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ABSTRACT

Competition in the Labor Market: The Wage Effect of Employer Concentration in China*

Competition in the labor market theoretically leads to higher wages, yet empirical evidence to substantiate it, particularly in developing countries, has been sparse. Our study delves into the impact of increased competition in the labor market on workers' wages using a panel dataset from Chinese industrial firms spanning 1998 to 2013. Employing OLS and IV regressions, we demonstrate that a decrease in employer concentration is significantly linked to higher wages. The elasticities of employer concentration on wages fall within the range of -0.034 and -0.107. Additionally, our findings suggest that state-owned enterprises gained the most from this upswing in competition, primarily due to restructuring. Furthermore, we demonstrate that total factor productivity serves as an important channel linking employer concentration to wages.

JEL Classification: J42, J3, O53

Keywords: competition, monopsony, labor market concentration, wages, China

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1. Introduction

A growing consensus has emerged in economics that firms have some monopsony power and use such power to set wages below the rate that would prevail under perfect competition.[1] Recent evidence from the U.S. suggests that market concentration is an important source of wage-setting power and variation in wages across local labor markets (e.g., Azar et al., 2022; Benmelech et al., 2022; Qiu & Sojourner, 2023). Such evidence underscores policy concerns that rising labor market concentration contributes to wage stagnation, increased earnings inequality, and reduced job security in developed countries (e.g., Prager & Schmitt, 2021; Rinz, 2022; Bassanini et al., 2024). Meanwhile, the implication on wage growth is promising for countries such as China, where reforms have made labor markets more competitive. But, whether and how much rising competition contributed to China's rapid wage growth is unknown.

This paper investigates the impact of labor market concentration on the wage of workers, exploring potential underlying mechanisms and variations, as the consequences of China's market reforms, which have precipitated heightened competition within the labor market.[2] The objective of this research is to bridge the existing knowledge gap concerning the impacts of an intensifying competitive labor market on the remuneration of Chinese workers, spanning the period from the late 1990s through the early 2010s. Meanwhile, it also spans the critical growth period of China associated with its WTO accession, which led to significant TFP (total factor productivity) growth (Brandt et al., 2017), and wage growth under rent-sharing (Duan & Martins, 2022).

China constitutes a particularly intriguing case study, primarily for two reasons. First, in sharp contrast to developed nations such as the United States and Europe, where markets have

[1] See the comprehensive discussion on the recent literature by Ashenfelter et al. (2022) and Card (2022).
[2] The background of China's economic reform is provided in Appendix A.

increasingly veered towards monopsony, China's labor market has experienced a surge in competitiveness. This is largely attributable to the country's institutional transition from a command economy to a market-oriented one, a transformation initiated in the late 1970s. Second, as the country with the largest labor force globally, China has witnessed a rapid acceleration in wage growth commencing in the late 1990s.[3] This growth has had a direct and profound impact on elevating the living standards of its citizens. Moreover, given the size of China's labor force, these changes have had wide-reaching implications, affecting a substantial number of individuals. Thus, a comprehensive understanding of these dynamics is not only of academic interest but is also pivotal to informing policy makings at a global level.

Our empirical strategy employs firm-level panel data from the Chinese Annual Survey of Industrial Firms (CASIF) spanning 1998 to 2013 and estimates panel data regression models with fixed effects to control for potential confounders. In addition to accounting for observed factors such as employment and labor productivity, we control for various unobservable factors by including year, firm, market, region, and industry fixed effects, or combinations thereof. For instance, in our preferred specification, the wage effect of local labor market concentration is identified using within-firm, within-industry-year, and within-region-year variations in employer concentration. This specification, which incorporates firm fixed effects, geographic region-by-year indicators, and industry-by-year dummies, is robust to all unobserved permanent firm characteristics determining wages (e.g., firm culture), all unobserved time-varying location-specific factors common to all firms in the same region (e.g., rural-urban migration, local regulations, and infrastructure), and all unobserved transitory differences in the mean wages of firms across industries (e.g., investment opportunities and demand shocks).

[3] Li et al. (2012) show that over the 1998–2010 period, the average annual real wage growth rate was 13.8%, prevailing over the 12.7% real GDP growth rate.

To further alleviate endogeneity concerns regarding local-level employer concentration, we estimate a panel instrumental variable (IV) regression model that utilizes the inverse number of employers in other geographic regions within the same industry and year as the IV. This IV exploits variation driven solely by national-level changes, excluding endogenous changes in the productivity of a specific area.

Our results first confirm that China's labor market has indeed become more competitive, by showing declined trends of local employer concentration, measured by the Herfindahl-Hirschman Index (HHI). Our panel OLS and IV regression results show that lower employer concentration has a significant and positive effect on wages, with OLS estimated elasticities ranging from zero to -0.033 and IV estimates between -0.034 and -0.107. This finding is robust across different local labor market definitions and various model specifications, and does not appear to be driven by changes in productivity or national-level product market concentration. The results are comparable to estimates in the literature. For instance, Azar et al. (2022) use posted wages from online job postings during the 2009-2012 period, which are not solely focused on manufacturing. Their market-level OLS elasticity is -0.038, and the IV estimate is -0.127. Benmelech et al. (2022) find an establishment-level elasticity of wages to local-level employer concentration of approximately -0.02 over the 2008-2016 period.

