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

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April 20, 2026

Abstract

We use matched employer–employee administrative data for the Netherlands to study the labor market effects of flexible employment contracts. Using an Abowd–Kramarz–Margolis (AKM) framework, we show that flexible contracts are associated with lower wages, a greater volatility of worked hours, and a higher probability of unemployment in the following year. However, our findings indicate that the disadvantages associated with flexible contracts arise not only from the contractual arrangement itself, but also from the types of firms in which flexible workers are employed. Specifically, workers on flexible contracts are disproportionately employed at lower-paying firms with lower firm-specific wage premiums. Furthermore, we find that flexible workers benefit less from employment at more profitable, larger, and financially safer firms, and that local labor market concentration amplifies their wage disadvantage. Overall, our findings imply that the negative effect of flexible contracts on wages may be overstated if the types of firms at which flexible workers are employed are not taken into account.

Keywords: flexible contracts, alternative work arrangements, firm-specific wage premiums, labor market

JEL Codes: E32, J22, J31, J41, J63, R23

*This paper utilizes confidential administrative data from Statistics Netherlands (CBS). The views expressed here are solely those of the authors and do not necessarily reflect the views of the Central Bank of Chile.

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1 Introduction

In contemporary labor markets, the growing prevalence of flexible employment contracts—such as temporary, part-time, and agency work—has become a central concern for policymakers, particularly in Western European countries such as the Netherlands, Belgium, and Germany. These non-standard contractual forms are often associated with labor market segmentation and heightened income volatility, raising concerns about job quality, long-term career progression, and access to social protection systems (OECD, 2019). In the Netherlands, for instance, nearly one third of the workforce is employed under flexible arrangements, prompting policy debates on the sustainability and fairness of this "flexibilization" trend.[1] Similarly, in Belgium and Germany, researchers have found the emergence of a dual labor market structure—where core workers benefit from stable contracts while peripheral workers face precarious employment and limited access to training or advancement (Eurofound, 2023).

To protect workers, in 2020 the Netherlands enacted the Balanced Labor Market Act (WAB), which, among other measures, mandates more equal pay for flexible workers compared to their permanent counterparts. 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 partially reflects that such workers are employed by worse-paying firms. Thus, the flexible contracts themselves can only explain part of the observed wage gap.

Applying the model of Abowd et al. (1999) (AKM) that 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 of 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). More specifically, our empirical results show that the wage penalty associated with flexible contracts is economically meaningful, as in our baseline AKM specification a flexible contract is associated with a 4.4% lower fixed hourly wage and a 5.3% lower full hourly wage including variable pay. Flexible work

[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.

is also associated with materially weaker employment stability: the volatility of worked hours rises by 70% compared to its mean, and the probability of unemployment in the following year rises by 2.4 percentage points. These adverse effects are present across all major forms of flexible work, with temporary-agency and on-call contracts displaying especially strong links to unstable hours and subsequent unemployment. Thus, flexible contracts are associated not only with lower pay, but also with a broader deterioration in labor market security.

The AKM model not only allows us to estimate a direct wage effect of being on a flexible contract, but also whether flexible workers are disadvantaged because they work at firms that pay lower wage premiums as estimated within the AKM framework. Indeed, we find that this is the case, as the average firm-specific wage premium is roughly 0.05 log points lower for workers on flexible contracts. When we allow firms to have different wage premia for permanent and flexible workers, the direct flexible contract penalty declines by about one third, from 4.4% to 3.1% for the fixed hourly wage and from 5.3% to 3.7% for the full hourly wage. These results confirm that workers on flexible contracts tend to earn less because they work at firms that systematically pay less.

We further show that the wage penalty for flexible workers cannot be explained fully by observable firm characteristics. In fact, controlling for firm profitability, size, and financial stability leaves the estimated flexible contract penalty virtually unchanged. Additional interaction results indicate that flexible workers benefit less than permanent workers from employment at more profitable, larger, and financially safer firms. Finally, we provide evidence that local labor market concentration amplifies the wage penalty of flexible work. In more concentrated local labor markets, the interaction between flexible contract status and concentration is negative and highly significant for both the fixed and full hourly wage, and these results remain robust once firm-level controls are added. This suggests that monopsony power in the labor market is an additional mechanism through which flexible workers are disadvantaged.

Overall, our findings imply that the negative effect of flexible contracts on wage income may be overstated if firm-specific pay differentials are ignored, and they point to a broader policy lesson: reducing inequality between permanent and flexible workers may require not only equal-pay provisions within firms, but also better access of flexible workers to higher-paying firms and less concentrated local labor markets.

2 Data

We obtain wage income and contract information for the entire Dutch labor market from SPOLIS, which is an administrative dataset. 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 or 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).

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 additionally 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 include demographic information on age and gender, restricting our sample to workers between the ages of 25 and 55. The resulting dataset has $67,743,426$ worker-year observations covering the years $2006-2019$. We complement this dataset with firm-level information on profits per worker, assets, and the z-score as a measure of firm financial stability for a subsample of firms.

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

Table 1: Descriptive statistics for the regression sample

	Observations	Mean	SD	p1th	p50th	p99th
Hourly fixed wage	67,743,426	18.86	11.77	7.78	16.59	56.75
Hourly full wage	67,743,426	21.52	16.83	8.29	18.68	68.45
Age	67,743,426	40.31	8.81	25.00	41.00	55.00
Gender	67,743,426	0.53	0.50	0.00	1.00	1.00
Vol. worked hours	67,743,426	0.21	0.26	0.00	0.13	1.11
Unemployment	59,011,968	0.06	0.24	0.00	0.00	1.00
HHI_{LLM}	67,743,426	0.24	0.24	0.01	0.15	1.00
Share:						
Flexible contracts	67,743,426	0.25	0.43	0.00	0.00	1.00
On-call	67,743,426	0.02	0.15	0.00	0.00	1.00
Temporary-agency	67,743,426	0.04	0.20	0.00	0.00	1.00
Fixed term and other	67,743,426	0.18	0.39	0.00	0.00	1.00
Subsample with firm data						
-Profits per worker ($\times$ 1,000)	39,151,908	0.02	0.07	-0.11	0.00	0.50
-Log assets	39,151,908	10.17	3.20	4.11	9.54	16.96
-Z-score	39,151,908	0.09	0.12	-0.11	0.06	0.62
Total observations (N)	67,743,426					

Notes: This table shows descriptive statistics for the main regression sample. The volatility of worked hours is defined as the standard deviation of monthly worked hours within a year. HHI_{LLM} is the employer concentration within each local labor market using the Herfindahl-Hirschman Index (HHI) of employment. Firm-level variables (profits per worker, log assets, z-score) are only available for some firms, resulting in lower observation counts. The z-score is constructed as the sum of the equity-to-assets ratio and the rate of return on assets (ROA) divided by the standard deviation of the ROA and it measures how unlikely it is that a firm will become insolvent.

Table 1 reports summary statistics for the main regression sample. The average hourly fixed wage is 18.9 euros, while the average full hourly wage is 21.5 euros, reflecting the importance of variable compensation. The average worker is 40 years old, and slightly more than half of workers are female. The data also indicate substantial labor market instability. The average volatility of worked hours is 0.21, and about 6% of workers are unemployed in the following year. Flexible contracts account for one quarter of all employment relationships, with most of them concentrated in fixed-term and related contracts (18%), followed by temporary-agency (4%) and on-call contracts (2%). For the subsample with firm-level financial data, firms exhibit substantial heterogeneity in profits per worker, size, and financial stability. Overall, our sample displays meaningful variation in wages, employment stability, contractual flexibility, and firm characteristics, providing a relevant setting to study the wage implications of flexible contracts.

