The heterogenous effects of employers' concentration on wages: better sorting or uneven rent extracting?

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Abstract

Are workers equal in front of employers' concentration? We show, using instrumental variable estimations for France between 2000 and 2019, that employers' concentration has a negative heterogenous effect on wage, with the lowest earners being the most vulnerable. This increased wage inequality may reflect some efficiency gains if concentration allows employers to impose a more demanding selection process, improving sorting i.e. workers selection, thus generating both inequality and higher productivity. We find, exploring within-firm and between-firm inequality, that it is not the case. Employers' concentration instead generates wage inequality by undercutting relatively more the bargaining power of the lowest earners.

JEL Classification: J31, J42
Keywords: Labor market concentration, Inequality

1 Introduction

In the same way that firms can exert market power on the market of goods, they can also have some market power on the labor market. The monopsony argument dates back to Joan Robinson and has been more recently developed extensively in the work of Alan Manning (Manning (2003)). Employers' concentration in particular can be a source of market power for employers[1]. The degree of employers' concentration depends on the number and on the weight of employers in the total employment of a given labor market. When employers' 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.

Beyond the effect of employers' concentration on the *average* wage, our focus is on investigating whether this effect is stable across the wage distribution. Are workers differently impacted by a rise in employers' concentration? Are the lowest earners more vulnerable? Furthermore, besides the negative effect predicted by monopsony, could there be any positive effect of an increased employers' concentration on productivity?

The average effect of employers' concentration has been studied by a recent strand of the literature and its effect on inequality has been studied, using the Gini coefficient, for the US by Rinz (2020)[2]. A first contribution of our work is that we quantify, for France, the effect of employers' concentration on a wide range of measures of overall inequality (inequality between jobs) but also on within-firm inequality (dispersion of wages of jobs in a given firm) and on between-firm inequality (dispersion of firms' average wage). A second contribution is that we investigate whether the increase in wage inequality brought by employers' concentration could entail some efficiency gains, or if it is a mere reflection of an uneven rent extracting across workers.

Using French administrative matched employee-employer data from 2000 to 2019, we first show that an increase in employers' concentration depresses the *average* wage, a result that is

[1] A situation of monopsony or oligopsony also arises in the presence of frictions (costs of moving, informational asymmetry, idiosyncratic tastes for jobs not fully priced in wages etc.).

[2] See for the US (Rinz (2020), Benmelech et al. (2020), Qiu and Sojourner (2019), Azar et al. (2020a), Azar et al. (2020b)) and for France (Bassanini et al. (2021), Marinescu et al. (2021))

consistent with what has been found in the literature[3]. All other things equal, the average wage on a market on which employers' concentration is at the average level in the manufacturing sector (high employers' concentration) is 3.3% lower than on a market on which employers' concentration is at the average level in services (low concentration).

Our second result is that this negative effect is heterogeneous: the lower decile of a given local labor market suffers a decrease in wage of 6.7% when employers' concentration increases from the average level in services to the average level in manufacturing, while the 9th decile suffers a more modest decrease of 2.2%[4]. In other words, within each local labor market, the lowest-paid jobs are the most vulnerable to employers' concentration. We then show that employers' concentration deepens inequality between jobs in a given local labor market for a wide range of indicators[5]. In particular, the wedge between the first and the last decile would be 4,8% higher on a market at the average level of concentration in manufacturing compared to the average level in services, all others things equal.

Could those inequalities be acceptable if they were to imply productivity gain or is employers' concentration simply making rent extracting more uneven across workers[6]?

A first possible mechanism -the heterogeneous monopsony argument- holds that an additional decrease in bargaining power might be more damaging for the lowest earners who already are in a weak bargaining position[7,8,9]. Indeed, it is possible that as those poorer workers cannot afford to look for outside options for long, implying a higher dependence of their wage on the current

[3]For France, Marinescu et al. (2021) find a negative impact for new hires: a 10% increase in employers' 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 employers' concentration not only depresses the starting salary but slows down the wage increase of existing jobs.

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

[5]; Namely the 90/10, 90/50, 80/50, 50/20 ratios, the Gini coefficient, the Mehran, the Piesch, the Entropy ratio and the Theil index

[6]Other mechanisms could be at work; we focus our analysis on those two.

[7]Wages and bargaining power are likely to be highly correlated

[8]The weaker the bargaining position gets, the higher the marginal effect of an additional weakening of the bargaining position is on the wage. In other words, we hypothesize that the return to bargaining power on wage might be concave. The economic reasons why that might be the case are left for future research.

[9]For countries as France, the lower bound of the minimum wage constrain the decrease for workers already at the minimum wage. However, in our study, we construct deciles by local labor markets -a given sector in a given commuting zone, so that first deciles include first decile of all markets, including richer markets. As a result, workers in the first deciles can have a wage higher than the minimum wage in those richer markets.

employers' concentration, compared to better paid workers whose financial resources allow them to wait longer before accepting a job, attenuating the impact of increased employers' concentration on their wage.

The second mechanism we investigate -the sorting argument- holds that employers' concentration could improve sorting, by allowing employers to be more demanding in the selection process - imposing more rounds of interviews, including more difficult tasks, asking for a sample work etc. With such a more stringent selection process, sorting improves. If higher productivity workers have a higher positive externality on higher productivity workers, a better sorting would result in more productive workers being selected into the more productive firms (positive assortative matching), leading to an increase in inequality between firms; and would be accompanied by a rise in average productivity.

To explore the plausibility of the two mechanisms, we study the effects of employers' concentration on two dimensions of inequality: within-firm inequality, defined as the dispersion of workers' wages within a firm, and between-firm inequality, defined as the dispersion of firms' average wage.

If the heterogeneous monopsony mechanism is at play, we should see an increase in within-firm inequality (the bargaining position of the lowest earners is relatively more affected) and an increase in between-firm inequality (some firms have a higher share of lowest earners, leading to a mechanical decrease in the average wage of thoses firms). By contrast, if the sorting mechanism is at play, we should see only an increase in between-firm inequality: the most productive firms select the more productive workers more easily, which increases the wedge between firms. Finally, for the sorting mechanism to be plausible, some workers and some firms (the most productive firms hiring the most productive workers thanks to better sorting) should benefit, while the heterogeneity monopsony mechanism is consistent with the effect of employers' concentration being negative for all firms and workers.

We find that both within-firm and between-firm inequality increase. We also find that the effect of concentration is negative for the entirety of the distribution of firms and jobs, including for the

99th percentile, which is not consistent with the sorting mechanism. Even when we restrict the sample to the richest local labor markets to the largest markets (sorting might more easily arise when there are a very large number of employees), we find no evidence in favor of the sorting mechanism. Overall, our results point to the fact that the inequality brought by employers' concentration is consistent with the heterogenous bargaining effect argument, with no evidence in favor of the sorting mechanism.

An important question is the definition of the relevant labor market. Following Rinz (2020), we define local labor market as firms belonging to a given sector in a given commuting zone[10,11,12]. Our main specification is conducted on a sample with relatively large markets: markets with at least 10 firms having at least two employees, among which at least one firm has at least 10 employees[13]. As a result, the local labor markets in our restricted sample have on average more than 1,000 jobs and 67 firms, hence rather large labor markets.

A natural alternative choice to define local labor market would be to use occupations, instead of sectors. We choose sectors over occupations in our main specification for three main reasons. The first is a conceptual one: our objective is to study mechanisms which requires us to investigate between-firm and within-firm inequality, which makes more sense when the analysis is conducted at the sectoral level (to which the whole firm belongs). The second reason is data limitation: the variable occupation is reliable in our data at a sufficient disaggregated level since 2009 only. The third reason for using sectors is that the share of workers changing sectors is similar to the share of workers changing occupations[14].

However, to test the robustness of our results, we use different definitions of local labor markets. First, we reproduce our main specifications for inequality between jobs using occupations instead

[10] See section 3.1 for a more thorough discussion

[11] Commuting zones are defined by the French Statistical institution INSEE as geographical units, made of several municipalities, in which employers find most of their workforce.

[12] Because, over the period studied, there is a break in sector classification, we build a constant classification over the whole period (2000-2019). See A B for more details on the methodology.

[13] Section 2.2 details our restrictions on size in more details. We mainly want to ensure that the construction of deciles are meaningful and that we have market of a sufficient size in terms of number of jobs.

[14] Between 2017 and 2018, 7% of workers changed sectors as per our classification, while 6.8% changed occupations defined at the 3-digit level and 7.8% for occupations at the 4-digit level. More details are provided in section 3.1

of sectors to define labor market, and find similar results. Second, we also reproduce the analysis using the 99 administrative geographical units called *départements* instead of the 304 commuting zones and find similar results.

To measures employers' concentration, we use the employment-Herfindahl index, i.e. the sum of squared share of employment of each employer on the local labor market. This index captures two dimensions: the number of employers and their weight on the labor market. Our robustness checks therefore include alternative measures: the number of firms and a normalized HHI that holds constant the number of firms. We replicate the analysis and find for both measures a significant effect on inequality. This suggests that both the number of employers and their respective weight in employment matter for wage and inequality.

The relationship between employers' concentration and wage inequality is not easy to identify. The dynamism of the local labor market could both explain why employers concentration increases -as many firms exit- and inequalities -a local economic decline could depress relatively more the wages of the lowest earners. Concentration on the product market, productivity, polarization (increase in the share of high-skill and low-skill employees), could also explain both employers' concentration and inequality. To mitigate those concerns we control for productivity and product market concentration at the sectoral year level, and for polarization and job creation (or destruction) -to proxy for economic dynamism-, at the local labor market year level[15] .

However, we cannot control for local productivity shocks[16]. Imagine a world with a variety of firms, some highly productive and large firms with high wages, others less productive and smaller with lower wages. A positive productivity shock, on the local labor market, benefiting only the most productive and largest firms locally, could increase both employers' concentration -the already large employers benefiting from the new technology are growing-, and decrease inequality -when the lowest-productivity firms are forced to exit the market due to a higher average productivity on the market, the lowest-paid jobs at those firms are destroyed, reducing the disparity between

[15] See section 4.1: we use the combined share of high-skill and low-skill jobs in the total employment of a given labor market.

[16] We do not have balance sheet at the establishment level, hence at the local level

wages of *remaining* jobs. We therefore use an instrumental variable analysis, using the employers' concentration of *other commuting zones in the same sector*, as in Azar et al. (2020b), Rinz (2020). This instrument allows to abstract from those local productivity shocks that would hit only the largest firms locally[17].

Our paper relates to empirical literature on the negative effect of the concentration of employers in labor markets on wages: Rinz (2020), Benmelech et al. (2020), Qiu and Sojourner (2019), Azar et al. (2020a), Bassanini et al. (2021), Marinescu et al. (2021), Azar et al. (2020b). Wages inequalities, to the best of our knowledge, are considered only in Rinz (2020). Rinz (2020) offers a vast analysis of labor market concentration, the first of this extent, in which inequality is not the only focus of the study, which is much broader. The mechanisms by which employers' concentration impact 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). On the theory side, Jarosch et al. (2019) develop a model with a finite number of firms in which concentration can be studied explicitly[18]. The literature on labor market power (Berger et al. (2019), Lamadon et al. (2022) for instance) is less directly linked to our paper: the market power in those models does not arise from the weight of an employer on the market as there is an infinity of firms.

Section 2 presents the data used, the sample choices made and provides definitions of inequality and employers' concentration measures. Section 3 presents some descriptive features of French labor markets in those two dimensions. Section 4 details our estimation and presents our results on the effect of employers' concentration on inequality and explores two possible mechanisms. Section 5 presents the robustness checks.

2 Data and measures

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

[18] Outside options for a worker do not include vacancies from 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.

2.1 Data sources

2.1.1 DADS-Postes

The first data source is a French Administrative employee-employers data named *Déclaration annuelle de données sociales* (DADS-Postes) collected by the 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 excluded from filing such declarations. This database catalogues all jobs. For each observation 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 as well as the sector of the employing firm (four-digit sector classification) and the commuting zone of employers.

2.1.2 FICUS/FARE

The second source of data is *Système unifié de statistique d'entreprises* (SUSE ; Ficus) collected by INSEE between 1995 and 2007. Since 2008 it has been replaced by *Elaboration des statistiques annuelles d'entreprise* (ESANE ; Fare). This database provides information on firms such as sector, turnover, employment, and value added. We match firm and employees' characteristics through a firm-specific identifier (SIREN). This database allows to calculate the product market concentration (see section 2.4) and firm's labor productivity (value added divided by employment) as a proxy of the productivity.

2.2 Sample construction

The quality of data of DADS-Postes is considered to be stable starting in 2000, which is why we start our study in 2000.

