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ABSTRACT

Labor Market Concentration and Wages: Incumbents versus New Hires*

We investigate the impact of labor market concentration on average wages and decompose it into its effects on new hires and incumbents, where incumbents are defined as individuals who were already employed in the same firm the year before. Using administrative data for France, we find that concentration negatively affects both new hires' and incumbents' wages with elasticities ranging from -0.0287 to -0.0296 and -0.0185 to -0.0230, respectively. It also reduces the probability that a worker be a new hire rather than an incumbent. When decomposing the overall effect of labor market concentration on wages into its different components, we find that the negative effect on incumbents' wages accounts for between two thirds and three fourth of the total.

JEL Classification: J31, J42, L41

Keywords: labor market concentration, monopsony, wages, incumbents

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1 Introduction

How labor market concentration affects wages has been the subject of a burgeoning literature in recent years. Many papers have shown that a substantial proportion of individuals are employed in labor markets that are at least moderately concentrated according to the thresholds defined by the US Horizontal Merger Guidelines and that this has a depressing effect on wages, consistent with a monopsony model - see e.g. Azar et al. (2020); OECD (2022).

However, the channels through which labor market concentration affects wages are still poorly understood. In particular, is the effect concentrated on new hires or does it also affect incumbents, i.e. individuals who were already employed in one of the establishments of their current firm the year before? If the elasticity of new hires' wages with respect to labor market concentration is large enough, it could in principle account for the entire effect estimated in the literature, all the more that new hires represent a substantial part of the workforce in many OECD countries - on average 20% in the OECD and as much as 27% in the USA.[1] If this were the case though, it would imply that labor market concentration affects wages only at the margin, i.e. for individuals who change job. For a given individual, the downward pressure on wages experienced when concentration is high would then only be transitory, since most new hires eventually become incumbents. If, in contrast, incumbents' wages are also negatively impacted by labor market concentration, this entails that the core of the labor force is affected and that individuals may suffer the negative effects concentration in the labor market all along their career.

In this paper, we use French data to estimate the effect of labor market concentration on total wages[2] and decompose it into its effects on new hires and incumbents separately. Our contribution is twofold.

First, we provide estimates of wage elasticities with respect to labor market concentration that are not confounded by the effect of establishment-level productivity or product market competition. While these two factors likely correlate both with

[1] Source: OECD data. See Bassanini and Garnero (2013).

[2] In the whole paper, we use the expression *total wages* as a shortcut for *wages of all workers*.

labor market concentration and wages, most papers in the literature do not control for them. Two noticeable exceptions are Benmelech et al. (2022) and Marinescu et al. (2021). The former control for establishment-level productivity but restrict their analysis to the manufacturing sector. To the extent that they focus on tradable goods whose market is not mainly local, they validly control for product market competition by including firm-by-time fixed effects. Marinescu et al. (2021) consider all sectors of the economy and control for productivity using covariates at the firm level. As a result, they do not take into account differences in productivity that may correlate with labor market concentration and wages at the more disaggregate (establishment) level where wages are observed. In this paper, we control for establishment-level productivity and product market competition in the strictest possible way, by including establishment-by-time fixed effects. Thus doing, we provide estimates of the elasticities of total, incumbents' and new hires' wages that are not affected by changes in plant efficiency and competitive pressure in downstream markets over time.

Our second contribution is to decompose the overall impact of labor market concentration on total wages. To do so, we estimate the elasticities of new hires' and incumbents' wages separately. If concentration in the labor market reduces workers' outside options, we expect the former to be negative. For the same reason, we also expect the latter to be negative, to the extent that incumbents' bargaining power will be weaker.[3] We show, however, that the overall effect of labor market concentration on total wages is not the weighted sum of these two elasticities. By making outside options scarcer, labor market concentration indeed affects worker flows. This should mechanically reduce the probability that a worker be a new hire rather than an incumbent. How this affects total wages ultimately depends on the relative level of wages of new hires as compared to incumbents: if new hires are better paid than incumbents, this third component will negatively affect total wages; if, in contrast, incumbents' wages are higher than those of new hires, it will

[3]Although incumbents' wages are known to be downwardly rigid in France (Le Bihan et al., 2012; Avouyi-Dovi et al., 2013; Fougère et al., 2018), we expect them to grow at a slower pace whenever outside options are few so that workers' bargaining power is reduced.

dampen the negative effect of labor market concentration on total wages. To our knowledge, we are the first to provide such a decomposition, thereby enhancing our understanding of the different channels through which labor market concentration affects worker flows and wages.[4]

We find that the point estimate of the effect of labor marker concentration on total wages ranges from -0.0244 to -0.0267 depending on the instrument we use. The elasticity of incumbents' wages ranges from -0.0185 to -0.0230, i.e. between about two thirds and three quarters of the elasticity we estimate for new hires. We show that the effect of labor market concentration on incumbents is not due to the persistence of the effect that concentration had at the time they were hired since our results are robust to the inclusion of a match-specific fixed effect. Our estimates suggest that the effect of labor market concentration on new hires' wages accounts for 30% to 34% of the overall effect on total wages, according to the instrument we use. The effect on incumbents' wages accounts for 74% to 70% and is therefore far from negligible. The sum of both effects is slightly larger than 100% since labor market concentration reduces the probability that workers' be new hires. Since we find that incumbents' wages are higher than new hires' wages, this dampens the negative effect of labor market concentration on total wages by a small 4%.

Our paper belongs to the growing literature estimating the effect of labor market concentration on wages - see e.g. Azar et al. (2019b); Rinz (2022); Benmelech et al. (2022); Martins (2018); Dodini et al. (2020); Arnold (2021); Hafner (2021); Schubert et al. (2021); Qiu and Sojourner (2022). We provide a new estimate of the wage elasticity that is not confounded by the effect of product market competition nor by establishment productivity. Our findings point to a significant degree of employers' monopsony power in France.

We also contribute to the literature investigating the effects of labor market concentration on specific groups of workers and, in particular, new hires and incumbents. For the USA, using vacancy data, Azar et al. (2022) estimate an elasticity of posted wages with respect to labor market concentration of -0.12, without con-

[4]We are grateful to an anonymous referee for suggesting such a decomposition.

trolling for either productivity or product market competition. Focusing on new hires in France, Marinescu et al. (2021) find a wage elasticity as large as -0.05 in their preferred specification where they control for productivity and product market competition through firm-level observables. We improve on these estimates by controlling in a stricter way for these two potential confounders. Beyond looking at the effect on average market wages, Arnold (2021) also focuses on incumbents and shows that mergers and acquisitions that lead to higher concentration have a negative effect on the wages of employees who stay in the firms that have merged. We estimate the effect of labor market concentration on the wages of incumbents employed in all types of companies, not only those that have merged. The paper closest to ours is Thoresson (2021). She considers the impact of a reform of the State monopoly over pharmacies in Sweden on the wages of new hires and incumbents. In 2009, entry barriers were removed and a majority of state-owned pharmacies were privatized, thereby increasing the number of employers on the market for the corresponding industry-specific skills. Thoresson (2021) finds no effect of this reform on the wages of new hires in the pharmacy sector. In contrast, incumbents' wages increased with elasticities to concentration ranging between -0.02 and -0.05. Our paper enlarges the scope of the analysis by considering the impact of labor market concentration on both new hires' and incumbents' wages in all sectors of the economy. Moreover, we determine how much of the overall effect of labor market concentration on total wages is due to the impact on the wages of each category of workers, and how much is due to the effect on worker flows, which has never been investigated so far.

The remainder of the paper is structured as follows. Section 2 lays out our empirical strategy and derives the decomposition of the effect of labor market concentration on total wages. Section 3 describes the data we use and presents summary statistics. Section 4 presents the results and Section 5 concludes.

2 Empirical specification

2.1 Labor market concentration

In the literature, concentration is typically measured at the level of local labor markets. Part of this literature defines a local labor market as one industry in a particular geographical area (most often a commuting zone) - see Rinz (2022); Benmelech et al. (2022). However, the very existence of non-poaching agreements covering several industries, e.g. in the high-tech sector (Gibson, 2021), suggests that employees frequently change jobs across industry borders when they are free to do so. Moreover, workers in different occupations within a given industry usually do not compete for the same jobs - see e.g. Prager and Schmitt (2021). To overcome this problem, we use a definition, frequently used in the literature, which characterizes a local labor market as one occupation in a given geographical area - see Azar et al. (2022); Martins (2018); Marinescu et al. (2021).[5] This choice is also motivated by the fact that one of our contributions is to identify the effect of labor market concentration, controlling in the strictest possible way for plant productivity and local product market competition. Given the structure of our data, we do so by introducing plant-by-time fixed effects in our specification - see Section 2.2.1. Since a given plant operates in one single industry and geographical area, these would be collinear to any measure of labor market competition defined with respect to an industry in a geographical area.

