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The Heterogeneous Effects of Employer Concentration on Wages: Better Sorting or Uneven Rent extraction?

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Highlights

- Labor market concentration decreases average wage and increases inequality between jobs in the same local labor market.
- Labor market concentration decreases wages of jobs and average wage of all firms along the wage distribution, even on the largest markets.
- We investigate two possible mechanisms linking labor market concentration and wage inequality.

RESEARCH AND EXPERTISE ON THE WORLD ECONOMY

Abstract

We show empirically for France that labor market concentration decreases wages heterogeneously, with the lowest earners being the most vulnerable, and increases local wage inequality within occupations. If concentration allows employers to improve worker selection, both inequality and efficiency gains could materialize. However, based on a simple formalization, we interpret the findings that employer concentration increases within-firm inequality and decreases between-firm inequality as evidence against such a sorting mechanism. We also find evidence that employer concentration does not increase positive assortative matching. The results therefore suggest that concentration increases inequality through the relatively reduced bargaining position of the lowest earners.

Keywords

Labor Market Concentration, Inequality, Sorting.

JEL

J31, J42.

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1 Introduction

Just as firms can exert power on the market of goods, they can also have some power over the labor market. The monopsony argument dates back to Joan Robinson and was extensively developed more recently in the work of Alan Manning (Manning (2003)). Employer concentration in particular - which depends on the number and weight of employers in the local labor market - can be a source of market power for firms.[1] When employer concentration on a given local labor market increases, employers are in a better position to bargain with workers: they can set wages below the marginal product of workers and extract a rent.

However, just as concentration in the goods market is not necessarily a sign of market power with detrimental consequences, employer concentration on the labor market could entail potential positive effects.[2] In particular, a higher concentration of employers might improve worker selection thanks to improved sorting. A concentration of employers on the labor market could therefore bring some efficiency gains. These productivity gains might materialize only in the wages of some jobs at the top of the distribution, while wages would be reduced on average.

The negative effect of employer concentration on wages has indeed been shown by a recent strand of the literature.[3] Our focus is on investigating whether this effect is stable across the wage distribution. Are workers differently impacted by a rise in employer concentration on the labor market: in particular, are the lowest earners more vulnerable? Could an increase in wage inequality brought about by employer concentration imply productivity gains thanks to a better selection of workers (improved sorting) or does employer concentration make rent extraction more uneven across workers (heterogeneous change in the bargaining position of

[1] A situation of monopsony or oligopsony also arises in the presence of friction (costs of moving, informational asymmetry, idiosyncratic tastes for jobs not fully priced in wages etc.). The notion of labor market power is indeed broader than labor market concentration, which is one possible source of market power for firms.

[2] See Syverson (2019) for a thorough discussion on concentration and market power on the market of goods.

[3] See for the US (Rinz (2020), Benmelech et al. (2022), Qiu and Sojourner (2022), Azar et al. (2020a), Azar et al. (2020b)) and for France (Bassanini et al. (2021), Marinescu et al. (2021)).

workers)?

This is an important question, as levels of employer concentration are high in many local labor markets in the developed countries studied in the literature so far, where employers take up an important share of the jobs in a given occupation and a given commuting zone. In France in 2019, 41% of local labor markets can be considered as highly concentrated when applying the Department of Justice guidelines.[4,5]

The first contribution of our work is that we quantify, for France over the period 2009-2019, the effect of employer concentration on a wide range of measures concerning overall inequality (inequality between jobs), within-firm inequality (dispersion of wages for jobs belonging to the same occupation in a given firm) and between-firm inequality (dispersion between the average wage of a given occupation in each firm) on a given local labor market.[6] A second contribution is that we investigate two possible mechanisms through which concentration could impact inequality (sorting and heterogeneous bargaining): based on a simple formalization, we interpret the results of the effects of employer concentration on *i*) within-firm inequality, *ii*) between-firm inequality, and *iii*) three measures of positive assortative matching as evidence in favor of or against the two mechanisms studied.

Using French administrative matched employee-employer data from 2009 to 2019, we first show that an increase in employer concentration depresses wages on *average* on a local labor market (defined as a 4-digit occupation in a commuting zone). Second, we show that this negative effect is heterogeneous: the 20% poorest workers (2nd decile) endure a decrease in wages of 10.8% when employer concentration increases by two standard deviations from a moderate level (from an HHI of 0.15 to an HHI of 0.4), while the 10% richest workers (9th decile) undergo a more modest decrease of 6.2%.[7,8] In other words, within each local

[4]These markets have a Herfindahl-Index higher than 0.25. The DoJ benchmark was meant for the market of goods but serves as a useful benchmark for labor markets too (https://www.justice.gov/atr/herfindahl-hirschman-index).

[5]All local labor markets with no restriction on size are considered to calculate this share of 41%.

[6]A local labor market is defined as the interaction between a commuting zone and a 4-digit occupation.

[7]We construct the distribution of jobs within each local market.

[8]For countries such as France, the lower bound of the minimum wage constrains the wage decrease for workers already on the minimum wage. However, note that the first deciles in some rich markets have a wage

labor market, the lowest-paid jobs are the most vulnerable to employer concentration. We then show that employer concentration deepens inequality between jobs in a given local labor market for a wide range of indicators.[9] In particular, the Gini coefficient would be 5% higher on a market on which employer concentration is two standard deviations higher than a moderately concentrated local market, all others things being equal.

A first possible mechanism linking employer concentration and wage inequality -labeled the heterogeneous bargaining argument- holds that an additional decrease in bargaining power (resulting from an increase in employer concentration) might be more damaging for the lowest earners who are already in a weak bargaining position.[10,11] Indeed, the least paid workers cannot afford to look for outside options for long. The value of their outside option is lower than for better paid workers whose financial resources allow them to wait longer before accepting a job, attenuating the impact of concentration. Therefore, the wage of the least paid workers depends relatively more on the current employer concentration.

The second mechanism we investigate -labeled the sorting argument- holds that employer concentration could improve sorting, by allowing employers, which have a greater weight on the labor market, to be more demanding in the selection process - imposing more rounds of interviews, including more difficult tasks, asking for sample work, etc. With this more stringent selection process, sorting improves. If it is more efficient for high productivity workers to be matched with high productivity firms (because high productivity workers have a higher positive externality effect on the productivity of their peers), better sorting would result in more (less) productive workers being selected by more (less) productive firms (positive assortative matching). In this case of positive assortative matching, sorting leads to more wage inequality *and* is accompanied by a rise in average productivity.

To set out our ideas clearly, we propose a rough formalization in section 4. This simple

higher than the minimum wage.

[9]Namely the Gini, Mehran, Piesch, Entropy and Theil indices.

[10]Wages and bargaining power are of course likely to be highly correlated.

[11]The weaker the bargaining position, the higher the marginal effect of an additional decrease in the bargaining position will be on the wage. In other words, we hypothesize that the return to bargaining power on wages might be concave.

setting is aimed at clarifying the two mechanisms studied and at outlining for each mechanism the resulting effects on within-firm and between-firm inequality through very basic equations - meant for illustrative purposes. We formulate the assumptions that need to be satisfied for each mechanism to exist, and then study the expected consequences on within-firm and between-firm inequality if each mechanism does exist, i.e. if the related assumptions are satisfied. This exercise allows us to formulate hypotheses to be tested in the data (section 4.4).

If the heterogeneous bargaining mechanism is at play, we should see an increase in within-firm inequality as the workers at the bottom of the wage distribution are relatively more impacted. By contrast, if the sorting mechanism dominates, within-firm inequality should be reduced: workers' quality levels get closer as firms increase the quality of matches (enhanced sorting reduces quality dispersion within a given occupation), decreasing wage inequality within a given occupation at a firm.

If the sorting mechanism is prevalent, there should be an increase in between-firm inequality for a given occupation, as the best firms should be able to recruit the best workers and therefore increase their productivity and the average wage of an occupation at the firm, widening the gaps with lower quality firms that are now more likely to recruit lower quality workers (positive assortative matching). On the other hand, if the heterogeneous bargaining mechanism is at play, between-firm inequality should decrease.[12] Indeed, a rise in employer concentration is more likely to be driven by the already largest firms increasing their weight. In such a case, the largest, most productive firms are able to extract relatively more rent from their workers than the smallest, least productive firms whose weight on the labor market has decreased. Therefore, the gap between the average wage of firms is reduced.

Additionaly, if the sorting mechanism is effective, some workers and some firms (the most productive firms hiring the most productive workers thanks to better sorting) should benefit, while the heterogeneous bargaining mechanism is consistent with the effect of employer

[12]Provided that the mechanical composition effect does not dominate: see section 4.3.

concentration being negative for all workers.

We find that employer concentration increases within-firm inequality but reduces between-firm inequality, for a given occupation in a given commuting zone.[13] This result is consistent with the heterogeneous bargaining argument but not with the sorting argument.

In addition, we find that the effect of employer concentration on wages is negative for the entire distribution of firms and jobs, which is not consistent with the sorting mechanism, but is consistent with the heterogeneous bargaining mechanism. Even when we restrict the sample to the largest markets (as the positive effects of sorting might more easily materialize with a larger number of employees), we find that jobs and firms at the top of the distribution do not see any increase in their wages.

Finally, we analyze the effect of employer concentration on sorting by constructing three measures of positive assortative matching. Indeed, if employer concentration generates both efficiency gains and higher wage inequality through enhanced sorting, it must be the case that positive assortative matching has materialized. That is precisely why wage inequality increases: when high (low) quality workers are matched with high (low) quality firms, wage inequality increases. Worker quality is defined as the worker fixed effect from an AKM regression (Abowd et al. (1999)) while firm quality is either the firm fixed effect from an AKM regression or the firm's labor productivity. The strength of sorting is then defined as the ratio of good matches to all matches (good matches plus mismatches) or as rank correlation.[14] We show that employer concentration, in a given sector of a given commuting zone, does not increase the strength of matching and even decreases positive assortative matching in some cases.

Overall, our results taken together point to the fact that the inequality brought about by employer concentration is consistent with the heterogeneous bargaining effect argument,

[13]To ensure that inequality measures are meaningful, our main specification is conducted on a sample involving relatively large markets (a 4-digit occupation in a given commuting zone): markets with at least 20 jobs and firms with at least 10 jobs. As a result, the local labor markets in our restricted sample have on average more than 275 jobs and 66 firms.

[14]See Orefice and Peri (2020), Dauth et al. (2019) and Davidson et al. (2012).

with evidence against the sorting mechanism.

In terms of methodology, a possible bias in the OLS estimation leads us to conduct an instrumental variable analysis, because we cannot properly control for unobserved local idiosyncratic productivity shocks.[15] Imagine a world with a variety of firms: some highly productive, large firms offering high wages, and other less productive, smaller firms paying lower wages. A local positive productivity shock benefiting only the most productive and largest firms, could increase both employer concentration -when already large employers benefit from the new technology and grow-, and decrease inequality -when the lowest-productivity firms are forced to exit the market due to a higher average productivity on the market, and the lowest-paid jobs at those firms are destroyed, reducing the disparity between the wages of *remaining* jobs.[16] We therefore instrument the employer concentration of a local labor market by the employer concentration of *other commuting zones in the same occupation*, as in Azar et al. (2020b), Rinz (2020). This instrument allows to abstract from those local productivity shocks, and from any local shock that would hit firms differently.