3 Labor Market Consequences of Flexible Contracts

3.1 Baseline Empirical Specification

In the empirical analysis, we examine how flexible contracts affect wages and job security. To allow for unobserved worker and firm heterogeneity, we use the modeling approach of Abowd et al. (1999) (AKM) as follows

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

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 - with the latter two of the outcomes measuring job insecurity. $Q_{i,t}^{Flex}$ is either a dummy variable for a flexible contract or a categorical variable for the three types of flexible contracts (on-call contracts, temporary-agency contracts, and fixed-term and other contracts). $\boldsymbol{X}$ includes a polynomial term in age (normalized to 40 years old), gender-age fixed effects, and industry-year fixed effects. In addition, α_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 λ_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.[3] In Appendix B, we provide a detailed discussion of the assumptions underlying the AKM framework, and we show that key assumptions on worker mobility patterns and sorting are satisfied in our dataset. Importantly, the AKM framework allows for particular patterns of workers matching to firms. For example, it allows for the possibility that high-skilled workers are more likely to transition to high-wage firms (see Card et al. (2013)). As a result, high-skilled workers (with larger worker fixed effects) are likely to be matched with high-wage firms (with more positive firm fixed effects).

However, there are three scenarios in which the assumptions of exogenous mobility in

[3]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."

the AKM framework may be violated. First, there could be a link between firm-wide shocks and mobility if workers disproportionately leave negatively shocked firms and join positively shocked firms. Second, there is potential selection based on idiosyncratic match effects, which would generate asymmetric wage changes for movers (e.g., gains for moves aligned with comparative advantage and losses for misaligned moves), contradicting the approximate symmetry implied by exogenous mobility. Third, there can be a correlation between the direction of mobility and transitory wage shocks, if promotions or stalls in wage trajectories induce moves that create differential pre-trends between movers to high- versus low-wage firms. In Appendix B, we examine each of these scenarios and do not find evidence consistent with any of these concerns in our data.

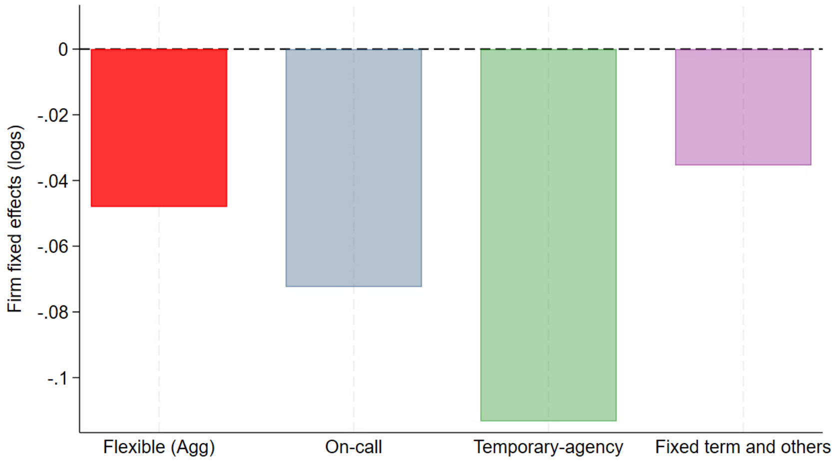
3.2 Baseline Results

Table 2 presents our baseline estimates of the relationship between flexible contracts and labor market outcomes. Panel A reports the AKM estimates based on Equation (1), which controls for worker fixed effects, firm fixed effects, year fixed effects, and a rich set of observable worker characteristics. Across all specifications, flexible contracts are associated with worse labor market outcomes relative to permanent contracts.

Columns (1) and (2) show that workers on flexible contracts earn significantly lower hourly wages. Specifically, a flexible contract is associated with a 4.4% lower fixed hourly wage and a 5.3% lower full hourly wage. The larger effect for the full hourly wage indicates that the wage disadvantage of flexible workers extends beyond base pay and also applies to variable compensation such as overtime payments and bonuses. When we disaggregate flexible contracts into their main subcategories, all three types are associated with significantly lower wages than permanent contracts. For the fixed hourly wage, the estimated wage penalties are 3.5% for on-call contracts, 4.0% for temporary-agency contracts, and 4.5% for fixed-term and other contracts. For the full hourly wage, the corresponding effects are 4.1%, 5.1%, and 5.4%, respectively. Thus, while all flexible arrangements are associated with lower pay, the wage penalty is largest for temporary-agency contracts and fixed-term and other contracts for either wage measure.

Columns (3) and (4) show that flexible contracts are also associated with substantially greater employment insecurity. In Column (3), the coefficient on the flexible contract indicator implies an increase of 0.150 in the volatility of worked hours, which is a 70% increase compared to the mean. This is an economically large effect. The disaggregated estimates further indicate marked heterogeneity across contract types. On-call contracts are associated with a 0.191 increase in the volatility of worked hours, temporary-agency

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 regression such as Equation (1), and then take the average firm fixed effect by type of contract (logs). "Agg" stands for aggregate effect. Flexible contracts are divided into three categories: on-call, temporary-agency, and fixed term and others.

contracts with a 0.235 increase, and fixed-term and other contracts with a 0.144 increase. Hence, on-call and temporary-agency arrangements appear particularly strongly linked to unstable work schedules.

Column (4) shows that flexible contracts are also associated with a significantly higher likelihood of unemployment in the following year. The aggregate estimate implies a 2.41 percentage point increase in next-year unemployment risk. This adverse effect is again present across all flexible contract categories. Relative to permanent workers, on-call contracts are associated with a 6.8 percentage point higher probability of unemployment in the following year, temporary-agency contracts with a 4.3 percentage point higher probability, and fixed-term and other contracts with a 2.0 percentage point higher probability. These results reinforce the notion that flexible contracts are not only associated with lower wages, but also with materially weaker job security.

In our benchmark AKM specification in Panel A, firm fixed effects absorb persistent wage differences across employers. As a result, the coefficient on $Q_{i,t}^{Flex}$ is identified from within-firm variation, after controlling for worker fixed effects and other observables. It therefore captures the wage penalty associated with a flexible contract conditional on the employer. We next ask whether in addition flexible workers experience lower wages because they tend to be employed at lower-paying firms. Figure 1 provides a first indication that the wage

Table 2: Flexible contracts and labor market outcomes

	Log fixed hourly wage (1)	Log full hourly wage (2)	Vol. worked hours (3)	Unempl. (4)
PANEL A: AKM REGRESSION				
Flexible contract	-0.0440***	-0.0530***	0.150***	0.0241***
	(0.000156)	(0.000169)	(0.000219)	(0.000232)
Disaggregated				
-On-call	-0.0350***	-0.0411***	0.191***	0.0680***
	(0.000374)	(0.000390)	(0.000436)	(0.000620)
-Temporary-agency	-0.0402***	-0.0514***	0.235***	0.0431***
	(0.000516)	(0.000543)	(0.000647)	(0.000877)
-Fixed term and other	-0.0449***	-0.0541***	0.144***	0.0201***
	(0.000159)	(0.000171)	(0.000220)	(0.000232)
PANEL B: AKM WITHOUT FIRM FIXED EFFECTS				
Flexible contract	-0.0459***	-0.0555***	0.156***	0.0316***
	(0.000154)	(0.000167)	(0.000217)	(0.000233)
$\Delta\%$: Panel B vs Panel A	4%	5%	4%	31%
Observations	67,743,426	67,743,426	67,743,426	59,011,968