Based on this definition, we measure employer concentration using the Herfindahl-Hirschman Index (HHI) computed either on hirings or on employment:

$$HHI_{l,t} = \sum_{f=1}^{N_{l,t}} s_{f,l,t}^2 \tag{1}$$

where $HHI_{l,t}$ is the HHI for local labor market l at year t where l is defined as

[5] Dodini et al. (2020) suggest using a skill-based definition of labor markets. However, since changes in occupations generally entail wage penalties - Gathmann and Schönberg (2010); Kambourov and Manovskii (2009) -, the extent to which skills are truly homogeneous within skill groups is critical to this approach. Dodini et al. (2020) conduct a cluster analysis with a fixed and small number of skill groups (20) but it is still unclear whether these groups are homogeneous enough for occupations to be almost perfect substitutes within each group.

$l = (o, z)$, i.e 4-digit occupation o in commuting zone z. $N_{l,t}$ is the number of firms that have positive hirings (resp. employment) in local labor market l at time t and $s_{f,l,t}$ is the share of firm f in hirings (resp. employment) in local labor market l at time t. With this definition, HHI ranges from 0 (no concentration) to 1 (one firm in the market).

In our baseline specification, we use an HHI based on hirings although we also present a robustness check showing that our results are qualitatively similar if using an HHI based on employment. In a standard Cournot model of oligopsony, wages are indeed inversely related to the HHI measured in terms of employment (Boal and Ransom, 1997). An HHI based on employment also seems to be a reasonable approximation of the index of labor market concentration that is relevant for wage determination in a stationary search and matching model with granular search, where concentration affects wages by changing workers' outside options (Jarosch et al., 2021). However, in a non-stationary environment, downsizing firms may have a positive share of the stock of employment in a local labor market, whereas their hirings are zero, so that they do not contribute to creating outside options for workers in that labor market. In this case, as emphasized by Marinescu et al. (2021), a measure based on hirings better captures the fact that labor market concentration may negatively affect wages by reducing workers' outside options.

2.2 Labor market concentration and wages

2.2.1 Baseline specification

We first estimate the impact of labor market concentration on individual wages of all workers, and of incumbents and new hires separately. Our baseline specification is as follows:

$$log(w_{i,j,f,l,t}) = \beta log(HHI_{l,t}) + \boldsymbol{X_{i,j,f,l,t}}\gamma + \mu_i + \mu_l + \mu_{j,t} + \epsilon_{i,j,f,l,t} \tag{2}$$

where i indices the individual, j the establishment and f the firm. w denotes the wage. $\boldsymbol{X}$ is a vector of time-varying individual controls including age, whether or not the individual is a new hire - if relevant - and, if so, whether or not he/she was employed the year before. μ are fixed effects. Standard errors are clustered at the local-labor-market-by-time level, which is the level at which the HHI varies.

In this baseline specification, we control for individual and local-labor-market fixed effects. We also include establishment-by-time fixed effects. When estimating the impact of labor market concentration on wages, labor productivity and product market competition are indeed key potential confounders. Including establishment-by-year fixed effects allows controlling for establishment-level labor productivity better than any measure of value added per worker that can only be computed at the firm level (since establishments are not profit centers in France). This also allows controlling for product market competition. If local firms produce for the national or international market - and not for the local market -, product market competition is firm specific and firm-by-year fixed effects would control for it. However, if establishments in a given geographical area also produce for the local market, a simple way to control for product market competition would be to include firm-by-commuting-zone-by-year fixed effects. Since establishments of a given firm do not change location, controlling for establishment-by-year fixed effects does the same job.

With this rich set of fixed effects, our model is identified if there exist several occupations within individual establishments. This is the case in our data since, on average, an observation belongs to an establishment with 6.44 different occupations. Our identification then relies on 3 different sources of variations. The first one is provided by the different changes in HHI over time in the various occupations within each establishment. The second one comes from individuals changing occupation within an establishment over time. This modifies the average HHI in the establishment since the latter is computed as the weighted average of the various occupational HHIs where the weights are given by the number of workers employed in each occupation. When the latter changes, the average HHI in the establishment

changes. Given that we control for an establishment-by-time fixed effect, at any given point in time the HHI attached to an individual is de facto defined in deviation from the establishment mean which varies because of individuals changing occupations. Finally, the third source of variation comes from individuals changing establishment within a local labor market, as long as there exist several occupations in each establishment. Since this changes the number of individuals employed in each occupation in a given establishment, it changes the average HHI in the establishment and hence induces again a variation at the individual level since the HHI attached to the individual is defined in deviation from the mean.

2.2.2 IV Strategy and violations of exogeneity of the instrument

A key threat to identification in this set-up is that an omitted time-varying variable could be correlated with both the HHI and wages. This may happen, for example, if a new technical school opens in a local labor market $l = (o, z)$. On the one hand, this generates a positive shock on the local supply of the corresponding skills, which will likely reduce wages. On the other hand, it creates new opportunities for activities leveraging those skills, which may increase the number of firms that find it profitable to enter this market. As a consequence, labor market concentration is likely to decrease, thus giving rise to a positive correlation between concentration and wages.

To deal with this endogeneity problem, we rely on an instrumental variable strategy building upon Azar et al. (2022), Rinz (2022), Qiu and Sojourner (2022) and Marinescu et al. (2021). These scholars suggest instrumenting $log(HHI)$ in local labor market $l = (o, z)$ at time t with the average of $log(1/N_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period t - where $N_{o,z',t}$ is the number of firms with positive hirings (resp. employment).[6] This instrument gives equal weight to all local labor markets, independent of their size. Alternatively, we use a weighted version of it where the weights are the shares of each local la-

[6]This type of leave-one-out instrument is standard in international economics and industrial organization - see e.g. Hausman et al. (1994), Autor et al. (2013), Bai et al. (2017) and Azar et al. (2019a).

bor market in all new hires (resp. employment) in France in the corresponding occupation.

These instruments aim at capturing exogenous national changes in labor market concentration in an occupation due, for example, to mergers and divestitures of large national companies. When such companies merge or split, this modifies the number of firms operating in all local labor markets where these firms were present without being correlated with market-specific shocks. It therefore generates an exogenous shock to local labor market concentration that allows identifying the causal effect of concentration on wages.

One worry with this strategy is that variations in the weighted or unweighted instruments could, in principle, also capture national trends in supply and demand for the corresponding occupations, which could also affect wages. Consider, for example, the development of a new automating technology. Some firms adopt the technology and lay off assembly-line workers. Because fewer firms are employing assembly-line workers, concentration increases. Wages will likely also decrease, driven by the decrease in demand for workers of this type. In such a situation, the instrument would no longer be exogenous. To alleviate this concern, we build upon Bassanini et al. (2022) and proceed as follows.

We first augment our baseline specification by including the share of each 4-digit occupation in new hires at the national level to control for occupation-specific national trends in labor supply and demand. This variable being endogenous, including it could bias the estimates of β in equation (2), even in the IV regressions. However, if our instrument were strongly affected by national trends in supply and demand, we expect that the introduction of this variable should significantly alter our estimates. We will show that this is not the case, which suggests that the violation of exogeneity of the instrument, if any, is likely to be small.

As a second step, we quantify the exogeneity violation that our model may tolerate using the plausibly exogenous instrument regression method proposed by Conley et al. (2012). We assume that the instrument Z is not fully exogenous and allow for the fact that it may be correlated with $\epsilon_{i,j,f,l,t}$ in equation (2), so

that $\epsilon_{i,j,f,l,t} = \delta Z_{l,t} + \eta_{i,j,f,l,t}$, where $\eta_{i,j,f,l,t}$ is a standard error term. Equation (2) therefore becomes:

$$log(w_{i,j,f,l,t}) = \beta log(HHI_{l,t}) + \delta Z_{l,t} + \boldsymbol{X_{i,j,f,l,t}}\gamma + \mu_i + \mu_l + \mu_{j,t} + \eta_{i,j,f,l,t} \quad (3)$$

If the true value of δ - denoted δ^* - were known, one could fix that value and estimate the following equation using Z as a valid instrument:

$$log(w_{i,j,f,l,t}) - \delta^* Z_{l,t} = \beta log(HHI_{l,t}) + \boldsymbol{X_{i,j,f,l,t}}\gamma + \mu_i + \mu_l + \mu_{j,t} + \eta_{i,j,f,l,t} \quad (4)$$

In practice, δ^* is unknown but we can still estimate how large its absolute value should be to make our coefficient of interest, β, insignificant. To do so, we proceed in the following way. First, we show that Z and $log(HHI)$ are positively correlated. Therefore, if δ^* were positive, incorrectly using Z as an instrument for $log(HHI)$ would generate a bias towards positive values when estimating β by 2SLS in equation (2). The risk of overestimating the magnitude of the wage elasticity hence materializes only if δ^* is negative. As a consequence, we can take 0 as the upper bound of the support of δ - which corresponds to the case where Z is exogenous. We then consider decreasing potential values of δ^* one-by-one, take them as given and estimate equation (4) by 2SLS, instrumenting $log(HHI)$ with Z and storing confidence intervals for β at every step. This allows us to determine the lowest value of δ^* that would still make β significant at the 10% level.

We then estimate the reduced form equation of our model by OLS:

$$log(w_{i,j,f,l,t}) = \alpha Z_{l,t} + \boldsymbol{X_{i,j,f,l,t}}\gamma + \mu_i + \mu_l + \mu_{j,t} + u_{i,j,f,l,t} \quad (5)$$

and we express the lowest value of δ^* that still makes β significant at the 10% level as a proportion of the reduced-form effect α, estimated in equation (5). This gives us a sense of the magnitude of the violation of exogeneity of the instrument that our model may tolerate.