Our paper relates to the empirical literature on the negative effect on wages of the concentration of employers in labor markets: Rinz (2020), Benmelech et al. (2022), Qiu and Sojourner (2022), Azar et al. (2020a), Bassanini et al. (2021), Marinescu et al. (2021), Azar et al. (2020b). For France, Marinescu et al. (2021) find a negative impact for new hires: a 10% increase in employer concentration decreases the wages of new hires by nearly 0.9%. We consider the impact on all jobs rather than new hires only, showing that employer concentration not only decreases starting salaries but that it also slows down wage increases for existing jobs, as shown by Bassanini et al. (2021) who find an elasticity between labor market concentration and stayers' wages between -0.0185 and -0.0230.

Wage inequality, to the best of our knowledge, is considered only in Rinz (2020). Rinz (2020) offers the first vast analysis of labor market concentration, although inequality is not

[15] We do not possess an overview of the balance sheet at the establishment level, and hence we have no reliable measure of establishments' productivity at the local level.

[16] Those largest, most productive firms are the most likely to innovate.

the only focus of the study, which is much broader. The mechanisms by which employer concentration impacts wage inequality are therefore not explored; within-firm and between-firm inequality are not studied. Our paper also relates to the literature on sorting (Card et al. (2018), Song et al. (2019), and Eeckhout (2018) for a literature review) and on positive assortative matching: we rely in particular on measures developed in Orefice and Peri (2020), Dauth et al. (2019) and Davidson et al. (2012). On the theory side, Jarosch et al. (2021) develop a model with a finite number of firms in which concentration can be studied explicitly.[17] The literature on labor market power (Berger et al. (2022), Lamadon et al. (2022) for instance) is also linked to our paper, but these studies have a much broader scope as employer concentration is only one possible source of monopsony studied in this strand of literature. We rely on the theory developed in Berger et al. (2022) to offer payroll-HHI as a robustness check. The authors show that payroll-HHI is the welfare-relevant measure to study labor share in particular.

Section 2 presents the data used, the sample choices made and defines and describes inequality and employer concentration measures. Section 3 details our methodology (3.1), and presents our results on how employer concentration affects wages (on average) and overall wage inequality. Section 4 offers a rough formalization of two possible mechanisms, sorting and bargaining, by which employer concentration can impact overall inequality, and formulates hypotheses to be tested on the data. Section 5 presents the results on within-firm and between-firm inequality (5.1), and on positive assortative matching (5.2), in order to assess which mechanism is prevalent in the data. Finally, section 6 presents the robustness tests.

2 Data and measures

The main data source is DADS-Postes, which we use to construct measures of wage inequality and employer concentration on the labor market. We also use FARE and Panel-DADS

[17] Outside options for a worker do not include vacancies in the same firms in the future, so that a larger firm, having a higher probability of re-encounter, has a larger, size-based, market power.

datasets to construct measures of positive assortative matching (whose construction is detailed in section 5.2). For our estimations, we restrict the sample to sufficiently large local labor markets - at least 20 jobs, and firms with more than 10 jobs - so that the inequality measures are meaningful.

2.1 Data sources

2.1.1 DADS-Postes and Panel-DADS

We use French Administrative employer-employee datasets named *Déclaration annuelle de données sociales* (DADS-Postes and Panel-DADS) collected by INSEE (*Institut Nationale de la Statistique et des Etudes Economique*) between 1995 and 2019. All wage-paying individuals and legal entities established in France are required to file payroll declarations; only individuals employing civil servants are exempted from filing such declarations. DADS-Postes catalogues all jobs but does not allow to follow workers over time, which is possible with Panel-DADS.[18] For both databases we have information on the individual's gender, age, employment contract (fixed-term contracts or permanent contract), annualized real earnings, total number of hours worked, and occupation (4-digit level) as well as the sector of the employing firm (4-digit sector classification) and the commuting zone of employers.

Panel-DADS allows us to follow individuals born in October (resulting in a sample of 1/12th of the population) over their lifetime. We use Panel-DADS to run an AKM regression from which we retrieve workers' and firms' fixed effects to be used as a proxy of worker and firm quality when we construct measures of positive assortative matching (section 5.2).

[18]DADS-Postes offers individual identifiers only for the year considered and the previous year. These identifiers change for each vintage of the dataset.

2.1.2 FARE

Another data source is *Elaboration des statistiques annuelles d'entreprise* (ESANE ; Fare).[19] This database provides information on firms such as sector, turnover, employment, and value added. This database is used to calculate firm's labor productivity (value added divided by employment) as a proxy of their quality to be used to construct one of the measures of positive assortative matching.

2.2 Sample construction

The 4-digit occupation variable of DADS-Postes is considered to be stable starting in 2009, which is why our period of estimation is between 2009 and 2019, hence over 11 years.

In terms of jobs, we only retain full-time and "non annex" jobs of individuals aged between 21 and 65.[20] The reason we only keep full-time jobs is so that the composition between full-time and part-time does not affect our results as it is likely to vary over time, and so that the observations are comparable in terms of annual wages. We do not retain the jobs of individuals aged under 21 in order to exclude student jobs which might be more specific in terms of labor supply elasticity.

To exclude outliers, we remove observations whose log annualized real earnings are more than 5 standard deviations away from the predicted wage, based on a linear model including gender, age, occupation, an *Ile-de-France* dummy (the wealthiest region) and in-firm experience, as well as some characteristics of the firm such as the size and sector. This procedure leads us to exclude between 3% and 5% of all observations each year.

In terms of firms, we proceed as follows: if a firm owns several establishments *in the same labor market (same occupation, same commuting zone)*, we consider that the jobs of all these establishments belong to one single entity, which we consider as a unique employer

[19] Since 2008, FARE has replaced *Système unifié de statistique d'entreprises* (SUSE ; Ficus), collected by INSEE between 1995 and 2007.

[20] Since 2002 a job is defined as "non annex" if earnings are more than three times the monthly minimum wage or if the length of employment is more than 30 days and more than 120 hours and the ratio of hours to days is higher than 1.5.

for the purpose of our study. Indeed, we consider that managerial and human resources decisions might be taken at the firm level. Therefore, to assess the bargaining position of a given worker, the relevant employer is the firm and not the establishment. The calculation of the share of employment of each employer, which is necessary to compute the index of concentration, is based on this principle. Finally, we keep only firms with at least 10 jobs in a given local labor market (occupation times commuting zone) so that within-firm inequality measures are constructed on a sufficient number of jobs.

In terms of occupations and sectors, we exclude: agriculture, coking, public administration, home production and education. Our final sample contains 305 4-digit occupations. In terms of commuting zones, there is a break in the classification in 2010. We use the correspondence table between municipalities ('*communes*') and commuting zones in 2010 to establish a match between the work municipalities of each job before 2010 and the commuting zone according to the 2010 classification, paying attention to any change in municipalities that occurred over the period (some municipalities merged, changed names, were absorbed, etc.). As a result, there is no break in the classification we are using.

To investigate the effect of concentration on wages and inequality, it is fundamental to define a relevant labor market, i.e. the set of employers that a given worker is likely to wish to work for. We define local labor markets as the intersection of an occupation (4-digit) and a commuting zone. We use this definition to identify stable labor markets, where workers cannot easily change occupation and have low geographical mobility. To give an order of magnitude, between 2017 and 2018, only 4.4% of workers changed commuting zone and 7.8% changed occupation defined at the 4-digit level.[21]

In terms of local labor markets, we restrict our sample to markets with at least 20 jobs

[21]For this calculation, we use longitudinal data on a representative sample of workers (1/12th of the French population) in which it is possible to follow identified individuals (DADS-panel). To identify a true change of firm by a worker, pure administrative changes in firm identifiers should be excluded as they do not correspond to true mobility across distinct firms by a worker. These identifier changes represent half of the total apparent change in firms in these data (Picart (2008)). For that reason, and to avoid a more complex calculation, we retain firms with more than 50 employees as we consider that they are less likely to change identifier (SIREN).

(and as said before, firms with at least 10 jobs) so that inequality measures are computed over a sufficient number of jobs. As a result, for our econometric analysis we use a restricted sample with large markets: local labor markets have on average more than 275 jobs and 66 firms.

2.3 Measures

2.3.1 Measures of inequality

We are interested in inequality between wages for jobs in the same local labor market. We construct three different measures of inequality: overall inequality, within-firm inequality and between-firm inequality.

We consider wage inequality between jobs instead of wage inequality between individuals as the aim of the paper is to understand if employer concentration has different effects on the bargaining power of workers and therefore inequality. Jobs are therefore the most relevant unit of observation. If a given individual has two jobs within the same occupation, their wages should be considered independently and not aggregated as the worker did not negotiate the wages of the two jobs together, but separately. The fact that he or she could not obtain a single contract is important; information on the bargaining power would be lost if the two jobs were aggregated into one.[22]

Overall inequality measures the dispersion of wages between jobs in the same occupation and the same commuting zone, regardless of whether or not those jobs are within the same firm. This measure therefore provides a general assessment of wage inequality in a local labor market. Following the logic of Song et al. (2019), we consider two different dimensions of overall inequality: a variation in overall inequality can be driven by an increase in inequality within a given firm or by an increase in inequality between firms.

The first dimension, within-firm inequality, measures how unequally a given employer

[22]In our point of view, it does not matter if it is the same person who negotiated the contract or not, what matters is the wage of each job.

pays its workers in the same occupation compared to each other. In other words, it measures the dispersion of workers' wages in a given occupation within a given firm. First, within each firm, i.e. considering only the occupation of one given firm, a measure of inequality is computed at the firm level, $Ineq^{with}_{f,m}$ (where m stands for the local labor market, f for the firm). Second, this firm-level measure is weighted by the share of employment of the firm in the local labor market (occupation times commuting zone), $s^{e}_{m,f}$, to compute a weighted average at the local labor market level. This calculation gives the within-firm inequality measure of this given market, $Ineq^{with}_{m}$.

$$s^{e}_{m,f} = \frac{emp_{m,f}}{\sum_f emp_{m,f}} \; ; \; Ineq^{with}_{m} = \sum_f s^{e}_{m,f} Ineq^{with}_{m,f}$$

The second dimension, between-firm inequality, measures the degree of dispersion of the average wage between firms, in a given occupation. The first step is to compute for each firm in a local labor market the average wage for the occupation considered and then compute for each occupation indices between the average wages of all the firms present on a given market. This assesses the degree of inequality between firms, regardless of how unequally workers are paid within a given firm.

We compute a variety of inequality indices for these three measures - overall, within-firm and between-firm inequality, such as the Gini, Theil, Entropy, Mehran and Piesch indices. The Gini index is relatively more sensitive to changes in the middle of the earnings distribution, when compared to the Piesch index, which is more sensitive to changes in the upper end of the distribution, and the Mehran index, which is more sensitive to changes in the bottom end of the distribution.