In terms of jobs, we only keep full-time and "non annex" job[19]. We only keep full-time jobs

[19]Since 2002 a job is defined as "non annex" job 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 hours to days is higher than

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 keep jobs of individuals below 21 years-old in order to exclude students jobs which might be more specific in terms of labor supply elasticity. Finally, 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, an Ile-de-France dummy (the wealthiest region) and in-firm experience, as well as some characteristics of the firm such as the number of employees and the sector. This procedure leads 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 sector, same commuting zone), we consider that the jobs of all these establishments belong to one and unique entity, which we consider as a unique employer for the purpose of our study. Indeed, we consider that managerial and human resources decision 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: employees of all establishments owned by the same firm within the same labor market are considered as being employed by the same entity. Finally, we keep only firms with at least two employees in a given local labor market as firms with only one employee might be very specific ones, that we do not want to be driving our results.

In terms of sectors, we exclude: agriculture, extracting industries, coking, finance, public administrative and education[20]. We drop public administration and education because the bargaining power is likely to be different on this market and wage setting might depend on different factors than employers' concentration, a notion that makes less sense in the public sector. Agriculture is excluded as overall activity and therefore most likely employment and wages are highly dependent on weather and seasons. Sector classification was subject to minor changes in 2003 and to a major

1.5.

[20]See section B for a detailed list of sectors excluded.

one in 2008. Therefore, in order to cover the full period, we compute our own sector classification (see A B for the precise details of our procedure). To ensure smoothness, and as the crisis happened at the same time as this classification change, we attribute to firms who were present in 2007 the sector code they had in 2007 for the years 2008, 2009 and 2010. Our final sample contains 178 sectors including 94 in manufacturing and 84 in services.

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 municipalities of work of each job before 2010 and the commuting zone according to the 2010 classification, taking care of changes in municipalities that happened over the period (some municipalities were merged, changed names, were absorbed, etc.). As a result, there is no break in the classification we are using. It is however possible that the 2010 classification that we are using is less relevant for the early years and the latest years of our sample. Our final sample contains 304 commuting zones.

In terms of local labor market (sector*commuting zone), we restrict our sample to rather large markets: we keep markets on which at least 10 firms having at least 2 employees are present, and we also require that among those 10 firms, at least one firm has more than 10 employees. We apply those restrictions so that our between-firm and within-firm deciles are meaningful: we need at least 10 units in both cases. As a result, we use for our econometric analysis a restricted sample with relatively large markets: local labor markets have on average more than 1,000 jobs and 67 firms.

2.3 Measures of inequality

We are interested in inequalities between the wages of jobs in a given local labor market (same sector and same commuting zone). We construct three different measures of inequality: overall inequality, within-firm inequality and between-firm inequality.

Overall inequality measures the dispersion of wages between *jobs* in a given local market, regardless of whether or not those jobs are within the same firm. This measure therefore provides a general assessment of inequalities in a local labor market. Jobs are considered here, instead of indi-

viduals, for two reasons. The first one is data limitations: the identifier of a given worker allowing to aggregate wages of a given individual is available only from 2002 onward. The second reason is a conceptual one: this paper is concerned with understanding how concentration of employers can affect differently the bargaining power of workers and therefore inequalities so that jobs is the most relevant unit of observation. If a given individual has two jobs within the same sector, those wages should be considered independently and not aggregated as the worker did not negotiate the wages of the two jobs together but separately. And the fact that he could not get one unique contract is important; information on the bargaining power would be lost, if those two jobs were to be aggregated as one[21].

Following the logic of Song et al. (2019), we consider two different dimensions of overall inequality, i.e. of inequality between jobs, that should be explored: 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 pays his workers compared to each other. In other words, it measures the dispersion of workers' wages in a given firm. First, within each firm, i.e. considering only the jobs of one given firms, 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 the employment of each firm, $s^{e}_{m,f}$, 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 of firms. This measure is therefore calculated by computing different inequality indices between the average wage of each firms in a given market. The first step is to compute within each

[21] From 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 of those jobs

firm in a local labor market the average wage and then compute indices between the average wages of all the firms present on a given market. It assesses the degree of inequalities between firms, regardless of how unequally workers are paid within a given firm.

We compute a variety of inequality measures for all those three measures - overall, within-firm and between-firm inequality. First, we calculate the percentiles of the earnings distribution and then compute some key percentile ratios (90/10, 50/10, 90/50, 80/50, 50/20 and 99/10). Some inequalities indices (Gini, Theil, Entrop, Mehr and Piesch) are also computed. The Gini coefficient is relatively more sensitive to changes in the middle of the earnings distribution, when compared to the Piesch index, more sensitive to changes in the upper end of the distribution, or the Mehran index, more sensitive to changes in the bottom end of the distribution.

2.4 Measures of employers' concentration and of sales concentration

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. In the main specifications, a local labor market is defined as the intersection of a sector (3-digit) and a commuting zone. In the robustness checks we conduct (see section 5), we use alternative definitions of the local labor markets: we first replace sectors with occupations (only available on the period 2009-2019), and second, we use *départments* instead of commuting zones.

The choice of the degree of aggregation of the sector classification is important as we want to capture the relevant set of potential employers. After excluding some specific sectors (see section 2.2) our 3-digit classification includes 178 sectors, whereas the 2-digit one includes 46 sectors. We consider that the 2-digit classification is too aggregated to accurately capture relevant labor markets. For instance, in the 2-digit classification, the sector of personal services encompasses both hairdressers and funerals, which are separate in our 3-digit classification and obviously are two distinct labor markets[22]. We cannot use a more disaggregated classification (4-digit) as the bridge between the two classifications (*NAF rév.1* and *NAF rév.2*) was difficult to implement at this

[22] Another example is the sector of food sector in the 2-digit classification which encompasses both meat and fish sector, vegetables sector and grain products sector, labor markets on which workers and firms might be very different.

level (see A B).

Our main measure of labor market concentration is the employment Herfindahl-Hirschman Index (HHI) which is used in the industrial organization literature and in antitrust practice[23]. The HHI is the sum of the square of the share of employment in a giving 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, and f represents a firm that operates in sector j and commuting zone c in year t. If a firm has several establishments in the same sector *and the same commuting zone*, we regroup all of them together. Then, the employment-HHI at the sector, commuting zone, year level writes:

$$HHI^{e}_{j,c,t} = \sum_{f} (s^{e}_{j,c,f,t})^2$$

Values of the HHI lies by construction between 0 and 1[24]. 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. A HHI between 0.15 and 0.25 is considered to be indicative of a moderately concentrated market while a HHI above 0.25 is considered to be indicative of a high degree of concentration.

We use three alternative definitions. First, we use the number of firms, calculating the average of $log(1/N)$, where N refers to the number of firms in the local labor market[25]. Second, we also use the normalized HHI, which is a measure that holds constant the number of firms, so that only the distribution of the employment shares matters. It writes:

[23] As an alternative, we use the payroll-HHI for robustness tests, as described in section 5.

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

[25] Table 1 shows some correlations between the measures used.

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

Third, instead of employment-HHI, we also use pay-roll HHI (see section 5.3.)

Finally, we compute product market concentration at the sectoral level, to be used as a control variable. Indeed, product market concentration can be correlated with employers' concentration: sellers having high market share of output are likely to be large firms and could therefore also have a high market share of employment on the labor market. However, the labor market is mostly local while in some sectors (manufacture, consultancy, research for instance), the output market is at the national or international level: a company recruits workers locally but can sell products or some services on a much larger scale. Following the method in Qiu and Sojourner (2019), we regress the log of employment-HHI and the log of product HHI on our fixed effect structure and compute the correlation between the two residuals. We find the correlation to be rather low, 0.02 (against 0.45 for the raw correlation). Even though this problem does not seem very acute in our data, we control for the sectoral product market concentration in order to disentangle its effect from the effect of employers' concentration.

We can only compute product market concentration at the sectoral level because our data does not contain balance sheet information at the establishment (local level). Our measure of market product concentration is similar to a traditional HHI:

$$s^p_{j,f,t} = \frac{prod_{j,f,t}}{\sum_f prod_{j,f,t}}; HHI^p_{j,t} = \sum_f (s^p_{j,f,t})^2$$

where *prod* represents turnover and f represents a firm that operates in sector j in year t.

3 French labor markets: concentration and inequality

3.1 Local labor markets

We define local labor market as a given sector in a given commuting zone for most of the paper. First, labor markets are mostly local, as the geographical mobility of workers is low. To give an order of magnitude, between 2017 and 2018, only 4.4% of workers have changed commuting zone. 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 a true mobility across distinct firms by a worker. Those identifiers change represent half of the total apparent change in firms in this data (Picart (2008)). For that reason, and to avoid a more complex calculation, we keep firms of more than 50 employees as we consider that those firms are less likely to change firm identifier.

Second, labor markets are mostly organized by sector of activity. Between 2017 and 2018, 7% of workers in our sample of identified individuals have changed sector (as per our classification and using the same data and methodology as above). Overall, 8.4% of individuals have changed either sector or commuting zone, i.e. have changed local labor market as we define them.

There is of course no perfect *a priori* definition of labor markets but the intersection of a commuting zone and a sector seems a reasonable one when considering those results on mobility. We use alternative definitions, using occupation and a larger geographical unit called *départements*, detailed in section 5. It should be noted that mobility across occupations is in the same order of magnitude as mobility across sectors so that there is no reason, based on mobility calculations, to prefer occupation over sectors. Indeed, 7.8% of workers in our sample have changed occupation defined at the 4-digit level (6.8% at the 4-digit level).

However, figures on crude overall mobility should be taken with caution and might not allow to identify labor markets perfectly either: ideally, we would like to look at *chosen* mobility only. Indeed, a worker who has been fired and is in a difficult financial situation, might actually accept to change labor market (i.e. change the nature of his or her job) in order to find a job. A nurse employed in the health sector might be forced to accept a job in the pharmaceutical sector if she

cannot find a job in a hospital, hence within her true labor market.

3.2 Employers' concentration

Table 2 provides descriptive statistics for our estimation sample, sample in which we keep only sufficiently large local labor markets[26]. The average HHI is 0.12 while the median HHI nears 0.09: on average, in our sample of rather large labor markets, labor markets are not very concentrated. The wedge between the average and the median can be explained by the existence of a few markets with high levels of employers' concentration. However, the maximum HHI is below 1 (0.97) so that there is no pure monopsony with one unique employer, and only around 25% of labor markets have a level of concentration higher than the moderate level of the 2010 horizontal merger guidelines of the American Department of Justice ($HHI > 0.25$).

Thus, our econometric results, presented in section 4, are not driven by labor markets in situation of pure monopsony, or by highly concentrated labor markets; most of them in our sample have on the contrary a rather low level of employers' concentration.

Only for the purpose of describing employers' concentration in France in a more general way, we temporarily do not restrict the analysis to our sample of large markets and instead consider all local labor markets in our data (for figure 1 and 2 only). We only exclude firms with less than two employees. France is characterized by strong geographical disparities in terms of employers' concentration. Figure 1 shows how *départements* located on a north south-west/east-north diagonal have on average a high level of employers' concentration. In contrast, large cities benefit from more numerous and more dispersed employers, offering workers a richer set of potential employers that do not have a too large weight on the labor market.

Employers' concentration also differs across sectors. Using a weighted average HHI, figure 2 shows that labor markets sectors in manufacturing (represented by black bars) are more concentrated than services.[27] Importantly, manufacture is also found to more concentrated holding the size

[26] See section 2.2 for our restriction on labor markets' size: markets with more than 10 firms of at least 2 employees, among which one firm with at least 10 employees.

[27] The local labor markets in all the different commuting zones are weighted by the share of employment of the

of labor markets fixed. Indeed, simply regressing the employment-HHI on a dummy manufacture 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 a HHI whose values are between 0 and 1.

Most manufacture sectors would be considered as highly concentrated using the Department of Justice benchmark (HHI above 0.25). The manufacture of rubber products (HHI of 0.815 in 2019) or the manufacture of motor vehicles (0.76) have for instance very high levels. In contrast, labor markets in services, where HHI is under 0.2 on average, are not very concentrated. For example the sector of restaurants (HHI of 0.01 in 2019) or the computer programming sector (HHI of 0.05) have low levels of employers' concentration.

3.3 Labor market inequality

We also compute inequality ratios and indices within jobs of a given local labor market. We are indeed interested in differences between the wages of workers who share the same set of potential employers. On average, local labor markets in our sample are large: they have more than 1,000 jobs (the median is 355) and more than 67 employers (the median is 27)[28]. Given the size of the labor markets considered, measuring inequality within those units is therefore reasonable, and inequality indices will be meaningful when calculated on units of that size. In particular, between-firm and within-firm wage deciles can be constructed as we kept markets with at least 10 firms and at least one firm with more than 10 employees.