2.3 Decomposing the overall effect of labor market concentration on wages

As a second step, we decompose the overall effect of labor market concentration on total wages into the effects on new hires' and incumbents' wages. For any given values of a vector of observables X, the average wage in the entire population, conditional on X, writes:

$$E(w_{i,t}|X_{i,t}) = Pr(i = NewHire|X_{i,t})E(w_{i,t}|i = NewHire, X_{i,t}) + \big(1 - Pr(i = NewHire|X_{i,t})\big)E(w_{i,t}|i = Incumb, X_{i,t}) \quad (6)$$

where $Incumb$ stands for incumbent.

The effect of concentration on the average wage conditional on X can therefore be written as:

$$\begin{aligned}
&\frac{\partial}{\partial HHI_{i,t}}E(w_{i,t}|X_{i,t}) = \\
&Pr(i = NewHire|X_{i,t})\frac{\partial}{\partial HHI_{i,t}}E(w_{i,t}|i = NewHire, X_{i,t}) \\
&+ \big(1 - Pr(i = NewHire|X_{i,t})\big)\frac{\partial}{\partial HHI_{i,t}}E(w_{i,t}|i = Incumb, X_{i,t}) \\
&+ \frac{\partial}{\partial HHI_{i,t}}Pr(i = NewHire|X_{i,t})\big[E(w_{i,t}|i = NewHire, X_{i,t}) - E(w_{i,t}|i = Incumb, X_{i,t})\big]
\end{aligned} \quad (7)$$

Equation (7) shows that, conditional on covariates, the effect of labor market concentration on total wages is a weighted average of the effects on new hires' and incumbents' wages, plus a component which depends on the effect of concentration on the probability of being a new hire and the wage difference between new hires and incumbents, conditional on covariates.

The unconditional effect of concentration on average wages can be obtained by integrating over the space of covariates (with indexes suppressed for the sake of

simplicity):

$$\begin{aligned}
&\int \frac{\partial}{\partial HHI} E(w|X) dF(X) = \\
&\int Pr(i = NewHire|X) \frac{\partial}{\partial HHI} E(w|i = NewHire, X) dF(X) \\
&+ \int \big(1 - Pr(i = NewHire|X)\big) \frac{\partial}{\partial HHI} E(w|i = Incumb, X) dF(X) \\
&+ \int \frac{\partial}{\partial HHI} Pr(i = NewHire|X) \big[E(w|i = NewHire, X) - E(w|i = Incumb, X)\big] dF(X)
\end{aligned} \tag{8}$$

where F is the cumulative distribution function of X.

The effect of labor market concentration on new hires' and incumbents' wages is estimated using a standard regression model. More specifically, the terms $\frac{\partial}{\partial HHI} E(w|i = NewHire, X)$ and $\frac{\partial}{\partial HHI} E(w|i = Incumb, X)$ are estimated by regressing wages on concentration and the set of covariates depicted in Section 2.2.1 on the samples of new hires and incumbents separately. $\frac{\partial}{\partial HHI} Pr(i = NewHire|X)$ can be obtained by regressing the dummy variable for being a new hire on concentration and the same set of covariates as in the wage equations, using a linear probability model. Finally, $\big[E(w|i = NewHire, X) - E(w|i = Incumb, X)\big]$ can be obtained by a regression of wages on a dummy variable for being a new hire and the usual set of covariates.

The adopted regression models imply that the estimated effects do not vary when the covariates vary. This allows us taking out of the integrals all terms that are invariant across different values of X. Taking advantage of the fact that $\int dF(X) = 1$, we obtain:

$$\begin{aligned}
&\int \frac{\partial}{\partial HHI} E(w|X) dF(X) = \\
&\frac{\partial}{\partial HHI} E(w|i = NewHire, X) \int Pr(i = NewHire|X) dF(X) \\
&+ \frac{\partial}{\partial HHI} E(w|i = Incumb, X) \int \big(1 - Pr(i = NewHire|X)\big) dF(X) \\
&+ \big[E(w|i = NewHire, X) - E(w|i = Incumb, X)\big] \frac{\partial}{\partial HHI} Pr(i = NewHire|X)
\end{aligned} \tag{9}$$

Finally, considering that:

$$\int Pr(i = NewHire|X)dF(X) = Pr(i = NewHire) \tag{10}$$

equation (9) can be re-written as:

$$\begin{aligned}
&\int \frac{\partial}{\partial HHI} E(w|X)dF(X) = \\
&Pr(i = NewHire)\frac{\partial}{\partial HHI} E(w|i = NewHire, X) \\
&+ \big(1 - Pr(i = NewHire)\big)\frac{\partial}{\partial HHI} E(w|i = Incumb, X) \\
&+ \big[E(w|i = NewHire, X) - E(w|i = Incumb, X)\big]\frac{\partial}{\partial HHI} Pr(i = NewHire|X)
\end{aligned} \tag{11}$$

where $Pr(i = NewHire)$ can be approximated by the frequency of new hires in our sample.

If labor market concentration reduces workers' outside options, we expect the first two terms of expression (11) to be negative since $\frac{\partial}{\partial HHI} E(w|i = NewHire, X)$ and $\frac{\partial}{\partial HHI} E(w|i = Incumb, X)$ will both be negative. We also expect $\frac{\partial}{\partial HHI} Pr(i = NewHire|X)$ to be negative since labor market concentration reduces the probability for workers to find a new job. However, the sign of the third term will eventually depend on whether average wages of new hires are higher or lower than those of incumbents. If higher, all terms of the decomposition will contribute to the negative effect of labor market concentration on total wages. If, in contrast, the wages of new hires are lower than those of incumbents, the third component of the decomposition will dampen the negative effect of concentration on total wages. We estimate the magnitude and sign of all effects in Section 4.

3 Data

We use two datasets extracted from the French Social Security records (DADS). The first one (DADS-Postes) covers the universe of salaried workers and establishments.

The units of observation are job matches, i.e. couples of establishments and workers in a given year. Regarding establishments, it contains information on their location (municipality), industry, and the firm to which they belong. Regarding workers, it provides information on the length of employment spells and the 4-digit occupation for all job matches with non-zero hours worked in a given year. Establishments have a unique identifier which is invariant over time, except when the establishment changes location or is sold out to another company, in which case it is assigned a new identifier. By contrast, for the sake of anonymity, workers' identifiers are changed every year. However, for any given year, we know in which establishments employees were working the year before. We use data starting in 2009 since the coverage of DADS was incomplete until 2008.[7] We match each municipality contained in the DADS-Postes with the 2010 commuting zones using a mapping provided by the French Statistical Institute (INSEE).

For the subset of job matches in the DADS-Postes whose workers were born in October of each year, there exists a panel (Panel Tous Salariés) which maintains the same identifier over time for each worker and hence allows following workers across various employers and years. This panel contains information on gross annual wages, the length of employment spells, hours worked, workers' age, gender and 4-digit occupation. It is available only until 2017. Since some of our controls are lagged one year, our analysis covers the period ranging from 2010 to 2017.

We use the whole DADS-Postes to construct HHIs based on hirings (and employment). We eliminate internships as well as household workers and workers with fewer than 30 days of employment with the same employer in a year.[8] We also eliminate the sub-sectors belonging to agriculture and the public sector. A new hire in a given year is defined as a worker who did not work for any establishment of the firm the year before. In contrast, an incumbent worker is a worker who was already employed in one of the establishments of the firm the year before.

Our dataset contains a yearly average of 107,540 local labor markets with positive

[7]Sectors that were missing were agriculture, the food processing industry, some of the most important commercial banks, as well as the public sector.

[8]The so-called *emplois annexes*.

hirings. There are 412 4-digit occupations and 304 commuting zones in France, but not all of them have positive hirings each year. In our sample, the average number of firms with positive hirings per market is 800, the 25th percentile, 38, the median, 135 and the 75th percentile, 509. With 6 million inhabitants, Paris is, by far, the largest commuting zone in France (INSEE, 2010). However, it is the largest market in terms of number of new hires for a given occupation*year couple in only 78.9% of the cases. Lyon comes second with 3.8% and Toulouse third with 1.7%. Moreover, 130 commuting zones (43% of the total) are the largest market at least once in our sample.

Descriptive statistics of concentration in French local labor markets are reported in Appendix Table A1. When measured with reference to hirings, mean concentration, weighted by employment, is around 0.12 over the period we consider (2010-2017). Unsurprisingly, it is lower when measured on the basis of employment: about 0.09. However, mean values of HHIs turn out to be much larger than median values, suggesting that a number of local labor markets are highly concentrated. As a matter of fact, the 90th percentile of the distribution is as high as 0.32 when measured on the basis of hirings and 0.24 when measured on the basis of employment.

In over 70% of our commuting zones, the average concentration between 2010 and 2017 was above 0.15 - see Figure A1. As in most countries - see Abel et al. (2018), Rinz (2022) and Azar et al. (2019b) - local labor markets are more concentrated in mostly rural than in mostly urban commuting zones in France. This will be accounted for in our regressions by including local labor market fixed effects.