2.3.2 Measures of employer concentration

Our main measure of labor market concentration is the employment Herfindahl-Hirschman Index (HHI) which is used in the industrial organization literature and antitrust practice. As an alternative, we use the payroll-HHI and the normalized HHI for robustness tests, as

described in section 6.

The HHI is the sum of the square of the share of employment in a given market. Employment shares write:

$$s^e_{j,c,f,t} = \frac{emp_{j,c,f,t}}{\sum_f emp_{j,c,f,t}}$$

where *emp* represents employment in terms of number of jobs in the occupation j, and f represents a firm that has employees in occupation j and commuting zone c in year t. If a firm has several establishments in the same occupation and the same commuting zone, we group all of them together. Then, the employment-HHI at the occupation, commuting zone, year level writes:

$$HHI^e_{j,c,t} = \sum_f (s^e_{j,c,f,t})^2$$

To compute employment shares, we keep only jobs pertaining to the occupation considered. Therefore, we do not use the variable '*effectif*' which corresponds to the total number of employers declared by the firm, all occupations taken together. Instead, we recompute the number of jobs the firm has in each occupation and consider only those jobs.

The HHI value lies by construction between 0 and 1.[23] One way to assess the magnitude of the HHI is by comparing its values to the 2010 horizontal merger guidelines of the American Department of Justice and Federal Trade Commission. These guidelines were originally intended for product market concentration and are of course sensitive to the size of the market considered but can serve as a useful reference in the absence of a more appropriate one. An HHI between 0.15 and 0.25 is considered to be indicative of a moderately concentrated market, while an HHI above 0.25 is considered to be indicative of a high degree of concentration.

[23]For our estimation, the HHI is multiplied by 10,000 and is therefore between 0 and 10,000.

2.4 French labor markets: concentration and inequality

2.4.1 Employer concentration

For the purpose of describing employer concentration in France in a more general way and providing a more complete picture, we temporarily do not restrict the analysis to our sample of large markets and instead consider all local labor markets in our data (for figures 1 and 2 only). We only exclude firms with fewer than two employees. The first stylized fact is that many local labor markets are highly concentrated: in 2019, 41% of local labor markets have an HHI (calculated from occupation times commuting level) higher than 0.25, and would be considered as highly concentrated applying the DoJ benchmark.

A second stylized fact is that France is characterized by strong geographical disparities in terms of employer concentration. Figure 1 shows how *départements* located on a south-west/north-east diagonal have on average a high level of employer concentration in 2019. By contrast, large cities benefit from more numerous, more dispersed employers, offering workers a richer set of potential employers that do not wield excessive weight on the labor market.

To explore the sectoral variation, we now analyze the HHI calculated from the *sector* times commuting zone level, which shows a large variation across sectors in 2019. Using a weighted average HHI at the 2-digit sector level, figure 2 shows that labor markets in manufacturing (represented by black bars) are more concentrated than services.[24] Importantly, this finding holds when controlling for the size of labor markets. Indeed, simply regressing the employment-HHI on a dummy equal to 1 for manufacturing and controlling for the number of jobs (capturing the size of the market), we find a positive and significant effect (at the 1% level) of the dummy with an estimate of 0.26, which is a rather large effect for the HHI whose values are between 0 and 1.

Most manufacturing sectors would be considered as highly concentrated using the Department of Justice benchmark (HHI above 0.25). The manufacture of rubber products (HHI

[24]The local labor markets in all the different commuting zones are weighted by the share of commuting zone employment in the total employment of the sector in order to obtain a unique figure at the sector level.

of 0.815 in 2019) and the manufacture of motor vehicles (0.76) have for instance very high levels. In contrast, labor markets in services, where the HHI is under 0.2 on average, are not very concentrated. For example the restaurant sector (HHI of 0.01 in 2019) and the computer programming sector (HHI of 0.05) have low levels of employer concentration.

Table 1 provides descriptive statistics for our estimation sample, in which we keep only sufficiently large local labor markets.[25] The average HHI, computed from the occupation times commuting zone level, is 0.17 while the median HHI is close to 0.10. The wedge between the average and the median indicates the presence of a few markets with high levels of employer concentration. However, only 5.6% of markets are in pure monopsony with one unique employer, and one third of labor markets have a level of concentration higher than the high level of the 2010 horizontal merger guidelines of the American DoJ ($HHI > 0.25$).

Importantly, the mean HHI is not high (0.17) and 46% of labor markets in our regression sample have a low level of employer concentration ($HHI < 0.15$). Thus, our econometric results are not driven by labor markets in a situation of pure monopsony, or only by highly concentrated labor markets.

2.4.2 Wage inequality on local labor markets

We are interested in differences between the wages of workers who share the same set of potential employers, hence on a given local labor market. All our wage inequality indices are therefore constructed between jobs belonging to a same occupation in a given commuting zone.

Table 2 provides descriptive statistics on the earnings distribution for our estimation sample. The average Gini index among these labor markets is 0.24, a lower level than at the national level - which does not measure the same type of inequality, but provides a benchmark (0.32 in 2018 for the Gini index measuring inequality of household income in France, according to the World Bank).

[25] See section 2.2 for our restriction on labor market size: markets with at least 20 jobs and firms with more than 10 jobs.

The within-firm inequality (0.18) is lower than the between-firm inequality (0.22). This difference suggests that, in France, overall inequality on labor markets arises more as a result of differences in average wages between distinct firms rather than because of inequality between jobs within the *same* firm.

3 The heterogeneous effects of employer concentration on wages

3.1 Methodology

We estimate the following regression, first using an OLS and second using an instrumental variable:

$$log(y_{c,j,t}) = \beta * log(HHI_{c,j,t}) + X_{c,j,t} + \alpha_{c,t} + \omega_{c,j} + \epsilon_{c,j,t}$$

where $y_{c,j,t}$ is the log of the inequality measure or earning outcome in commuting zone c, in occupation j, in year t. $HHI_{c,j,t}$ is the employment-HHI of the local labor market, i.e. for a given occupation j in a given commuting zone c, in a given year t. $\epsilon_{c,j,t}$ is noise. Fixed effects are included at the commuting zone by occupation level and commuting zone by year level. Standard errors are clustered at the commuting zone level.

$X_{c,j,t}$ controls for the size of the local labor market in terms of jobs (in log) in an occupation by commuting zone and year level. The size of the market *per se* can explain both employer concentration on the labor market and wage inequality. Indeed, larger markets are both less concentrated and exhibit more unequal wage distribution.[26] The fact that the larger markets are more unequal can be explained by the fact that sorting is more efficient when there are more employees, i.e. on larger labor markets. A better matching, in the case of positive

[26]Indeed, a simple OLS analysis with commuting zone by occupation and commuting zone by year fixed effects shows a significant and negative effect of the size of the market (log) on the HHI (log), with an estimate of -0.24, and a positive effect on the Gini index (log), with an estimate of 0.09.

assortative matching, results in the most (least) productive workers matched with the most (least) productive firms, hence higher wage inequality. The fact that larger markets are less concentrated is also intuitive, as there might be more employers on such markets (whereas small markets are more likely to have a low number of employers each having a large share of the few jobs in the local labor market).

A simple OLS analysis can suffer from one omitted variable bias in particular: the main threat is the existence of local idiosyncratic shocks on a local economy where firms are heterogeneous. Let us consider a positive productivity shock hitting firms in a heterogeneous way, benefiting the largest, already more productive firms offering higher wages, but not the lowest-productivity, low wage firms.[27] The largest firms, which are positively impacted, will grow and create more jobs, while some low productivity firms, confronted with even more productive competitors, are forced to exit the market (or simply lay-off some workers). As a result, the weight of the largest firms on employment increases - in other words, employer concentration increases. At the same time, the exit of (or layoffs by) low productivity firms, i.e. firms offering lower wages on average, can reduce the dispersion of wages, as low paid jobs are destroyed: inequalities decrease among the *remaining* jobs. Therefore, a negative relationship between concentration and inequalities could ensue as a result of local heterogeneous productivity shocks, creating a bias in the OLS estimation.

In order to respond to this concern, we employ an instrumental variable strategy similar to the one used in Azar et al. (2020b) and Rinz (2020). We instrument for the HHI in each occupation of each commuting zone, i.e. in each local labor market, using the employment-weighted average HHI within the *same occupation* across *other commuting zones*, excluding the one considered. This instrument provides us with variation in labor market concentration that is driven by national-level changes in the occupation, and not by local changes in that particular local labor market: it eliminates the effect of local shocks, in particular of idiosyncratic productivity shocks.

[27]It is indeed likely that a positive productivity shock hits the already largest and most productive firms.

Formally, the instrument for the concentration in a given local labor market is defined as:

$$HHI_{j,t}^{-c} = \frac{\sum_z (HHI_{z,j,t} * empl_{z,j,t})}{\sum_z empl_{z,j,t}}$$

where c is a specific commuting zone, z indexes other commuting zones excluding c, j indexes occupations, t indexes years and *empl* is employment, measured by the number of jobs.

3.2 Results

We start by discussing the OLS estimations and, due to the existence of a possible bias, we then turn to the IV estimations.

3.2.1 OLS estimations

OLS results are presented in table 3. All our estimations are conducted for local labor markets with at least 20 jobs and with firms having more than 10 jobs so that inequality measures are meaningful.

The OLS analysis shows that employer concentration leads to lower wages on average on local labor markets (first column). Indeed, estimates are negative (-0.025) and statistically significant (at the 1% level).

The sign of estimates of the effect on inequality is negative for overall inequality and between-firm inequality, and positive for within-firm inequality. As will be explained in section 4.1, these signs are expected for between-firm and within-firm inequality when the sorting mechanism is not prevalent and when the heterogeneous bargaining argument dominates. However, the negative sign on overall inequality, suggesting that employer concentration could reduce inequality between jobs, is not expected and is likely to be biased by an unobserved productivity shock on the largest employers, as explained in section 3.1.

3.2.2 IV estimations

To deal with these unobserved idiosyncratic shocks, we instrument the local labor market concentration of a given labor market by the employer concentration in the same occupation in other commuting zones, hence abstracting from local shocks. Results from IV estimation are shown in table 4.[28] Overall, these results show that employer concentration on the labor market decreases wages on average and increases overall inequality, i.e. inequality between jobs of a given local labor market (same 4-digit occupation, same commuting zone).

Compared to the OLS analysis (table 3), the IV estimate of the average effect on wages is stronger (-0.093 versus -0.025 for the OLS). An increase in employer concentration by two standard deviations from a moderate level of labor market concentration (from an HHI of 0.15 to 0.4) decreases wages by 9% on average, in our restricted sample of relatively large French local labor markets.