Table 3 provides descriptive statistics on the earnings distribution for our estimation sample of large markets. The average Gini index among those labor markets is 0.26, 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 households' income in France, according to the World Bank). For each index of inequality (Gini or 90/10 ratio) the between-firm inequality is lower than the within-firm inequality. For instance, the within-firm Gini index is 0.25 while the

commuting zone in total employment of the sector to have a unique figure at the sector level.

[28] See section 2.2 for our restriction on markets' size.

between-firm is 0.14. This difference suggests that, in France, overall inequality on labor markets arises more as a result of inequalities between jobs within the *same* firm, rather than because of differences of average wage between distinct firms.

4 Estimation

4.1 Methodology

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

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

where $y_{c,j,t}$ is the log of the inequality measure or earning outcome in commuting zone c, in sector j, in year t. Two inequalities measures are shown in the main text for each type of inequality: the Gini coefficient and the 90/10 ratio (for robustness, more inequality measures are tested, see section 5). $HHI_{c,j,t}$ is the employment-HHI of the local labor market, i.e. for a given sector j in a given commuting zone c, in a given year t. $\varepsilon_{c,j,t}$ is noise. Our preferred specification includes fixed effects at the commuting zone by sector and commuting zone by year. Standard errors are clustered at the commuting zone level.

$X_{c,j,t}$ is a vector of controls at the sector by commuting zone by year level, including: the average age of employees, the average size of firms, the number of jobs (as a proxy for the market size and to capture the dynamism of the labor market), and job polarization. $Z_{j,t}$ is a vector of controls at the sector by year level, including: product market concentration and labor productivity. All control variables are expressed in log.

A structural change in the production function inputs (in terms of the type of labor needed) leading to polarization (a rise in the share of high-skill and low-skill employees) could both increase employers' concentration (the larger firms are better equipped to navigate this structural change and

increase their share in employment) and increase inequality (low-skill and high-skill employees are at the two extremes of the wage distribution). To control for job polarization, an important feature of French labor markets since 1994, we compute the combined share of high-skill and low-skill jobs in the total employment of a given labor market[29]. We use occupations at the 2-digit level because this level of disaggregation is sufficient to capture low-skill and high-skill jobs and because it is available over the whole period we cover without incurring breaks. The list of occupations that we consider as high-skill and low-skill, as well as their respective employment shares, are provided in table 19 in Appendix A.

Another possible threat to identification is that instead of capturing the effect of employers' concentration, we could be capturing the effects of a decreasing dynamism in local economic activity, which could increase at the same time employers' concentration and, possibly, inequalities. At the local labor market level (commuting zone* sector), a decline could manifest as an increase in the average age of employees, with younger people moving away to more dynamic labor markets. A decline might also be characterized by bankruptcies or relocation away from the commuting zone, or simply by firms firing employees, all three phenomena leading to a decrease in the number of jobs. We therefore control for the average age of employees and for the number of jobs, i.e. the labor market size, as proxies for the dynamism of the local economy. At the sectoral level, controlling for labor productivity is also important to make sure that our estimate does not merely capture a sectoral decline. Controlling for product market concentration is necessary as labor market and product market concentration tend to be correlated (even though, they are weakly correlated in our data, with a correlation of 0.02 only, see section 2.4 for more details).

Even though our estimation includes fixed effects and controls for the main local labor markets and sectoral characteristics, a simple OLS analysis can suffer from one omitted variable bias in particular. The main threat is a positive productivity shock hitting firms in an heterogeneous way, benefiting the largest, already more productive firms with higher wages, but not the lowest-productivity, low-wage firms. The largest firms, positively impacted, will grow and create more

[29] See Harrigan et al. (2021) for an analysis of this structural trend in France.

jobs, while some low-productivity firms, confronted with even more productive competitors, are forced to exit the market. As a result, the weight of the largest firms on employment increases, in other words, employers' concentration increases. At the same time, the exit of low-productivity firms, i.e. of firms offering lower wages on average, can reduce the dispersion of wages, as low-paid jobs are destroyed: inequalities decrease among *remaining* jobs. Therefore, a negative relationship between concentration and inequalities ensue as a result of local heterogenous productivity shocks, creating a bias in the OLS estimation.

In order to respond to this concern, we employ an instrumental variables strategy similar to the one used in Azar et al. (2020b) and Rinz (2020). We instrument for the HHI in each sector of each commuting zone, i.e. in each local labor market, using the employment-weighted average HHI within the *same sector* across *other commuting zones*, excluding the one considered. This instrument provides us with variation in market concentration that is driven by national-level changes in the sector, and not by local changes in that particular local market: it eliminates the effect of local shocks, in particular of local heterogenous productivity shocks, as well as of a general decline in the local economic activity[30].

Formally, the instrument for the concentration in a given local labor market (sector j, commuting zone c) at time t 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 sectors, t indexes years and $empl$ is employment, measured by the number of jobs.

For robustness, we use two other instruments, the average of $\log(1/N)$ in other commuting zones for the same sector and time period (where N refers to the number of firms in the local labor market), as in Azar et al. (2020b). We also use a normalized HHI, which holds the number of firms constant, and captures only the change in the respective weights of employers in employment. We obtain similar results (see section 5 for a more thorough discussion).

[30] Sectoral shocks are controlled for with the yearly measurement of sectoral productivity.

4.2 Heterogenous effect on wages

We start with the effect on the *average* wage. As shown in table 4, the OLS estimate of the effect of employers' concentration, measured by the employment-HHI, on the average wage, is positive (0.030) and statistically significant. Interestingly, the IV estimate is negative (-0.058) (and significant). Results of the first stage regression are shown in Table 20 in Appendix A.

This change of sign can be explained by the existence of local heterogenous positive productivity shocks hitting the already most productive and largest firms, not captured by controls[31]. The more productive firms grow and increase their share in employment so that employers' concentration increases, and at the same time, wages increase due to the positive effect of technology. Such a mechanism explains why the OLS estimate is positive, whereas the IV estimate is negative: we instrument the local concentration of a given labor market by the employers' concentration in the same sector in *other* commuting zones, hence abstracting from local productivity shocks.

For average wage, we find results consistent with the literature. A 10% increase in employers' concentration decreases average wage by 0,6%, on average on our restricted sample of relatively large French local labor markets.

To go beyond the effect of employers' concentration on the average wage, we turn to the effect on the wage 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 level of wage 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.

Figure 3 shows estimates of the effect on concentration on wage by deciles from the 1st to the 9th decile, with 95% confidence intervals. Estimates on the first to the fifth decile, and on the ninth decile are significant, while they are not significant for the sixth to the eighth deciles. All other things equal, in a local labor market having a concentration equal to the average level in the

[31] We can only control for productivity at the sectoral level as we have balance sheet only at the firm level and not at the establishment level.

manufacturing sector (0,62), the wage of the first decile of jobs would be 6.7% inferior compared to a market having a concentration equal to the average in the services sector (0,35), while it would be lower by 7.5% for the second decile, by 5.5% for the third decile, and by 2.2% for the ninth decile.

Thus, employers' concentration has a more modest effect (or a non significant effect) for high-wage jobs. Crucially, our results show that employers' concentration has a stronger negative impact on workers at the bottom of the wage distribution: lowest-paid jobs are the most vulnerable to an increase in employers' concentration.

The estimate on the 1st decile (-0.122) is smaller than the estimate on the second decile (-0.135) as in some of the local labor markets, the first decile might be at the minimum wage[32]. The minimum wage acts as a lower bound on how much down the wage can go and therefore limits the negative effect of employers' concentration for markets which are already at the minimum wage, thereby reducing the size of the average effect, hence our estimate. Given that France has a minimum wage, our estimate provides a lower bound of the effect of employers' concentration which could be even stronger for the lowest earners, absent the minimum wage (see Bassanini et al. (2021) who develop a similar argument).

We now turn to the effect on inequality to examine whether the effects of employers' concentration are significantly different across income groups. Results of the OLS and IV estimates for the Gini index and for the 90/10 are reported in table 5. The OLS estimates are significant and negative (-0.016 for Gini and -0.023 for the 90/10 ratio) while the IV estimates are positive (0.025 for Gini and 0.083 for the 90/10 ratio), and all estimates are significant.

Such a sign reversal between the OLS and the IV estimation is consistent with the argument developed in section 4.1: if a local heterogenous productivity shock hits the largest, most productives, high-wage firms, the lowest productivity firms, faced with increased productivity of their competitors, are forced to exit the market, destroying the low-paid jobs at those firms. Therefore, inequality between jobs mechanically decreases as the remaining jobs, pertaining to the most pro-

[32]The first decile of some markets is at the minimum wage, but on some richer markets, even the first decile is above minimum wage.

ductivity firms, have a more homogenous productivity level and therefore wage. At the same time, employers' concentration increases because large firms hit by the positive productivity shock increase their size further and hence their share of employment. Our instrument allows to abstract from these local heterogenous productivity shocks so that the IV estimation identifies a positive relationship between employers' concentration and inequality.

Our IV analysis shows that a 10% increase in employers' concentration is associated with a rise in the Gini index of 0.3% and a rise in the 90/10 earnings ratio of 0.8%. All other things held equal, in a local labor market having a concentration equal to the average level in manufacturing (HHI of 0.62), the wedge between the first and the ninth decile would be higher by almost 5% compared to a market with a employers' concentration equal to the average level in services (HHI of 0.35). Similar results hold for other inequality ratios (90/50, 80/20, etc.) and other inequality indices (Theil, Entropy, Piesch, Mehran); they are reported in section 5.

4.3 Mechanisms

We choose to focus on two possible mechanisms that could theoretically be at play to answer the following question. Could the inequalities generated by employers' concentration be acceptable if they were to imply a higher aggregate productivity or are they the mere reflection of more rent extracting of employers on the lowest earners?

A first mechanism is that an increased concentration could improve sorting as larger employers can afford more demanding and therefore more efficient selection process, 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. But on a more concentrated markets, it is easier for employers to find candidates who accept more burdensome recruiting processes without losing them to competitors.

When high-productivity workers have a higher positive externality on their high-productivity peers, a more efficient sorting process ends up gathering high-productive workers together in high-

productivity firms (positive assortative matching)[33]. At the same time, smaller employers can now only hire workers with a lower productivity than before concentration rose. As a result, inequality between firms increases: a higher share of high-productivity workers mechanically increases the average wage of the high-productivity firms. In addition, if the positive externality of high-productivity workers on their peers materializes, the average wage should increase too due to higher average productivity.

A second possible mechanism is that increased employers' concentration, by rising the bargaining power of employers, affects heterogeneously workers: it is relatively more detrimental for the wage of lower deciles whereas the wages of better paid jobs could be less sensitive to a change in concentration. As a result, when concentration increases, the wages of the lowest-paid jobs is more affected than the better-paid, and inequalities increase.

The reasons why the wage of low-paid jobs is more affected than better paid jobs by a rise in employers' concentration could be one of those two. First, lower paid workers might in general have skills which are less differentiated than better paid jobs. Their wage therefore depends relatively more on the bargaining position of employers, compared to better-paid jobs with more differentiated skills, for which individual bargaining position is stronger. Second, those poorer workers have less financial wealth and cannot afford to look for outside options for long, making their wage highly dependent on the current bargaining position of employers, compared to better paid workers who can wait longer, therefore attenuating the impact of the current employers' concentration on their wage.

This second mechanism leads to interpret the increase in inequality brought by employers' concentration as inefficient (in the sense that it is not accompanied by any positive effect on average productivity): inequalities widen as the result of an uneven effect of a change on the bargaining position of employers, enabling them to extract a higher rent from some employees, the lowest earners. In contrast, following the reasoning of the first mechanism, the increase in inequality brought by

[33]If, on the contrary, the most productive workers have a higher positive effect on their low-productivity peers, negative assortative matching would be optimal, meaning that hiring a mix of high- and low- productivity workers guarantees a higher productivity for the firm, than hiring exclusively high-productivity workers.

employers' concentration could simply be the reflection of a better allocation of workers, resulting in a higher average productivity, hence an efficient process.

To investigate the plausibility of those two mechanisms, the respective effect of concentration on between-firm and within-firm inequality are analyzed, as they might be a reflection of either one of those two possible effects. An increase in between-firm inequality is consistent with the two mechanisms, while an increase in with-firm inequality supports the bargaining argument only. Indeed, if sorting becomes more efficient, the dispersion between firms will widen as high-productive workers increasingly match with the largest, higher-wage firms, while there is no reason for within-firm inequality to be affected. If instead, the wage of the poorest workers is relatively more affected by the increased bargaining power of employers linked to an increased employers' concentration, 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 in its own firm, while the between-firm inequality should increase too (firms having a different composition of high-wage and low-wage jobs, the dispersion between firms' average wage will mechanically increase as well).