To better comprehend the driving forces behind our results, we analyze changes in employer concentration by industry. We find that all industries, except for Tobacco Processing, experience decreases in employment-weighted HHI. We also examine trends of employer concentration by ownership type and discover that state-owned enterprises (SOEs) have a higher level of HHI than non-SOEs and foreign-invested enterprises (FIEs). SOEs exhibit opposite trends of changes in HHI due to restructuring. The estimated elasticity of wages to employer concentration is the

largest for SOEs. Furthermore, we conduct analyses by region and identify similar trends of HHI across all six regions. The overall level of HHI is largest in the northwest region and smallest in the southeast coastal region. As the country opens up, the northwest region faces greater competitive pressure than the already relatively competitive southeast coastal region. Consequently, the estimated effects are largest in the northwest region and smallest in the southeast coastal region. Further analyses suggest that China's decreasing employer concentration stimulates an enhancement in total factor productivity (TFP), and the effect of concentration on wages attenuates but remains significant when controlling for TFP. This insinuates that besides the monopsony explanation, total factor productivity operates as an important channel linking employer concentration to workers' wages.

Our research introduces several significant contributions to the existing body of knowledge. First, much of the existing literature centers on developed countries where labor markets have become increasingly monopsonistic, empowering firms with substantial wage-setting authority and leading to a negative impact on wages. Contrarily, China's experience provides crucial insights from an alternative standpoint, demonstrating the implications of augmented labor market competition on wages.

Second, a multitude of studies focuses on labor markets within the context of an already established market economy. Our research, however, pivots around China, a nation that has undergone a monumental transition from a government-planned, state-dominated economic system to a more market-oriented economy characterized by a blend of industry ownerships. This distinctive context provides an opportunity to explore the effects of China's economic reform on labor market dynamics and wage determination.

Third, our methodology hinges on the use of a nationally representative firm-level panel

dataset, collected by the National Bureau of Statistics of China (NBS). We exploit this dataset to estimate the causal impact of labor market competition (measured by employer concentration) on wages. The comprehensive nature of this firm-level data permits us to control for labor productivity—an indispensable variable when investigating wage determination—and to address potential endogeneity issues.

Lastly, our study offers a unique perspective, not just in terms of its geographic focus but also to extend the understanding of China's economic reform. This economic metamorphosis, unprecedented in both scale and pace, provides a rich context for understanding the interplay between labor market competitiveness and wage dynamics.

The rest of the paper proceeds as follows. Section 2 provides a review of the literature. Section 3 describes the data and descriptive statistics of the key variables. Section 4 details the empirical methods and presents our results. Section 5 explores heterogenous effects by region and by industry ownership. In Section 6, we discuss the mechanism. Finally, Section 7 concludes the study.

2. Literature Review

Our study complements recent studies on firms' market power in the product market (Autor et al., 2020; Barkai, 2020; Covarrubias et al., 2020), which find that increased industry concentration correlates with a decline in the labor share of GDP in the U.S. Analogous to product market power, the burgeoning literature frequently diverges from the perfectly competitive labor market models and examines the causes and consequences of labor market monopsony power (Manning, 2003; Hirsch et al., 2010; Manning, 2011). Recent reinvigorated research on labor market monopsony in the U.S., as detailed in Card (2022), provides various types of new evidence including quit and recruiting responses to wages, the relationship between

wages and firm productivity, conspiracies and other arrangements aimed at suppressing competition, and the effects of labor market concentration on wages.[4]

Prior studies, which demonstrate the adverse influence of local labor market concentration on wages, primarily focus on developed economies and consistently observe increasing trends in employer concentration.[5] These studies exploit cross-sectional and time-series variations in the HHI of firm employment (Lipsius, 2018; Macaluso et al., 2019; Benmelech et al., 2022; Rinz, 2022; Qiu & Sojourner, 2023), online job vacancies (Dube et al., 2020; Azar et al., 2022), and wage bills (Berger et al., 2022). The majority of these investigations explore either local labor markets or online labor markets in the U.S., focusing on the entire economy or specific industries, such as manufacturing. U.S. labor markets are commonly measured at the county-industry-year or commuting zone-industry-year levels, although some studies substitute industry measures with occupation or task measures. For instance, Azar et al. (2022) use data from an online job-posting platform in the U.S. and measure labor market concentration using the HHI of job vacancies. The authors define local labor markets through a combination of occupations and commuting zones, finding that increased concentration results in lower posted wages. Rinz (2022) posits that increased local concentration reduces earnings and exacerbates inequality. Conversely, Lipsius (2018) contends that the decline in average local labor market concentration since 1980 is an unlikely driver of the falling labor share in the U.S. Qiu and Sojourner (2023) differentiate labor market concentration from product market concentration, suggesting that higher product market concentration intensifies the adverse effects of labor market concentration

[4] The monopsony power, i.e. wage-setting power, of the firm could be directly seen and measured with firm-specific labor supply. With detailed information on workers, a growing literature employs structural analysis to estimate such elasticities (Azar et al., 2019; Dube et al., 2020; Berger et al., 2022; Jarosch et al., 2024). However, in the Chinese context, we lack such data to provide similar analyses.

[5] Even given a certain degree of employer concentration, monopsony power could still vary depending on labor market frictions due to factors that restrain worker mobility such as commuting costs, incomplete information, etc.

on labor compensation. Our study is closely related to that of Benmelech et al. (2022), which reveals a rising employment concentration trend in the U.S. manufacturing sector over recent decades, potentially linked to increased import competition from China within the U.S. market, and reveals a negative relationship between local-level employer concentration, as measured by the HHI of establishment employment, and wages of workers.

To establish a persuasive research design concerning the causality between concentration and wages, some studies exploit merger-induced changes in concentration, which can also enhance labor market power, and analyze the resulting wage effects. Prager and Schmitt (2021) investigate hospital mergers, finding evidence of reduced wage growth associated with increased concentration resulting from large mergers. The authors further confirm that this reduction in wage growth is mitigated in markets with strong labor unions. Arnold (2019) uncovers similar results using matched employer-employee data from the U.S. Census, suggesting the presence of negative spillover effects on other firms within the same labor market. Additionally, the author employs data on job-to-job mobility patterns to account for substitutability across industries by extending a simple Cournot model of labor market competition.