These results are consistent with the literature. For France, Marinescu et al. (2021) find a negative impact for new hires: a 10% increase in employer concentration decreases the wages of new hires by nearly 0.9%. We consider the impact on all jobs rather than new hires only, showing that employer concentration not only depresses the starting salary but slows down the wage increase of existing jobs, as shown by Bassanini et al. (2021) who find an elasticity between labor market concentration and stayers' wages between -0.0185 and -0.0230. Our higher estimate might be explained by the fact that our regression is at the local labor market level, not at the worker level, and therefore captures an average effect across stayers and new hires together. Some general equilibrium effect could also possibly materialize as a reduction, or a slow down, in wages estimated at the local labor market level might be higher than when measured at the individual level due to some externality (a slow down in the wages of some individuals can transmit to other more vulnerable workers with amplification).

We now turn to the effect on overall inequality, i.e. inequality between jobs of a given local labor market. Interestingly, table 4 shows that the IV estimate on the Gini index is positive

[28] Results of the first stage regression are shown in Table 11 in Appendix A.

(0.05) (and significant at the 1% level) while the OLS estimate is negative (see table 3). This change of sign can be explained by the existence of local idiosyncratic positive productivity shocks hitting the already most productive and largest firms. It is indeed likely that a positive productivity shock will hit the most productive firms which also tend to be larger. These impacted firms grow and further increase their already large share of employment, so that employer concentration increases. At the same time, the productivity threshold to operate on the market increases due to competition so that the least productive firms exit or lay off workers, destroying the least paid jobs: inequality between the remaining jobs decreases. Such a mechanism can explain why the OLS estimate is negative, whereas the IV estimate is positive: instrumenting the local concentration of a given labor market by the employer concentration in the same occupation in other commuting zones allows abstraction from local productivity shocks.

The fact that the OLS estimate on between-firm inequality (table 3) is negative is suggestive of the existence of such idiosyncratic productivity shocks on the largest firms: following the shock, the lowest productivity and lowest wage firms exit the market or lay off workers so that the wedge between the wages of jobs remaining in the market is reduced.

Table 4 also shows the results for the Gini index and four other inequality indices (Theil, Entropy, Piesch, and Mehran). IV estimates for these indices are also positive and significant at the 1% level, ranging from 0.043 for the Piesh and Mehran indices to 0.078 for the Theil index. An increase by 2 within standard deviations in employer concentration from a moderate level of concentration (HHI of 0.015 to 0.4) is associated with a rise in the Gini index of 5% and a rise in the Theil index of 8%.

We turn to the effect on the wages of jobs depending on their position in the wage distribution. Jobs are ranked according to their level of wage, within each local labor market, to create the distribution and construct deciles within each local labor market. Of course, the wage level of each decile varies across labor markets; we are interested in the relative variation of wages of jobs *within a given labor market* only, i.e. within this set of potential

employers and employees.

Overall, our results show that employer concentration on the labor market has a higher negative effect on wages at the bottom of the distribution and a more modest, but still negative, effect on high wage jobs (figure 3). Crucially, the lowest-paid jobs are the most vulnerable to an increase in employer concentration.

Figure 3 shows estimates of the effect of labor market concentration on wage for the nine deciles and for the 99th percentile, with 95% confidence intervals, and controlling for the size of local labor markets. All estimates are negative and significant at the 1% level. All other things being equal, the 30% poorest workers (3rd decile, the most impacted) endure a 12% decrease in wages when employer concentration increases by two standard deviations from a moderate level (from an HHI of 0.15 to an HHI of 0.4), while the 1% richest workers (99th percentile, the least impacted) undergo a more modest decrease of 5.9%.

Interestingly, the estimates of the first decile (-0.075) and second decile (-0.113) are smaller than the estimate of the third decile (-0.178) - and estimates then gradually decrease. This finding can be explained by the fact that in some local labor markets, the first and second deciles might be at the minimum wage.[29] The minimum wage acts as a lower bound on wage decreases and therefore limits the negative effect of employer concentration for markets which are already at the minimum wage. The minimum wage can therefore explain the difference between estimates of the first two deciles (constrained by the minimum wage on many markets), and the estimate of the third one (less likely to be constrained by the minimum wage). Given that France has a minimum wage, our estimates provide a lower bound of the effect of employer concentration on wage inequality, which could be even stronger for the lowest earners, absent the minimum wage (see Bassanini et al. (2021) who develop a similar argument).

[29]The first decile of some markets is at the minimum wage, but on some wealthier markets, even the first decile is above the minimum wage, for the highest-earning occupations. For instance, even the 10% least paid executives in financial markets (PCS 376a) in Paris could be paid above the minimum wage.

4 Mechanism

Having shown that employer concentration on the labor market increases wage inequality, we now ask the following question: Could the wage inequality generated by employer concentration imply efficiency gains thanks to better worker selection (sorting argument) or is inequality the mere reflection of a larger decrease in the barganing power of the lowest earners (heterogeneous bargaining argument)?

In this section we develop a rough formalization, only meant as an illustrative exercise, and then use this simple setting to study two possible mechanisms that could link employer concentration and inequality: sorting, and heterogeneous bargaining. In each case, we formulate assumptions consistent with the existence of each mechanism. Based on these assumptions, we deduce the likely consequences on within- and between- firm inequality if each mechanism were to exist, i.e. if the related assumptions are satisfied. This exercise allows us to formulate hypotheses to be tested on the data. If a hypothesis is satisfied, we interpret this as suggesting that the related mechanism is prevalent in our data. Otherwise, we conclude that it is not important, or dominated by the other counteracting mechanism.

4.1 Formalization

For the sake of clarity, let us briefly formalize the discussion. Imagine that there are two types of worker (a continuum), and two types of firm (finite number): either H, high productivity, or L, low productivity. $A^{j,i}$ is the productivity of a match between a firm $j = [H, L]$ and a worker $i = [H, L]$, which constitutes the surplus of the match. The probability of a match between a firm $j = [H, L]$ and a worker $i = [H, L]$ is $\theta^{j,i}(S)$. $\theta^{j,i}(S)$ is a function of S, which denotes the strength of sorting.

The match surplus is split between workers and firms and the total share accruing to worker ω is $\alpha_{\omega}^{i=[H,L]}$, capturing the strength of the bargaining position of the worker and of the firm. $\alpha_{\omega}^{i=[H,L]}$ depends on individual characteristics s_{ω} and on employer concentration,

HHI, and the way it depends on those two dimensions differs across worker types.

$$\alpha_{\omega}^{H} = f^{H}(s_{\omega}) + g^{H}(HHI) \; ; \; \alpha_{w}^{L} = f^{L}(s_{\omega}) + g^{L}(HHI)$$

where f^H and f^L are increasing functions of the worker's individual characteristics.

The average wage in a firm of type H writes:[30]

$$\overline{w}_{j}^{H} = \theta^{H,H}(S)A^{H,H} + \theta^{H,L}(S)A^{H,L}$$

The average wage in a firm of type L writes:

$$\overline{w}_{j}^{L} = \theta^{L,L}(S)A^{L,L} + \theta^{L,H}(S)A^{L,H}$$

Between-firm inequality is therefore measured as the difference between the average wage of H type firm (the highest average wage on the market) and the average wage of L type firm (the lowest average wage):

$$I_{BTW} \equiv \overline{w}_{j}^{H} - \overline{w}_{j}^{L}$$

Within a given firm c, the individual wage of H type worker writes: $w_{\omega,c}^{H} = \alpha_{\omega,c}^{H} A^{H}$ and the wage of L type worker writes: $w_{\omega,c}^{L} = \alpha_{\omega,c}^{L} A^{L}$. Within-firm inequality is measured as the difference between the wage of the H type worker (the best paid workers) and the wage of the L type worker (the least paid workers) within the same firm c:

$$I_{WTH,c} \equiv w_{\omega,c}^{H} - w_{\omega,c}^{L}$$

4.2 Sorting

A first mechanism is that an increased employer concentration could improve sorting as larger employers can afford more demanding, and therefore more efficient selection processes,

[30] We assume that there is a continuum of workers of type H and type L so that the law of large numbers applies.

thereby improving the quality of matches. On a less concentrated labor market, they would lose candidates by making them go through a too stringent process. However, on a more concentrated labor market, it is easier for employers to find candidates who accept more burdensome recruitment processes without losing them to competitors.

We study an economy in which the most productive workers have a higher positive externality effect on their peers than on less productive workers. Note that while we do not think that this is necessarily the case, for more efficient sorting to generate more inequality, it has the be an incentive for the most productive firms to select the most productive workers. If, on the contrary, the most productive workers have a higher positive effect on their low productivity peers, negative assortative matching would be optimal: in that case, hiring a mix of high and low productivity workers guarantees the firm higher productivity than hiring exclusively high productivity workers. Such sorting would not increase wage inequality: we therefore focus on positive assortative matching (which by contrast does increase wage inequality).

In the terms of the formalization above, we therefore assume that when S increases, $\theta^{H,H}(S)$ and $\theta^{L,L}(S)$ increases, while $\theta^{L,H}(S) = \theta^{H,L}(S)$ decreases (positive assortative matching). We also assume that the impact of sorting on the probability of good matches (high quality worker matched with high quality firms or low quality worker matched with low quality firms) is the same in the two cases (high-high and low-low pairs). In the same way, we assume that the impact of sorting on the probability of mismatches (high quality worker matched with low quality firms or low quality worker matched with high quality firms) is the same in the two cases (high-low and low-high pairs). In other words, we assume that sorting has a symmetric effect on positive assortative matching within good matches and within mismatches. Therefore, we have:

$$\frac{\partial \theta^{H,H}(S)}{\partial S} = \frac{\partial \theta^{L,L}(S)}{\partial S} \text{ and } \frac{\partial \theta^{H,L}(S)}{\partial S} = \frac{\partial \theta^{L,H}(S)}{\partial S}$$

We therefore study an economy in which productivity is highest (lowest) when high (low)

productive workers are matched with high (low) productivity firms, with intermediate productivity levels for mismatches (that for simplicity we assume to be equal):

$$A^{H,H} > A^{L,H} = A^{H,L} > A^{L,L}$$

When high productivity workers have a higher positive externality effect on their high productivity peers, a more efficient sorting process ends up gathering high productive workers in high productivity firms (positive assortative matching) so that matching of high productivity workers with high productivity firms becomes more likely. At the same time, smaller employers can now only hire workers with lower productivity than before the concentration increased: matching of low productivity workers with low productivity firms becomes more likely. The average wage of high productivity firms increases, while the average wage of low productivity firms decreases, augmenting the dispersion between firms: between-firm inequality increases.