Notes: This table indicates how labor market outcomes vary with contract type. In Panel A, we run the following AKM regression: $W_{i,t} = \phi Q^{Flex}_{i,t} + \boldsymbol{X}\boldsymbol{\beta} + \alpha_i + \psi_{J(i,t)} + \lambda_t + \epsilon_{i,t}$ 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. $Q^{Flex}_{i,t}$ 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), gender-age fixed effects, and industry-year fixed effects. α_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. λ_t are year fixed effects. Finally, $\epsilon_{i,t}$ is the error term. In Panel B, we estimate the same specification but exclude the firm fixed effects ($\psi_{J(i,t)}$). Panel B also reports the absolute percentage change ($\Delta\%$) in the flexible contract coefficient relative to Panel A. Standard errors are clustered at the worker level and reported in parentheses.

disadvantage of workers on flexible contracts in part reflects the firms at which they are employed. The figure plots the average estimated firm fixed effect by contract type, based on the benchmark AKM specification. Workers on flexible contracts are employed, on average, at firms with substantially lower wage premia than workers on permanent contracts. For the aggregate flexible contract category, the average firm effect gap is about 0.05 log points in terms of the full hourly wage. This difference is economically large, and in fact slightly larger than the direct fixed wage penalty of a flexible contract estimated in the benchmark AKM regression. The pattern is even more pronounced for some subcategories of flexible work: temporary-agency workers are employed at firms with the lowest average wage premia, followed by on-call workers, while the gap for fixed-term and other contracts is smaller but still clearly negative. Overall, Figure 1 suggests that an important part of the lower wages observed among flexible workers reflects where they work, rather than only the contractual arrangement itself.

As an alternative to the AKM model, we can estimate Equation (1) but without the firm fixed effects. The estimate of ϕ in this model without firm fixed effects, labeled $\phi^{\text{No FE}}$, then reflects a direct effect of a flexible contract on the wage as well as a sorting effect stemming from flexible workers being employed at firms with on average lower firm fixed effects. The difference in the estimated coefficients on flexible contracts in the model without firm fixed effects and the AKM model with firm fixed effects, i.e. $\phi^{\text{No FE}} - \phi^{\text{FE}}$, can be interpreted as a measure of the contribution of the sorting effect to the overall wage disadvantage of flexible work. By the Frisch–Waugh–Lovell theorem, this difference between the two coefficients can be written as

$$\phi^{\text{No FE}} - \phi^{\text{FE}} = \frac{\text{Cov}(\tilde{Q}^{Flex}_{i,t}, \tilde{\psi}_{J(i,t)})}{\text{Var}(\tilde{Q}^{Flex}_{i,t})}. \tag{2}$$

where $\tilde{Z}_{i,t}$ denotes the residual from projecting any variable $Z_{i,t}$ on the set $C_{i,t}$ of all controls other than firm fixed effects. Equation (2) shows that omitting firm fixed effects introduces a term reflecting the covariance between flexible contract status and employer specific outcome components. The interpretation is straightforward: if flexible workers are disproportionately employed at firms with lower wage premia, then the covariance term is negative and the estimated flexible contract coefficient becomes more negative when firm fixed effects are omitted. For regressions that estimate the impact of flexible contract status on undesirable outcomes such as the volatility of worked hours and next-year unemployment, the logic is analogous but the sign reverses: if flexible workers are disproportionately employed at firms with higher employer-specific volatility of hours or unemployment risk, then the covariance term is positive and the estimated coefficient in the model without firm fixed effects becomes more positive.

Panel B of Table 2 provides the results of re-estimating the benchmark specifications without firm fixed effects, and it compares estimated coefficients in the two models. For wages and the volatility of worked hours, the resulting coefficients are only modestly larger in absolute value: the estimated flexible contract penalty rises from 4.4% to 4.6% for the fixed hourly wage, from 5.3% to 5.6% for the full hourly wage, and from 0.150 to 0.156 for the volatility of worked hours. By contrast, the difference is much larger for unemployment, where the coefficient rises from 0.0241 to 0.0316, corresponding to a 31% increase relative to the benchmark specification. This comparison confirms that part of the disadvantage associated with flexible contracts reflects sorting into firms with systematically less favorable labor market outcomes, a mechanism that appears especially important for unemployment risk.

Overall, Table 2 shows that flexible contracts are robustly associated with lower wages, greater instability of hours worked, and a higher probability of subsequent unemployment. This is consistent with the broader interpretation of our paper: workers on flexible contracts earn materially less, but an important part of this disadvantage reflects the firms at which they work rather than the contract type alone.[4]

3.3 Firm Fixed Effects by Contract Type

The analysis in the previous subsection revealed that part of the wage penalty associated with flexible contracts reflects sorting of flexible workers into lower-paying firms. However, even within the same firm, employers may pay flexible contract workers a lower wage premium than permanent workers. In other words, firms may differentiate compensation across contract types, beyond differences in average pay across employers.

To examine this, we follow Drenik et al. (2023) and extend the standard AKM specification in Equation (1) to allow firm effects to differ by contract type. In particular, we estimate

$$W_{i,t} = \phi\, Q_{i,t}^{Flex} + \psi_{J(i,t)}^{P}\left(1 - Q_{i,t}^{Flex}\right) + \psi_{J(i,t)}^{F} Q_{i,t}^{Flex} + \mathbf{X}\boldsymbol{\beta} + \alpha_i + \lambda_t + \varepsilon_{i,t}, \tag{3}$$

where $\psi_{J(i,t)}^{P}$ denotes the firm wage premium paid to permanent workers at firm $J(i,t)$, while $\psi_{J(i,t)}^{F}$ denotes the firm wage premium paid to flexible workers at the same firm. Thus, each firm is allowed to have two distinct wage premia, one for each contract type. Identification of these parameters follows the same logic as in the standard AKM framework. The contract-specific firm effects ψ_j^P and ψ_j^F are identified from wage variation among workers linked through mobility across these firm-contract type cells. In practice, this requires a connected set in the worker–firm-contract network.

Regarding the standard errors associated with $\hat{\phi}$, these cannot be estimated analytically,

[4]Importantly, the relatively small difference between $\hat{\phi}^{\text{No FE}}$ and $\hat{\phi}^{\text{FE}}$ in the wage regressions does not mean that firm effects are unimportant for the wage gaps in the data. Figure 1 already shows that flexible workers are employed, on average, at lower-paying firms, and that the associated wage differences are large. The reason why Panels A and B show only a modest difference is that they measure a different object. The comparison between Panels A and B is based on a partial regression coefficient, so it captures only the part of firm sorting that remains associated with flexible contract status after controlling for worker fixed effects and other observables. By contrast, Figure 1 reports average differences in estimated firm effects across contract groups. For this reason, a large firm premium gap in Figure 1 can coexist with only a small difference between $\hat{\phi}^{\text{No FE}}$ and $\hat{\phi}^{\text{FE}}$. We therefore interpret the comparison between Panels A and B as suggestive reduced form evidence on sorting, while Figure 1 and the decomposition below provide more direct evidence on the role of lower-paying firms.

as such errors are not directly identified within the high-dimensional fixed effect framework as in Correia (2016). Instead, we obtain standard errors via a clustered bootstrap procedure with $R = 50$ replications. In each bootstrap iteration, we resample with replacement at the firm level to preserve the connected set of firms, re-estimate Equation (3), and calculate the parameters of interest. The reported standard errors correspond to the empirical standard deviation of these estimates across all bootstrap draws.