Our study also aligns with the literature on rent sharing. As reviewed by Card et al. (2018), studies find elasticities of wages with respect to value added per worker in developed countries fall in the range of 0.05 to 0.15. While Duan and Martins (2022) find elasticities of about 0.04 to 0.06, depending on measures of rents in China, which are at the lower bound of the international evidence, given the still-emerging nature of China's labor market institutions.

Lastly, our study also connects to the local labor market approach that considers regional economies as the unit of analysis. Manning and Petrongolo (2017) propose a spatial job search model that accounts for labor market overlaps and interdependencies, estimating that labor

mobility is limited across regions and job search is predominantly local. Additionally, when evaluating labor demand shocks, researchers rely on the slow and incomplete inter-regional adjustment and costly labor mobility among sectors. For instance, Autor et al. (2013) exploit cross-market variation in import exposure stemming from initial differences in industry specialization to study the effects of import competition from China on U.S. local labor markets.

3. Data and Summary Statistics of Key Variables

3.1. *Data Sources and Data Editing*

Our firm-level panel data—the CASIF—span from 1998 to 2013 and are conducted by the NBS of China. The NBS defines a firm as a legal unit; therefore, subsidiaries of large firms considered legal units are included in the CASIF as individual firms. The CASIF dataset encompasses all state-owned industrial firms in the country and "above-scale" non-state-owned industrial firms with sales of at least 5 million yuan (about $605,000). The "above-scale" threshold increased to 20 million yuan in 2011.[6] In the dataset, the number of firms rose from 145,966 in 1998 to 336,730 in 2007 and 344,875 in 2013.[7] The full sample contains all above-scale industrial firms in China, as defined by the NBS, which includes mining, manufacturing, and public utilities such as electricity, heat, gas, and water production and supply.[8] The CASIF is

[6] The threshold adjustment might raise concerns about the accuracy of our estimates. To address these concerns, we conduct a robustness analysis using a subset of firms from 1998 to 2007, before the threshold change. The results of this analysis are consistent, supporting the reliability of our findings despite the threshold adjustment. These details are provided in Appendix B.5.

[7] Potential specialization and outsourcing trends within Chinese firms over time —which result in changes in the labor markets where these firms operate—could possibly skew our understanding of how labor market concentration affects wages. This might lead to an overestimation of the impact of labor market concentration on wages. Although we cannot directly observe these trends in our data, meaning our model may not fully capture these dynamics, we acknowledge this potential issue and suggest that our findings should be interpreted with caution.

[8] The three sectors corresponding to two-digit Chinese SIC codes, as displayed in Online Appendix Table 1, are 06–12 for mining, 13–43 for manufacturing, and 44–46 for public utilities. The table's last column shows the percent changes in the average employment-weighted HHI from 1998 to 2013 for each industry, with the local labor market defined by prefecture and two-digit Chinese SIC codes. Only Tobacco Processing, predominantly owned by the state, exhibits an increasing HHI level. All other industries demonstrate decreases in HHI levels, ranging between -0.07 and -0.82.

widely recognized and employed in academic research as a significant representation of China's industrial activities.[9]

To construct a panel dataset, we employ the method outlined in Brandt et al. (2012) to match firms over time using their registration ID numbers and address issues such as changes in ID numbers for some firms during the sample period and instances where multiple firms share ID numbers. We also utilize other identifying information to merge firms over time, including legal representatives' names, Chinese Standard Industrial Classification (SIC) codes, phone numbers, zip codes, street names, starting months, and starting years. Price deflators for nominal variables, such as output and wages at the industry and province levels, are sourced from China statistical yearbooks, the online appendix of Brandt et al. (2012), and Upward et al. (2013). We convert all nominal values in our dataset to the price level in 1998 and exclude firms with reporting errors, typos, or illogical entries, such as zero or negative values for the number of employees, output, sales, and wage costs from the sample.[10]

Our definition of the geographic area for a local labor market is either a prefecture-level city (hereinafter prefecture) or a county. A prefecture is an administrative division in the PRC that ranks below the provincial-level administrative division (hereinafter province) and above a county in China's administrative structure. In 2002, there were 2,859 counties within the 337 prefectures across the 31 provinces of Mainland China, which included 22 provinces, five autonomous regions, and four municipalities. Due to administrative boundary changes over the years, we convert the region code for each year to the benchmark system based on the 2002 National Standard of Administration (GB/T 2260-2002). To define the industry level for a local

[9] According to Brandt et al. (2017), the firms in this dataset accounted for 91 percent of output, 71 percent of employment, 97 percent of exports, and 91 percent of total fixed assets in 2004, as compared to the totals recorded in the 2004 Economic Census.

[10] The percentages of firms excluded are 3.83% in 1998, 1.94% in 2013, and an overall average of 1.49% across all years examined, suggesting that the representativeness of the sample is not significantly compromised.

labor market, we use either two-digit or four-digit Chinese SIC codes based on the 2011 national standard (GB/T 4754-2011).[11] Consequently, a local labor market in our analysis is a geographic area by industry by year combination at the prefecture–two-digit Chinese SIC code–year, prefecture–four-digit Chinese SIC code–year, county–two-digit Chinese SIC code–year, and county–four-digit Chinese SIC code–year levels. For instance, automobile manufacturing in Shenyang in 2012 represents a local labor market at the prefecture–two-digit Chinese SIC code–year level.