Some occupations are more concentrated than others. If we compute average HHIs at the level of 4-digit occupations, we see that all occupations in the bottom 5% of the concentration distribution are either middle or low skilled: 75% of them belong to the group of clerks and salespersons while 25% are blue-collars or workers in elementary occupations - Appendix Table A2. In contrast, the top 5% of the distribution is more varied: clerks and salespersons account for 44% of this group, blue-collars for 24%, managers and skilled professionals for 18% and technicians and associate professionals for 14%. However, most occupations in this group are highly

specialized, even among middle and low-skilled occupations. This is the case, for example, of Locomotive engine drivers, Food processing and related trades workers or Transport conductors.

Between 2010 and 2017, the distribution of HHIs across local labor markets is remarkably stable over time - see Table A3. Yet, there is much more variation at the level of single local labor markets. From one year to the next, on average, one quarter of these markets experiences a fall in HHI larger than 28%, while another quarter experiences an increase larger than 28%. Most of these changes occur in markets with low HHI.

Our preferred specification has daily wages as the dependent variable. These are defined as the ratio of gross annual wages to the number of days in employment in a year. They represent a more accurate measure of labor earnings than hourly wages since a number of firms report conventional rather than actual hours worked in the DADS, thus giving rise to much measurement error. In order to avoid that our results be affected by the incidence of very short part-time employment, we restrict our sample to full-time workers. Nonetheless, we run a robustness check including part-timers with hourly wages as the dependent variable. Whatever the wage variable we use, as standard when using the DADS, we trim the top and bottom 1% wages.

Our observations are job matches in each year, i.e. individual-by-establishment-by-year triples. Descriptive statistics for our full sample are provided in Appendix Table A4. As shown in the first panel, incumbents represent 73.2% of our sample while full-time workers are 72.7%. Incumbents are on average older than new hires (40.2 as compared to 32.3) - see the second and third panels. They earn higher daily wages (65.75€ as compared to 44.11€)[9] and males represent a slightly larger proportion of them than in new hires (57.9% vs 56.8%). As evidenced in the third panel, a majority of new hires (69.7%) were in employment - although not with their

[9]The daily wages reported in Appendix Table A4 are averages across job matches. If aggregating at the individual level, the average annual wage is 20,178€ over the whole sample period and 21,136€ in 2017. The latter is very close to the annual individual wage reported by the French Statistical Institute INSEE, for 2017, i.e. 20,940€ - see https://www.insee.fr/fr/statistiques/4503068?sommaire=4504425q=revenus+salariaux.

current employer - the year before.

4 Results

4.1 Labor market concentration and wages

We first estimate the impact of labor market concentration on daily wages of full-time workers. The results are shown in Table 1. As evidenced in Panel A, the OLS point estimates are negative although small in magnitude. Moreover, the association between labor market concentration and wages is significant at the 5% level when estimated for incumbents only but it is insignificant at conventional levels - although larger - when estimated on new hires. However, as mentioned in Section 2.2.2, the small effect of labor market concentration on wages could be due to an omitted time-varying variable negatively affecting local wages and simultaneously increasing the number of firms operating in the local labor market - e.g. the opening of a new technical school.

To tackle this endogeneity problem we run IV estimates in which $log(HHI_{l,t})$ is instrumented by the (unweighted or weighted) average of $log(1/N_{l',t})$, where $N_{l',t}$ is the number of firms with positive hirings in the same occupation o in all commuting zones z' except the one corresponding to labor market l. This instrument is strongly positively correlated with labor market concentration, as evidenced by the first-stage F-statistics reported at the bottom of Table 1 and the first-stage regression coefficients reported in Appendix Table A5. When estimated in this way, the impact of labor market concentration on daily wages turns out to be negative and significant at the 1% level, whatever the instrument and the sample we consider.[10]

As expected, the effect of labor market concentration on wages is smaller for incumbents than for new hires, with an elasticity ranging from -0.0185 to -0.0230 depending on the instrument. When relying on the unweighted IV - Panel B -, we estimate that increasing labor market concentration by one standard deviation from

[10]These results are robust to using a pure leave one out version of the instrument in which the average of $log(HHI_{l',t})$ is used instead of $log(1/N_{l',t})$ - see Appendix Table A6.

the median reduces daily wages by 3% for incumbents as compared to 4.6% for new hires. The gap across both groups is slightly smaller when using the weighted IV with a wage penalty of 3.7% for incumbents as compared to 4.7% for new hires - Panel C. In both cases, however, the depressing effect of labor market concentration on incumbents' wages is far from negligible: between about two thirds and three quarters of that estimated on new hires. Moreover, this effect is not due to the potential persistence of the negative effect of labor market concentration on wages at the time of hiring: as shown in Appendix Table A7, our findings are indeed robust to controlling for a match-specific fixed effect which absorbs any impact of concentration at the time of hiring.

The findings presented so far rely on the classical IV strategy which instruments the HHI in a local labor market with the unweighted - resp. weighted - average of $log(1/N_{o,z',t})$ in all other commuting zones z' for the same occupation and time period. As highlighted in Section 2.2.2, this instrument provides a source of variation of labor market concentration relying on national rather than local changes in the occupation we consider. If these changes are induced by mergers and divestitures of large national firms, they will affect concentration in the local labor markets where those firms are present, without being correlated with market-specific shocks. However, variations in our instrument could, in principle, also capture national trends in supply and demand for the corresponding occupation, which could also affect wages.

To alleviate this concern, we first augment our baseline specification by including the share of each 4-digit occupation in new hires at the national level to control for national occupational trends in labor supply and demand. If our instrument were strongly affected by national trends in supply and demand, this should substantially modify our estimates. As shown in Table 2, this is not the case. Our results are hardly modified when introducing this control: the point estimate on $Log(HHI)$ is identical to that in Table 1 in the OLS specifications, while the IV estimates are within one standard error from each other both in the overall sample and for new

hires and incumbents, separately.[11] This suggests that the violation of exogeneity of the instrument, if any, is likely to be small.

We then quantify the exogeneity violation that our model may tolerate using the method presented in Section 2.2.2. As evidenced in Table 3, our results are robust to large violations of exogeneity of the instruments. When estimated on the overall sample, the impact of $Log(HHI)$ on average wages would still be significant at the 10% level should the direct effect of the unweighted or weighted instrument on wages be as high as 86.5% of the effect estimated in the reduced form - see the third rows of Panels A and B. Results are very similar for incumbents only, since the model tolerates violations as large as 86% of the direct effect. For new hires, the violations that are tolerated are smaller but they are still very large in magnitude (43%). We consider such large violations to be unlikely given the stability of our estimates when controlling for the national occupational shares. Based on these findings, we interpret our results as capturing the causal effect of labor market concentration on wages, rather than the effect of any potential confounder.

Since the impact of labor market concentration on daily wages can only be meaningfully estimated on full timers, we run a robustness check on the joint sample of full-time and part-time workers, using hourly wages as the dependent variable. The results are presented in Appendix Table A8 and are similar to those reported in Table 1. The OLS estimates are small and not significant, except for incumbents at the 10% level - see Panel A. As evidenced in Panels B and C, the IV elasticity of new hires' wages with respect to labor market concentration is significant at the 1% level and ranges from -0.0213 to -0.0228 depending on the instrument. Regarding incumbents, the elasticity ranges from -0.0117 to -0.0126, also significant at the 1% level.

Finally, we estimate the impact of labor market concentration on wages using a measure of the HHI based on employment rather than hirings. As shown in Appendix Table A9, the results are very similar to those obtained with the HHI

[11] Results are unchanged if using the log instead of the level of the share of each 4-digit occupation in new hires at the national level.

based on hirings. The OLS estimates are very small and insignificant at conventional levels, whatever the sample we consider. When estimated using an IV strategy, the elasticity of wages with respect to concentration varies between -0.0217 and -0.0273 for new hires, while it varies between -0.0232 and -0.0282 for incumbents, significant at the 1% level in all cases.

4.2 Labor market concentration and probability of being a new hire

As a second step, we estimate the effect of labor market concentration on the probability that a worker be a new hire rather than an incumbent. As evidenced in the first column of Table 4 - Panel A, and as was the case for daily wages, the OLS point estimate is small and insignificant at conventional level, although negative. In contrast, the IV estimates reveal that labor market concentration reduces the probability of being a new hire, whatever the instrument we use - see Panel A., columns (2) and (3).[12] Increasing concentration by one standard deviation from the median indeed decreases the probability of being a new hire by 3 to 3.3 percentage points according to the instrument we use. This confirms that the more concentrated employers are on a labor market, the fewer the outside options for workers.

Here again, one could worry that our instrument partly captures national trends in occupation-specific labor supply and demand. However, as for wages, this does not come out as a major concern in our data. First, our results are stable when controlling for the shares of 4-digit occupations in new hires at the national level, which capture potential changes in labor supply and demand at the aggregate occupational level - see Panel B of Table 4. This suggests that the potential violations of exogeneity of our instruments, if any, are likely to be small. Second, when estimating the magnitude of the violations that our model may tolerate we find very large values: depending on the instrument, our results appear to be robust to exogeneity

[12]The results of the corresponding first-stage regressions are presented in Appendix Table A10. Our results are robust to using a pure leave one out version of the instrument in which the average of $log(HHI_{l',t})$ is used instead of $log(1/N_{l',t})$ - see Appendix Table A11.

violations up to 70% - see last row of Table 5. As a consequence, we consider that we can safely interpret our findings as capturing the causal effect of labor market concentration on the probability of being a new hire.