Panel A of Table 3 repeats the benchmark AKM estimates from Table 2, while Panel B extends the model by allowing firms to have different fixed effects for permanent and flexible workers. Once contract-type specific firm fixed effects are introduced, the estimated direct effect of a flexible contract falls substantially across all outcomes. Regarding hourly wages, the flexible contract coefficient declines from -0.0440 to -0.0310 for the fixed hourly wage and from -0.0530 to -0.0367 for the full hourly wage. Thus, allowing firm premia to differ by contract type reduces the estimated wage penalty by roughly one third. A similar attenuation arises for the non-wage outcomes: the effect on the volatility of worked hours falls from 0.150 to 0.101, and the effect on next-year unemployment declines from 0.0241 to 0.0151. These results indicate that part of the disadvantage associated with flexible contracts reflects firm-specific pay and employment policies that are not captured when firms are assumed to have common pay and employment policies across contract types.

The analysis so far shows that the wage disadvantage of flexible-contract workers may arise through two distinct channels. First, even within the same firm, they may receive a lower firm-specific wage premium than permanent workers. Second, flexible workers may be disproportionately employed at lower-paying firms. We next quantify the relative importance of these two mechanisms for the overall firm effect gap between flexible and permanent workers.

To do so, we follow Card et al. (2016) and decompose the difference in average firm effects between flexible and permanent workers as follows:

$$\begin{aligned} E[\psi^F_{J(i,t)} \mid \text{Flex}] - E[\psi^P_{J(i,t)} \mid \text{Perm}] \\ = \underbrace{E[\psi^F_{J(i,t)} - \psi^P_{J(i,t)} \mid \text{Perm}]}_{\text{Within-firm contract premium}} + \underbrace{E[\psi^F_{J(i,t)} \mid \text{Flex}] - E[\psi^F_{J(i,t)} \mid \text{Perm}]}_{\text{Sorting across firms}}. \end{aligned} \tag{4}$$

The first term on the right captures within-firm differences in firm wage premia across contract types, that is, the average premium associated with a flexible contract relative to a permanent contract within the same employer. The second term captures sorting

Table 3: Flexible contracts and contract-type firm fixed effects

	Log fixed hourly wage (1)	Log full hourly wage (2)	Vol. worked hours (3)	Unempl. (4)
PANEL A: AKM REGRESSION				
Flexible contract ($\hat{\phi}_A$)	-0.0440***	-0.0530***	0.150***	0.0241***
	(0.000156)	(0.000169)	(0.000219)	(0.000232)
PANEL B: AKM WITH CONTRACT-TYPE FIRM FIXED EFFECTS				
Flexible contract ($\hat{\phi}_B$)	-0.0310***	-0.0367***	0.101***	0.0151***
	(0.000178)	(0.000210)	(0.000196)	(0.000284)
$100 \times [(\hat{\phi}_A - \hat{\phi}_B)/\hat{\phi}_A]$	34%	33%	38%	35%
Total gap: $E[\psi_J^F \mid \text{Flex}] - E[\psi_J^P \mid \text{Perm}]$	-0.037	-0.048	0.089	0.027
Decomposition:				
-Within-firm contract premium $E[\psi_J^F - \psi_J^P \mid \text{Perm}]$	-0.025	-0.027	0.050	0.011
-Sorting across firms $E[\psi_J^F \mid \text{Flex}] - E[\psi_J^F \mid \text{Perm}]$	-0.013	-0.021	0.039	0.017
Share explained by sorting	34%	43%	44%	61%
Observations	67,743,426	67,743,426	67,743,426	59,011,968

Notes: This table shows how labor market outcomes change with contract-type firm fixed effects. In Panel A, we run the following AKM 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 a dummy variable for having a flexible contract. $\boldsymbol{X}$ includes a polynomial term on age (normalized to 40 years old), gender-age fixed effects, and industry-year fixed effects. α_i are worker fixed effects, $\psi_{J(i,t)}$ are firm fixed effects, and λ_t are year fixed effects. In Panel B, we estimate an AKM model allowing for contract-type specific firm fixed effects (ψ_J^F for flexible and ψ_J^P for permanent contracts). We decompose the total firm effect gap $E[\psi_J^F \mid \text{Flex}] - E[\psi_J^P \mid \text{Perm}]$ into a within-firm contract premium ($E[\psi_J^F - \psi_J^P \mid \text{Perm}]$) and a sorting component ($E[\psi_J^F \mid \text{Flex}] - E[\psi_J^F \mid \text{Perm}]$). In Panel A, standard errors are clustered at the worker level and reported in parentheses. For the decompositions in Panel B, we report bootstrapped standard errors based on $R = 50$ replications. In each iteration, we resample with replacement at the firm level (to preserve the connected set), re-estimate the AKM model, and calculate the resulting parameter $\hat{\phi}_B$. The reported standard errors correspond to the standard deviation of these estimates across all bootstrap draws.

across firms, namely whether flexible workers are disproportionately employed at firms with lower firm effects. This decomposition allows us to quantify whether the firm effect gap between flexible and permanent workers mainly reflects differences in pay-setting within firms or the sorting of flexible workers into lower-paying employers.

The decomposition that we provide in Panel B of Table 3 clarifies the sources of the overall firm effect gap between flexible and permanent workers. For the full hourly wage, the total gap in firm effects is -0.048. Of this, -0.027 is due to a within-firm permanent contract premium, meaning that the same firm tends to attach a lower wage premium to flexible jobs than to permanent jobs. The remaining -0.021 reflects sorting across firms, indicating that flexible workers are disproportionately employed at firms that pay relatively low premia when we compare flexible workers across firms. Hence, about 43% of the total firm effect gap in the full hourly wage is explained by sorting across firms, with the remainder due to differential pay-setting within firms. For the fixed hourly wage, the corresponding share explained by sorting is 34%. These magnitudes imply that both mechanisms matter quantitatively, although within-firm differences in contract-specific premia account for the larger share of the wage gap.

The same decomposition can also be applied to the non-wage outcomes. For the volatility of worked hours, the total firm effect gap is 0.089, of which 0.050 reflects within-firm differences and 0.039 reflects sorting across firms, implying that 44% of the gap is explained by sorting. For next-year unemployment, the total firm effect gap is 0.027, with 0.011 attributable to within-firm differences and 0.017 to sorting. In this case, sorting explains as much as 61% of the gap. Thus, firm sorting appears particularly important for understanding why workers on flexible contracts face worse employment security, even more so than for wages.

Taken together, Figure 1 and Tables 2 and 3 deliver a consistent message: workers on flexible contracts do not experience less favorable labor market outcomes only because their contracts are flexible; they also tend to work at firms that systematically offer lower wage premia and less favorable employment outcomes. At the same time, firms themselves differentiate between permanent and flexible workers in their pay-setting and employment approaches. Therefore, the overall firm effect gap disadvantage associated with flexible contracts reflects both sorting into worse employers and worse contract-specific effects within employers, with the relative importance of the two channels varying across outcomes.

3.4 Incorporating Firm Controls

In this section we incorporate firm-level information into our AKM specification and investigate the implications of firm controls for our results. In particular, as firm-level controls we consider profits per worker, firm size, and the z-score as a proxy for firm stability. As a first step, Panel A of Table 4 shows the results of re-estimating Equation (1) for the subsample of firms for which we have firm-level information, but without adding the firm-level controls. In this panel, we find that flexible contracts are associated with a 3.6% lower fixed hourly wage, a 4.5% lower full hourly wage, a 0.150 increase in the volatility of worked hours, and a 1.0 percentage point higher probability of unemployment in the following year. In Panel B, after adding the firm-level controls, the corresponding estimates are nearly identical. These results imply that observable firm fundamentals cannot explain the adverse labor market outcomes associated with flexible contracts.