3.2. *Key Variables: Labor Market Concentration, Wages, and Labor Productivity*

Market power in a labor market is measured by calculating the local employer concentration using the Herfindahl-Hirschman Index (HHI) of firm employment for a specific industry located in a particular geographic area during a given year. Our main variable of interest, local labor market concentration, is defined as the HHI in geographic area r in industry *i* in year *t*, as follows:

$$HHI_{rit} = \sum_{f=1}^{N} s_{frit}^2,$$

where s_{frit} is the employment share of firm f in geographical area r in industry i in year t. That is:

$$s_{frit} = \frac{emp_{frit}}{\sum_{f=1}^{N} emp_{frit}},$$

where emp_{frit} denotes total employment of firm f in geographical area r in industry i in year t. Using the CASIF dataset we first measure the employment share of firm f by dividing its employment by the total employment of all firms within the same local labor market. Following

[11] The two-digit Chinese SIC codes encompass 41 categories, while the four-digit codes comprise 581 categories.

this, we compute the HHI by summing the squared employment shares. This labor market concentration measure is analogous to the HHI in a product market, which calculates the sum of squared market shares for all producers competing within the same product market. The employer concentration HHI measure exploits employment shares of all firms that hire from a common pool of workers in a labor market, thereby capturing labor market power.

Each firm's average wage is calculated by dividing the total wage by employment.[12] Firm-level labor productivity, defined as the average output per worker, is calculated by dividing the firm's total output by its number of workers. Here, firm-level output, defined by the National Bureau of Statistics of China, includes the value of finished products produced, the income of external processing fees, and the value of the difference between the end of the period and the beginning of the period of the self-made semi-finished products in process.[13] Our analysis excludes the years 2009, 2010, and 2011 due to missing wage or employment information.

3.3. *Summary Statistics*

Figure 1 displays substantial cross-sectional variation in reduced local employer concentration. Using four definitions of the local labor market, the average local labor market concentration trends, as measured by the HHI, declined during the 1998–2013 period. Taking the broadest definition of a local labor market (prefecture by two-digit Chinese SIC code) as an example, Figure 1 reveals that the employment-weighted average HHI began at 0.217 in 1998, rose slightly to 0.228 in 1999, and then consistently decreased to 0.076 in 2013.

[Insert Figure 1 here]

Table 1 presents the summary statistics of key variables and local-level HHI using four labor

[12] The term "wage" is commonly understood and in accordance with its prevalent use in China, while a more precise term would be "employee compensation" that includes both basic wages and benefits such as pensions, insurance, and housing subsidies.

[13] Note that this definition is similar to standard practices in the literature such as in Benmelech et al. (2022) who indicate it as the sum of the total value of shipments and the net increase in inventories of finished goods and works in progress.

market definitions, as shown in Table 1. Throughout the analysis period of 1998-2013, all key variables exhibit significant variation. The broadest labor market definition—prefecture by two-digit Chinese SIC code by year—displays the lowest employer concentration and smallest proportion of monopsony firms. Conversely, the narrowest definition—county by four-digit Chinese SIC code by year—reveals the highest employer concentration and the largest proportion of monopsony firms.

[Insert Table 1 here]

Panel A of Table 1 indicates that a firm's average wage cost is 6,953.9 (in thousands) *yuan*, with an average total employment of approximately 300 people. The average annual wage per worker is 17.3 (in thousands) *yuan*, and the average labor productivity of a firm is 620.9 (in thousands) *yuan*. Panels B to E of Table 1 report the HHI means, dummy HHI = 1 (an indicator of whether a single firm dominates the local labor market, with the mean representing the percentage of monopsony firms), and the log of employment. As anticipated, the mean of HHI increases from 0.357 (the broadest labor market definition) to 0.732 (the narrowest labor market definition). With the HHI standard deviation ranging from 0.333 to 0.370 and the standard deviation-to-mean ratio varying from 0.48 to 0.93, Table 1 demonstrates that China's labor markets display substantial cross-sectional variation in local employer concentration.

The mean of the dummy HHI = 1, an indicator capturing prefectures or counties with high labor market power, ranges from 0.139 to 0.572. This shows that 13.9% to 57.2% of local labor markets have one dominant firm. Such concentrated local labor market percentages align with existing studies and are expected,[14] considering China's ongoing transition from a planned economy to a market economy and its diverse nature.

[14] Benmelech et al. (2022) show that 21.1% of their plant-year observations have only one employer at the county–three-digit SIC code–year level using a manufacturing firm dataset from the U.S. Census Bureau between 1978 and 2016.

The means of the associated logs of total employment at the market level vary from 5.456 to 7.466, exhibiting considerable variation, with standard deviations ranging from 1.412 to 1.865. In summary, the summary statistics in Table 1 are comparable to those of Benmelech et al. (2022), who use plant-level data from the U.S. Census Bureau during the 1978–2016 period to construct the HHI measure in the U.S. manufacturing sector. This consistency supports the hypothesis that China's local labor markets display significant diversity and variation in employer concentration.

4. Empirical Strategies and Results

Our empirical strategy builds upon the methodologies used by Benmelech et al. (2022), Azar et al. (2022), and Rinz (2022), estimating similar fixed effects models and employing IV regressions to address potential endogeneity issues. Extending beyond these studies, we implement the "Plausibly Exogenous Instrument Regressions" methodology, as introduced by Conley et al. (2012) and used in Azar et al. (2022), to ensure that our instrumental variable satisfies the exogeneity condition.