Our results show that employers' concentration increases both within and between-firm inequality. Table 6 presents the IV estimates. Orders of magnitude are roughly similar for within-firm and between-firm inequality, with in both cases a higher estimate on the 90/10 ratio (0,089 on within-firm and 0,09 on between-firm inequality) than on the Gini index (0,048 for within-firm and 0,059 for between-firm inequality). This difference can be explained by the fact that employers' concentration mostly deepens inequality between extremes of the distribution. Indeed, the Gini index is relatively more sensitive to changes in the middle of the earnings distribution, while the 90/10 ratio by definition depends on dispersion between the two extremes of the distribution.

Our previous results (table 6) only allow to conclude that the heterogenous bargaining mechanism should be at play, given that within-inequality increases when employers' concentration rises. But we cannot conclude on the sorting mechanism so far, as between-firm inequality could rise as a result of the heterogenous bargaining mechanism only. In order to investigate further the mechanisms at work, we now ask which firms benefit from an increase in employers' concentration: if

the sorting mechanism plays a role, we should find that the effect of employers' concentration on the average wage of the richest firms, i.e. firms at the top end of the earnings distribution, should be positive. Indeed, those are the firms who should benefit from increased concentration: by being able to sort workers better, they should recruit higher productivity workers, which mechanically increases the average at the firm. In a second step, due to positive assortative matching, 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 4 shows the estimates of employers' concentration on the average wage of firms, by deciles of firms (ranked by their average wage): the effect is negative along the wage distribution. Even the 99th percentile suffers a negative significant effect. Such a result is not consistent with the sorting mechanism: even firms at the top of the distribution do not see an increase in their average wage following an increase in employers' concentration, contrary to the natural prediction of the sorting mechanism.

In order to focus on markets that could be more likely to benefit from improved sorting, we investigate the effect of employers' concentration on a subsample of the richest markets only. Indeed, it could be the case that sorting is at work only on the richest labor markets, and that this positive effect is averaged out in the main specification. However, when we conduct the same regression on the subset of labor markets above the median wage, we still find that all deciles of firms suffer a negative effect on their average wage. Figure 5 shows that the estimates remain negative and significant.

We also reproduce the same regression on the sample of large markets only, i.e. markets whose number of jobs is above the median calculated on our sample, which is already made of rather large markets (see section 2.2 for details on restrictions used). The idea is that large markets could also be more likely to benefit from sorting as sorting might naturally arise more easily in markets where the number of jobs is important. Figure 6 shows the estimates by deciles of firms: we see that the effect of employers' concentration on the average wage of firm is negative and significant (at the 1% or 5% levels) for all deciles. Therefore, on very large markets, no firms benefit of increased

employers' concentration in terms of average wage; on the contrary, the average wage declines even for the highest deciles.

We therefore conclude from our analysis that the sorting mechanism is not likely to account for the heterogeneity of the negative effect of employers' concentration on wages. Instead, the higher vulnerability of the lowest earners to employers' concentration is consistent with a bargaining power argument: the worsening of the bargaining position of workers that ensue an increase in employers' concentration has a higher effect on the wage of the lowest earners.

5 Robustness analysis

5.1 Alternative definitions of local labor market

We recur to alternative definitions of local labor markets to check that our results are not affected by our choice to use the intersection of a sector and a commuting zone to define local labor markets. We chose this definition for conceptual reason -it makes more sense to study between-firm inequality at the sectoral level-, for data availability -with sectors we can cover the period 2000-2019 while with occupations we can cover only the period 2009-2019-, and finally because in our data, workers change occupation and sectors with the same frequency, so that mobility is not indicative of preferring one definition over the other.

First, we reproduce the whole analysis using occupations at the 3-digit and the 4-digit level, instead of sectors. While we have 187 sectors, there are 136 occupations at the 3-digit level and 415 at the 4-digit level. Qualitatively, the sign and significance are similar to the ones from our main specification which uses sectors and in the two specifications using occupations instead.

Figures 7 and 8 show the estimates of the effect of labor concentration on the wage of jobs by deciles. As in our main specification, we find that this effect is negative and significant along the wage distribution, with a higher estimate for the bottom of the job distribution. Table 7 show the estimates on the Gini coefficient, the average wage and the 90/10 ratio. The estimates on the Gini coefficient are higher than in our main specification which uses sectors (0.627 for occupation

at the 3-digit, 0.078 at the 4 digit, versus 0.0253 in our main specification using sectors). For the 90/10 ratio and the average mean, estimates in our main specification (resp. 0.083 and -0.058) are in-between the higher estimates for occupation at the 3-digit (resp. 0.233 and -0.221) and the lower estimates at the 4-digit (resp. 0.048 and -0.024).

Second, we reproduce our main analysis using sectors and *départements* instead of commuting zones. While there are 304 commuting zones, there are only 99 *départements* so that the two geographical units entail labor markets of different sizes. Figure 9 shows the estimates of the effect of labor concentration on the wages by deciles. The effect is negative and significant (at the 1% or 5% level) up to the fourth decile included. Table 8 shows the estimates for the Gini coefficient, the 90/10 and the 99/10 ratios: they are significant and slightly higher compared to our main specification (using commuting zones): 0.028 for the Gini coefficient (versus 0.025 for our main specification) and 0.107 for the 90/10 ratio (versus 0.083 for our main specification).

5.2 Alternative instruments

In the main specification, we instrument the HHI of the local labor market by the HHI of other commuting zones in the same sector, as in Rinz (2020). To test the sensitivity of our results to this choice, we consider two alternative instruments: the number of firms and the normalized HHI[34]. Indeed, a rise in the labor concentration and in the HHI index can be caused by a decrease in the number of employers and/or by changes in the employment share of employers.

First, instead of instrumenting by the HHI of other commuting zone in the same sector, we use the number of firms in other commuting zones of the same sector. Table 9 shows the estimates with the number of firms as an instrument for the local employment-HHI. The effect of employers' concentration on inequalities is positive and significant, consistent with our main specification.

Second, we instrument the employment HHI by the normalized HHI (see section 2.4).

Table 10 shows the estimates with the normalized HHI as an instrument for the local employment-HHI. The effect of labor concentration on inequalities is positive and significant, consistent with

[34]First stages are shown in table 20 in annex A

our main specification. This result is interesting as it shows that the effect of labor concentration is not only driven by the number of employers but also by their respective weights on the labor market.

5.3 Alternative measure of concentration

Instead of the employment-HHI we use the payroll-HHI, i.e. the HHI calculated in terms of wage bill, both as the dependent variable and as the instrument[35]. 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.

In our data, employment-HHI and payroll-HHI are highly and positively correlated (0.94 between 2000 and 2019). When there is a positive relationship between wages and employment, the payroll HHI is strictly larger than the employment HHI (Berger et al. (2019)). In our data, the payroll-HHI is slightly higher with an average for the whole economy of 0.13 versus 0.12 for the employment-HHI (for our baseline), which is consistent with Berger et al. (2019).

Berger et al. (2019) 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. have a higher weight on the labor market, than a firm with an employment share of 20%, as wage and size are strongly correlated. This is a fact that employment-HHI fails to capture and that payroll-HHI takes it into account.

The estimates for the IV analysis using the payroll-HHI are presented in table 11 for overall inequality and in table 12 for between-firm and within-firm inequality. Results are consistent with our main specification: labor concentration increases inequality between jobs, within firms and between the average wage of firms. Only one estimate is not significant: the estimate on the Gini index for overall inequality (while it is significant for within-firm and between-firm inequality). As the estimate on overall 90/10 ratio is significant at the 1%level, it could indicate a different effect

[35]The first stage is shown in table 20 in annex A

on the distribution than captured with the employment-HHI, with a smaller effect on the middle of the distribution. The estimates on wages by deciles of jobs are shown in figure 10. We also find qualitatively similar results: the negative effect of labor concentration on wages is strongest for the lowest deciles and the estimates are slightly lower (-0.084 versus -0.122 for employment-HHI).

5.4 Other inequality measures

We reproduce our main specifications for other measures than the 90/10 ratio and the Gini coefficient in tables 13, 14, 15, 18, 17 and 18. We find results that are consistent with the results found for the Gini coefficient and the 90/10 ratios: labor concentration increases inequality as measured by those other indices and ratios.

Among the inequality ratios, the stronger estimates are on the 50/20 ratio (0.103) and the 50/10 ratio (0.090). The 80/50 ratio is significant but much lower (0.019) while the estimate on the 90/50 is not significant. Those results suggest that labor concentration is mostly increasing inequality by hurting the lowest earners, while the inequality between the best-paid jobs and jobs at the median wage are not much affected.

6 Figures

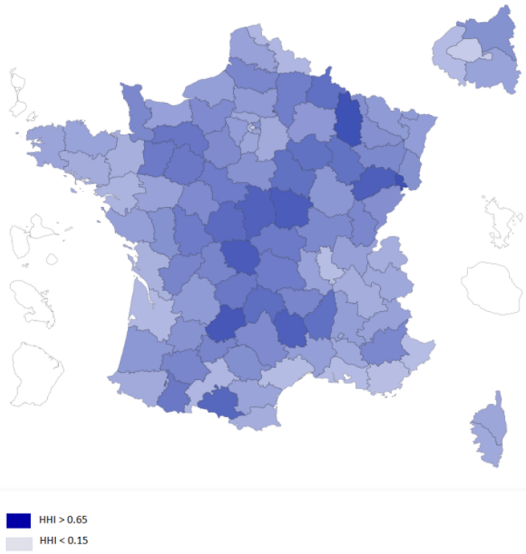

Figure 1: Labor concentration, France, 2019, authors' calculations (HHI)

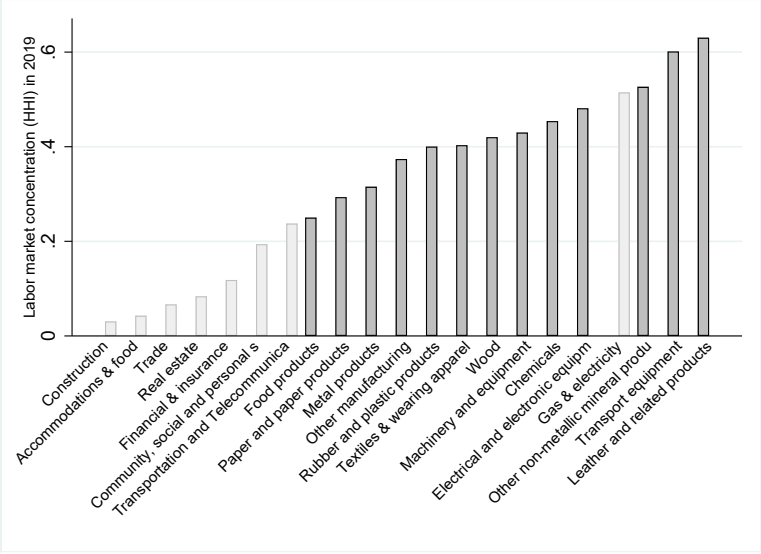

Figure 2: Labor concentration by sector, France, 2019, authors' calculations

7 Tables

Table 1: Correlation with Employment Herfindahl

Across market correlations with Employment-HHI	2000-2019
Number of firms	-0.19
Number of jobs	-0.08
Payroll-HHI	0.94

Table 2: Summary Statistics-Concentration index

	N	Mean	SD	Min	p25	p50	p75	Max
Labor Market Concentration	212575	0.1235694	0.111541	0.0006544	0.0477465	0.094988	.1604938	0.9755783
Wage Market Concentration	212575	0.1324256	0.1185651	0.0007109	0.0526206	0.1018357	.1702246	0.977924
Product Market Concentration	4331	0.0804548	0.1506047	0.0000647	0.0093018	0.0252324	.0819034	1
Number of firms	212575	67.84448	233.4131	10	15	27	59	14526
Average age (mkt)	212575	38.29853	2.776663	24.89583	36.56613	38.33139	40.14264	51.80551
Ratio of men	212575	0.8740451	1.74446	0	0.462697	0.741573	0.905868	63.77273
Number of jobs	212575	1035	4191.4	29	166	355	849	319576