The coefficients on the firm controls are informative about the broader firm environment. More profitable firms and larger firms pay higher wages on average, as reflected in the positive coefficients on profits per worker and log assets in both wage specifications. At the same time, larger firms are associated with lower hours volatility and lower unemployment risk, suggesting a more stable employment environment. A higher z-score, which indicates a lower likelihood of insolvency, is also associated with lower hours volatility and unemployment risk, although its relationship with wages is weak. Overall, Table 4 suggests that firm profitability, size, and financial stability matter for labor market outcomes in their own right, but they do not explain the main flexible contract penalty documented in the paper.

In Table 5, we extend the specification by also including interactions between firm level characteristics and the type of contract. Our analysis in this table reveals that the interaction between flexible contract status and profits per worker is negative and highly significant in both wage specifications, implying that flexible workers benefit less from firm profitability than permanent workers. The interactions with log assets are also negative, indicating that the relative wage disadvantage of flexible workers is larger in bigger firms. Finally, the interactions with the z-score are negative as well, suggesting that the wage gap between permanent and flexible workers is larger at financially safer firms. Overall, the wage gap between permanent and flexible workers tends to be larger at stronger firms, which suggests that the benefits of working at stronger firms accrue disproportionately to workers on permanent contracts.

Taken together, Tables 4 and 5 reinforce the general interpretation of our results. Flexible workers are not only concentrated in lower-paying firms on average, but they also appear to benefit less from the advantages offered by profitable, large, and financially stable firms. This suggests that the disadvantage associated with flexible contracts reflects both worker sorting and a more limited ability of flexible workers to share in firm rents.

Table 4: Flexible contracts and labor market outcomes after controlling for firm characteristics

	Log fixed hourly wage (1)	Log full hourly wage (2)	Vol. worked hours (3)	Unempl. (4)
PANEL A: AKM REGRESSION				
Flexible contract ($\hat{\phi}$)	-0.0355***	-0.0445***	0.150***	0.0101***
	(0.000196)	(0.000212)	(0.000291)	(0.000310)
PANEL B: AKM WITH FIRM DATA				
Flexible contract ($\hat{\phi}$)	-0.0357***	-0.0447***	0.149***	0.0106***
	(0.000195)	(0.000210)	(0.000289)	(0.000309)
Z-score	-0.00634***	-0.00408	-0.00213**	-0.0673***
	(0.000952)	(0.00101)	(0.000993)	(0.00121)
Profits per worker	0.0267***	0.0575***	0.208***	-0.0248***
	(0.000863)	(0.000940)	(0.000734)	(0.000861)
Log assets	0.00418***	0.00549***	-0.00253***	-0.00430***
	(0.00059)	(0.00063)	(0.00062)	(0.00079)
Observations	39,151,908	39,151,908	39,151,908	39,151,908

Notes: This table shows the effect of flexible contracts on labor outcomes when controlling for firm characteristics. In Panel A, we run the following AKM regression: $W_{i,t} = \phi Q_{i,t}^{Flex} + \boldsymbol{X\beta} + \alpha_i + \psi_{J(i,t)} + \lambda_t + \epsilon_{i,t}$ 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 a dummy variable for having a flexible contract. $\boldsymbol{X}$ includes a polynomial term in age (normalized to 40 years old), gender-age fixed effects, and industry-year fixed effects. α_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. λ_t are year fixed effects. Finally, $\epsilon_{i,t}$ is the error term. In Panel B, we add firm-level controls: z-score, profits per worker, and log assets. Standard errors are clustered at the worker level and reported in parentheses.

3.5 Flexible Contracts and Labor Market Monopsony Power

To conclude our analysis, we further investigate why workers on flexible contracts receive lower wages by exploring the role of employer market power in the local labor market. Our argument in this section builds on the notion that when firms operate in highly concentrated markets, they possess monopsony power that allows them to mark down wages below the marginal product of labor (Manning and Petrongolo, 2024). This wage setting power may disproportionately penalize workers on flexible contracts, if these workers face higher search frictions, possess less bargaining power, or have fewer outside options than their permanent counterparts.

To test this mechanism, we need to have a measure of labor market concentration. We define a local labor market (LLM), indexed by m, as the intersection of a municipality and an industry. We capture employer concentration within each LLM using the Herfindahl-Hirschman Index (HHI) of employment. Let $M_{m(j),t}$ be this monopsony power proxy

Table 5: Flexible contracts and labor market outcomes: Interactions with firm characteristics

	Log fixed hourly wage			Log full hourly wage		
	(1)	(2)	(3)	(4)	(5)	(6)
Flexible contract (FC)	-0.0341***	-0.0336***	-0.00966***	-0.0428***	-0.0416***	-0.00156***
	(0.000217)	(0.000199)	(0.000503)	(0.000233)	(0.000215)	(0.000535)
Z-score	-0.00278***	-0.00538***	-0.00627***	0.00378***	0.00106	-0.000295
	(0.000969)	(0.000952)	(0.000952)	(0.00103)	(0.00101)	(0.00101)
Profits per worker	0.0266***	0.0394***	0.0263***	0.0574***	0.0771***	0.0568***
	(0.000863)	(0.000901)	(0.000863)	(0.000940)	(0.000986)	(0.000939)
Log assets	0.00418***	0.00418***	0.00484***	0.00549***	0.00549***	0.00659***
	(0.00058)	(0.00058)	(0.00059)	(0.00063)	(0.00064)	(0.00064)
FC × Z-score	-0.0168***			-0.0198***		
	(0.00112)			(0.00117)		
FC × Profits per worker		-0.0950***			-0.147***	
		(0.00223)			(0.00248)	
FC × Log assets			-0.00258***			-0.00428***
			(0.00047)			(0.00050)
Observations	39,151,908	39,151,908	39,151,908	39,151,908	39,151,908	39,151,908

Notes: This table reports coefficients from an augmented AKM regression: $W_{i,t} = \phi Q_{i,t}^{Flex} + \sum \gamma_k F_{J(i,t)}^k + \theta(Q_{i,t}^{Flex} \times F_{J(i,t)}^*) + \mathbf{X}\beta + \alpha_i + \psi_{J(i,t)} + \lambda_t + \epsilon_{i,t}$. The dependent variable $W_{i,t}$ is the log fixed hourly wage (columns 1–3) or the log full hourly wage (columns 4–6). All specifications include the full set of firm-level controls (z-score, profits per worker, and log assets), but only one firm characteristic is interacted with the flexible contract dummy $Q_{i,t}^{Flex}$ at a time: z-score (columns 1 and 4), profits per worker (columns 2 and 5), and log assets (columns 3 and 6). Other controls ($\mathbf{X}$) include a polynomial in age, gender-age fixed effects, and industry-year fixed effects. The model includes worker (α_i), firm ($\psi_{J(i,t)}$), and year (λ_t) fixed effects. Robust standard errors, clustered at the worker level, are in parentheses.

for the market m in which firm j operates at time t. We extend the baseline AKM specification by introducing this market-level concentration variable and its interaction with the flexible contract indicator. In particular, we estimate

$$W_{i,t} = \phi\, Q_{i,t}^{Flex} + \theta M_{m(j),t} + \delta \left(Q_{i,t}^{Flex} \times M_{m(j),t} \right) + \mathbf{X}\boldsymbol{\beta} + \alpha_i + \lambda_t + \psi_{J(i,t)} + \varepsilon_{i,t}. \tag{5}$$

In this specification, θ captures the baseline relationship between local labor market concentration and wages for permanent workers. The key parameter of interest for our hypothesis is the coefficient on the interaction term, δ. A negatively estimated δ would imply that higher employer concentration exacerbates the wage penalty for flexible workers. This would support the hypothesis that firms with greater monopsony power use their market position to disproportionately depress the wages of workers on flexible contracts.