Specifically, our paper exploits both cross-sectional and time-series variations at the firm level from the panel dataset of Chinese manufacturing firms spanning from 1998 to 2013. In an attempt to address potential endogeneity concerns arising from local employer concentration, as measured by the HHI, we use the IV approach. Motivated by Azar et al. (2022), we use the reciprocal of the employer count from distinct geographical regions within the same industry and year, as an instrument for the HHI. To assess the robustness of our results, we conduct a series of robustness analyses that demonstrate the reliability of our findings under various scenarios and

alternative definitions of a local labor market. These analyses are detailed in Appendix B.[15]

4.1. *Panel OLS and IV Regressions*

Our empirical investigation employs fixed-effects panel data regressions at the firm level, which permits us to account for firm-level labor productivity. We apply the following equation:

$$lnW_{frit} = \beta lnHHI_{rit} + X'_{frit}\theta + \alpha_t + \mathcal{F}_f + \mathcal{R}_{rt} + \phi_{it} + \varepsilon_{frit}, \quad (1)$$

where lnW_{frit} denotes the natural logarithm of the average wage of firm f, located in region r, belonging to industry i, in a specific year t. When we estimate Equation (1), we categorize geographic region r as either a prefecture or a county and industry i in accordance with two-digit or four-digit Chinese SIC codes. Our key independent variable $lnHHI_{rit}$, serving as a proxy for local employer concentration, denotes the natural log of the HHI in region r, industry i, and year t.[16] X'_{frit} refers to a set of controls at the firm-by-year level, incorporating the logarithm of firm employment and the logarithm of firm labor productivity.

To address potential endogeneity issues, we incorporate year fixed effects α_t and firm fixed effects $\mathcal{F}_f$ to control for factors that are constant across firms but vary over time, or vary across firms but remain stable over time.[17] To further mitigate unobserved heterogeneity concerns, we progressively include region-by-year fixed effects $\mathcal{R}_{rt}$, accounting for changes in location-

[15] To offer a concise summary of Appendix B: Appendix B.1 presents firm-level results using various combinations of geographical regions and SIC codes to test the robustness of local labor market definitions. Appendix B.2 extends these analyses to the market level. Appendix B.3 explores the influence of perfect monopsony markets by excluding them from the analysis. Appendix B.4 includes controls for national-level employer concentration to consider the impact of product market concentration. Appendix B.5 specifically omits the period of the Great Recession to mitigate the effects of firm closures and addresses concerns related to changes in the threshold in 2011. Appendix B.6 uses a balanced sample of firms to further address the issue of sample selection. Furthermore, Appendix B.7 employs an alternative definition of the dependent variable to ensure the robustness of our findings. To further test the sensitivity of our empirical strategy, Appendix B.8 expands the set of instrumental variables used, and Appendix B.9 examines alternative model specifications.

[16] To probe the potential non-linear effect, we included polynomial terms of the logarithm of HHI—both squared and cubic—to investigate non-linear relationships between labor market concentration and wages and report the results in Appendix B.9. The findings suggest some evidence of non-linearity in addition to our original log-linear specification.

[17] We are aware of the potential negative weighting bias in two-way fixed effects (TWFE) models as discussed by de Chaisemartin and d'Haultfoeuille (2020). We have implemented their method in our analysis. Our findings indicate that while the presence of negative weights is notable, they constitute a smaller portion of the overall weighting and do not dominate our results.

specific factors common to all firms within a region, and industry-by-year fixed effects ϕ_{it}, controlling for time-varying heterogeneity across industries. We recognize the significant role that rural-to-urban migration plays on the supply side, shaping the process of wage determination. The incorporation of these region-by-year fixed effects, as well as industry-by-year fixed effects, should mitigate the concern. In response to concerns about product market concentration correlating with both local labor market concentration and worker wages (Autor et al., 2020), we include the logarithm of the national HHI as a proxy for national-level product market competition. Finally, ε_{frit} denotes the error term. All regressions employ clustered standard errors at the market level, from which the variation of lnHHI originates (Abadie et al., 2023).[18]

To further alleviate the endogeneity concern associated with the HHI measure, we adopt the IV approach, which uses the average number of employers in other geographic regions within the same industry and year as an instrument for the HHI variable. More specifically, we construct the IV as the average of ln(1/*N*) in other geographic regions within the same industry and year, with *N* representing the number of firms in labor markets. The instrument has been used in previous studies on labor market concentration, including Azar et al. (2022), Marinescu et al. (2021), Rinz (2022), and Qiu and Sojourner (2023), Bassanini et al. (2024). It has also been employed in the literature of industrial organization and international economics such as Hausman et al. (1994), Nevo (2001), Autor et al. (2013), and Bai et al. (2019).

This instrument, therefore, identifies the effect of employer concentration on worker wages by utilizing variation in the HHI driven by national changes in the same industry and year, which are not related to time-varying market-specific changes. This specific IV accounts for the issue

[18] The statistical significance of the results does not change when we use clustered standard errors at the prefecture or the county level. The results are available upon request.

of time-varying market-specific productivity changes that correlate with the HHI and the average wage.[19] To ensure our instrument meets the exogeneity requirement for a valid IV, we implement the "Plausibly Exogenous Instrument Regressions" (Conley et al., 2012) in the following section.

4.2. *Exogeneity of IV: Plausibly Exogenous Instrument Regressions*

The nationwide labor productivity in China experienced a significant rise throughout the period of our analysis (Li et al., 2012). This overall increase in labor productivity could potentially lead to a decrease in product market concentration, which is likely to be associated with local employer concentration. This suggests that our proposed IV might not be fully exogenous. To address this concern, we employ two strategies. First, we carry out plausibly exogenous instrument regressions as proposed by Conley et al. (2012). This technique identifies a plausible estimate threshold, even when the IV is imperfect (i.e., the instrument has a direct correlation with the dependent variable). Second, as a robustness test in Appendix B.4, we incorporate a national-level employer concentration measure to control for potential confounding factors.