These estimates were obtained on the sample of full-time workers that we used for estimating the effect of labor market concentration on daily wages. If we re-estimate our model on the entire sample of full-time and part-time workers used for the robustness check based on hourly wages, our findings are in the same order of magnitude as those reported in Panel A of Table 4: increasing labor market concentration by one standard deviation reduces the probability of being a new hire by 2.2 to 2.6 percentage points, depending on the instrument we use - see Table A12, Panel A. The same holds when using a measure of concentration based on employment rather than hirings: a one-standard-deviation increase in HHI indeed reduces the probability of being a new hire by 3.6 to 3.8 percentage points - see Panel B. of Table A12.

4.3 Decomposition of the overall effect of labor market concentration on wages

As a last step, we decompose the overall effect of labor market concentration on total wages into the effects on new hires' and incumbents' wages.

As highlighted by Equation (11), the first two terms of this decomposition correspond to the product of the effect of concentration on new hires' and incumbents' wages, weighted by the probability that a worker belongs to each group. These probabilities can be approximated by the frequency of new hires and incumbents in our sample - i.e. 23.7% and 76.3% respectively.[13]

Inspection of Equation (11) shows that the overall effect of labor market concentration on total wages is not simply the weighted average of the effects on new hires' and incumbents' wages. A third term enters the decomposition, i.e. the product of

[13]The frequency of new hires in our sample is obtained as the ratio of the number of full-time new hires with non-missing daily wages (2,228,660) to the total number of full timers with non-missing daily wages (9,385,841) - see Appendix Table A4.

the effect of concentration on the probability of being a new hire multiplied by the difference in average wages between new hires and incumbents.

To estimate the wage difference across new hires and incumbents, we regress the daily wage of full-time workers on a dummy variable indicating whether the individual is a new hire, as well as individual, age, labor-market, and establishment-by-time fixed effects, using an OLS specification. Thus doing, we find that new hires' wages are 4.78% lower than incumbents', significant at the 1% level. This difference is not explained by heterogeneity in job tenure since, when augmenting our specification with dummy variables for each year of tenure - and a common dummy for 0 and 1 year of tenure -, we still find a wage difference of 3.54% in favor of incumbents.[14] This is likely due to specific institutional features of the French labor market. In France, the incidence of fixed-term contracts in new hires is indeed very high - 85% over our sample period, according to the Ministry of Labor.[15] Workers on such contracts are forced to move when the contract cannot be renewed, which is the case after 18 months or when the contract has already been renewed once - OECD (2020). This implies that they do not necessarily move towards better paid jobs.

Once determined all the terms that enter Equation (11), we can compute the percentage contribution of each of its three components to the overall effect of labor market concentration on wages.

In Sections 4.1 and 4.2, we have shown that labor market concentration negatively affects the wages of both new hires and incumbents on the one hand, and the probability of being a new hire on the other hand. To the extent that the wage difference between new hires and incumbents turns out to be negative, the third term of the decomposition ends up being positive - since it is the product of the negative effect of labor market concentration on the probability of being a new hire and the negative difference between new hires' and incumbents' wages. This means that, while the effect of concentration on new hires' and incumbents' wages contributes

[14] This suggests that the effect of tenure is already largely controlled for by age and individual fixed effects.

[15] See https://dares.travail-emploi.gouv.fr/donnees/les-mouvements-de-main-doeuvre

to its negative impact on total wages, the third term of the decomposition dampens this effect.

When computing how much of the overall effect is due to each component, we find that the negative effect of concentration on incumbents' wages largely dominates - see Table 6: it accounts for 70% to 74% of the total[16] - depending on the instrument we use - while the effect on new hires accounts for 34% to 30%.[17] The sum of both effects is slightly larger than 100% since the third component goes in the opposite direction: it dampens the effect by a small 4%.

Overall, our analysis suggests that the negative effect of labor market concentration on incumbents' wages is the main channel through which concentration affects total wages in the entire working population.

5 Conclusion

Using French administrative data, we have shown that the elasticity of total wages with respect to labor market concentration ranges from -0.0244 to -0.0267, when controlling in the strictest possible way for establishment-level productivity and product market competition. Concentration negatively affects both new hires' and incumbents' wages with elasticities ranging from -0.0287 to -0.0296 and -0.0185 to -0.0230, respectively. It also reduces the probability that a worker be a new hire rather than an incumbent. When decomposing the overall effect of labor market concentration on wages into its different components, we find that the negative effects on new hires' and incumbents' wages account for 34% to 30% and 70% to 74% of the overall effect, respectively. They are counterbalanced - although only to a small extent (4%) - by the fact that concentration reduces the probability that a worker be a new hire while, in France, new hires have, on average, lower wages than

[16]These percentages are obtained as the ratio of the contribution of the effect of concentration on incumbents' wages to the overall effect of concentration on total wages. The overall effect of concentration on total wages is the sum of the three components of Equation (11). It is therefore slightly different from the effect estimated in Table 1. The contribution of the effect of concentration on incumbents' wages is obtained as the probability of being an incumbent (76.3%) multiplied by the point estimates reported in Table 1 - Column (3) - Panels B or C.

[17]These percentages are obtained using the method described in Footnote 16 and the point estimates reported in Table 1 - Column (2) - Panels B or C.

incumbents.

Our findings suggest that labor market concentration does not only affect wages at the margin, i.e. when changing jobs, but also in the course of the employment relation, by reducing the bargaining power of incumbents who then have fewer outside options. They complement the results of Thoresson (2021) who finds that reduced labor market concentration in pharmaceutical retailing led to an increase in wages for incumbent workers in Sweden. We show that labor market concentration is also harmful to incumbents' wages in another EU country, France, and in the whole economy. Our findings also complement Arnold (2021) who finds that mergers that increase labor market concentration reduce incumbents' wages in merged companies. We find that concentration affects incumbents' wages in non-merged companies too.

Our results also suggest a channel through which labor market concentration may reduce the labor share, as evidenced by Jarosch et al. (2021). To the extent that incumbents' wages have been found to be a key determinant of the latter (Hahn et al., 2021), the large contribution of these wages to the negative effect of labor market concentration on total salaries that we uncover stands as a potential mechanism by which increasing concentration in the labor market may reduce the labor share. Symmetrically, our findings are consistent with the fact that the labor share remained quite stable in France in recent years - see Cette et al. (2020) - since labor market concentration did not markedly increase since 2010, as evidenced in Table A3.

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Table 1: Daily Wages of Full-time Workers - HHI based on hirings

	Log(Daily Wage)		
	(1)	(2)	(3)
	All	New hires	Incumbents
	Panel A. OLS		
$Log(HHI_{l,t})$	-0.0005*	-0.0014	-0.0005**
	(0.0003)	(0.0020)	(0.0003)
Observations	9,205,538	2,170,850	7,034,688
R^2	0.91	0.89	0.93
	Panel B. Unweighted IV		
$Log(HHI_{l,t})$	-0.0244***	-0.0287***	-0.0185***
	(0.0018)	(0.0099)	(0.0016)
Observations	9,205,504	2,170,843	7,034,661
Kleibergen-Papp F-stat	1,098.09	531.59	1,023.54
	Panel C. Weighted IV		
$Log(HHI_{l,t})$	-0.0267***	-0.0296***	-0.0230***
	(0.0020)	(0.0100)	(0.0019)
Observations	9,205,504	2,170,843	7,034,661
Kleibergen-Papp F-stat	742.14	407.40	658.32
Individual FE	Yes	Yes	Yes
Age FE	Yes	Yes	Yes
Labor market FE	Yes	Yes	Yes
Establishment*Year FE	Yes	Yes	Yes

Note: The dependent variable is the logarithm of the daily wage. HHI denotes the Herfindahl-Hirschman index. Age fixed-effects include one dummy variable for each year of age of the individual. In Panel B - resp. C - $log(HHI)$ in local labor market $l = (o, z)$ at time t is instrumented with the unweighted - resp. weighted - average of $log(1/N_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period - where $N_{o,z',t}$ is the number of firms with positive hirings. Column (1) controls for a dummy variable indicating whether the individual is a new hire and, if so, for a dummy variable indicating whether he/she was in employment the year before. Column (2) controls for a dummy variable indicating whether the individual was in employment the year before. The number of observations is marginally lower in IV specifications since, for a few occupations each year, hirings are positive in one commuting zone only, so that the instrument cannot be constructed. Standard errors are clustered at the labor-market-by-time level. *** p<0.01, ** p<0.05, * p<0.1.