Table 6 examines whether local labor market concentration amplifies the wage penalty associated with flexible contracts. The results provide clear evidence that it does. In the specifications without the interaction term, the flexible contract penalty remains equal to the benchmark estimates from the baseline AKM model: -0.0440 for the fixed hourly wage in column (2) and -0.0530 for the full hourly wage in column (6). Once the interaction between flexible contract status and local labor market concentration is introduced, however, the interaction term is negative and highly significant. For the fixed hourly wage, the coefficient on $FC \times HHI_{LLM}$ is -0.0163 in column (3). For the full hourly wage, the corresponding interaction effect is even larger, at -0.0243 in column (7). These estimates imply that the wage disadvantage of flexible workers becomes more severe in more concentrated local labor markets, consistent with the interpretation that monopsony power disproportionately depresses the wages of workers on flexible contracts.

The coefficients on the concentration measure itself are also informative. For permanent workers, a higher HHI_{LLM} is associated with slightly higher wages in most specifications: the coefficient is 0.00410 for the fixed hourly wage in column (3), and 0.00749 for the full hourly wage in column (7). This suggests that concentrated labor markets may also reflect rents or productivity advantages at the firm level. Yet the negative interaction terms imply that flexible workers capture less of these benefits than permanent workers. Put differently, even if concentration is not uniformly associated with lower wages overall, it systematically widens the wage gap between permanent and flexible workers.

Table 6 also shows that this mechanism remains important once contract-type firm fixed effects are included. In columns (4) and (8), where the model allows firms to pay different premia to permanent and flexible workers, the direct flexible contract coefficient becomes smaller in absolute value, falling to -0.0270 for the fixed hourly wage and -0.0306 for the full hourly wage. At the same time, the interaction with local concentration remains strongly negative. This indicates that the monopsony channel is not merely capturing average pay differences across firms. Rather, even after allowing firms to differentiate pay by contract type, local labor market concentration continues to exacerbate the wage penalty faced by flexible workers.

In Table A1 we show that these findings are robust to controlling for firm-level characteristics. In the subsample of firms for which firm-level information is available, the interaction between flexible contract status and local labor market concentration remains negative and highly significant throughout. Thus, even after controlling for profits per worker, firm size, and firm risk, more concentrated labor markets are still associated with a larger wage penalty for flexible workers.

Table 6: The effect of local labor market concentration on the flexible contract wage penalty

	Log fixed hourly wage				Log full hourly wage			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Flexible contract (FC)	-0.0440***	-0.0440***	-0.0404***	-0.0270***	-0.0530***	-0.0530***	-0.0477***	-0.0306***
	(0.000156)	(0.000156)	(0.000183)	(0.000167)	(0.000169)	(0.000169)	(0.000196)	(0.000176)
HHI_{LLM}		0.000433	0.00410***	0.00348***		-0.00201***	0.00749***	0.00820***
		(0.000371)	(0.000379)	(0.000391)		(0.000382)	(0.000389)	(0.000399)
FC × HHI_{LLM}			-0.0163***	-0.0167***			-0.0243***	-0.0298***
			(0.000445)	(0.000756)			(0.000469)	(0.000798)
Contract-type FE	No	No	No	Yes	No	No	No	Yes
Observations	67,743,426							

Notes: This table presents the estimation results of the extended AKM specification detailed in Equation (5). The dependent variable in columns (1)-(4) is the log fixed hourly wage, and in columns (5)-(8) is the log full hourly wage. Flexible contract is an indicator variable equal to one if the worker is on a flexible contract. HHI_{LLM} measures the local labor market concentration using the Herfindahl-Hirschman Index of employment at the municipality-industry level. All regressions include worker fixed effects, firm fixed effects, gender-age fixed effects, and industry-year fixed effects, as well as individual controls ($\mathbf{X}$). Columns (4) and (8) alternatively include contract-type firm fixed effects. Standard errors are clustered at the worker level and reported in parentheses for columns (1)–(3) and (5)–(7). For columns (4) and (8), we report bootstrapped standard errors based on $R = 50$ replications. In each iteration, we resample with replacement at the firm level (to preserve the connected set), re-estimate the AKM model, and calculate the resulting parameter $\hat{\phi}$. The reported standard errors correspond to the standard deviation of these estimates across all bootstrap draws.

Overall, Tables 6 and A1 suggest that local monopsony power is an important mechanism behind the wage disadvantage of flexible contracts. Flexible workers appear to be especially vulnerable in concentrated labor markets, where firms can exercise greater wage-setting power. The persistence of this result after controlling for firm-level characteristics strengthens the interpretation that labor market concentration itself, rather than only differences in firm quality, contributes to the lower wages observed for workers on flexible contracts.

4 Concluding Remarks

In this paper, we use comprehensive administrative employer–employee data for the Netherlands to examine the labor market consequences of flexible employment contracts. Our analysis confirms that workers on flexible contracts earn lower wages, face greater volatility in hours worked, and are more likely to become unemployed in the following year. At the same time, our results show that the wage disadvantage associated with flexible contracts should not be interpreted as arising solely from the contract form itself. A central finding of the paper is that workers on flexible contracts are disproportionately employed at firms that pay systematically lower wage premia. As a result, an important part of the overall pay gap reflects firm sorting rather than only within-firm pay differences between flexible and permanent workers.

Moreover, once we allow firm premia to differ by contract type, the estimated direct effect of flexible contracts declines substantially, indicating that firms themselves differentiate between permanent and flexible workers in their pay-setting. The decomposition of firm wage premia further shows that both within-firm contract premia and sorting across firms contribute to the disadvantage of flexible workers, with the latter playing an especially important role for employment instability and unemployment risk.

We also show that the adverse outcomes associated with flexible contracts can not be explained by observable firm characteristics such as profitability, size, or financial stability. Although more profitable and larger firms tend to pay higher wages and offer greater employment stability on average, flexible workers benefit less from these firm advantages than permanent workers. This suggests that flexible workers have a more limited ability to share in firm rents, especially when employed by stronger firms.

Finally, we provide evidence that local employer market power is an additional mechanism behind the wage disadvantage of flexible contracts. In more concentrated local labor markets, the wage penalty associated with flexible work becomes significantly larger. This pattern is robust to controlling for firm-level characteristics and to allowing firms to have different wage premia for permanent and flexible workers. These findings suggest that workers on flexible contracts are particularly vulnerable in labor markets where employers possess greater monopsony power.

Overall, our results imply that the negative effect of flexible contracts on wage income can be overstated if firm-specific pay differentials are not taken into account. Flexible workers earn less not only because of the contractual arrangement they hold, but also because they are more likely to work at firms that pay less. In addition, flexible workers appear less able to capture the benefits associated with profitable, stable, and concentrated firms. These findings are important for policy. If policymakers aim to reduce inequalities between permanent and flexible workers, interventions focused exclusively on equalizing pay across contract types within firms may be insufficient. Policies that also improve access of flexible workers to better-paying firms may be equally important.