The plausibly exogenous instrument regression approach allows us to deviate from the second requirement of a valid IV, i.e., instrument exogeneity, permitting the IV to have a non-zero and direct impact on the dependent variable. We assume that our proposed instrument z does not satisfy the perfect exogeneity requirement, which implies $corr(z, u) \neq 0$, and it consequently enters the second stage of the IV estimation as the following firm-level equation:

$$lnW_{frit} = \beta lnHHI_{rit} + X'_{frit}\theta + \gamma z + \alpha_t + \mathcal{F}_f + \mathcal{R}_{rt} + \phi_{it} + \varepsilon_{frit}, \qquad (2)$$

[19] We have also considered expanding our instrument set by incorporating both lags and differences of our primary instrument and employed a Generalized Method of Moments (GMM) approach to estimate the model with this expanded set of instruments. The results, presented in Appendix B.8, demonstrate that the outcomes using the GMM approach with additional instruments are consistent with our main findings.

where γ is the coefficient of the IV. If our IV is fully exogenous, then γ equals zero, yielding the standard IV estimation. Any deviation from strict exogeneity of the instrument z is likely to exert a direct impact, of magnitude within the $[-\gamma,\ \gamma]$ interval, on the dependent variable lnW. The method by Conley et al. (2012) relaxes the strict exogeneity restriction, such that γ does not necessarily have to be zero and can fall within the $[-\gamma,\ \gamma]$ interval. The lower bound $-\gamma$ allows us to assess the extent of the (negative) direct impact, causing the IV estimate to become insignificant.

Initially, we substitute the $lnHHI$ variable with the instrument z and estimate the reduced-form OLS regression, which is similar to the IV regression. We then take the estimated coefficient $\hat{\gamma}$, (i.e., the reduced-form effect) as the lower bound and zero as the upper bound of the γ range. Subsequently, we compute the lower and upper bounds of our coefficient of interest, β, by executing plausibly exogenous instrument regressions and calculating γ_{max}— the lower bound value of γ that makes β insignificant.[20] Furthermore, we compute the ratio $\gamma_{max}/\hat{\gamma}$ to demonstrate the degree to which the direct (reduced-form) effect of the instrument would need to exceed the overall effect to result in an insignificant IV estimate.

4.3. *Results of OLS and IV Regressions*

Table 2 presents the outcomes of our firm-level panel OLS and panel IV regressions, using the county by four-digit Chinese SIC codes as a definition of local labor markets. Consistently, the results demonstrate that lower local employer concentration leads to higher wages. The negative employment coefficient and the positive labor productivity coefficient align well with our theoretical predictions; specifically, the estimated wage elasticities of labor productivity range from 0.337 to 0.351 and are statistically significant at the 1% level. Furthermore, the first-

[20] We use the Stata command plausexog developed by Clarke and Matta (2018).

stage results unanimously indicate that the IV is statistically significant and highly relevant, as evidenced by the substantial F-statistic values.

[Insert Table 2 here]

In Panel A, the panel OLS results suggest a 10% decrease in local labor market concentration results in a wage increase of 1.01% in Model (1) and 0.94% in Model (2). When labor productivity is controlled for in Models (3)–(5), the effects decrease to between 0.33% and 0.37%. This underlines the significance of accounting for labor productivity in studying wage determination. Panel B illustrates the panel IV results, where Models (6)–(10) display the estimated elasticities of the HHI on wages, which ranges between -0.073 and -0.272, with -0.107 in Model (10) being our preferred estimate. This preferred model specification, accounting for employment, labor productivity, firm fixed effects, industry-year fixed effects, and region-year fixed effects, reveals that a 10% decrease in employer concentration results in a 1.07% wage increase. In summary, the firm-level results, while underscoring the importance of accounting for labor productivity, consistently demonstrate a negative and statistically significant causal relationship between employer concentration and workers' wages.

4.4. *Results of Plausibly Exogenous Instrument Regressions*

Table 3 displays the results of the plausibly exogenous instrument regressions using county-four-digit Chinese SIC as the local labor market, including the bounds of β and the $\gamma_{max}/\hat{\gamma}$ ratios.[21] Notably, the high $\gamma_{max}/\hat{\gamma}$ ratio (between 0.73 and 0.88) suggests that for our IV estimate to become insignificant, the direct effect of the instrument would need to surpass 73%–88% of the overall effect. This evidence reinforces our finding that a decrease in employer concentration leads to higher wages is robust to a substantial degree of endogeneity in the

[21] The results under different local labor market definitions and those at the market level show consistent findings. These results are available in Online Appendix Table 2 and Online Appendix Table 3.

proposed IV.

For instance, our preferred Model (5), which controls firm fixed effects, year-region fixed effects, and industry-year fixed effects, demonstrates that the estimated panel IV coefficient of HHI lies within the $[-0.112,\ 0.015]$ interval. The computed $\gamma_{max}/\hat{\gamma}$ ratio—representing the extent to which the direct (reduced-form) effect of the instrument must surpass the total effect to yield an insignificant IV estimate—is 0.86. In simpler terms, the likelihood of the IV being exogenous is approximately 86%. In essence, given the results from the plausibly exogenous instrument regression, we hold strong confidence in the significance of our models' lower bound, as the instrument would have to be highly endogenous to invalidate our finding. To visualize the plausibly exogenous instrument regression results, Figure 2 plots the upper and lower bounds of the estimated β and γ_{max} and the 95% confidence intervals of β from model specification (7) in Online Appendix Table 2 and the market-level result is taken from model specification (6) in Online Appendix Table 3.