Table 2: Daily Wages of Full-time Workers - HHI based on hirings
Controlling for the share of 4-digit occupations in new hires at the national level

	Log(Daily Wage)		
	(1)	(2)	(3)
	All	New hires	Incumbents
	Panel A. OLS		
$Log(HHI_{l,t})$	-0.0005*	-0.0012	-0.0005**
	(0.0003)	(0.0020)	(0.0003)
Observations	9,205,538	2,170,850	7,034,688
R^2	0.91	0.89	0.93
	Panel B. Unweighted IV		
$Log(HHI_{l,t})$	-0.0227***	-0.0390***	-0.0170***
	(0.0015)	(0.0094)	(0.0014)
Observations	9,205,504	2,170,843	7,034,661
Kleibergen-Papp F-stat	1,482.64	666.37	1,393.58
	Panel C. Weighted IV		
$Log(HHI_{l,t})$	-0.0254***	-0.0359***	-0.0217***
	(0.0018)	(0.0097)	(0.0017)
Observations	9,205,504	2,170,843	7,034,661
Kleibergen-Papp F-stat	947.67	481.31	862.47
Individual FE	Yes	Yes	Yes
Age FE	Yes	Yes	Yes
Labor market FE	Yes	Yes	Yes
Establishment*Year FE	Yes	Yes	Yes
National share of 4-digit occupation	Yes	Yes	Yes

Note: The dependent variable is the logarithm of the daily wage. HHI denotes the Herfindahl-Hirschman index. Age fixed-effects include one dummy variable for each year of age of the individual. In Panel B - resp. C - $log(HHI)$ in local labor market $l = (o, z)$ at time t is instrumented with the unweighted - resp. weighted - average of $log(1/N_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period - where $N_{o,z',t}$ is the number of firms with positive hirings. Column (1) controls for a dummy variable indicating whether the individual is a new hire and, if so, for a dummy variable indicating whether he/she was in employment the year before. Column (2) controls for a dummy variable indicating whether the individual was in employment the year before. The number of observations is marginally lower in IV specifications since, for a few occupations each year, hirings are positive in one commuting zone only, so that the instrument cannot be constructed. Standard errors are clustered at the labor-market-by-time level. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Daily Wages of Full-time Workers - HHI based on hirings
Plausibly exogenous instrument regressions

	Log(Daily Wage)		
	(1) All	(2) New hires	(3) Incumbents
	Panel A. Unweighted IV		
(1) Reduced form estimate of δ from Equation (5)	-0.0206***	-0.0229***	-0.0160***
	(0.0014)	(0.0081)	(0.0013)
(2) Minimum δ^* for which β is significant at the 10% level in Equation (4)	-0.0185	-0.0100	-0.0139
(2)/(1)	0.898	0.437	0.867
	Panel B. Weighted IV		
(1) Reduced form estimate of δ from Equation (5)	-0.0141***	-0.0185***	-0.0114***
	(0.0009)	(0.0062)	(0.0008)
(2) Minimum δ^* for which β is significant at the 10% level in Equation (4)	-0.0122	-0.0080	-0.0098
(2)/(1)	0.865	0.432	0.860

Note: The dependent variable is the logarithm of the daily wage. HHI denotes the Herfindahl-Hirschman index. In Panel A - resp. Panel B - $Z_{l,t}$ in equations (4) and (5) refers to the unweighted - resp. weighted - average of $log(1/N_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period - where $N_{o,z',t}$ is the number of firms with positive hirings. When estimating equation (4), δ^* is fixed and $log(HHI_{l,t})$ is instrumented with $Z_{l,t}$. Controls and fixed effects are the same as in Table 1. Standard errors are clustered at the labor-market-by-time level. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Probability of Being a New Hire - HHI based on hirings

	Pr(NewHire)		
	(1)	(2)	(3)
	OLS	Unweighted IV	Weighted IV
	Panel A. Baseline specification		
$Log(HHI_{l,t})$	-0.0008	-0.0184***	-0.0207***
	(0.0006)	(0.0031)	(0.0034)
Observations	9,205,538	9,205,504	9,205,504
R^2	0.64	-	-
Kleibergen-Papp F-stat	-	1,098.01	742.10
Individual FE	Yes	Yes	Yes
Age FE	Yes	Yes	Yes
Labor market FE	Yes	Yes	Yes
Establishment*Year FE	Yes	Yes	Yes
	Panel B. Controlling for the share of 4-digit occupations in new hires at the national level		
$Log(HHI_{l,t})$	-0.0009	-0.0138***	-0.0176***
	(0.0006)	(0.0025)	(0.0031)
Observations	9,205,538	9,205,504	9,205,504
R^2	0.64	-	-
Kleibergen-Papp F-stat	-	1482.66	947.67
Individual FE	Yes	Yes	Yes
Age FE	Yes	Yes	Yes
Labor market FE	Yes	Yes	Yes
Establishment*Year FE	Yes	Yes	Yes
National share of 4-digit occupation	Yes	Yes	Yes

Note: The dependent variable is a dichotomous variable taking value 1 if the worker is a new hire and 0 otherwise. The sample is restricted to full-time workers with non-missing daily wages. HHI denotes the Herfindahl-Hirschman index. Age fixed-effects include one dummy variable for each year of age of the individual. In Columns (2) - resp. (3) - $log(HHI)$ in local labor market $l = (o, z)$ at time t is instrumented with the unweighted - resp. weighted - average of $log(1/N_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period - where $N_{o,z',t}$ is the number of firms with positive hirings. The number of observations is marginally lower in IV specifications since, for a few occupations each year, hirings are positive in one commuting zone only, so that the instrument cannot be constructed. Standard errors are clustered at the labor-market-by-time level. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Probability of Being a New Hire - HHI based on hirings
Plausibly exogenous instrument regressions

	Pr(NewHire)	
	(1) Unweighted IV	(2) Weighted IV
(1) Reduced form estimate of δ from Equation (5)	-0.0160*** (0.0026)	-0.0105*** (0.0017)
(2) Minimum δ^* for which β is significant at the 10% level in Equation (4)	-0.0112	-0.0080
(2)/(1)	0.700	0.762

Note: The dependent variable is a dichotomous variable taking value 1 if the worker is a new hire and 0 otherwise. The sample is restricted to full-time workers with non-missing daily wages. HHI denotes the Herfindahl-Hirschman index. In column (1) - resp. (2) - $Z_{l,t}$ in equations (4) and (5) refers to the unweighted - resp. weighted - average of $log(1/N_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period - where $N_{o,z',t}$ is the number of firms with positive hirings. When estimating equation (4), δ^* is fixed and $log(HHI_{l,t})$ is instrumented with $Z_{l,t}$. Controls and fixed effects are the same as in Table 4. Standard errors are clustered at the labor-market-by-time level. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Percentage Contributions to the Effect of
Labor Market Concentration on Total Daily Wages of Full-Timers

	Contribution in %	
	(1) Unweighted IV	(2) Weighted IV
(1) New hires	34%	30%
(2) Incumbents	70%	74%
(3) Probability of being a new hire	-4%	-4%

Note: Line (1) reports how much of the overall effect of the HHI on total wages is due to its effect on the wages of new hires, multiplied by the probability of being a new hire. Line (2) reports how much of the overall effect of the HHI on total wages is due to its effect on the wages of incumbents, multiplied by the probability of being an incumbent. Line (3) reports how much of the overall effect of the HHI on total wages is due to its effect on the probability of being a new hire, multiplied by the difference in average wages between new hires and incumbents.

A Appendix

Table A1: Average Labor Market Concentration 2010-2017

2010-2017	(1) Mean	(2) SD	(3) P25	(4) P50	(5) P75	(6) P90
HHI based on Hirings	0.1172	0.1831	0.0162	0.0461	0.1280	0.3194
HHI based on Employment	0.0911	0.1595	0.0103	0.0308	0.0909	0.2444

Note: HHI denotes the Herfindahl-Hirschman index. The values of HHIs reported in the table are weighted by employment on December 31st of each year in each local labor market.

Table A2: Share of Large Occupational Groups in the 5% 4-digit Occupations with Highest and Lowest HHIs

Large occupational groups	Bottom 5%	Top 5%
Managers and high-skill professionals	0%	18.2%
Technicians and associate professionals	0%	14.0%
Clerks and salespersons	75.0%	43.8%
Blue-collars and elementary occupations	25.0%	24.0%

Note: HHI denotes the Herfindahl-Hirschman index. HHIs are based on hirings. The table regroups the 5% 4-digit occupations with the highest and lowest HHIs into large occupational groups and shows the related distribution of observations. The top and bottom 5% 4-digit occupations refer to the distribution of HHIs across 4-digit occupations, weighted by the number of observations (job matches). *Reading*: Clerks and salespersons account for 43.8% of the observations in the group of 4-digit occupations with an HHI belonging to the top 5% of the concentration distribution.

Table A3: Mean and Median Labor Market Concentration in France Over Time
HHI based on hirings

Year	Mean	Median
2010	0.1171	0.0437
2011	0.1167	0.0452
2012	0.1160	0.0464
2013	0.1158	0.0450
2014	0.1209	0.0482
2015	0.1158	0.0456
2016	0.1190	0.0493
2017	0.1116	0.0424

Note: $\overline{HHI}$ denotes the Herfindahl-Hirschman index. The table presents the mean and median of the distribution of HHIs across local labor markets (weighted by their employment on December 31st of each year).