Table 3: Summary Statistics-Inequality index

	N	Mean	SD	Min	p25	p50	p75	Max
Mean annual wage	391481	16866.02	5763.207	912	13206.98	16369	19817.17	143298.5
Ratio 90/10 - overall	391481	1.434703	0.5844391	0	1.112054	1.521966	1.824539	4.44874
Ratio 90/10 - within	212575	1.400983	0.3612797	0	1.150528	1.391163	1.640863	4.118728
Ratio 90/10 - between	391470	.7513487	0.520834	0	0.268877	0.8390436	1.121236	3.793265
Gini - overall	391224	0.2570299	0.0932112	0	0.2147317	0.2716614	0.3175072	0.6698991
Gini - within	212575	0.2548524	0.0541102	0	0.2185621	0.2514347	0.2869256	0.6570368
Gini - between	371691	0.1467279	0.0898465	0	0.088679	0.1631229	0.2079618	0.5922833

Table 4: Effect of employer's concentration on average wage - 2000-2019

	OLS-Mean wages	IV-Mean wages
HHI employment (log, mkt)	0.030***	−0.058***
	(0.003)	(0.010)
Lab. prod. (mean log, sect)	0.028***	0.023***
	(0.002)	(0.002)
HHI sales (log, sect)	0.002***	0.003***
	(0.001)	(0.001)
Average age (mkt)	0.013***	0.014***
	(0.000)	(0.000)
Market size (log, mkt), post	−0.061***	−0.064***
	(0.005)	(0.005)
Firm size (mean log, mkt), decl. eff	0.076***	0.029***
	(0.003)	(0.004)
Polarization	0.012***	0.007***
	(0.002)	(0.002)
CZ year FE	Yes	Yes
CZ sector FE	Yes	Yes
Obs	210,551	210,551
KP Stat		840.8

Notes: This table reports regression estimates of the effect of employers' concentration on log of average wage. A labor market is defined as the intersection of a commuting zone and a sector. Column (1) shows OLS estimates and column (2) shows IV estimates. HHI-employment is the logarithm of the Herfindahl-Hirschman index of the labor market considered. The following control variables are at the communting zone, sector and year level: average age of employees, average size of firms, size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the HHI for the product market, using turnover. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector year level. All regressions have the same fixed-effect structure : sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

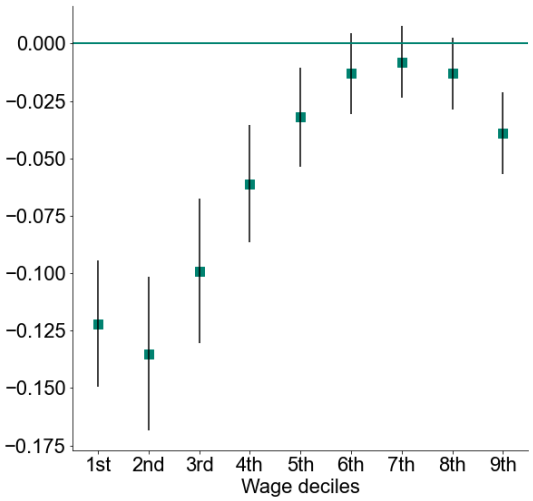

Figure 3: Effect of labor concentration on wage of jobs by deciles (overall inequality), with 95% level confidence intervals - 2000-2019

Table 5: Effect of employer's concentration on overall inequality - 2000-2019

	OLS		IV	
	(1)	(2)	(3)	(4)
	Gini	90/10	Gini	90/10
HHI employment (log, mkt)	−0.016***	−0.023***	0.025***	0.083***
	(0.002)	(0.003)	(0.005)	(0.010)
Lab. prod. (mean log, sect)	−0.025***	−0.054***	−0.022***	−0.049***
	(0.002)	(0.005)	(0.002)	(0.005)
HHI sales (log, sect)	0.002***	0.004***	0.002***	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
Average age (mkt)	−0.008***	−0.023***	−0.009***	−0.025***
	(0.000)	(0.001)	(0.000)	(0.001)
Market size (log, mkt), post	0.077***	0.085***	0.078***	0.088***
	(0.003)	(0.005)	(0.003)	(0.005)
Firm size (mean log, mkt), decl. eff	−0.040***	−0.060***	−0.045***	−0.073***
	(0.002)	(0.005)	(0.003)	(0.006)
Polarization	0.032***	0.043***	0.034***	0.049***
	(0.002)	(0.004)	(0.002)	(0.004)
CZ year FE	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes
Obs	210,551	210,551	210,551	210,551
KP Stat			840.8	840.8

Notes: This table reports regression estimates of the effect of employers' concentration on overall inequality (inequality between jobs). A labor market is defined as the intersection of a commuting zone and a sector. Columns (1) and (2) show OLS estimates and column (3) and (4) show IV estimates. Two indices of inequality are shown (Gini and 90/10 ratio) and are both calculated between jobs in a given market. HHI employment is the logarithm of the Herfindahl-Hirschman index of the labor market considered. The following control variables are at the communting zone, sector and year level: average age of employees, average size of firms, size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the HHI for the product market, using turnover. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector year level. All regressions have the same fixed-effect structure : sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 6: Effect of employer's concentration on within-firm and between-firm inequality - 2000-2019

	Within		Between	
	(1)	(2)	(3)	(4)
	Gini	90/10	Gini	90/10
HHI employment (log, mkt)	0.048***	0.089***	0.059***	0.090***
	(0.007)	(0.011)	(0.008)	(0.009)
Lab. prod. (mean log, sect)	−0.008**	−0.026***	0.013**	0.015**
	(0.003)	(0.005)	(0.005)	(0.006)
HHI sales (log, sect)	0.002*	0.003*	0.001	0.003**
	(0.001)	(0.002)	(0.001)	(0.001)
Average age (mkt)	−0.006***	−0.013***	−0.012***	−0.019***
	(0.000)	(0.001)	(0.001)	(0.001)
Market size (log, mkt), post	0.078***	0.060***	0.097***	0.066***
	(0.004)	(0.006)	(0.004)	(0.005)
Firm size (mean log, mkt), decl. eff	−0.016***	−0.010**	−0.237***	−0.219***
	(0.003)	(0.005)	(0.005)	(0.005)
Polarization	0.022***	0.026***	0.045***	0.044***
	(0.003)	(0.006)	(0.003)	(0.004)
CZ year FE	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes
Obs	210,551	210,551	210,551	210,551
KP Stat	840.8	840.8	840.8	840.8

Notes: This table reports regression estimates of the effect of employers' concentration on within-firm and between-firm inequality. A labor market is defined as the intersection of a commuting zone and a sector. Column (1) and (2) show within-firm inequality. Column (3) and (4) show between-firm inequality. Two indices of inequality are shown : Gini and 90/10 ratio. HHI employment is the logarithm of the Herfindahl-Hirschman index of the labor market considered. The following control variables are at the communting zone, sector and year level: average age of employees, average size of firms, size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the HHI for the product market, using turnover. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector year level. All regressions have the same fixed-effect structure : sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

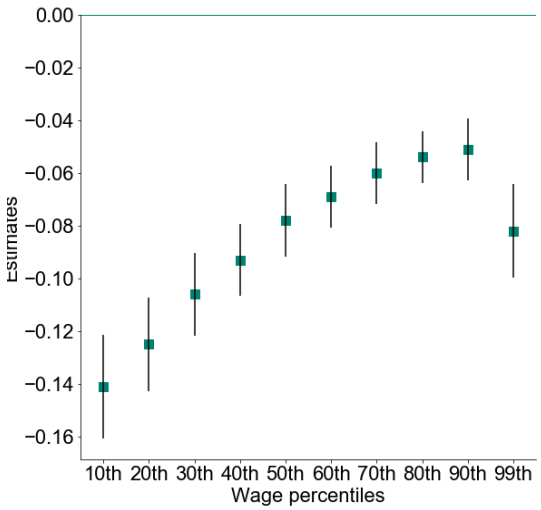

Figure 4: Effect of labor concentration on the average wage of firms, by percentiles of firms (between-firm inequality), with 95% level confidence intervals - 2000-2019

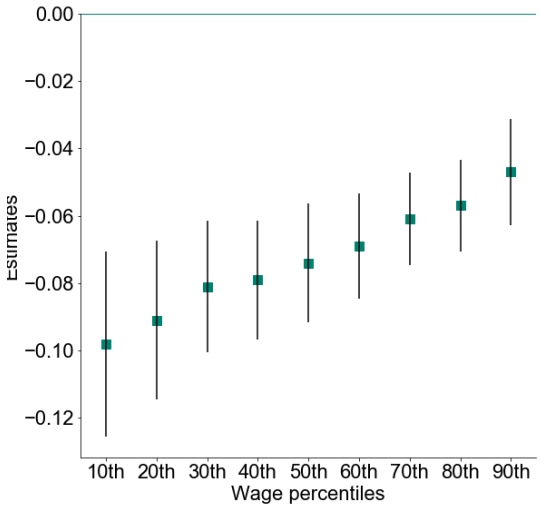

Figure 5: Effect of labor concentration on the average wage of firms by deciles of firms (between-firm inequality), for the richest markets of our restricted sample, with 95% level confidence intervals - 2000-2019

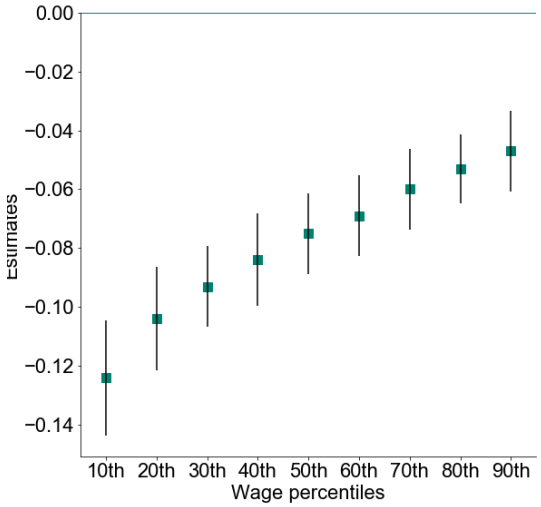

Figure 6: Effect of labor concentration on the average wage of firms by deciles of firms (between-firm inequality), for the largest markets of our restricted sample, with 95% level confidence intervals - 2000-2019

Table 7: Effect of employers' concentration on overall inequality by Occupation*Commuting zone - 2009-2019

	3-digit			4-digit		
	(1)	(2)	(3)	(4)	(5)	(6)
	Gini	90/10	Gini	90/10	Gini	90/10
HHI employment (log, mkt)	0.627***	0.233***	-0.084***	0.078***	0.048***	-0.024***
	(0.174)	(0.036)	(0.021)	(0.011)	(0.006)	(0.003)
Average age (mkt)	-0.017***	-0.028***	0.018***	-0.013***	-0.025***	0.016***
	(0.003)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Market size (log, mkt)	-0.147**	-0.102***	0.078***	0.018***	0.015***	0.027***
	(0.005)	(0.003)	(0.002)	(0.059)	(0.015)	(0.008)
Firm size (mean log, mkt), decl. eff	0.013	-0.052***	0.026***	-0.023***	-0.055***	0.026***
	(0.017)	(0.008)	(0.004)	(0.003)	(0.003)	(0.002)
CZ year	Yes	Yes	Yes	Yes	Yes	Yes
CZ occup FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	90,402	90,592	90,592	525,979	527,664	527,664
KP Stat	787.3	772.0	772.0	2026.3	1974.3	1974.3

Notes: This table reports regression estimates of the effect of employers' concentration on overall inequality (inequality between jobs). A labor market is defined as the intersection of a commuting zone and a sector. Columns (1) and (2) show OLS estimates and column (3) and (4) show IV estimates. Two indices of inequality are shown (Gini and 90/10 ratio) and are both calculated between jobs in a given market. HHI employment is the logarithm of the Herfindahl-Hirschman index of the labor market considered. The following control variables are at the communting zone, sector and year level: average age of employees, average size of firms, size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the HHI for the product market, using turnover. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector year level. All regressions have the same fixed-effect structure : sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees. Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

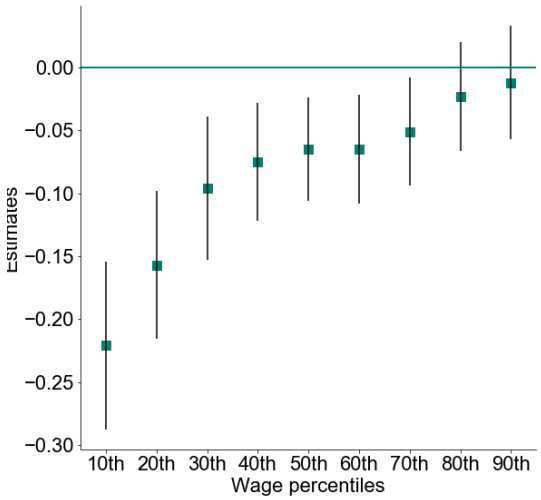

Figure 7: Effect of labor concentration on the average wage of firms by deciles of firms (between-firm inequality), occupation at 3-digit level - 2009-2019