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APPENDIX

A Additional Table

Table A1: The effect of local labor market concentration on the flexible contract wage penalty for the subsample with firm data

	Log fixed hourly wage				Log full hourly wage			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Flexible contract (FC)	-0.0355***	-0.0358***	-0.0342***	-0.0208***	-0.0445***	-0.0448***	-0.0409***	-0.0233***
	(0.000196)	(0.000195)	(0.000224)	(0.000156)	(0.000212)	(0.000210)	(0.000240)	(0.000201)
HHI_{LLM}		0.00139***	0.00332***	0.00419***		0.00150***	0.00618***	0.00956***
		(0.000507)	(0.000522)	(0.000549)		(0.000514)	(0.000528)	(0.000550)
FC × HHI_{LLM}			-0.00781***	-0.0147***			-0.0188***	-0.0350***
			(0.000544)	(0.000925)			(0.000574)	(0.000966)
Contract-type FE	No	No	No	Yes	No	No	No	Yes
Observations	39,151,908							

Notes: This table presents the estimation results of the extended AKM specification detailed in Equation (5). The dependent variable in columns (1)-(4) is the log fixed hourly wage, and in columns (5)-(8) is the log full hourly wage. Flexible contract is an indicator variable equal to one if the worker is on a flexible contract. HHI_{LLM} measures the local labor market concentration using the Herfindahl-Hirschman Index of employment at the municipality-industry level. All regressions include worker fixed effects, firm fixed effects, gender-age fixed effects, and industry-year fixed effects, as well as individual controls ($\mathbf{X}$). Columns (4) and (8) alternatively include contract-type firm fixed effects. Standard errors are clustered at the worker level and reported in parentheses for columns (1)–(3) and (5)–(7). For columns (4) and (8), we report bootstrapped standard errors based on $R = 50$ replications. In each iteration, we resample with replacement at the firm level (to preserve the connected set), re-estimate the AKM model, and calculate the resulting parameter $\hat{\phi}$. All regressions include firm-level controls: z-score, profits, and log assets. The reported standard errors correspond to the standard deviation of these estimates across all bootstrap draws.

B AKM Assumptions

This appendix describes in more detail the identifying assumptions of the AKM framework as well as the results of some diagnostic tests for our regression sample that have been proposed in the literature.

B.1 Log Additive Functional Form in the AKM Regression

We use the following AKM specification:

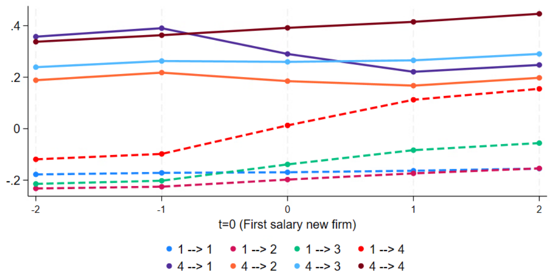
$$W_{i,t} = \mathbf{X}\boldsymbol{\beta} + \alpha_i + \lambda_t + \psi_{J(i,t)} + \epsilon_{i,t}, \tag{B1}$$

where W_{it} is the log wage of worker i in year t, $\mathbf{X}$ are control variables, α_i are worker fixed effects, $\psi_{J(i,t)}$ are firm fixed effects, λ_t are year fixed effects, and $\epsilon_{i,t}$ is the idiosyncratic error term. Firm fixed effects contain a matching function J that assigns worker i in year t at firm j.

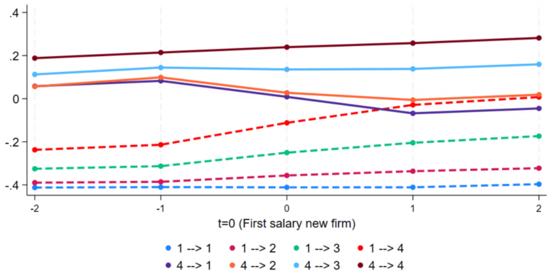
The (log) additive functional form in the AKM specification implies that all workers who move from firm k to j will experience an average wage change of $\psi_j - \psi_k$, independent of the worker quality α_i, while those who move in the opposite direction will experience an average change of $\psi_k - \psi_j$. To assess the log additive structure, we perform an event study of the average wage change experienced by workers moving between different types of firms as in Card et al. (2018, 2016). The samples are restricted to workers who switch firms and have worked for at least two years at both the origin and destination firms. Similarly to their study, we define groups of firms based on co-worker pay quartiles (using data on male and female co-workers). Panels (a) and (b) of Figure B1 report the wage profiles of workers who move from jobs in quartile 1 and quartile 4, for male and female workers, respectively. Reassuringly, our results are in line with the log additive structure. Workers who move to firms with more highly paid coworkers experience a wage raise, while those who move in the opposite direction experience wage cuts of similar magnitude. As expected, the average wage does not change when workers move between firms with similarly paid coworkers. Furthermore, the wage profiles for all groups are relatively stable in the years before and after a job move.

Though the event study gives credence to a log-additive structure of the wage regression into worker and firm fixed effects, it is still possible to have interactions between worker and firm effects. Even if the functional form is non-additive, the gains and losses may look symmetric if workers making upward moves are of the same quality as those making

Figure B1: Event study of changes in earnings when workers move between firms



(a) Male workers



(b) Female workers

Notes: The figure shows the event study developed by Card et al. (2018, 2016). We consider workers who switch firms and have worked for at least two years at both the origin and destination firms for the period 2006-2019. We define firms' groups based on co-worker pay quartiles (using data on all coworkers). We report the wage profiles of workers who move from jobs in quartile 1 and quartile 4, separated by gender. Each line represents a different firm-to-firm movement, given by the firm group. We use the log full hourly wage (gross wage over paid hours) to describe the wage profile. To compare between different years, we detrend the log full hourly wage by using year fixed effects. We then plot the residual from this regression. Since the first wage in the new firm does not represent a "real" annual wage (as the worker may have missed some variable compensation or bonuses because they decided to change jobs in the middle of the year), the first full salary in the new firm is $t = 1$. Therefore, a proper comparison between firms is between $t = -1$ and $t = 1$.

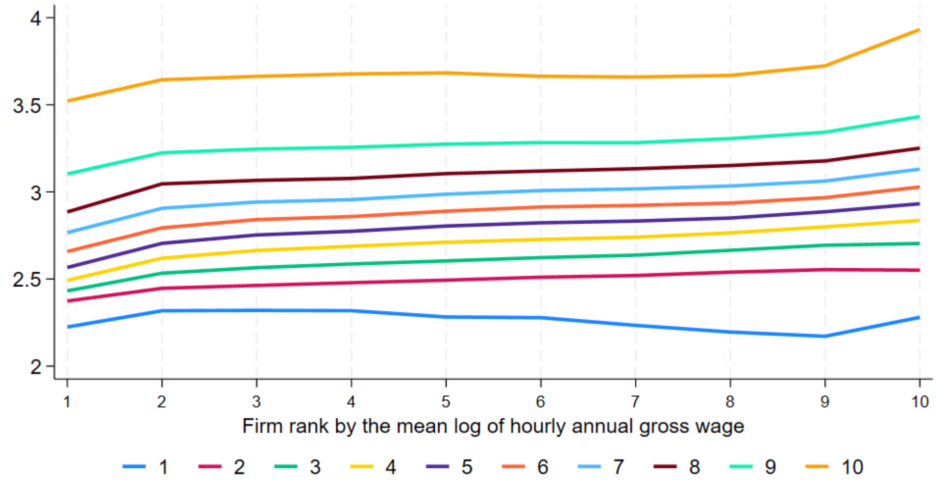
downward moves (Bonhomme et al. (2019)). Motivated by Lamadon et al. (2022), we classify firms and workers into ten types according to the average wage over the sample period. We then calculate the average wage for the combinations of worker-firm types. Figure B2 reports the results. Each point represents a worker-firm type ($10 \times 10 = 100$ points). While the figure shows evidence of worker heterogeneity (the vertical differences), we also observe that the gains for high-paid workers moving from low- to high-paying firms are similar to the gains for low-paid workers moving from low- to high-paying firms. This can be seen by visually moving on the top line (high worker type) from firm type 1 to firm type 10. Doing the same for the lowest worker type shows a similar difference. We conclude similarly to Card et al. (2013) that while firm-worker fixed effects may improve the statistical fit, the additive structure into separate worker and firm fixed effects is a fair assumption for our data.