Table A4: Individual Characteristics

	Mean	Std Deviation	Observations
		All Employees	
Incumbents	0.732	0.443	12,914,280
New hires in employment year before	0.187	0.390	12,914,280
Full-time workers	0.727	0.446	12,914,280
Age	38.06	12.34	12,914,280
Males	0.577	0.494	12,914,280
Daily nominal wage (€)	59.94	73.03	12,914,277
Daily nominal wage of full-timers (€)	70.70	79.42	9,385,841
Hourly nominal wage (€)	13.19	15.61	12,914,280
		Incumbents	
Full-time workers	0.757	0.429	9,449,981
Age	40.18	11.91	9,449,981
Males	0.579	0.494	9,449,981
Daily nominal wage (€)	65.75	80.89	9,449,979
Daily nominal wage of full-timers (€)	75.74	86.96	7,157,181
Hourly nominal wage (€)	14.12	16.91	9,449,981
		New Hires	
In employment year before	0.697	0.459	3,464,299
Full-time workers	0.643	0.479	3,464,299
Age	32.26	11.62	3,464,299
Males	0.568	0.495	3,464,299
Daily nominal wage (€)	44.11	41.08	3,464,298
Daily nominal wage of full-timers (€)	54.54	43.98	2,228,660
Hourly nominal wage (€)	10.64	10.95	3,464,299

Note: Each observation is an individual-by-establishment-by-year triple. Daily nominal wages are defined as the ratio of gross annual wages to the number of days in employment in a year. Hourly nominal wages are defined as the ratio of gross annual wages to the reported number of hours worked in a year. A new hire in a given year is a worker who did not work for any establishment of the firm the year before. An incumbent is a worker who was already employed in one of the establishments of the firm the year before.

Table A5: First-Stage Regressions - Wage equations
HHI based on hirings - Full timers only

	Log(HHI)		
	(1)	(2)	(3)
	All	New hires	Incumbents
	Panel A. Unweighted IV		
Unweighted Avg of $log(1/N_{o,z',t})$	0.8620***	0.8282***	0.8792***
	(0.0260)	(0.0359)	(0.0275)
Observations	9,205,504	2,170,843	7,034,661
R^2	0.97	0.99	0.96
	Panel B. Weighted IV		
Weighted Avg of $log(1/N_{o,z',t})$	0.5266***	0.6258***	0.5038***
	(0.0193)	(0.0310)	(0.0196)
Observations	9,205,504	2,170,843	7,034,661
R^2	0.97	0.99	0.96
Individual FE	Yes	Yes	Yes
Age FE	Yes	Yes	Yes
Labor market FE	Yes	Yes	Yes
Establishment*Year FE	Yes	Yes	Yes

Note: HHI denotes the Herfindahl-Hirschman index. Age fixed-effects include one dummy variable for each year of age of the individual. In Panel A - resp. B - $Log(HHI)$ in local labor market $l = (o, z)$ at time t is regressed on the unweighted - resp. weighted - average of $log(1/N_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period - where $N_{o,z',t}$ is the number of firms with positive hirings. Column (1) controls for a dummy variable indicating whether the individual is a new hire and, if so, for a dummy variable indicating whether he/she was in employment the year before. Column (2) controls for a dummy variable indicating whether the individual was in employment the year before. Standard errors are clustered at the labor-market-by-time level. *** p<0.01, ** p<0.05, * p<0.1.

Table A6: Daily Wages of Full-Time Workers - HHI based on hirings
Pure Leave-One-Out Instrument

	Log(Daily Wage)		
	(1)	(2)	(3)
	All	New hires	Incumbents
		Second Stage	
$Log(HHI_{l,t})$	-0.0099***	-0.0036	-0.0084***
	(0.0011)	(0.0068)	(0.0021)
		First Stage	
Avg of $log(HHI_{o,z',t})$	1.2521***	1.1742***	1.2864***
	(0.0263)	(0.0350)	(0.0278)
Observations	9,205,504	2,170,843	7,034,661
Kleibergen-Papp F-stat	2,272.33	1,122.71	2,134.59
Individual FE	Yes	Yes	Yes
Age FE	Yes	Yes	Yes
Labor market FE	Yes	Yes	Yes
Establishment*Year FE	Yes	Yes	Yes

Note: The dependent variable is the logarithm of the daily wage. HHI denotes the Herfindahl-Hirschman index based on hirings. Age fixed-effects include one dummy variable for each year of age of the individual. The first column includes a dummy variable for being a new hire and a dummy variable for being employed the year before if new hire. The second column includes a dummy variable for being employed the year before. For each local labor market $l = (o, z)$ at time t, the pure leave-one-out instrument is the average of $log(HHI_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period. Standard errors are clustered at the labor-market-by-time level. *** p<0.01, ** p<0.05, * p<0.1.

Table A7: Daily Wages of Full-Time Incumbents - HHI based on hirings
With Job Spell Fixed-Effects

	Log(Daily Wage)		
	(1)	(2)	(3)
	OLS	Unweighted IV	Weighted IV
$Log(HHI_{l,t})$	-0.0004*	-0.0131***	-0.0180***
	(0.0002)	(0.0015)	(0.0018)
Observations	7,034,688	7,034,661	7,034,661
R^2	0.94	-	-
Kleibergen-Papp F-stat	-	1,010.00	629.55
Job spell FE	Yes	Yes	Yes
Age FE	Yes	Yes	Yes
Labor market FE	Yes	Yes	Yes
Establishment*Year FE	Yes	Yes	Yes

Note: The dependent variable is the logarithm of the daily wage. HHI denotes the Herfindahl-Hirschman index. Age fixed-effects include one dummy variable for each year of age of the individual. In column (2) - resp. (3) -, $log(HHI)$ in local labor market $l = (o, z)$ at time t is instrumented with the unweighted - resp. weighted - average of $log(1/N_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period - where $N_{o,z',t}$ is the number of firms with positive hirings. The number of observations is marginally lower in IV specifications since, for a few occupations each year, hirings are positive in one commuting zone only, so that the instrument cannot be constructed. Standard errors are clustered at the labor-market-by-time level. *** p<0.01, ** p<0.05, * p<0.1.

Table A8: Hourly Wages of All Workers - HHI based on hirings

	Log(Hourly Wage)		
	(1)	(2)	(3)
	All	New hires	Incumbents
	Panel A. OLS		
$Log(HHI_{l,t})$	-0.0002	0.0019	-0.0006*
	(0.0004)	(0.0014)	(0.0003)
Observations	12,667,434	3,374,576	9,292,858
R^2	0.91	0.89	0.93
	Panel B. Unweighted IV		
$Log(HHI_{l,t})$	-0.0142***	-0.0213***	-0.0117***
	(0.0018)	(0.0048)	(0.0018)
Observations	12,667,389	3,374,564	9,292,825
Kleibergen-Papp F-stat	1,409.98	821.41	1,265.56
	Panel C. Weighted IV		
$Log(HHI_{l,t})$	-0.0138***	-0.0228***	-0.0126***
	(0.0023)	(0.0053)	(0.0021)
Observations	12,667,389	3,374,564	9,292,825
Kleibergen-Papp F-stat	1,007.52	730.59	839.11
Individual FE	Yes	Yes	Yes
Age FE	Yes	Yes	Yes
Labor market FE	Yes	Yes	Yes
Establishment*Year FE	Yes	Yes	Yes

Note: The dependent variable is the logarithm of the hourly wage. HHI denotes the Herfindahl-Hirschman index. Age fixed-effects include one dummy variable for each year of age of the individual. In Panel B - resp. C - $log(HHI)$ in local labor market $l = (o, z)$ at time t is instrumented with the unweighted - resp. weighted - average of $log(1/N_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period - where $N_{o,z',t}$ is the number of firms with positive hirings. All columns control for a dummy variable indicating whether the individual works part time or not. Column (1) controls for a dummy variable indicating whether the individual is a new hire and, if so, for a dummy variable indicating whether he/she was in employment the year before. Column (2) controls for a dummy variable indicating whether the individual was in employment the year before. The number of observations is marginally lower in IV specifications since, for a few occupations each year, hirings are positive in one commuting zone only, so that the instrument cannot be constructed. Standard errors are clustered at the labor-market-by-time level. *** p<0.01, ** p<0.05, * p<0.1.

Table A9: Daily Wages of Full-Time Workers - HHI based on employment

	Log(Daily Wage)		
	(1)	(2)	(3)
	All	New hires	Incumbents
	Panel A. OLS		
$Log(HHI_{l,t})$	-0.0000	0.0012	-0.0004
	(0.0005)	(0.0027)	(0.0005)
Observations	9,297,814	2,178,264	7,119,550
R^2	0.91	0.89	0.93
	Panel B. Unweighted IV		
$Log(HHI_{l,t})$	-0.0258***	-0.0217***	-0.0232***
	(0.0017)	(0.0098)	(0.0016)
Observations	9,297,814	2,178,264	7,119,550
Kleibergen-Papp F-stat	2,122.95	1,375.05	1,844.76
	Panel C. Weighted IV		
$Log(HHI_{l,t})$	-0.0297***	-0.0273***	-0.0282***
	(0.0020)	(0.0101)	(0.0021)
Observations	9,297,814	2,178,264	7,119,550
Kleibergen-Papp F-stat	1,325.30	693.65	1,156.36
Individual FE	Yes	Yes	Yes
Age FE	Yes	Yes	Yes
Labor market FE	Yes	Yes	Yes
Establishment*Year FE	Yes	Yes	Yes

Note: The dependent variable is the logarithm of the daily wage. HHI denotes the Herfindahl-Hirschman index based on employment. Age fixed-effects include one dummy variable for each year of age of the individual. In Panel B - resp. C - $log(HHI)$ in local labor market $l = (o, z)$ at time t is instrumented with the unweighted - resp. weighted - average of $log(1/N_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period - where $N_{o,z',t}$ is the number of firms with positive employment. Column (1) controls for a dummy variable indicating whether the individual is a new hire and, if so, for a dummy variable indicating whether he/she was in employment the year before. Column (2) controls for a dummy variable indicating whether the individual was in employment the year before. Standard errors are clustered at the labor-market-by-time level. *** p<0.01, ** p<0.05, * p<0.1.

