated with job displacement. The row Event study reports average treatment effects by the length of exposure to the job displacement.

premiums for workers who obtain different contracts.

Column 1 of Table 3 presents the overall estimated earnings losses of job displacement for all workers, and for workers who receive permanent and flexible contracts (as in Table 2). Column 2 reports the associated estimated losses stemming from changes in firm-specific wage premiums, and Column 3 gives the shares of overall earnings losses explained by the firm-specific wage premiums. Considering the average loss over the 5 years after displacement for all workers in Panel A, we find that changes in firm-specific wage premiums explain 50% of overall earning losses, and hence are the leading explanation of these earnings losses. For workers with permanent contracts, we find that overall earning losses of 2.1% are less than those implied by the the changes in firm-specific wage premiums of

**Table 3:** Estimated earnings losses and firm-specific wage premium losses by type of contract.

| | Earnings (1) | | AKM fixed effects (2) | | Ratio (2)/(1) (3) |
|---|---|---|---|---|---|
| **PANEL A: AVERAGE LOSS** | | | | | |
| | -0.129 | (0.00346) | -0.065 | (0.00120) | 0.50 |
| By type of contract: | | | | | |
| Permanent | -0.021 | (0.00238) | -0.044 | (0.00119) | 2.01 |
| Flexible | -0.151 | (0.00509) | -0.123 | (0.00227) | 0.81 |
| **PANEL B: LOSS 5 YEARS AFTER JOB DISPLACEMENT** | | | | | |
| | -0.102 | (0.00561) | -0.062 | (0.00178) | 0.61 |
| By type of contract: | | | | | |
| Permanent | -0.031 | (0.00473) | -0.037 | (0.00177) | 1.19 |
| Flexible | -0.191 | (0.00955) | -0.157 | (0.00445) | 0.82 |
| Observations 482,834 | | | | | |

**Notes:** This table reports estimates of the event study model in Borusyak et al. (2022). Column 1 reports results as in Table 3. Column 2 reports results based on AKM employer fixed effects. AKM stands for a regression such as Equation (1) associated with Abowd et al. (1999). Column 3 reports the share of losses in earnings due to losses in firm-specific wage premiums. We cluster at the worker level in all panels.

4.4%. This could reflect that workers who obtain permanent contracts can negotiate relatively high wages in their new firms on the basis of their previously even higher wages. In contrast, workers who receive flexible contracts experience overall average earnings losses of 15.1%, while changes in firm-specific wage premiums can explain an average wage reduction of 12.3%. Thus, the lower wages for workers who receive flexible contracts mainly reflect lower firm-specific wage premiums, rather than the move to a flexible contract per se. We obtain similar results when we analyze earnings losses five years after displacement in Panel B. Overall, our finding that wage reductions after displacement primarily reflect lower firm-specific wages premiums is in line with the literature, although we find evidence of an independent negative effect for a move to a flexible contract.

# 5 Concluding remarks

In this paper, we have used comprehensive administrative data for the Netherlands to investigate the labor income effects of flexible labor contracts in two different settings: wage determination as modelled in the AKM approach, and an analysis of earnings losses following job displacement. In both settings, we find that flexible contracts lead to lower wages, but that workers with flexible contracts primarily earn less because they work or start to work at lower paying firms. This implies that the negative effect of flexible contracts on wage income is overstated, if firm-specific pay differentials are not taken into account. This is an important insight for any policy discussion of the pros and cons of flexible contracts.

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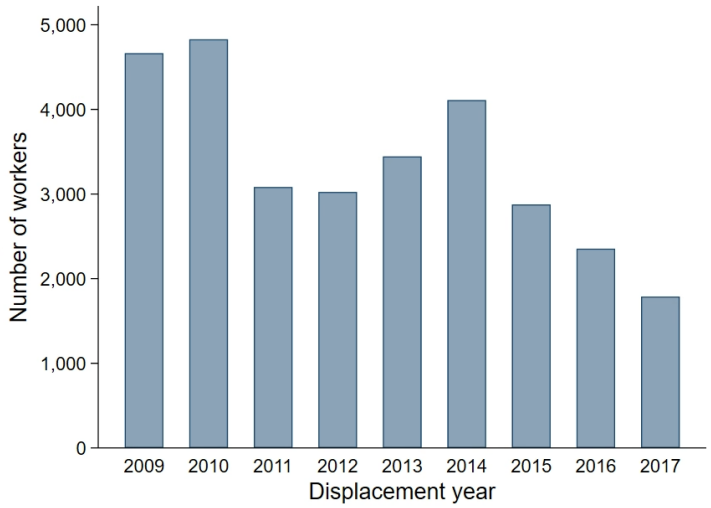
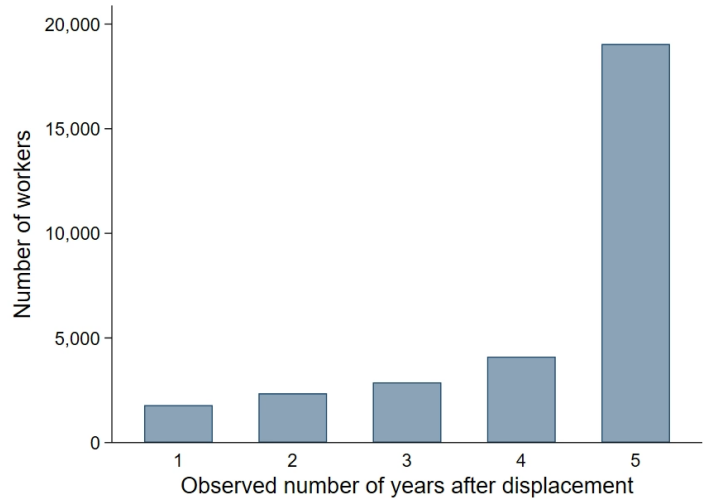
# ONLINE APPENDIX