[Insert Table 3 here]

[Insert Figure 2 here]

5. Heterogeneous Effects

5.1. *Effects by Ownership Type*

Prior to the implementation of economic reform and open-door policies in 1978, China's industry was primarily made up of similar, publicly owned organizations, with state-owned enterprises (SOEs) producing 77% of the total industrial output, and collective enterprises producing the remaining 23% (Naughton, 2007). Starting in 1979, China began the process of gradually dismantling its command economy, which had been dominated by SOEs in key industrial sectors, and introduced markets in almost all sectors. After the Chinese policymakers

initiated large-scale efforts to restructure the state-owned corporate sector with the adoption of the Company Law on July 1, 1994, China successfully transitioned from a state monopoly to a diverse mix of ownership types (Naughton, 2018). Based on the definition of the National Bureau of Statistics of China, roughly 30% of all firms in our dataset are categorized as SOEs, 57% as non-SOEs, and the remaining 11% are classified as FIEs as of 1998. However, by 2013, these proportions have dramatically shifted, with SOEs representing a mere 3%, non-SOEs significantly increasing to 85%, and FIEs maintaining a steady presence at 11%.

[Insert Figure 3 here]

As depicted in Figure 3, which illustrates the trends in employer concentration by ownership type, it is clear that SOEs generally have a higher level of HHI compared to both non-SOEs and FIEs. Interestingly, the SOEs demonstrate a contrary trend in changes to the HHI due to restructuring, which starkly contrasts with the patterns shown by the other types of enterprises.

[Insert Table 4 here]

Table 4 presents the firm-level estimations by the three ownership types, showing that local employer concentration (calculated using firms of all types) has a significant and negative association with wages, according to the IV results. In our preferred IV model specification, we find that the SOEs demonstrate the largest effect compared with non-SOEs and FIEs, with estimates ranging from -0.067 to -0.186. For non-SOEs, which make up the majority of manufacturing firms, depending on the definition of the local labor market, we find that a 10% decrease in employer concentration leads to a 0.29%–1.04% increase in wages. For FIEs, we find the smallest wage effect, within the range of 0.12%–0.65% for a 10% decrease in employer concentration.[22]

[22] The results under different local labor market definitions are shown in Online Appendix Table 10.

One potential explanation for this could be rooted in the fact that the wage structures of SOEs are determined within the internal labor market, which operates distinctly from the market-oriented wage-setting mechanisms. For instance, while SOEs might generally offer lower wages, they typically compensate for this through the provision of significant non-wage benefits, such as job stability, internal promoting opportunities, and job prestige. As the competition within labor markets intensifies, the wage determination process within SOEs tends to become more market-aligned, leading to more pronounced fluctuations in wage levels.

Moreover, SOEs have a propensity to be prevalent in particular industries characterized by higher concentration levels, leading to greater elasticity as these markets become less concentrated. Finally, SOEs showcasing superior performance and notable productivity growth are more likely to thrive in labor markets that are becoming increasingly competitive. This is attributable to the closures, restructuring, and privatization of SOEs, which are part and parcel of the broader SOE reform. In conclusion, our results provide evidence that China's transformation from a command to a more market-oriented economy led to more competitive local labor markets, which, in turn, resulted in higher wages for Chinese workers.

5.2. *Effects by Region*

China's diverse regional economies—ranging from its vast manufacturing sector, highly prosperous urban cities, growing modern service and knowledge-intensive sectors, to lagging rural areas—offer a unique context for studying labor market monopsony power and its impact on wages. The economic reform initiated in the 1980s instituted a "dual-track" approach that introduced market mechanisms alongside traditional planning structures. This has left a complex legacy in the transition from a command economy to a market economy, with progress varying across different regions (Naughton, 2018). To investigate the effects of labor market monopsony power on wages in this diverse context, we explored the relationship between wages and labor market concentration in six regions defined by their industrial activities, as outlined in Brandt et al. (2017).

Figure 4 displays these six regions of China as per our study: Northeast, North, Southeast

Coast, Central, Northwest, and Southwest.[23] These regional divisions help to provide a comprehensive understanding of how the changes in the local labor market concentration have been distributed across different parts of the country.

[Insert

Figure 4 here]

We estimate the panel OLS and IV models and plot our preferred IV estimates with 95% confidence intervals with the four definitions of a local labor market for the six regions in Figure 5. The IV estimates depicted in the figure consistently show a statistically significant negative correlation between employer concentration and wages across all these regions. The strength of this correlation varies depending on the region and the definition of a local labor market.

[Insert Figure 5 here]

In the southeast coastal region, which was among the first to open up to the global economy, a 10% decrease in employer concentration led to a 0.17% increase in wages when using the broadest definition of a local labor market. With the narrowest definition, the wage increase was found to be 0.61%.

Conversely, the northwest region, which has seen slower economic growth and competition compared to the coastal areas, shows the largest effect. A 10% decrease in employer concentration in this region results in a 0.92% wage increase under the broadest market definition, and a 2.21% wage increase under the narrowest market definition.

These outcomes align with the geographical diversity and uneven progress of reforms.

[23] Northeast includes Heilongjiang, Jilin, and Liaoning provinces. North includes Beijing, Tianjin, Inner Mongolia, Shanxi, Hebei, and Shandong provinces. Southeast Coast includes Jiangsu, Shanghai, Zhejiang, Fujian, Guangdong, and Hainan provinces. Central includes Henan, Anhui, Hubei, Hunan, and Jiangxi provinces. Northwest includes Shaanxi, Ningxia, Gansu, Qinghai, and Xinjiang provinces. Southwest includes Sichuan, Chongqing, Guangxi, Yunnan, Guizhou, and Tibet.