Table A10: First-Stage Regressions - Equation for the Probability of Being a New Hire - HHI based on hirings - Full timers only

	Log(HHI)	
	(1)	(2)
	Unweighted IV	Weighted IV
Unweighted Avg of $log(1/N_{o,z',t})$	0.8620***	-
	(0.0260)	-
Weighted Avg of $log(1/N_{o,z',t})$	-	0.5266***
	-	(0.0193)
Observations	9,205,504	9,205,504
R^2	0.97	0.97
Individual FE	Yes	Yes
Age FE	Yes	Yes
Labor market FE	Yes	Yes
Establishment*Year FE	Yes	Yes

Note: HHI denotes the Herfindahl-Hirschman index. Age fixed-effects include one dummy variable for each year of age of the individual. In Column (1) - resp. (2) - $Log(HHI)$ in local labor market $l = (o, z)$ at time t is regressed on the unweighted - resp. weighted - average of $log(1/N_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period - where $N_{o,z',t}$ is the number of firms with positive hirings. Standard errors are clustered at the labor-market-by-time level. *** p<0.01, ** p<0.05, * p<0.1.

Table A11: Probability of Being a New Hire - HHI based on hirings
Pure Leave-One-Out Instrument

	Pr(NewHire)
	Second Stage
$Log(HHI_{l,t})$	-0.0085***
	(0.0019)
	First Stage
Avg of $log(HHI_{o,z',t})$	1.2521***
	(0.0263)
Observations	9,205,504
Kleibergen-Papp F-stat	2,272.36
Individual FE	Yes
Age FE	Yes
Labor market FE	Yes
Establishment*Year FE	Yes

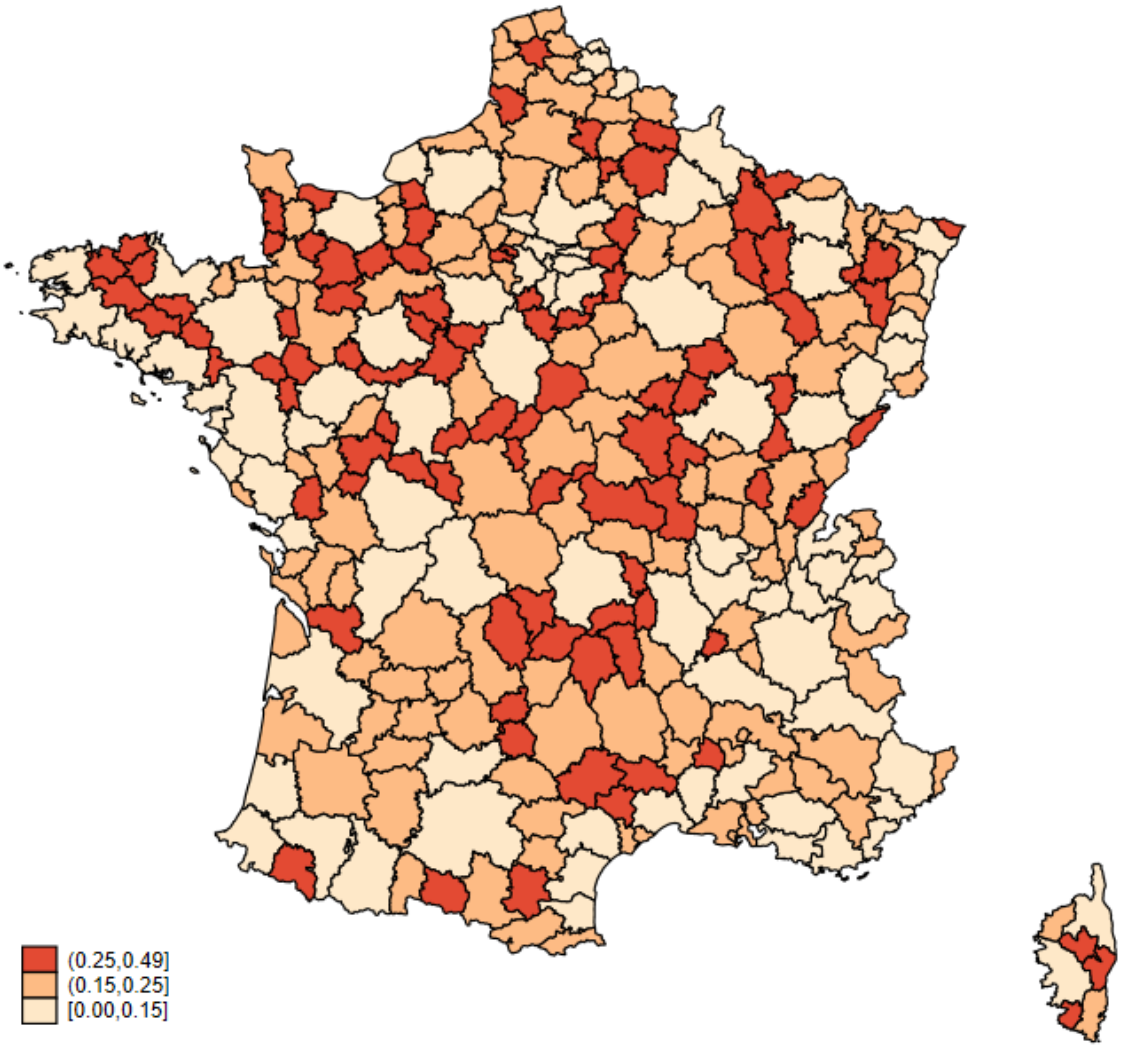
Note: The dependent variable is a dichotomous variable taking value 1 if the worker is a new hire and 0 otherwise. The sample covers only full-timers for whom we have non-missing daily wages. HHI denotes the Herfindahl-Hirschman index based on hirings. Age fixed-effects include one dummy variable for each year of age of the individual. For each local labor market $l = (o, z)$ at time t, the pure leave-one-out instrument is the average of $log(HHI_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period. Standard errors are clustered at the labor-market-by-time level. *** p<0.01, ** p<0.05, * p<0.1.

Table A12: Probability of Being a New Hire - Robustness checks

	Pr(NewHire)		
	(1)	(2)	(3)
	OLS	Unweighted IV	Weighted IV
	Panel A. All workers with non-missing hourly wages		
$Log(HHI_{l,t})$	-0.0004	-0.0159***	-0.0139***
	(0.0009)	(0.0026)	(0.0028)
Observations	12,667,434	12,667,389	12,667,389
R^2	0.60	-	-
Kleibergen-Papp F-stat	-	1409.86	1007.47
Individual FE	Yes	Yes	Yes
Age FE	Yes	Yes	Yes
Labor market FE	Yes	Yes	Yes
Establishment*Year FE	Yes	Yes	Yes
	Panel B. HHI based on employment		
$Log(HHI_{l,t})$	-0.0003	-0.0135***	-0.0127***
	(0.0009)	(0.0031)	(0.0033)
Observations	9,297,814	9,297,814	9,297,814
R^2	0.64	-	-
Kleibergen-Papp F-stat	-	2,122.81	1,325.25
Individual FE	Yes	Yes	Yes
Age FE	Yes	Yes	Yes
Labor market FE	Yes	Yes	Yes
Establishment*Year FE	Yes	Yes	Yes
National share of 4-digit occupation	Yes	Yes	Yes

Note: The dependent variable is a dichotomous variable taking value 1 if the worker is a new hire and 0 otherwise. In Panel A, the sample covers all workers for whom we have non-missing hourly wages while, in Panel B, it covers only full-timers for whom we have non-missing daily wages. HHI denotes the Herfindahl-Hirschman index based on hirings in Panel A and based on employment in Panel B. Age fixed-effects include one dummy variable for each year of age of the individual. In Columns (2) - resp. (3) - $log(HHI)$ in local labor market $l = (o, z)$ at time t is instrumented with the unweighted - resp. weighted - average of $log(1/N_{o,z',t})$ in all other commuting zones z' for the same occupation o and time period - where $N_{o,z',t}$ is the number of firms with positive hirings in Panel A and with positive employment in Panel B. Standard errors are clustered at the labor-market-by-time level. *** p<0.01, ** p<0.05, * p<0.1.

Figure A1: Labor market concentration based on Hirings in French commuting zones 2010-2017



Note: Average HHI (weighted by employment on December 31st) by commuting zone.