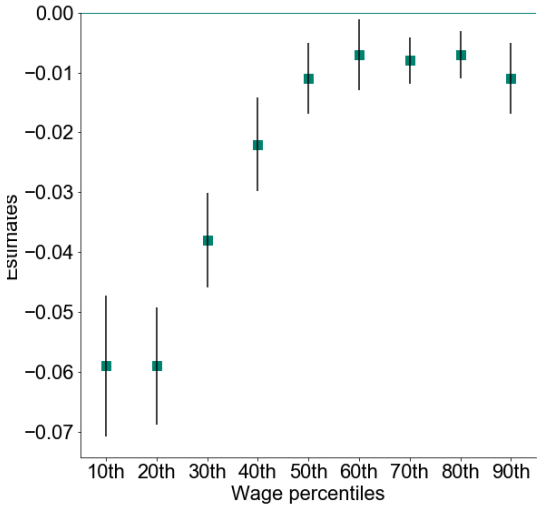

Figure 8: Effect of labor concentration on the average wage of firms by deciles of firms (between-firm inequality), occupation at 4-digit level - 2009-2019

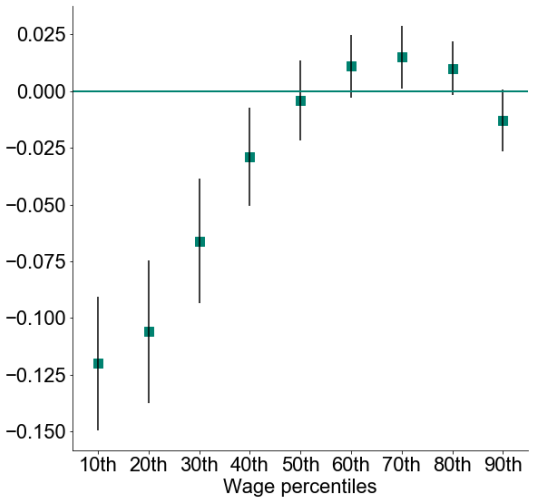

Figure 9: Effect of labor concentration on the average wage of firms by deciles of firms (between-firm inequality), *Départements* - 2000-2019

Table 8: Effect of employers' concentration on overall inequality - *Départements* - 2000-2019

	(1) Gini	(2) 90/10	(3) 99/10
HHI employment (log, mkt)	0.028***	0.107***	0.074***
	(0.006)	(0.012)	(0.012)
Lab. prod. (mean log, sect)	-0.012***	-0.019***	0.006
	(0.002)	(0.002)	(0.006)
HHI sales (log, sect)	0.004***	0.004***	-0.001
	(0.001)	(0.001)	(0.002)
Average age (mkt)	-0.008***	-0.025***	-0.022***
	(0.000)	(0.001)	(0.001)
Market size (log, mkt), post	0.065***	0.081***	0.123***
	(0.004)	(0.007)	(0.008)
Firm size (mean log, mkt), decl. eff	-0.037***	-0.069***	-0.054***
	(0.003)	(0.007)	(0.007)
Polarization	0.033***	0.063***	0.095***
	(0.002)	(0.005)	(0.006)
DEP year FE	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes
Obs	144,055	144,055	144,055
KP Stat	1076.9	1076.9	1076.9

Notes: This table reports regression estimates of the effect of local employers' market concentration on overall inequality. A labor market is defined as the intersection of a department and a sector. All regressions are IV estimates. Three indices of inequality are shown (Gini index, 90/10 and 99/10 ratio) and are calculated between jobs in a given market. HHI employment is the logarithm of the Herfindahl-Hirschman index of the labor market considered. The following control variables are at department, sector and year level: average age of employees, average size of firms, size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the Herfindahl-Hirschman index for the product market, in terms of turnover. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector year level. All regressions have the same fixed-effect structure: sector*department FE and year*department FE. Standard errors are clustered at the department level. The regressions are conducted on a restricted sample of markets that have at least ten firms.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 9: Effect of employers' concentration on overall inequality - Number of firms as the instrumental variable, 2000-2019

	Overall		Between		Within	
	(1)	(2)	(3)	(4)	(5)	(6)
	Gini	90/10	Gini	90/10	Gini	90/10
HHI employment (log, mkt)	0.0397***	0.1213***	0.0197**	0.0546***	0.0876***	0.1644***
	(0.0060)	(0.0119)	(0.0092)	(0.0106)	(0.0083)	(0.0129)
Lab. prod. (mean log, sect)	-0.0238***	-0.0503***	0.0076	0.0105*	-0.0055*	-0.0224***
	(0.0021)	(0.0048)	(0.0050)	(0.0063)	(0.0032)	(0.0053)
HHI sales (log, sect)	0.0016***	0.0018	0.0017*	0.0034***	0.0008	0.0016
	(0.0005)	(0.0011)	(0.0009)	(0.0011)	(0.0010)	(0.0015)
Average age (mkt)	-0.0091***	-0.0253***	-0.0118***	-0.0189***	-0.0067***	-0.0143***
	(0.0003)	(0.0006)	(0.0006)	(0.0006)	(0.0004)	(0.0007)
Market size (log, mkt), post	0.1874***	0.3480***	-0.0064	-0.0375	0.2447***	0.3632***
	(0.0580)	(0.0756)	(0.0602)	(0.0811)	(0.0807)	(0.1245)
Firm size (mean log, mkt), decl. eff	-0.0467***	-0.0784***	-0.2335***	-0.2163***	-0.0204***	-0.0191***
	(0.0027)	(0.0060)	(0.0047)	(0.0055)	(0.0033)	(0.0055)
Polarization	0.1380**	0.3013***	-0.0670	-0.0684	0.1859**	0.3266***
	(0.0579)	(0.0754)	(0.0604)	(0.0810)	(0.0802)	(0.1237)
CZ year FE	Yes	Yes	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	208,463	208,463	208,463	208,463	208,463	208,463
KP Stat	900.7	900.7	900.7	900.7	900.7	900.7

Notes: This table reports regression estimates of the effect of employers' concentration on overall, between-firm and within-firm inequality. A labor market is defined as the intersection of a commuting zone and a sector. All regressions are instrumented by inverse of the number of firms in other commuting zones of the same sector. Columns (1) and (2) show overall inequality. Columns (3) and (4) show between-firm inequality. Columns (5) and (6) show within-firm inequality. Two indices of inequality are shown : Gini index and 90/10 ratio. HHI employment is the logarithm of the Herfindahl-Hirschman index of the labor market considered. The following control variables are at commuting zone, sector and year level : the average age of employees, the average size of firms, the size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the Herfindahl-Hirschman index for the product market. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector*year level. All regressions have the same fixed-effect structure: sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 10: Effect of employers' concentration on overall inequality - normalized HHI as the instrumental variable, 2000-2019

	Overall		Between		Within	
	(1)	(2)	(3)	(4)	(5)	(6)
	Gini	90/10	Gini	90/10	Gini	90/10
HHI employment (log, mkt)	0.015**	0.053***	0.067***	0.096***	0.028***	0.050***
	(0.006)	(0.012)	(0.010)	(0.012)	(0.009)	(0.013)
Lab. prod. (mean log, sect)	-0.023***	-0.051***	0.013**	0.015**	-0.009***	-0.028***
	(0.002)	(0.005)	(0.005)	(0.007)	(0.003)	(0.005)
HHI sales (log, sect)	0.002***	0.003**	0.001	0.003**	0.002**	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Average age (mkt)	-0.009***	-0.024***	-0.012***	-0.019***	-0.006***	-0.012***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Market size (log, mkt), post	0.078***	0.087***	0.097***	0.067***	0.078***	0.059***
	(0.003)	(0.005)	(0.004)	(0.005)	(0.004)	(0.006)
Firm size (mean log, mkt), decl. eff	-0.043***	-0.069***	-0.238***	-0.220***	-0.013***	-0.006
	(0.003)	(0.006)	(0.005)	(0.006)	(0.003)	(0.005)
Polarization	0.034***	0.047***	0.045***	0.044***	0.021***	0.024***
	(0.002)	(0.004)	(0.003)	(0.004)	(0.003)	(0.006)
CZ year FE	Yes	Yes	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	210,551	210,551	210,551	210,551	210,551	210,551
KP Stat	816.6	816.6	816.6	816.6	816.6	816.6

Notes: This table reports regression estimates of the effect of employers' concentration on overall, between-firm and within-firm inequality. A labor market is defined as the intersection of a commuting zone and a sector. All regressions are instrumented by the normalized HHI-employment in other commuting zones of the same sector. Columns (1) and (2) show overall inequality. Columns (3) and (4) show between-firm inequality. Columns (5) and (6) show within-firm inequality. Two indices of inequality are shown : Gini index and 90/10 ratio. HHI employment is the logarithm of the Herfindahl-Hirschman index of the labor market considered. The following control variables are at commuting zone, sector and year level : the average age of employees, the average size of firms, the size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the Herfindahl-Hirschman index for the product market. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector*year level. All regressions have the same fixed-effect structure: sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 11: Effect of employers' concentration on overall inequality - payroll-HHI - 2000-2019

	(1) Mean	(2) Gini	(3) 90/10
Payroll HHI (log, mkt)	-0.055***	0.002	0.044***
	(0.011)	(0.005)	(0.009)
Lab. prod. (mean log, sect)	0.025***	-0.024***	-0.052***
	(0.002)	(0.002)	(0.005)
HHI sales (log, sect)	0.003***	0.002***	0.003**
	(0.001)	(0.001)	(0.001)
Average age (mkt)	0.014***	-0.009***	-0.024***
	(0.000)	(0.000)	(0.001)
Market size (log, mkt), post	-0.063***	0.077***	0.086***
	(0.005)	(0.003)	(0.005)
Firm size (mean log, mkt), decl. eff	0.088***	-0.042***	-0.070***
	(0.004)	(0.003)	(0.006)
Polarization	0.008***	0.033***	0.046***
	(0.002)	(0.002)	(0.004)
CZ year FE	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes
Obs	210,551	210,551	210,551
KP Stat	481.9	481.9	481.9

Notes: This table reports regression estimates of the effect of employers' concentration on overall inequality and on average wage. A labor market is defined as the intersection of a commuting zone and a sector. All regressions are IV estimates. Column (1) shows the log of the average wage. Two indices of inequality are shown in column (2) and (3) (Gini index and 90/10 ratio) and are both calculated between jobs in a given market. Payroll-HHI is the logarithm of the Herfindahl-Hirschman index, calculated in termes of wage bill instead of employment. The following control variables are at commuting zone, sector and year level : average age of employees, average size of firms, size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the Herfindahl-Hirschman index for the product market, in terms of turnover. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector year level. All regressions have the same fixed-effect structure: sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 12: Effect of employers' concentration on between-firm and within-firm inequality - payroll-HHI - 2000-2019

	Between		Within	
	(1)	(2)	(3)	(4)
	Gini	90/10	Gini	90/10
Payroll HHI (log, mkt)	0.079***	0.113***	0.029***	0.065***
	(0.009)	(0.011)	(0.007)	(0.012)
Lab. prod. (mean log, sect)	0.011**	0.012*	-0.010***	-0.030***
	(0.005)	(0.006)	(0.003)	(0.005)
HHI sales (log, sect)	0.000	0.001	0.002*	0.003*
	(0.001)	(0.001)	(0.001)	(0.002)
Average age (mkt)	-0.012***	-0.019***	-0.006***	-0.012***
	(0.001)	(0.001)	(0.000)	(0.001)
Market size (log, mkt), post	0.096***	0.065***	0.077***	0.059***
	(0.004)	(0.005)	(0.004)	(0.006)
Firm size (mean log, mkt), decl. eff	-0.242***	-0.225***	-0.014***	-0.009*
	(0.005)	(0.006)	(0.003)	(0.005)
Polarization	0.045***	0.044***	0.021***	0.024***
	(0.003)	(0.004)	(0.003)	(0.006)
CZ year FE	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes
Obs	210,551	210,551	210,551	210,551
KP Stat	481.9	481.9	481.9	481.9

Notes: This table reports regression estimates of the effect of employers' concentration on between-firm and within-firm inequality. A labor market is defined as the intersection of a commuting zone and a sector. All regressions are IV estimates. Columns (1) and (2) show between-firm inequality. Columns (3) and (4) show within-firm inequality. Two indices of inequality are shown : Gini index and 90/10 ratio. Payroll-HHI is the logarithm of the Herfindahl-Hirschman index, calculated in termes of wage bill instead of employment. The following control variables are at commuting zone, sector and year level : average age of employees, average size of firms, size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the Herfindahl-Hirschman index for the product market, in terms of turnover. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector year level. All regressions have the same fixed-effect structure: sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