First, in the terms of the formalization proposed above, more efficient sorting (an increase in S) materializes as an increase in $\theta^{H,H}$ and $\theta^{L,L}$, and a decrease in $\theta^{H,L} = \theta^{L,H}$. As a result, *between-firm inequality increases*: the average wage should increase too due to higher average productivity. Assuming $\theta^{H,L} = \theta^{L,H}$, $A^{L,H} = A^{H,L}$, $\frac{\partial \theta^{H,H}(S)}{\partial S} = \frac{\partial \theta^{L,L}(S)}{\partial S}$ and $\frac{\partial \theta^{H,L}(S)}{\partial S} = \frac{\partial \theta^{L,H}(S)}{\partial S}$, we have:

$$\frac{dI_{BTW}}{dS} = \frac{\partial \overline{w}_j^H}{\partial \theta^{H,H}} - \frac{\partial \overline{w}_j^L}{\partial \theta^{L,L}} = A^{H,H} - A^{L,L} > 0$$

Second, sorting should increase within-firm inequality within a given occupation. By increasing the quality of matches, sorting should actually reduce the dispersion of workers' quality. Consequently, the gap in wages within a given firm should decrease as well. To see this in the formalization proposed above, we need to complexify the setting slightly, only to illustrate this point. Imagine that there is now a continuum of productivity levels m for workers between 0 and 1, instead of the two types H and L. These productivity levels are

indexed by u and v below. The within-firm inequality is now written:

$$I_{WTH} \equiv \int_{\min(m(S))}^{max(m(S))} \int_{\min(m(S))}^{max(m(S))} [w^u - w^v] \, \mathrm{d}u \, \mathrm{d}v$$

In this setting, sorting determines the types of skills employed at the firm. An increase in sorting S will reduce the types of skills employed at the firm (it will decrease the range of m in the integrals above), as it favors positive assortative matching: firms will be able to recruit workers closer to their own productivity level, thereby decreasing the variance of productivity types within the firm. *Sorting should therefore reduce within firm inequality.*

Finally, for the sorting argument to dominate, it should be the case that some firms or workers should benefit: the top of the distribution should see an increase in wages. Indeed, the most productive firms should be able to recruit the most productive workers, thereby raising their average productivity and their average wage. The most productive workers should be matched with the most productive firms and see an increase in their wages too.

This first mechanism (sorting) leads to interpret the increase in inequality brought by employer concentration as having at least a positive impact on average productivity. Indeed, if sorting allows positive assortative matching that materializes as an increase in the productivity of the most productive firms, average productivity could increase. In the terms of the formalization, the productivity of the most productive firms writes $N^{H,H}A^{H,H} + N^{H,L}A^{H,L}$ where $N^{H,H}$ is the mass of high productivity workers at the high productivity firm and $N^{H,L}$ the share of low productivity workers.

4.3 Heterogeneous bargaining

A second possible mechanism is that increased employer concentration, by boosting the bargaining power of employers, affects workers heterogeneously: it is relatively more detrimental for the wages of the lower deciles whereas the wages of better paid jobs could be less sensitive to a change in concentration. As a result, when employer concentration on the labor market increases, the wages of the lowest paid jobs are more affected than those of better paid ones,

and inequality increases.

In the terms of the formalization above, we assume that the bargaining position of high productivity workers depends more on their individual characteristics s_w than the bargaining position of low productivity workers does. Furthermore, the bargaining position of workers depends negatively on employer concentration, and relatively less so for high productivity workers.

$$\frac{\partial f^H(s_\omega)}{\partial s_\omega} \geq \frac{\partial f^L(s_\omega)}{\partial s_\omega} \geq 0 \; ; \; \frac{\partial g^L(HHI)}{\partial HHI} \leq \frac{\partial g^H(HHI)}{\partial HHI} \leq 0$$

We focus on situations in which these assumptions are met because they are required for employer concentration to generate higher wage inequality through an uneven change in the bargaining position of workers and therefore an uneven variation in rent extraction across workers. Based on these assumptions, we will generate some testable assumptions and check whether they are verified, thus confirming or disproving these assumptions and therefore the relative bargaining mechanism.

A first reason why high wage jobs are less sensitive to employer concentration is linked to a possibility of waiting that is heterogeneous across workers depending on their wages. Better paid workers have more financial resources that allow them to wait longer to find a better job, raising the value of their outside options, and making their bargaining position less dependent on the current concentration of employers. Their wages are therefore relatively less impacted than those of poorer workers who cannot afford to wait. As the bargaining position of the poorest workers is relatively more sensitive to the current employer concentration, employers are able to extract higher rent from jobs at the bottom of the wage distribution when employer concentration increases.

Another possible reason why the wages of low paid jobs are more affected than those of better paid jobs by a rise in employer concentration could be that lower paid workers might in general have less differentiated skills. Their wages therefore depend relatively more on the bargaining position of employers, compared to better paid jobs with more differentiated

skills, for which the individual component of the bargaining position is stronger.

If the heterogeneous bargaining mechanism is at play, then the inequality within a given firm should increase, as a given employer will be able to extract a higher rent from the lower deciles of workers in a given occupation.

$$\frac{dI_{WTH}}{dHHI} = \frac{\partial g^H(HHI)}{\partial HHI} A^H - \frac{\partial g^L(HHI)}{\partial HHI} A^L \geq 0$$

When the relative bargaining mechanism dominates, the effect on between-firm inequality is theoretically ambiguous as two possible counteracting effects are at play. The first one is a mechanical one and leads to an increase in between-firm inequality: as firms have a different composition of high wage jobs and low wage jobs, employers will be able to extract a higher rent when the share of low wage jobs is greater. The most productive firms are more likely to have a bigger share of high productivity jobs so that the dispersion between firms' average wages should mechanically increase.

The second effect leads to a decrease in between-firm inequality. Complexifying the setting exposed above, the share of the surplus accruing to the workers would now have an additional component, depending only on the type of firm, and not on the worker, $\alpha^{j=[H,L]}$. This component depends on the type of firm ($j = [H, L]$) but is independent from the type of worker i, $\alpha^{j=[H,L]}$, capturing the bargaining position of the firm towards *any* worker so that the total share of the worker would write:

$$\alpha_\omega = \alpha_\omega^{i=[H,L]} - \alpha^{j=[H,L]}$$

while the component of the share depending only on the type of firm writes:

$$\alpha^H = v^H(HHI) \; ; \; \alpha^L = v^L(HHI)$$

When employer concentration on the labor market increases, it is likely that it is driven by an increase in the size of the most productive firms, i.e. type H. Indeed, the probability

is higher that concentration is driven by a rise in the size of the already largest firms, which are the most productive. As the H type grows, it is therefore in a better position to extract more rent from employees than the L type firm. In other words, we have:

$$\frac{\partial v^H(HHI)}{\partial HHI} \geq \frac{\partial v^L(HHI)}{HHI}$$

In this case, when employer concentration increases, H type firms can extract relatively more rent from their workers, compared to L type firms. As a result, H type firms are able to compress the wages of their workers relatively more than L type firms. Thus, between-firm inequality decreases: the average wage at H firms increases relatively less than before the labor market concentration increased, due to a higher increase in rent extraction in H firms -whose weight on the labor market has increased- compared to L firm -whose weight has decreased.

This second mechanism (heterogeneous bargaining) leads us to interpret the increase in wage inequality brought about by employer concentration on the labor market as undesirable since the rise in inequality is not accompanied by any positive effect on average productivity. Indeed, in this case, wage inequality widens as the result of an uneven effect on workers of a change on the bargaining position of employers, enabling them to extract a higher rent from the lowest earners.

4.4 Within-firm and between-firm inequality: Testable hypotheses

To summarize, in order to investigate which mechanism is the most prevalent, we will test the following hypotheses. It is likely that the two mechanisms are at play, meaning that the outcome we observe will only indicate if one effect dominates the other.

Hypothesis 1 *The sorting argument is consistent with an increase in between-firm inequality and with a decrease in within-firm inequality.*

Hypothesis 2 *The heterogeneous bargaining position argument is consistent with an increase in within-firm inequality. The effect on between-firm inequality is ambiguous: between-firm inequality should decrease, unless the mechanical composition effect dominates.*

Hypothesis 3 *If the sorting mechanism dominates, a positive effect of employer concentration on wages should materialize for jobs and for firms at the top of the wage distribution.*

5 Sorting or heterogeneous bargaining?

Using the methodology exposed in section 3.1, we first explore the effects of labor market concentration on within-firm inequality, between-firm inequality, and on wages by decile for these two dimensions of inequality: the results are interpreted in the light of hypotheses formulated in section 4.4 in order to investigate which mechanism is the most prevalent in the data. Second, we explore the effects of employer concentration on some explicit measures of positive assortative matching.

5.1 Effect on within-firm and between-firm inequality

Our first result is that employer concentration increases within-firm inequality. Table 5 presents the IV estimates: the effects on the inequality indices presented (Gini, Theil, Entropy, Piesch, and Mehran indices) are positive and significant at the 1% level, ranging from 0.055 for the Gini index to 0.105 for the Entropy index. This result is consistent with hypothesis 2 and therefore suggests the prevalence of the heterogeneous bargaining mechanism.

We now test whether, *within a given firm*, some workers along the wage distribution benefit from an increase in employer concentration, as sorting would predict that the most productive workers should see an increase in their wages as they are more likely to be matched with higher productivity firms. Figure 5 shows that the IV estimates are negative along the wage distribution, and even for the 99th percentile. This result underlines that no workers

benefit from an increased employer concentration on the labor market, contrary to what the sorting argument would suggest; in other words, hypothesis 3 is not confirmed.

In order to focus on markets that could be more likely to benefit from improved sorting, we investigate the effect of employer concentration on a subsample of the largest markets only. Indeed, sorting might be more efficient on markets with sufficiently large numbers of workers, an effect that could be averaged out in the main specification. However, conducting the same estimation on the subset of labor markets above the median number of jobs, we still find that all deciles of workers (still constructed within firms) endure a negative effect on their wages. The results, shown on figure 6, are similar to the ones found over the whole sample: even on large labor markets, no workers benefit. Therefore, the sorting mechanism does not seem to prevail in the data.

Our second result is that employer concentration on the labor market decreases between-firm inequality. Table 6 shows the IV estimates for inequality indices, ranging from -0.022 for the Piesch index to -0.131 for the Theil index (-0.109 for the Gini index). This result is not consistent with hypothesis 1, suggesting that sorting does not play a role in the effect of employer concentration on wage inequality. If sorting were prevalent, inequality between firms should increase, not decrease: relatively more productive firms should be able, thanks to increased employer concentration, to recruit higher productivity workers and raise their average wage, while their lower productivity competitors are now able to recruit less productive workers (leading to a lower average wage). This result is by contrast compatible with the heterogeneous bargaining argument if the mechanical composition effect is dominated (hypothesis 2).

We now ask which firms benefit from an increase in employer concentration: if the sorting mechanism plays a role, we should find a positive effect of employer concentration on the average wage of the richest firms, i.e. firms at the top end of the earnings distribution. Indeed, these firms should benefit from increased concentration: by being able to sort workers better, they should recruit higher productivity workers, which mechanically increases the average

wage at the firm. In a second step, due to positive assortative matching, the productivity of all workers at the firm should increase too following the arrival of those new recruits, ultimately leading to an additional increase in the average wage.

Figure 7 shows the IV estimates (controlling for the size of the labor market) of the effect of labor market concentration on the average wage of firms, by decile of firms (ranked by their average wage): the effect is negative along the wage distribution.[31] Even firms at the top of the distribution do not see an increase in their average wage following an increase in employer concentration, contrary to hypothesis 3. These results therefore suggest that sorting is not prevalent in the data.