**Figure A1:** Distribution of displaced workers by year.



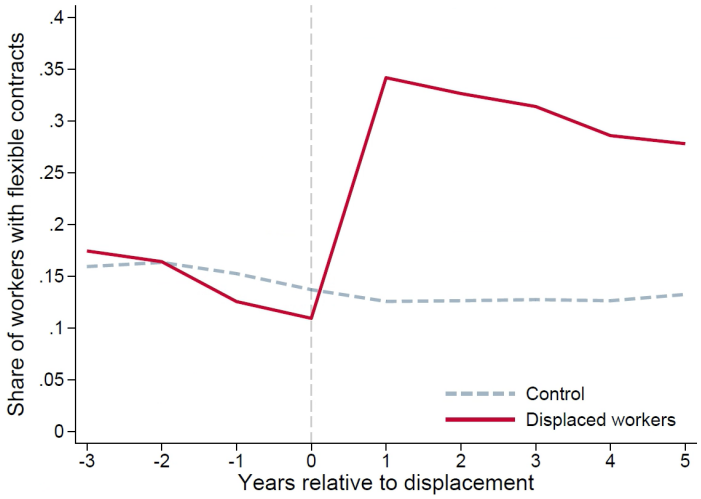

**Notes:** This figure shows the number of displaced workers by displacement year. The total number of displaced workers is 30,174.

**Figure A2:** Distribution of the number of years that a worker is observed after job displacement.



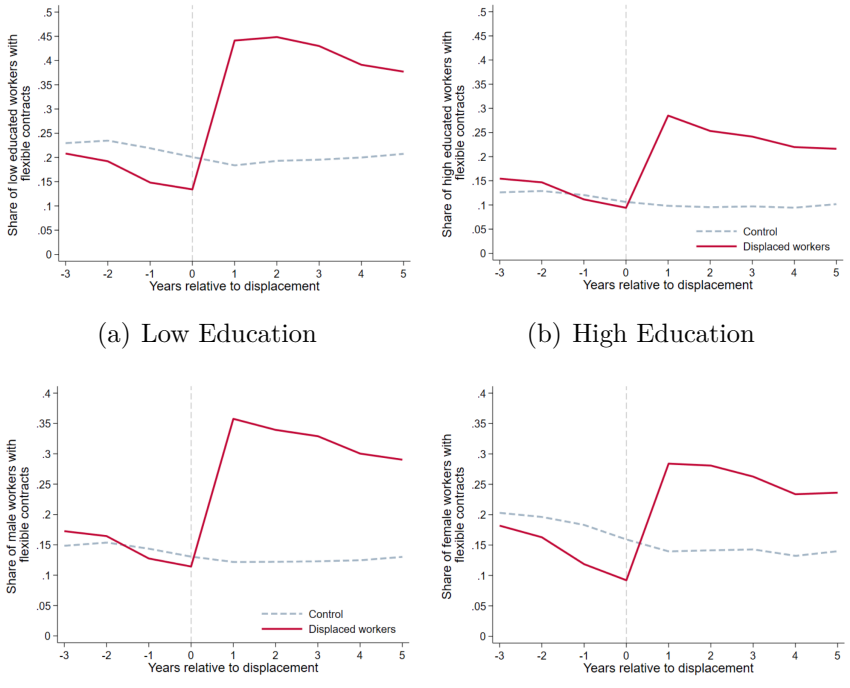

**Notes:** This figure shows the number of displaced workers by observed year after job displacement. The total number of displaced workers is 30,174.

**Figure A4:** Share of workers with flexible contracts before and after job displacement.




**Notes:** This figure shows the share of workers with flexible contracts before and after job displacement. The vertical line denotes the last year before displacement, i.e., year $d-1$.

**Figure A3:** Share of workers with flexible contracts after job displacement by education level and gender.




(a) Low Education

(b) High Education

(c) Male

(d) Female

**Notes:** This figure shows the share of workers with flexible contracts before and after job displacement. Panel (a) includes workers with low education, i.e., less than a Bachelor's degree. Panel (b) includes workers with at least a Bachelor's degree. Panel (c) includes male workers. Panel (d) includes female workers. The vertical line denotes the last year before displacement, i.e., year $d-1$.