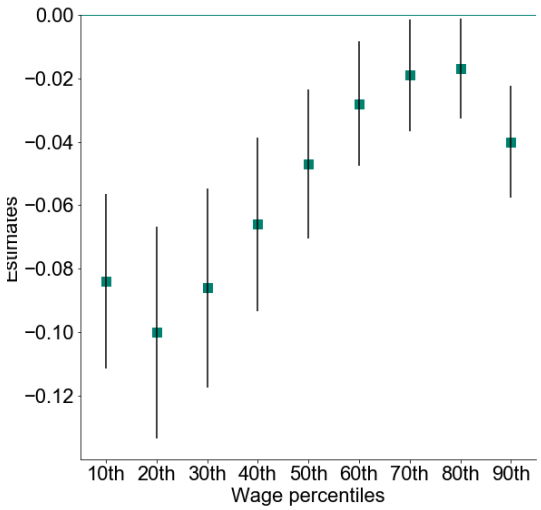

Figure 10: Effect of labor concentration on the average wage of firms by deciles of jobs (overall inequality), payroll-HHI - 2000-2019

Table 13: Effect of employers' concentration on overall inequality - other indices - 2000-2019

	Overall			
	(1)	(2)	(3)	(4)
	Theil	Entrop	Piesch	Mehran
HHI employment (log, mkt)	0.032***	0.077***	0.018***	0.034***
	(0.009)	(0.009)	(0.006)	(0.005)
Lab. prod. (mean log, sect)	-0.032***	-0.044***	-0.019***	-0.026***
	(0.004)	(0.005)	(0.002)	(0.002)
HHI sales (log, sect)	0.002**	0.003***	0.002***	0.002***
	(0.001)	(0.001)	(0.001)	(0.000)
Average age (mkt)	-0.015***	-0.026***	-0.008***	-0.010***
	(0.000)	(0.001)	(0.000)	(0.000)
Market size (log, mkt), post	0.141***	0.104***	0.090***	0.065***
	(0.006)	(0.005)	(0.004)	(0.003)
Firm size (mean log, mkt), decl. eff	-0.070***	-0.053***	-0.045***	-0.044***
	(0.005)	(0.005)	(0.003)	(0.002)
Polarization	0.063***	0.064***	0.040***	0.028***
	(0.003)	(0.004)	(0.002)	(0.002)
CZ year FE	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes
Obs	210,551	210,551	210,551	210,551
KP Stat	840.8	840.8	840.8	840.8

Notes: This table reports regression estimates of the effect of employers' concentration on overall inequality indices. A labor market is defined as the intersection of a commuting zone and a sector. All regressions are IV estimates. HHI employment is the logarithm of the Herfindahl-Hirschman index of the labor market considered. The following control variables are at commuting zone, sector and year level : average age of employees, average size of firms, size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the Herfindahl-Hirschman index for the product market, in terms of turnover. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector year level. All regressions have the same fixed-effect structure: sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 14: Effect of employers' concentration on overall inequality - other ratios - 2000-2019

	Overall				
	(1)	(2)	(3)	(4)	(5)
	50/10	90/50	80/50	50/20	99/10
HHI employment (log, mkt)	0.090***	-0.007	0.019***	0.103***	0.054***
	(0.009)	(0.006)	(0.005)	(0.008)	(0.012)
Lab. prod. (mean log, sect)	-0.041***	-0.008***	-0.016***	-0.060***	-0.012**
	(0.005)	(0.002)	(0.002)	(0.004)	(0.006)
HHI sales (log, sect)	-0.003***	0.006***	0.003***	0.001	-0.002*
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Average age (mkt)	-0.024***	-0.001***	-0.003***	-0.018***	-0.021***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Market size (log, mkt), post	0.034***	0.055***	0.040***	0.059***	0.129***
	(0.004)	(0.003)	(0.003)	(0.004)	(0.007)
Firm size (mean log, mkt), decl. eff	-0.050***	-0.023***	-0.024***	-0.076***	-0.061***
	(0.005)	(0.003)	(0.002)	(0.004)	(0.006)
Polarization	0.026***	0.023***	0.012***	0.018***	0.089***
	(0.004)	(0.002)	(0.001)	(0.003)	(0.005)
CZ year FE	Yes	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes	Yes
Obs	210,551	210,551	210,551	210,551	210,551
KP Stat	840.8	840.8	840.8	840.8	840.8

Notes: This table reports regression estimates of the effect of employers' concentration on overall inequality ratios. A labor market is defined as the intersection of a commuting zone and a sector. All regressions are IV estimates. HHI employment is the logarithm of the Herfindahl-Hirschman index of the labor market considered. The following control variables are at commuting zone, sector and year level : average age of employees, average size of firms, size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the Herfindahl-Hirschman index for the product market, in terms of turnover. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector year level. All regressions have the same fixed-effect structure: sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 15: Effect of employers' concentration on between-firm inequality - other indices of inequality - 2000-2019

	Between-Firm			
	(1)	(2)	(3)	(4)
	Theil	Entrop	Piesch	Mehran
HHI employment (log, mkt)	0.114***	0.144***	0.055***	0.064***
	(0.016)	(0.019)	(0.008)	(0.007)
Lab. prod. (mean log, sect)	0.030***	0.009	0.019***	0.006
	(0.011)	(0.012)	(0.006)	(0.005)
HHI sales (log, sect)	0.002	0.001	0.001	0.001
	(0.002)	(0.002)	(0.001)	(0.001)
Average age (mkt)	-0.023***	-0.036***	-0.010***	-0.014***
	(0.001)	(0.001)	(0.001)	(0.001)
Market size (log, mkt), post	0.183***	0.189***	0.107***	0.087***
	(0.008)	(0.010)	(0.004)	(0.004)
Firm size (mean log, mkt), decl. eff	-0.461***	-0.504***	-0.248***	-0.226***
	(0.010)	(0.012)	(0.005)	(0.005)
Polarization	0.084***	0.095***	0.049***	0.040***
	(0.007)	(0.009)	(0.004)	(0.003)
CZ year FE	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes
Obs	210,551	210,551	210,551	210,551
KP Stat	840.8	840.8	840.8	840.8

Notes: This table reports regression estimates of the effect of employers' concentration on between-firms indices of inequality. A labor market is defined as the intersection between a commuting zone and a sector. All regressions are IV estimates. HHI employment is the logarithm of the Herfindahl-Hirschman index of the labor market considered. The following control variables are at communting zone, sector and year level : the average age of employees, the average size of firms, the size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the Herfindahl-Hirschman index for the product market. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector*year level. All regressions have the same fixed-effect structure: sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 16: Effect of employers' concentration on between-firm inequality - other inequality ratios - 2000-2019

	Between-Firm				
	(1)	(2)	(3)	(4)	(5)
	50/10	90/50	80/50	50/20	99/10
HHI employment (log, mkt)	0.063***	0.028***	0.025***	0.046***	0.059***
	(0.008)	(0.006)	(0.005)	(0.005)	(0.012)
HHI sales (log, sect)	0.002**	0.001	0.001	0.002***	-0.000
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Lab. prod. (mean log, sect)	-0.012***	0.027***	0.016***	-0.012***	0.025***
	(0.004)	(0.005)	(0.004)	(0.003)	(0.008)
Average age (mkt)	-0.015***	-0.004***	-0.005***	-0.010***	-0.015***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Market size (log, mkt), post	0.020***	0.046***	0.023***	0.011***	0.146***
	(0.004)	(0.003)	(0.002)	(0.003)	(0.006)
Firm size (mean log, mkt), decl. eff	-0.129***	-0.090***	-0.053***	-0.086***	-0.315***
	(0.004)	(0.003)	(0.002)	(0.003)	(0.007)
Polarization	0.026***	0.017***	0.010***	0.017***	0.060***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.005)
CZ year FE	Yes	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes	Yes
Obs	210,551	210,551	210,551	210,551	210,551
KP Stat	840.8	840.8	840.8	840.8	840.8

Notes: This table reports regression estimates of the effect of employers' concentration on between-firms ratios of inequality. A labor market is defined as the intersection between a commuting zone and a sector. All regressions are IV estimates. HHI employment is the logarithm of the Herfindahl-Hirschman index of the labor market considered. The following control variables are at communting zone, sector and year level : the average age of employees, the average size of firms, the size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the Herfindahl-Hirschman index for the product market. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector*year level. All regressions have the same fixed-effect structure: sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 17: Effect of employers' concentration on within-firm inequality - other inequality indices - 2000-2019

	Within-Firm			
	(1)	(2)	(3)	(4)
	Theil	Entrop	Piesch	Mehran
HHI employment (log, mkt)	0.073***	0.132***	0.042***	0.052***
	(0.013)	(0.014)	(0.008)	(0.007)
Lab. prod. (mean log, sect)	-0.015***	-0.033***	-0.005	-0.012***
	(0.006)	(0.008)	(0.003)	(0.003)
HHI sales (log, sect)	0.002	0.003	0.002*	0.002*
	(0.002)	(0.002)	(0.001)	(0.001)
Average age (mkt)	-0.010***	-0.017***	-0.005***	-0.007***
	(0.001)	(0.001)	(0.000)	(0.000)
Market size (log, mkt), post	0.143***	0.134***	0.090***	0.066***
	(0.008)	(0.009)	(0.005)	(0.004)
Firm size (mean log, mkt), decl. eff	-0.024***	0.002	-0.018***	-0.013***
	(0.006)	(0.007)	(0.003)	(0.003)
Polarization	0.037***	0.043***	0.027***	0.018***
	(0.006)	(0.008)	(0.004)	(0.003)
CZ year FE	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes
Obs	210,551	210,551	210,551	210,551
KP Stat	840.8	840.8	840.8	840.8

Notes: This table reports regression estimates of the effect of employers' concentration on within-firms indices of inequality. A labor market is defined as the intersection between a commuting zone and a sector. All regressions are IV estimates. HHI employment is the logarithm of the Herfindahl-Hirschman index of the labor market considered. The following control variables are at communting zone, sector and year level : the average age of employees, the average size of firms, the size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the Herfindahl-Hirschman index for the product market. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector*year level. All regressions have the same fixed-effect structure: sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 18: Effect of employers' concentration on within-firm inequality - other inequality ratios - 2000-2019

	Within-Firm				
	(1)	(2)	(3)	(4)	(5)
	50/10	90/50	80/50	50/20	99/10
HHI employment (log, mkt)	0.073***	0.016**	0.020***	0.039***	0.121***
	(0.009)	(0.006)	(0.005)	(0.007)	(0.012)
HHI sales (log, sect)	-0.002*	0.005***	0.005***	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Lab. prod. (mean log, sect)	-0.026***	-0.000	-0.008***	-0.029***	-0.010*
	(0.005)	(0.003)	(0.002)	(0.003)	(0.006)
Average age (mkt)	-0.012***	-0.001***	-0.002***	-0.009***	-0.010***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Market size (log, mkt), post	0.017***	0.044***	0.028***	0.011**	0.165***
	(0.005)	(0.003)	(0.003)	(0.004)	(0.008)
Firm size (mean log, mkt), decl. eff	0.007	-0.017***	-0.014***	-0.008***	-0.006
	(0.004)	(0.002)	(0.002)	(0.003)	(0.006)
Polarization	0.007	0.020***	0.008***	-0.004	0.040***
	(0.005)	(0.003)	(0.002)	(0.004)	(0.006)
CZ year FE	Yes	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes	Yes
Obs	210,551	210,551	210,551	210,551	210,551
KP Stat	840.8	840.8	840.8	840.8	840.8

Notes: This table reports regression estimates of the effect of employers' concentration on within-firms ratios of inequality. A labor market is defined as the intersection between a commuting zone and a sector. All regressions are IV estimates. HHI employment is the logarithm of the Herfindahl-Hirschman index of the labor market considered. The following control variables are at communting zone, sector and year level : the average age of employees, the average size of firms, the size of the market (in terms of number of jobs) and job polarization. All variables are in logarithm. HHI sales is the logarithm of the Herfindahl-Hirschman index for the product market. Labor productivity is the log of total value added divided by the number of employees. These two variables are defined at the sector*year level. All regressions have the same fixed-effect structure: sector*commuting zone FE and year*commuting zone FE. Standard errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