We therefore conclude from our analysis that the sorting mechanism is not likely to account for the heterogeneity of the negative effect of employer concentration on wages resulting in higher wage inequality. Instead, the higher vulnerability of the lowest earners to employer concentration is consistent with a bargaining power argument: the worsening of the bargaining position of workers that ensues from an increase in employer concentration has a greater effect on the wages of the lowest earners. The fact that within-firm inequality widens and between-firm inequality shrinks due to an increase in employer concentration indeed supports the heterogeneous bargaining argument, as set out in hypothesis 2.

5.2 Effect on positive assortative matching

To complement this analysis, we now explore the direct effect of labor market concentration on positive assortative matching. Positive assortative matching means that high quality workers are matched with high quality firms, while low quality workers are matched with low quality firms. If employer concentration generates both efficiency gains and higher wage inequality through an enhanced sorting, it must be the case that positive assortative matching has materialized: that is precisely why wage inequality increases.

We construct three explicit measures of positive assortative matching. To construct a

[31] For robustness, we replicate the analysis for local labor markets with at least 10 firms, and find similar results: see figure 8.

measure of workers' quality, we first run an AKM regression (Abowd et al. (1999)) and use the workers' fixed effects as a proxy. To proxy for firms' quality, we use two alternative measures: either the firms' fixed effects from the AKM regression or the average labor productivity, measured as the value added divided by the number of workers, computed in Fare dataset.

We run an AKM regression over the period 2009-2019 in the DADS-panel dataset, which allows us to follow a representative subsample of workers across time. Measuring conjointly worker and firm quality as a worker's fixed effect and a firm's fixed effect of an AKM regression hinges on the assumption that workers have a sufficient number of employers: it is otherwise difficult to distinguish worker quality from firm quality. This well-known limited mobility bias (Andrews et al. (2008)) remains a concern but is limited in our data by the fact that 47% of the individuals in our sample have at least two employers over the period 2009-2019.

We regress the log of the annual wage $S_{i,z,c,j,t}$ of full-time worker i working in firm z, in commuting zone c, in sector j at time t on worker fixed effect γ_i, firm fixed effect α_z, a vector of observable time varying individual characteristics of worker i, $X_{t,i}$:

$$\log(S_{i,z,c,j,t}) = \alpha_z + \gamma_i + X_{i,t}$$

Following Orefice and Peri (2020), the vector $X_{t,i}$ includes a quartic polynomial in experience, an *Ile de France* dummy (the wealthiest region of France), the 4-digit occupation, and gender interacted respectively with experience, *Ile de France* and year dummies.

For the two first measures of positive assortative matching ($PAM1$), firms and workers are then divided into two groups, above (high productivity firm or worker) or below (low productivity firm or worker) the median level, as in Davidson et al. (2012). Those groups are defined at the *sectoral* times commuting zone level each year. We rank firms of a given sector and a given commuting zone together, as they arguably constitute a homogenous group. Ranking firms from two different sectors together (by ranking by occupation instead of sector) might introduce a bias. Indeed, if a sector has some difficulties independently from an individual firm's quality, then this would introduce a distortion in the way we measure

matching. Thus, we apply the same level of ranking for workers, within the same sector of a given commuting zone.

On a given labor market (sector j, commuting zone c), good matches are defined as occurrences of the most (least) productive firms being matched with the most (least) productive workers, while mismatches are defined as low (high) productivity firms being matched with high (low) productivity workers. There are a number $\pi_{m,c,j,t}$ of good matches and a number $\theta_{m,c,j,t}$ of mismatches.

A first index of the strength of positive assortative matching is then defined as the ratio of good matches to all matches (good matches plus mismatches): $\frac{\sum_m \pi_{m,c,j,t}}{\sum_m (\pi_{m,c,j,t}+\theta_{m,c,j,t})}$ where m denotes a given match between a firm and a worker. We then use either firm's fixed effect ($PAM1a$) or labor productivity ($PAM1b$) to proxy for firm's quality.

For the last measure of positive assortative matching ($PAM2$), we compute the correlation of the ranking of firm's fixed effect and worker's fixed effect from the AKM regression for each labor market (sector times commuting zone), as in Dauth et al. (2019). Correlations whose p-values are below 0.1 are considered non-significant and are set to zero.

We now study the effect of employer concentration, in a given sector of a given commuting zone, on the strength of matching $M_{c,j,t}$, restricting the study to markets having more than 20 jobs as before. As our measure of sorting is at the sectoral times commuting zone level, HHI is now also computed at the same level. We use the following specification:

$$M_{c,j,t} = \beta * log(HHI_{c,j,t}) + X_{c,j,t} + \alpha_{c,t} + \omega_{c,j} + \epsilon_{c,j,t}$$

As dependent variables, we use alternatively one of the three measures of positive assortative matching detailed above: $PAM1a$, $PAM1b$ or $PAM2$. The employment HHI is instrumented by the employment HHI of other commuting zones in the same sector. $X_{c,j,t}$ is the size of the local labor market in terms of the number of jobs.

Table 7 shows the result of the IV estimation. The effect is negative, however it is not significant in all cases. The estimates are significant for $PAM1a$ (ratio of good matches

using firm's fixed effect), with and without control, and for $PAM2$ (rank correlation) only without control. Therefore, an increase in employer concentration does not seem to increase positive assortative matching as the sorting argument would imply (for an enhanced sorting to generate both efficiency gains and more wage inequality). Our results even suggest that employer concentration could reduce the strength of positive assortative matching. With a higher concentration, employers might have less incentive to find the best matched workers as they know that they can extract a high rent from workers, preserving their profits.

6 Robustness analysis

6.1 Alternative instrument: the inverse of the number of firms

In the main specification, we instrument the employment-HHI of the local labor market by the employment-HHI of other commuting zones in the same occupation, as in Rinz (2020). To test the sensitivity of our results to this choice, we consider an alternative instrument, the number of firms, as in Azar et al. (2020a).[32]

Table 8 shows the estimates with the log of the inverse of the number of firms (1/N) as an instrument for the local employment-HHI. As in Azar et al. (2020a), we use the inverse of the number of firms within occupation across other commuting zones, excluding the one considered. Estimates of the effect of employer concentration on overall inequality and on within-firm inequality are positive and significant (respectively 0.064 and 0.119 for the Gini index), while the estimate is negative for between-firm inequality (-0.383). All estimates are significant at the 1% significance level. Results are therefore consistent with our main specification.

[32]First stages are shown in table 11 in annex A.

6.2 Other measures of employer concentration

6.2.1 The normalized HHI

We use an alternative measure of employer concentration on the labor market: the normalized HHI, both as the dependent variable and as the instrument. A rise in employer concentration as measured by the HHI index can indeed be driven by a decrease in the number of employers and/or by changes in their employment shares. This exercise therefore allows us not only to test the robustness of our results but also to explore if the effect identified is driven by both dimensions of the HHI.

The normalized HHI is a measure that holds constant the number of firms, so that only the distribution of the employment shares matters. It writes:

$$HHI_{norm} = \frac{HHI - 1/N}{1 - 1/N}$$

Table 9 shows the IV estimates of normalized HHI instrumented by the normalized HHI in other commuting zones in the same occupation. Estimates of the effect of employer concentration on overall inequality and within-firm inequality as measured by the Gini index are positive and significant (respectively 0.044 and 0.032), while the estimates for between-firm inequality are negative (-0.027), in line with our main specification. These results are also interesting *per se* as they show that the effect of employer concentration is not only driven by the number of employers but also by their respective weights on the labor market.

6.2.2 The payroll-HHI

Instead of the employment-HHI, we also use the payroll-HHI, i.e. the HHI calculated in terms of wage bill, both as the dependent variable and as the instrument.[33] Berger et al. (2022) argue that the employment-HHI understates concentration as it ignores the positive size-wage premium. A firm with a wage bill share of 20% might effectively be a larger employer, i.e.

[33]The first stage is shown in table 11 in annex A

have a greater weight on the labor market, than a firm with an employment share of 20%, but whose wage bill represents only 10%. This is a fact that the employment-HHI fails to capture and that the payroll-HHI takes it into account.

When there is a positive relationship between wages and employment, the payroll HHI is strictly larger than the employment HHI (Berger et al. (2022)). In our data, the payroll-HHI is slightly higher with an average for the whole economy of 0.18 versus 0.17 for the employment-HHI (for our baseline), which is consistent with Berger et al. (2022).

The payroll-HHI is calculated as follows:

$$s^{w}_{j,c,f,t} = \frac{wage_{j,c,f,t}}{\sum_f wage_{j,c,f,t}}; HHI^{w}_{j,c,t} = \sum_f (s^{w}_{j,c,f,t})^2$$

where *wage* corresponds to the wage bill, i.e. the sum of wages paid by firms.

The estimates for the IV analysis using the payroll-HHI are presented in table 10. The estimates of overall inequality and within-firm inequality as measured by the Gini index are positive and significant at the 1% significance level (respectively 0.033 and 0.034). The estimate of between-firm inequality is negative and also significant (-0.079). Therefore, results are consistent with our main analysis.

7 Conclusion

Employer concentration on the labor market has a detrimental effect on wages, and this effect is heterogeneous along the wage distribution. When concentration increases, the wages of the lowest earners decrease relatively more than the wages of earners at the top of the distribution. As a result, wage inequality across jobs belonging to the same occupation in a given commuting zone increases in the local labor market.

Employer concentration increases inequality between jobs *within a given firm* and decreases inequality *between firms*. Based on a simple formalization, we interpret these results as evidence in favor of the heterogeneous bargaining mechanism (the wages of the lowest

paid jobs are more sensitive to a reinforcement of employers' bargaining position) while the sorting mechanism (employer concentration could make worker selection easier, resulting in the most productive workers being matched with the most productive firms, and hence in higher inequality) seems not to prevail: the effect of labor market concentration is negative, even at the top of job distribution and at the top of firm distribution. This result continues to hold when we restrict the analysis to the largest local labor markets, on which sorting might be particularly prevalent. In addition, we show results on the direct effect of three explicit measures of positive assortative matching: employer concentration does not increase positive assortative matching and even reduces it in some cases.

Based on this analysis, the increase in wage inequality brought about by labor market concentration seems to be mostly driven by a higher rent extraction from the lowest paid jobs rather than by more efficient sorting. Therefore, the increase in wage inequality induced by labor market concentration is not likely to be accompanied by any positive effect on productivity. Policy makers might therefore find it desirable to limit labor market concentration in highly concentrated labor markets in order to protect the lowest earners, by favoring the entry of new employers for instance. This paper also underlines the importance of a minimum wage to shield the lowest earners from the effects of labor market concentration.