**Table A1:** Descriptive statistics of displaced workers and control workers before displacement.

| | Displaced Group | | Control Group | | | |
|---|---|---|---|---|---|---|
| | | | Unweighted | | Weighted | |
| | Mean | SD | Mean | SD | Mean | SD |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Permanent contacts | 0.84 | [0.33] | 0.81 | [0.34] | 0.84 | [0.31] |
| Flexible contracts: | | | | | | |
| -On-call | 0.01 | [0.09] | 0.02 | [0.13] | 0.01 | [0.09] |
| -Temporary-agency | 0.02 | [0.14] | 0.02 | [0.12] | 0.02 | [0.12] |
| -Fixed term and other | 0.13 | [0.29] | 0.15 | [0.29] | 0.13 | [0.27] |
| Fixed hourly wage (Euro) | 18.07 | [8.84] | 18.06 | [9.50] | 18.06 | [8.92] |
| Full hourly wage (Euro) | 20.77 | [11.98] | 20.75 | [13.65] | 20.73 | [12.33] |
| Age | 40.12 | [7.64] | 40.06 | [7.97] | 40.12 | [7.93] |
| Male worker | 0.53 | [0.50] | 0.53 | [0.50] | 0.53 | [0.50] |
| Low education | 0.54 | [0.49] | 0.55 | [0.49] | 0.54 | [0.54] |
| High education | 0.45 | [0.49] | 0.45 | [0.49] | 0.45 | [0.45] |
| Yearly gross wage ($\times 1,000$): | | | | | | |
| -Permanent worker | 37.42 | [24.74] | 37.71 | [29.81] | 37.42 | [26.95] |
| -Flexible worker | 29.04 | [18.14] | 28.05 | [19.70] | 28.23 | [19.12] |
| (difference) | (8.38) | | (9.66) | | (9.19) | |
| Number of workers | 30,174 | | 30,174 | | 30,174 | |

**Notes:** This table shows descriptive statistics for displaced and control workers before displacement. We report the mean and standard deviation (SD). We consider unweighted and weighted control groups. The weighted control group results from an adjustment of the covariate distribution of the unweighted control group data by reweighting or discarding units such that it becomes more similar to the covariate distribution in the treatment group of displaced workers (8; 9). Flexible contracts can be divided into three categories: on-call contracts, temporary-agency contracts, and fixed term and other contracts. On-call contracts are arrangements in which workers do not have any guaranteed hours of work. Temporary-agency contracts are arrangements where the worker is employed by the agency but temporarily subcontracted to a client's firm. Fixed term and other contracts include all others flexible contracts, but this category is mainly composed of arrangements that depend on the duration of a project or imply a temporary replacement. Fixed hourly wage is the basic wage divided by basic hours. Full hourly wage is the gross wage divided by paid hours (basic hours plus paid overtime hours). Age is worker age. Male worker is a dummy denoting a male worker. Low education denotes primary education, practical education, VMBO (preparatory secondary vocational education), MBO (middle level applied education), VWO (pre-university secondary education), or HAVO (higher general secondary education) as the highest education obtained. High education denotes completion of a Bachelor's degree, a Master's degree, or a PhD as the highest degree. Education is missing for about 35% of the workers. Volatility of worked hour is the standard deviation of worked hours within a year.

**Table A2:** Variance decomposition of the wage over the period 2006-2018.

| | (1) | (2) |
|---|---|---|
| **Total variance** | | |
| $Var(y)$ | 0.193 | |
| **Components of the variance** | | |
| | | % |
| $Var(WFE)$ | 0.126 | 65 |
| $Var(FFE)$ | 0.016 | 8 |
| $Var(ContractType)$ | 0.001 | 1 |
| $Var(Xb)$ | 0.013 | 7 |
| $Var(residual)$ | 0.020 | 11 |
| $2 * Cov(WFE, FFE)$ | 0.011 | 6 |
| $2 * Cov(WFE, ContractType)$ | -0.002 | 1 |
| $2 * Cov(FFE, ContractType)$ | -0.001 | 0 |
| Rest of Covariances | 0.001 | 1 |
| | | 100 |
| *Observations* (N× T) | 53,781,869 | |

**Notes:** This table shows the variance decomposition of the full hourly wage. In particular, we implement $Var(y) = Var(WFE)+Var(FFE)+Var(ContractType)+Var(Xb)+Var(residual)+2*Cov(WFE, FFE)+2 * Cov(WFE, ContracType) + 2 * Cov(FFE, ContracType) + Rest$ for the main regression sample. $Var(y)$ stands for the variance of the log of the full hourly wage. $Var(WFE)$ stands for the variance of worker fixed effects. $Var(FFE)$ stands for the variance of firm fixed effects. $Var(ContractType)$ stands for the variance of contract type fixed effects. $Var(Xb)$ stands for the variance of another covariates. $Var(residual)$ stands for the variance of residuals. $Cov(WFE, FFE)$ stands for the covariance between worker and firm fixed effects. $Cov(WFE, ContractType)$ stands for the covariance between worker fixed effects and contract type fixed effects. $Cov(FFE, ContractType)$ stands for the covariance between firm fixed effects and contract type fixed effects. *Rest* stands for the covariance of the rest of covariates. Sample includes only observations in the largest connected set.