B.2 The Exogeneity Assumption

To estimate Equation (B1), the following orthogonality condition must hold:

$$E[(\epsilon_{it} - \bar{\epsilon_i})(D_{it}^j - \bar{D}_i^j)] = 0 \quad \forall j \in [1, ..., J] \tag{B2}$$

Figure B2: Earnings by type of workers and firms



Notes: The figure shows the log full hourly wage for ten types of workers and firms. We classify firms and workers into ten types (i.e., deciles) according to the average log full hourly wage (gross wage over paid hours) over years 2006-2019. We then calculate the average log full hourly wage for the combinations of worker-firm types (i.e., 100 combinations).

for $D_{it}^{j} \equiv 1[J(i,t) = j]$ where D_{it}^{j} is an indicator for employment at firm j in period t and bars over represent time averages. This assumption is generally supported by data.[5]

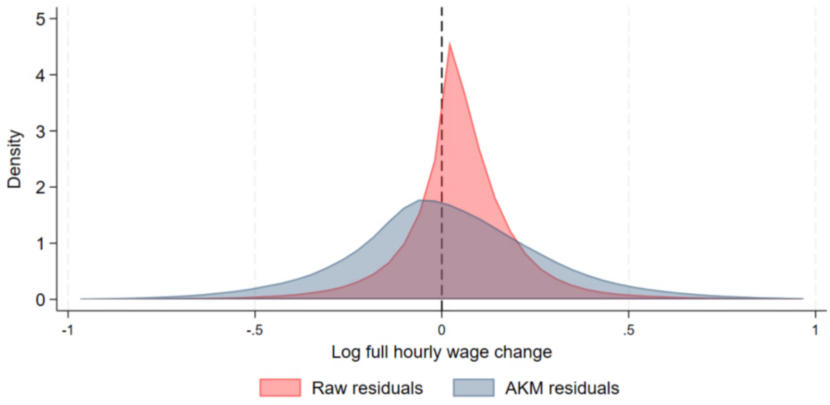
B.3 Limited Mobility Bias

The AKM estimates are sensitive to the limited mobility bias. According to Bonhomme et al. (2023) and Andrews et al. (2008), if firms are weakly connected to one another because of the limited mobility of workers across firms, AKM estimates of the contribution of firms' effects to wage inequality are biased upwards while AKM estimates of the contribution of sorting to firms are biased downwards. For instance, Lamadon et al. (2022) show that the estimated variance of the firm fixed effects is several times larger if they only keep ten percent of the movers within each firm as compared to what they obtain if they were to keep all movers.

Although limited mobility bias may be more prominent in short panels according to Lachowska et al. (2023), there is no formal test to check if the mobility observed in our dataset is sufficient to identify firm fixed effects. However, Bonhomme et al. (2023) give us a benchmark to compare our analysis to. To show how important the mobility bias may be, they compare the variance of firm fixed effects from a regular AKM with the bias-corrected estimates of the variance of firm effects. Importantly for us, they

[5]See Figure B3, and the event study discussed before. See Card et al. (2016) for a one-to-one relationship between Equation (B2) and the conclusions that we can derive from the event study.

Figure B3: Distribution of the log full hourly wage change for job-to-job movements over 2006-2019



Notes: The figure shows the distribution of the change in the log full hourly wage for workers changing jobs over the period 2006-2019. For each job-to-job movement observed in the dataset, we calculate the gains (or losses) for the log full hourly wage and represent these as the raw residuals. In addition, we show AKM residuals. To obtain these, we run the regression $W_{it} = \boldsymbol{X\beta} + \alpha_i + \lambda_t + \psi_{J(i,t)} + \epsilon_{it}$, where $W_{i,t}$ is the log of the full hourly wage; $\boldsymbol{X}$ includes a polynomial term in age (normalized to 40 years old), gender-age fixed effects, and industry-year fixed effects; α_i are worker fixed effects; λ_t are year fixed effects; $\psi_{J(i,t)}$ are firm fixed effects; finally, $\epsilon_{i,t}$ is the error term. We then use $\hat{\epsilon}_{i,t}$ to calculate the gains (or losses) from job-to-job movements. For the regression, we cover the period 2006-2019. We exclude firms changing industries. We consider workers from 18 to 65 years old. We drop extreme values. The sample includes only observations in the largest connected set.

consider the United States and four European countries: Austria, Italy, Norway, and Sweden. They find that while the interquartile range of non-corrected estimates goes from 14% to 23%, the interquartile range of bias-corrected estimates of the variance of firm effects goes from 5% to 16%. As reported in Table B2 column (2), the contribution of the variance of firm fixed effects in the Netherlands is 8%. While limited mobility bias may still be an issue, the consequences are likely to be small in our setting. A similar argument applies to bias-corrected estimates of sorting. While the interquartile range of non-corrected estimates go from -1% to 8%, the interquartile range of the bias-corrected estimates of the contribution of sorting lie between 5% and 20%. As reported in Table B2 column (2), in the Netherlands, the contribution of the variance of sorting is 6% (i.e., $2 * Cov(WFE, FFE)$).

Table B2: Variance decomposition of the wage over the period 2006-2019

	(1)	(2)
Total variance		
$Var(\ln(y))$	0.202	
Components of the variance		
		%
$Var(WFE)$	0.132	65
$Var(FFE)$	0.016	8
$Var(FlexibleContract)$	0.001	1
$Var(residual)$	0.022	11
$2 * Cov(WFE, FFE)$	0.013	6
$2 * Cov(WFE, FlexibleContract)$	-0.004	2
$2 * Cov(FFE, FlexibleContract)$	-0.001	1
Rest of components	0.012	6
		100
Observations (N× T)	67,743,426	

Notes: This table shows the variance decomposition of the log of the full hourly wage. In particular, we implement $Var(\ln(y)) = Var(WFE) + Var(FFE) + Var(FlexibleContract) + Var(Xb) + Var(residual) + 2 * Cov(WFE, FFE) + 2 * Cov(WFE, FlexibleContract) + 2 * Cov(FFE, FlexibleContract) + Rest\ of\ covariances$. $Var(\ln(y))$ 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. $Var(FlexibleContract)$ stands for the variance of the flexible contract dummy variable. $Var(Xb)$ stands for the variance of other covariates. $Var(residual)$ stands for the variance of residuals. $Cov(WFE, FFE)$ stands for the covariance between worker and firm fixed effects. $Cov(WFE, FlexibleContract)$ stands for the covariance between worker fixed effects and the flexible contract variable. $Cov(FFE, FlexibleContract)$ stands for the covariance between firm fixed effects and the flexible contract variable. $Rest\ of\ components$ stands for additional variances and covariances. Sample includes only observations in the largest connected set. Columns (1) and (2) report rounded values.