A Additional tables

Table 19: High-skill and low-skill jobs: definition and employment shares

	Code	Employment share in 2000 (%)	Employment share in 2019 (%)
HIGH SKILL		**18.79**	**26.8**
Heads of small business (10 employees or more)	23	0.67	0.5
Scientific professionals	34	0.38	0.6
Information, arts and entertainment professions	35	0.14	0.2
Administrative and commercial executives of companies	37	6.0	9.9
Engineers and technical managers	38	5.8	9.6
Technicians	47	5.8	6.0
LOW SKILL		**38.74**	**39.8**
Supervisory officier (private security)	53	1.1	1.2
Company administrative employees	54	11	9.8
Commercial employees	55	5.5	7.1
Personal services	56	3.3	5.6
Drivers	64	5.1	4.8
Unskilled industrial workers	67	9.8	6.3
Unskilled manual workers	68	2.9	3.1
Agriculture and related workers	69	0.04	1.9

Table 20: First-stage

	Employment-HHI			Payroll-HHI
	(1)	(2)	(3)	(4)
	HHI, log	HHI, log	HHI, log	HHI, log
Instrument : employment-HHI	0.779***			
	(0.027)			
Instrument : 1/Number of firms		0.595***		
		(0.021)		
Instrument : normalized employment-HHI			0.486***	
			(0.017)	
Instrument : payroll-HHI				0.572***
				(0.026)
CZ year FE	Yes	Yes	Yes	Yes
CZ sector FE	Yes	Yes	Yes	Yes
Obs	210,551	210,551	210,551	210,551
KP stat	840.82	808.18	819.15	481.88

Notes: This table reports regression estimates from a first-stage linear using the employment HHI for the first three columns and payrolll-HHI for the last one. A labor market is defined as the intersection of a commuting zone and a sector. The first instrument is our main instrument: the employment-HHI. The second is the inverse of the number of firms. The third one is the normalized HHI. For the last column, employment HHI is replaced by the payroll-HHI. Same control variables as in others regressions are used. All regressions have the same fixed effects structure : sector*commuting zone FE and year*commuting zone FE. Standard Errors are clustered at the commuting zone level. The regressions are conducted on our restricted sample of markets that have at least ten firms among which at least one firm has more than 10 employees.Standard errors in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

B Construction of a unique sector classification (2000-2019)

We use the European classification NACE (*nomenclature des activités dans la Communauté européenne*), more specifically the NAF (*nomenclature d'activités française*) which is the French sector classification. The classification changes over time, with two breaks over the period we cover: in 2003 and in 2008. In 2008, a new classification, *NAF rév.2*, replaces the old classification, *NAF rév.1*. A correspondence table is provided by INSEE to bridge the current classification (*NAF rév.2*) to its previous version (*NAF rév.1*); the new version being more disaggregated than the old one[36].

We compute our own sector classification because the correspondence table at the 4-digit level does not allow to establish a correspondence one to one for all categories. It would be possible to have a perfect match at the 2-digit level but 2-digit sectors are too large to capture relevant labor markets. The construction of a sector classification over the period 2000-2019 represents a

[36] *Tables de passage* in French.

methodological contribution as it allows us to cover the whole period, unlike many papers studying French labor markets.

We proceed as follows. For years between 2000 and 2007, we use the three-digit *NAF rév.1* classification, which is the basis of our classification. For firms that were already in the sample in 2007, we use the sector in the (*NAF rév.1*) classification that they were classified as in 2007, and use it for the three following years (2008, 2009, 2010). For firms who enter into the database after 2008, and for all firms between 2011 and 2019, we match the sectors provided in our data in the *NAF rév.2* classification to the *NAF rév.1* one in several steps.

1. We use the INSEE correspondence table and assign the 3-digit *NAF rév.1* in cases where there are a *unique* occurrence of *NAF rév.2*, and hence no ambiguity.

2. For 4-digit *NAF rév.1* categories which enter in several categories of 3-digit *NAF rév.2*, we look at the data: if more than 70% of firms in a given *NAF rév.2* in 2008 declared to be in a given *NAF rév.1* in 2007, we choose this *NAF rév.1* as a match.

   We use firms in our database that were present in 2007 and 2008 to associate *NAF rév.2* sector to *NAF rév.1* sector. For a given sector *NAF rév.2* (after 2007), we compute a percentage of firms for each sector *NAF rév.1* associated in 2007. For example, 58% of the firm in our sample that are classified as "*Repair of fabricated metal prod (33.11Z)*" in 2008 (*NAF rév.2*) were classified as "*The boilermaking sector (283)*" in 2007 *NAF rév.1*.

3. For the remaning 4-digit *NAF rév.2* still unmatched (15 categories), we make a manual choice by looking at the data and the detail of the Insee classification.

At the third step, we regroup together:

– the meat and fish sector (151a2): 151 and 152 in *NAF rév.1*,

– merchandise and passenger air transportation (no distinction between the two in *NAF rév.1*),

– recuperation: 371 and 372 of *NAF rév.1* as there is no distinction between recyclable and non recyclable in *NAF rév.2*.

In classification *NAF rév.2* we exclude: extraction: division 05, 06 07, 08 09, cokefaction: division 19, nuclear activities: classes 2013A, 2446Z, mail and post office activities: division 53, TV and movie production: division 59, edition of radio, TV: division 60, social activities, social housing, public administration, gambling, cultural activities, library, association: division 84, 86, 87, 88, 90, 91, 92, 93, 94, activities of households as producers or employers: 97, 98, 99. We exclude health (85.1) and social actions (85.3) but keep veterinaires (85.2).

In classification *NAF rév.1* we exclude: extraction: division 10, 11, 12 , 13, 14, cokefaction: division 23, nuclear activities: included in division 23, mail and post office activities: sous classe 641A et 641C, central bank activities: 651A, social activities, social housing, public administration, health, gambling, cultural activities, association: division 75, 80, 85, 91, TV, radio, movie production and edition , gambling, library in division 92 (in division 92, we only keep the press agency category), activities of households as producers or employers: 95, 96, 97, 99.

The final list of sectors in our classification is provided in table 21.

Table 21: Our sector classification

SECTOR	
151a2 Manufacture of meat and fish	153 Manufacture of fruit and vegetables
154 Manufacture of vegetable and animal oils and fats	155 Manufacture of dairy products
156 Manufacture of grain mill products, starches and starch products	157 Manufacture of prepared animal feeds
158 Manufacture of other food products	159 Manufacture of beverages
160 Manufacture of tobacco products	171 Preparation and spinning of textile fibres
172 Tissage Weaving of Textiles	173 Finishing of textiles
174 Manufacturing of textile articles	175 Manufacture of other textiles
176 Manufacture of knitted fabrics	177 Manufacture of knitted and crocheted apparel
181 Manufacture of leather clothes	182 Manufacture of textile clothing
183 Manufacture of articles of fur	191 Tanning and dressing of leather
192 Manufacture of luggage, handbags, saddlery and harness	193 Manufacture of footwear
201 Sawmilling, planing and impregnation of wood	202 Manufacture of veneer sheets and wood-based panels
203 Manufacture of other builders' carpentry and joinery	204 Manufacture of wooden containers
205 Manufacture of products of wood, cork, straw and plaiting materials	211 Manufacture of pulp, paper and paperboard
212 Manufacture of articles of paper and paperboard	221 Publishing
222 Printing and service activities related to printing	223 Reproduction of recorded media
241 Manufacture of basic chemicals	242 Manufacture of pesticides and other agrochemical products
243 Manufacture of paints, varnishes and similar coatings	244 Pharmaceutical industry
245 Manufacture of soap , cleaning and perfumes preparations	246 Manufacture of other chemical products
247 Manufacture of artificial or synthetic fibres	251 Manufacture of rubber products
252 Manufacture of plastics products	261 Manufacture of glass and glass products
262 Manufacture of other porcelain and ceramic products	263 Manufacture of ceramic tiles and flags
264 Manufacture of bricks, tiles and construction products, in baked clay	265 Manufacture of cement, lime and plaster
266 Manufacture of articles of concrete, cement and plaster	267 Cutting, shaping and finishing of stone
268 Manufacture of non-metallic mineral products	271 Steel industry
272 Manufacture of tubes	273 Manufacture of other products of first processing of steel
274 Manufacture of basic precious and other non-ferrous metals	275 Casting of metals
281 Manufacture of structural metal products	282 Manufacture of tanks, reservoirs and containers of metal
283 Boiler making	284 Forging, pressing, stamping and roll-forming of metal; powder metallurgy
285 Treatment and coating of metals; machining	286 Manufacture of cutlery, tools and general hardware
287 Manufacture of other fabricated metal products	291 Manufacture of mechanical equipment
292 Manufacture of general-purpose machinery	293 Manufacture of agricultural machinery
294 Manufacture of machine tools	295 Manufacture of other special purpose machinery
296 Manufacture of weapons and ammunition	297 Manufacture of household appliance
300 Manufacture of office machinery and computer equipment	311 Manufacture of electric motors, generators, transformers
312 Manufacture of electricity distribution and control apparatus	313 Manufacture of wiring and wiring devices
314 Manufacture of batteries and accumulators	315 Manufacture of electric lighting equipment
316 Manufacture of other electrical equipment	321 Manufacture of electronic components and boards
322 Manufacture of transmitting and receiving apparatus	323 Manufacture of sound and video reception, recording and reproduction apparatus
331 Manufacture of medical, surgical and orthopaedic equipment	332 Manufacture of measuring and checking instruments
333 Manufacture of industrial process control equipment	334 Manufacture of optical instruments and photographic equipment
335 Watches and clocks	341 Manufacture of motor vehicles
342 Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	343 Manufacture of parts and accessories for motor vehicles
351 Building of ships and boats	352 Manufacture of railway locomotives and rolling stock
353 Manufacture of air and spacecraft and related machinery	354 Manufacture of motorcycles and bicycles
355 Manufacture of transport equipment n.e.c.	361 Manufacture of furniture
362 Manufacture of jewellery, bijouterie and related articles	363 Manufacture of musical instruments
364 Manufacture of sports goods	365 Manufacture of games and toys
366 Manufacturing n.e.c.	37 Recovery of recyclable and non-recyclable metal materials
401 Electric power generation and distribution	402 Manufacture of gas; distribution of gaseous fuels through mains
403 Steam and air conditioning supply	410 Water collection, treatment and supply
451 Site preparation	452 Construction of residential and non-residential buildings or civil engineering
453 Installation works	454 Building completion and finishing
455 Renting of construction equipment with operator	501 Sale of motor vehicles
502 Maintenance and repair of motor vehicles	503 Sale of motor vehicle parts and accessories
504 Sale, maintenance and repair of motorcycles and related parts and accessories	505 Retail sale of automotive fuel
511 Wholesale on a fee or contract basis	512 Wholesale of agricultural raw materials
513 Wholesale of food	514 Wholesale of household goods
515 Wholesale of non-agricultural intermediate products	518 Wholesale of other machinery, equipment and supplies
519 Other wholesale	521 Retail sale in non-specialised stores
522 Retail sale of food, beverages and tobacco in specialised stores	523 Dispensing chemist in specialised stores
524 Retail sale of other goods in specialised stores	525 Retail of second-hand goods
526 Retail trade not in stores	527 Repair of personal and household goods
551 Hotels and similar accommodation	552 Other short-stay accommodation
553 Restaurants	554 Beverage serving activities
555 Event catering and other food service activities	601 Rail transport
602 Urban and Road transport	603 Transport via pipeline
611 Sea and coastal passenger water transport	612 Water transport
62 Passenger air transport and Freight air transport	623 Space transport
631 Warehousing and Cargo handling	632 Management of transport infrastructures
633 Travel agency activities	634 Organization of freight transport
642 Telecommunications	660 Insurance
671 Activities auxiliary to financial services	672 Activities auxiliary to insurance
701 Buying and selling of own real estate	702 Renting of real estate
703 Real estate activities on a fee or contract basis	711 Renting and leasing of motor vehicles
712 Renting and leasing of transport equipment	713 Renting and leasing of other machinery, equipment
714 Renting and leasing of personal and household goods	721 Consultancy
722 Computer programming and related activities	723 Data processing
724 Database activities	725 Maintenance and repair of office machines and computer equipment
731 Research and experimental development on natural sciences and engineering	732 Research and experimental development on social sciences and humanities
741 Legal and accounting activities Management consultancy activities	742 Architectural and engineering activities and related technical consultancy
743 Control activities and technical analysis	744 Advertising
745 Selection and supply of personnel	746 Security and investigation activities
747 Cleaning activities	748 Other services provided mainly to businesses
852 Veterinary activities	900 Remediation activities and other waste management services
924 Press Agencies	930a Laundry
930b Hairdressing	930c Other beauty treatment
930d Funeral and related activities	930e Physical well-being activities
930f Other personal service activities	

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