8 Figures

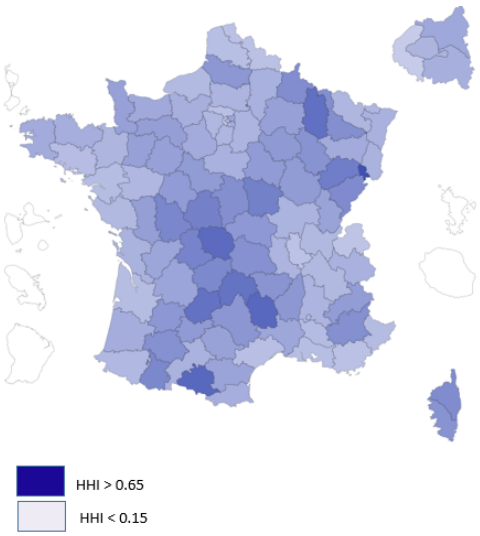

Figure 1: Employer concentration, France, 2019, authors' calculations (HHI)

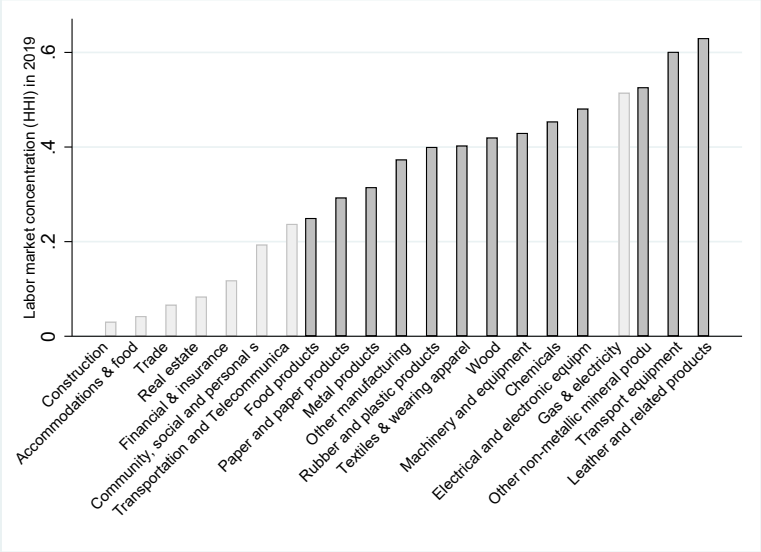

Figure 2: Employer concentration by sector, France, 2019, authors' calculations (HHI)

9 Tables

Table 1: Summary Statistics- Concentration

	N	Mean	SD	Min	p25	p50	p75	Max
Employment HHI	644,255	0.17	0.19	0.00005	0.05	0.10	0.21	1
Payroll HHI	644,255	0.18	0.19	0.00013	0.05	0.11	0.23	1
Normalized HHI	666,625	0.12	0.16	0	0.02	0.06	0.14	0.994
Number of firms	644,255	66.5	273.4	1	13	25	55	25,221
Average age	644,255	39.9	4.2	21.5	37	39.8	42.8	61.2
Ratio of men	644,255	0.65	0.30	0	0.41	0.72	0.93	1
Market size (no. of jobs)	644,598	275	1278	21	42	87	215	189,495
Average firm size (no. of jobs)	644,255	86	152	0	22.5	48	100	161,91

Table 2: Summary Statistics- Wage and Inequality

	N	Mean	SD	Min	p25	p50	p75	Max
Mean annual wage	644,255	21,157	8,972	1,358	15,250	18,881	24,543	121,431
Gini - overall	644,255	0.23	0.072	0	0.19	0.23	0.28	0.69
Gini - within	416,765	0.18	0.074	0	0.12	0.17	0.22	0.63
Gini - between	668,961	0.21	0.09	0	0.17	0.22	0.26	0.69

Table 3: Effect of employer concentration on wages and inequality - OLS

	(1) Wage	(2) Gini Overall	(3) Gini Within	(4) Gini Between
Emp-HHI (log)	-0.025***	-0.032***	0.079***	-0.040***
	(0.001)	(0.002)	(0.003)	(0.003)
Market size (log)	-0.064***	0.090***	0.111***	0.031***
	(0.002)	(0.004)	(0.004)	(0.005)
CZ year FE	Yes	Yes	Yes	Yes
CZ occup FE	Yes	Yes	Yes	Yes
Obs	640,948	639,914	411,667	510,256
R squared	0.889	0.462	0.639	0.399
Adjusted R-squared	0.876	0.395	0.586	0.321

This table reports OLS regression estimates of the effects of employer concentration on wages on average (column 1), overall inequality (column 2), within-firm inequality (column 3) and between-firm inequality (column 4) using the Gini index to measure inequality, for France between 2009 and 2019. A labor market is defined as the intersection of a commuting zone and a 4-digit occupation. Overall inequality is calculated between jobs in a given local labor market. Within-firm inequality is calculated between jobs within the same occupation in the same firm and then weighted and aggregated at the local labor market level. To compute between-firm inequality, we calculate for each firm an average wage for jobs belonging to the same occupation employed at the firm. Between-firm inequality is then calculated between these average wages for each labor market. Emp-HHI is the employment-HHI: the Herfindahl-Hirschman index of the labor market considered. To compute employment shares, all jobs belonging to the same occupation, employed by the same firm in the same commuting zone but in different establishments, are summed. The size of the market (in terms of number of jobs, in log) is controlled for. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least 20 jobs and retaining only firms with more than 10 employees. Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 4: Effect of employer concentration on wages and overall inequality - IV

	(1) Wage	(2) Gini	(3) Theil	(4) Mehran	(5) Entropy	(6) Piesch
Emp-HHI (log)	-0.093***	0.050***	0.078***	0.043***	0.048***	0.043***
	(0.003)	(0.006)	(0.009)	(0.006)	(0.008)	(0.004)
Market size (log)	-0.070***	0.097***	0.160***	0.088***	0.157***	0.095***
	(0.003)	(0.004)	(0.007)	(0.004)	(0.007)	(0.004)
CZ year FE	Yes	Yes	Yes	Yes	Yes	Yes
CZ occup FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	640,948	639,914	639,914	639,914	639,665	639,666
KP Stat	5181.3	5144.2	5144.2	5144.2	5134.1	5133.9

This table reports IV regression estimates of the effects of employer concentration on wages on average (column 1), and overall inequality (columns 2 to 6), using different inequality indices, for France between 2009 and 2019. A labor market is defined as the intersection of a commuting zone and a 4-digit occupation. Overall inequality indices are calculated between jobs in a given local labor market. Emp-HHI is the employment-HHI: the Herfindahl-Hirschman index of the labor market considered. To compute employment shares, all jobs belonging to the same occupation, employed by the same firm in the same given commuting zone but in different establishments, are summed. The size of the market (in terms of number of jobs, in log) is controlled for. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least 20 jobs and retaining only firms with more than 10 employees. Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

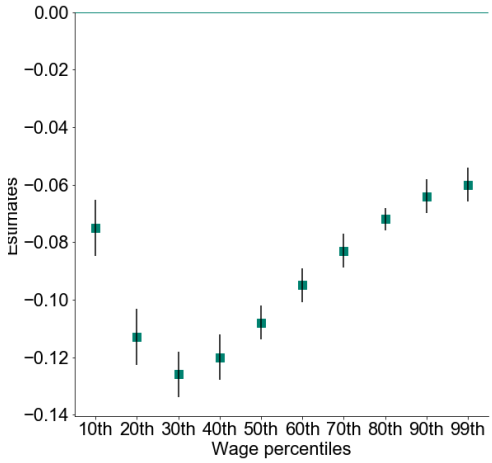

Figure 3: Effect of employer concentration on wages by decile (overall inequality), 4-digit occupation - 2009-2019 (95% level confidence intervals)

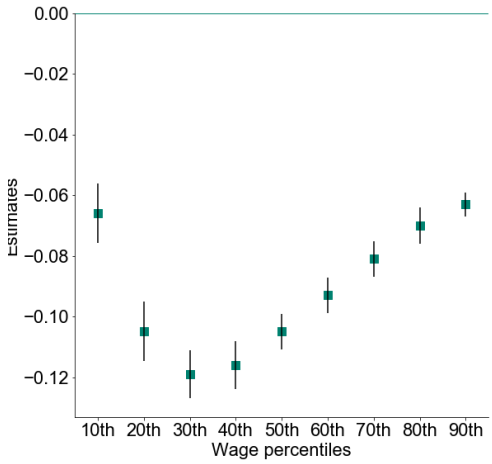

Figure 4: Effect of employer concentration on wages by decile (overall inequality) on largest markets, 4-digit occupation - 2009-2019 (95% level confidence intervals)

Table 5: Effect of employer concentration on within-firm inequality - IV

	(1) Gini	(2) Theil	(3) Mehran	(4) Entropy	(5) Piesch
Emp-HHI (log)	0.055***	0.096***	0.050***	0.105***	0.060***
	(0.005)	(0.009)	(0.004)	(0.011)	(0.005)
Market size (log)	0.109***	0.199***	0.103***	0.240***	0.116***
	(0.004)	(0.007)	(0.004)	(0.008)	(0.004)
CZ year FE	Yes	Yes	Yes	Yes	Yes
CZ occup FE	Yes	Yes	Yes	Yes	Yes
Obs	411,667	411,667	411,667	411,667	411,667
KP Stat	3435.7	3435.7	3435.7	3435.7	3435.7

This table reports IV regression estimates of the effect of employer concentration on wage inequality within a given firm (within-firm inequality) for France between 2009 and 2019. A labor market is defined as the intersection of a commuting zone and a 4-digit occupation. Within-firm inequality is calculated between jobs within the same occupation in the same firm and then weighted and aggregated at the local labor market level. Emp-HHI is the employment-HHI: the Herfindahl-Hirschman index of the labor market considered. To compute employment shares, all jobs belonging to the same occupation, employed by the same firm in the same given commuting zone but in different establishments, are summed. The size of the market (in terms of number of jobs, in log) is controlled for. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least 20 jobs and retaining only firms with more than 10 employees. Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

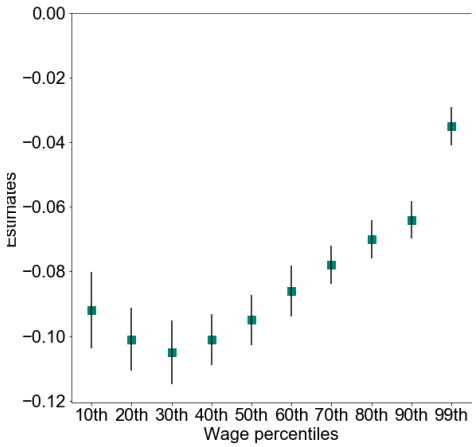

Figure 5: Effect of employer concentration on wages within a given firm (within-firm inequality), 4-digit occupation - 2009-2019 (95% level confidence intervals)

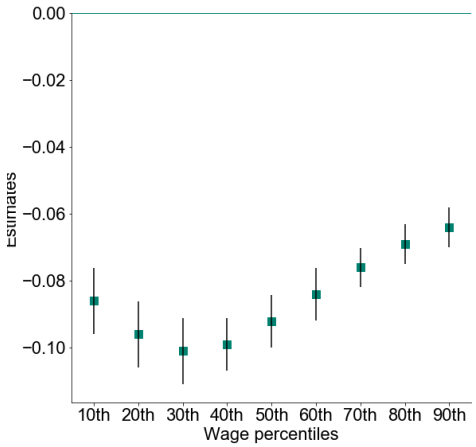

Figure 6: Effect of employer concentration on wages within a given firm (within-firm inequality) on largest markets (above the median of jobs), 4-digit occupation - 2009-2019 (95% level confidence intervals)

Table 6: Effect of employer concentration on between-firm inequality - IV

	(1) Gini	(2) Theil	(3) Mehran	(4) Entropy	(5) Piesch
Emp-HHI (log)	-0.109***	-0.131***	-0.106***	-0.083***	-0.022***
	(0.013)	(0.015)	(0.013)	(0.009)	(0.004)
Market size (log)	0.088***	0.113***	0.081***	0.071***	0.046***
	(0.006)	(0.007)	(0.006)	(0.005)	(0.002)
CZ year FE	Yes	Yes	Yes	Yes	Yes
CZ occup FE	Yes	Yes	Yes	Yes	Yes
Obs	605,093	605,091	605,093	601,189	601,194
KP Stat	4763.6	4763.7	4763.6	4651.7	4651.4

This table reports regression estimates of the effect of employer concentration on between-firm inequality for France between 2009 and 2019. A labor market is defined as the intersection of a commuting zone and a 4-digit occupation. For each firm, we calculate the average wage of jobs belonging to the same occupation employed at the firm. Between-firm inequality is then calculated between these average wages for each labor market. Emp-HHI is the employment-HHI: the Herfindahl-Hirschman index of the labor market considered. To compute employment shares, all jobs belonging to the same occupation, employed by the same firm in the same given commuting zone but in different establishments, are summed. The size of the market (in terms of number of jobs, in log) is controlled for. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least 20 jobs and retaining only firms with more than 10 employees. Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

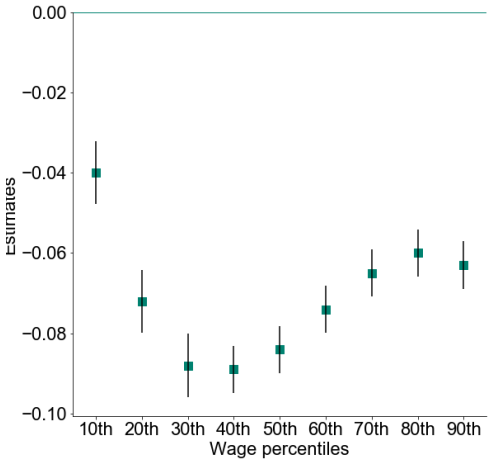

Figure 7: Effect of employer concentration on the average wages of firms ranked by decile (between-firm inequality), 4-digit occupation - 2009-2019 (95% level confidence intervals)

Table 7: Effect of employer concentration on positive assortative matching - IV

	(1) PAM1a	(2) PAM1a	(3) PAM1b	(4) PAM1b	(3) PAM2	(4) PAM2
Emp-HHI (log)	-0.028***	-0.033***	-0.012	-0.008	-0.045**	-0.018
	(0.012)	(0.012)	(0.015)	(0.015)	(0.021)	(0.021)
Market size (log)		-0.008***		0.008***		0.050***
		(0.002)		(0.003)		(0.004)
CZ year FE	Yes	Yes	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	226,115	226,115	169,570	169,570	167,775	167,775
KP Stat	1534.7	1365.7	746.9	668.8	1371.5	1302.4

This table reports IV regression estimates of the effect of employer concentration on three measures of sorting for France between 2009 and 2019. A labor market is defined as the intersection of a 3-digit sector and a commuting zone. Measures of matching quality labeled PAM1 are ratios of good match -high (low) quality firm matched with high (low) quality workers- over total matches (good matches and mismatches), on a given local labor market. All measures use the worker fixed effect from an AKM regression as a proxy of worker quality. PAM1a uses the firm fixed effect from an AKM regression as a proxy for firm quality while PAM1b uses labor productivity. PAM2 is a measure of the correlation of the ranking of firms' fixed effects and workers' fixed effects, for which the non-significant correlations have been set to zero, on a given local labor market. Emp-HHI is the employment-HHI: the Herfindahl-Hirschman index of the labor market considered, computed at the sector*CZ level. To compute employment shares, all jobs belonging to the same sector, employed by the same firm in the same given commuting zone but in different establishments, are summed. The size of the market (in terms of number of jobs, in log) is controlled for. Standard errors are clustered at the commuting zone level. The regressions are conducted on a restricted sample of markets that have at least 20 jobs. Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 8: Robustness - emp-HHI instrumented by inverse no. of firms

	(1) Gini Overall	(2) Wage	(3) Gini Within	(4) Gini Between
Emp-HHI (log)	0.064***	-0.107***	0.119***	-0.383***
	(0.007)	(0.004)	(0.006)	(0.022)
Market size (log)	0.098***	-0.072***	0.113***	0.067***
	(0.004)	(0.003)	(0.004)	(0.007)
CZ year FE	Yes	Yes	Yes	Yes
CZ occup FE	Yes	Yes	Yes	Yes
Obs	639,914	640,948	411,667	605,093
KP Stat	5717.6	5765.1	3325.6	6787.6

This table reports IV regression estimates of the effect of employer concentration on wages on average (column 2) and on overall inequality (column 1), within-firm inequality (column 3) and between-firm inequality (column 4) using the Gini index to measure inequality, in France between 2009 and 2019. For this robustness check, the employment-HHI is instrumented by the inverse of the number of firms, weighted by the share of the local labor market in the total number of jobs belonging to the occupation at the national level. A labor market is defined as the intersection of a commuting zone and a 4-digit occupation. Emp-HHI is the employment-HHI: the Herfindahl-Hirschman index of the labor market considered. To compute employment shares, all jobs belonging to the same occupation, employed by the same firm in the same given commuting zone but in different establishments, are summed. The size of the market (in terms of number of jobs, in log) is controlled for. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least 20 jobs and retaining only firms with more than 10 employees. Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 9: Robustness - normalized HHI as dep. variable and instrument

	(1) Gini overall	(2) Wage	(3) Gini Within	(4) Gini Between
Norm. HHI (log)	0.044***	-0.068***	0.032***	-0.027***
	(0.005)	(0.002)	(0.004)	(0.009)
Market size (log)	0.085***	-0.052***	0.104***	0.085***
	(0.004)	(0.002)	(0.004)	(0.006)
CZ year FE	Yes	Yes	Yes	Yes
CZ occup FE	Yes	Yes	Yes	Yes
Obs	636,788	637,824	409,950	604,289
KP Stat	4881.1	4988.4	2112.2	4655.1

This table reports IV regression estimates of the effect of employer concentration on the average wage (column 2) and overall inequality (column 1), within-firm inequality (column 3) and between-firm inequality (column 4) in France between 2009 and 2019. For this robustness check, employer concentration is measured as the normalized HHI (norm. HHI), both as the dependent variable and as the instrument. The normalized HHI takes into account the variations arising from a change in the weights of employers, holding fixed the number of employers. To compute employment shares, all jobs belonging to the same occupation, employed by the same firm in the same given commuting zone but in different establishments, are summed. A labor market is defined as the intersection of a commuting zone and a 4-digit occupation. The size of the market (in terms of number of jobs, in log) is controlled for. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least 20 jobs and retaining only firms with more than 10 employees. Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 10: Robustness - pay-roll HHI as dep. variable and instrument

	(1) Gini overall	(2) Wage	(3) Gini Within	(4) Gini Between
Wage-HHI (log)	0.033***	-0.096***	0.034***	-0.079***
	(0.006)	(0.003)	(0.005)	(0.013)
Market size (log)	0.096***	-0.074***	0.109***	0.087***
	(0.004)	(0.003)	(0.004)	(0.006)
CZ year FE	Yes	Yes	Yes	Yes
CZ occup FE	Yes	Yes	Yes	Yes
Obs	639,914	640,948	411,667	605,093
KP Stat	4129.0	4163.8	3611.9	3921.9

This table reports IV regression estimates of the effect of employer concentration on the average wage (column 2) and overall inequality (column 1), within-firm inequality (column 3) and between-firm inequality (column 4) in France between 2009 and 2019. A labor market is defined as the intersection of a commuting zone and a 4-digit occupation. Payroll-HHI is the logarithm of the Herfindahl-Hirschman index of the labor market considered for which wage bill shares have been computed. To compute wage shares, the wages of all jobs belonging to the same occupation, employed by the same firm in the same given commuting zone but in different establishments, are summed. The size of the market (in terms of number of jobs, in log) is controlled for. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least 20 jobs and retaining only firms with more than 10 employees. Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

A Appendix

Table 11: Overall Gini: first-stage results

	(1) emp-HHI	(2) emp-HHI	(3) wage-HHI	(4) norm.HHI
Instrument: emp-HHI	0.897***			
	(0.013)			
Instrument: inv. no. firms		0.715***		
		(0.009)		
Instrument: wage-HHI			0.821***	
			(0.013)	
Instrument: norm. HHI				0.928***
				(0.013)
Market size (log)	0.144***	0.155***	0.072***	0.384***
	(0.009)	(0.010)	(0.009)	(0.010)
CZ year FE	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes
Obs	639,914	639,914	639,914	636,788

This table reports the regression output from a first-stage linear regression. The first two columns show the results when the dependent variable is the employment-HHI. The first column corresponds to our main specification, for which the employment-HHI of other commuting zones in the same occupation is used as an instrument. Column 2 corresponds to a robustness check for which the inverse of the number of firms is used as an instrument for the employment-HHI. Columns 3 and 4 show results for alternative measures of concentration: the payroll-HHI and the normalized HHI, serving both as dependent variables and instruments. A labor market is defined as the intersection of a commuting zone and a 4-digit occupation. The size of the market (in terms of number of jobs, in log) is controlled for. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least 20 jobs and retaining only firms with more than 10 employees. Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

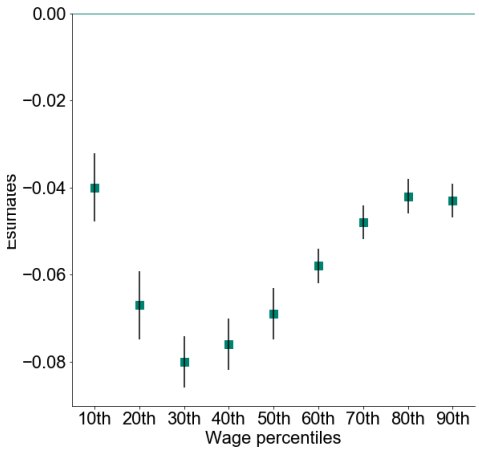

Figure 8: Effect of employer concentration on the average wage of firms ranked by decile (between-firm inequality) for markets with more than 10 firms, 4-digit occupation - 2009-2019 (95% level confidence intervals)

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