Specifically, southeast coastal provinces like Shanghai, Guangdong, and Jiangsu were amongst the first to open to the global economy and invite increased competition. In stark contrast, economic expansion and competition have been notably sluggish in the western and inland provinces when juxtaposed with the coastal regions. The results corroborate the finding that increased competition in China's labor market contributes to higher wages.

6. Additional Analyses

In this section, we delve into the possible mechanism by which an employer's concentration may impact the wages of their workers: through the lens of total factor productivity. Our study demonstrates that a decrease in employer concentration, which signifies greater competition in China's labor market, significantly yields higher workers' wages. This finding affirms Card's (2022) assertion that "A growing consensus is that firms have some wage-setting power." Yet, the underlying mechanism remains somewhat elusive, as Card (2022) also pointed out, "...though many questions remain about the sources of that power." In the course of our study period, China has experienced remarkable economic growth, with numerous studies attributing this growth to an increase in total factor productivity (henceforth referred to as TFP). We postulate that greater competition within the labor market could enhance TFP, which in turn could result in increased wages for workers.

We compute the firm-level TFP index using the approach developed by Levinsohn and Petrin (2003) and provide a comprehensive description of how TFP is constructed for our study in Appendix C. This approach, which builds upon the foundational concepts of Olley and Pakes (1996), aims to resolve the simultaneity bias stemming from unobserved firm-specific characteristics or shocks that might influence the levels of inputs and output when estimating the production function. Specifically, we estimate different Cobb-Douglas production functions for

each of the 2-digit industries using the firm-level data, and apply intermediate inputs to control for the unobserved firm-specific productivity process. Finally, we derive the TFP index from the residuals obtained in the process.

For TFP to serve as a viable channel of influence, it should not only relate to the HHI, but also to workers' wages. Consequently, the integration of TFP as a covariate in regressions linking workers' wages to HHI should result in a reduction in the coefficient size on HHI. To probe this mechanism, we employ an approach analogous to the one outlined by Alesina and Zhuravskaya (2011), by assessing how controlling for the potential channel affects the HHI coefficient.

[Insert Table 5 here]

Table 5 presents these results, with Panel A showing OLS estimates and Panel B displaying IV outcomes. In the first column, Models (1) and (4), we begin by regressing TFP on the logarithm of HHI. Both models indicate that the coefficients are negative and statistically significant, suggesting that a decrease in China's employer concentration (or an increase in labor market competition) fosters higher TFP. Subsequently, we compare Columns 2 and 3, which underline the distinct effects of HHI on wages, both with and without controlling for TFP. The coefficients diminish in absolute value in both regressions, with the OLS coefficient of HHI becoming insignificant once TFP is included as a covariate. Furthermore, in line with the existing literature, the coefficients of TFP are positive and statistically significant. The effect of labor market concentration on wages persists as negative and substantial, even after accounting for TFP using IV methodology. This suggests that the reduction in monopsony power significantly contributes to the wage growth of workers in China. In conclusion, when considered collectively, these results suggest that TFP is an important channel linking employer

concentration to workers' wages.

7. Conclusion

We use a nationally representative firm-level dataset from the NBS of China to examine the relationship between labor market concentration and wages. In contrast to existing studies that report increased labor market concentration, the data from China presents a declining trend in labor market concentration during the period 1998–2013. Our findings offer consistent and significant evidence, demonstrating a negative association between wages and labor market concentration. In other words, China's experience provides compelling evidence that increased competition in the labor market indeed promotes wage growth.

Our research presents several limitations and suggests various areas that merit further exploration. To begin with, the CASIF dataset predominantly includes "above scale" firms, thereby excluding small and medium enterprises (SMEs) from our analytical purview. Acknowledging that a significant portion of private firms constitutes SMEs, it can be deduced that competition within local Chinese labor markets is likely more intense than what our study reflects. This could potentially exert a greater impact on wage dynamics. Furthermore, employer concentration may have a distributive effect on workers with diverse skill sets, potentially amplifying wage inequality. Our dataset, however, only provides wage information at the firm level, which prevents us from accessing individual worker information. Consequently, future research could benefit from utilizing employee-employer matched data to delve deeper into this issue.

Institutional change in the industry was central to China's transition from a planned to a market economy. We provide evidence on the wage growth in China in recent decades and emphasize the importance of such an institutional change in the role of labor market monopsony

power in policy evaluations. Competition, restructuring, and privatization, which radically altered China's industrial landscape over the past 40 years, especially post mid-1990s, culminated in a more competitive labor market. This transition has had an unassailably positive impact on the wages of Chinese workers.

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Table 1 Summary Statistics

	Mean	STD
Panel A		
Wages (1,000 *yuan*)	6,953.9	74,420.97
Employment (person)	299.5	1,350.08
Average wage (1,000 *yuan*)	17.3	18.78
Labor productivity (1,000 *yuan*)	620.9	23,981.46
Panel B: Prefecture-two-digit Chinese SIC-year		
HHI	.357	.333
HHI=1	.139	.346
ln(employment)	7.466	1.865
Panel C: Prefecture-four-digit Chinese SIC-year		
HHI	.594	.370
HHI=1	.377	.485
ln(employment)	6.028	1.619
Panel D: County-two-digit Chinese SIC-year		
HHI	.576	.368
HHI=1	.351	.477
ln(employment)	6.144	1.608
Panel E: County-four-digit Chinese SIC-year		
HHI	.732	.352
HHI=1	.572	.495
ln(employment)	5.456	1.412

Note: Wages have been deflated to the price level in year 2000.

Source: Authors' calculations based on the.Chinese Annual Survey of Industrial Firms (CASIF), 1998–2013.

Table 2 Estimates of Labor Market Concentration on Wages

Dependent variable: log of average wages					
	A: Panel OLS				
Regressor (in log)	(1)	(2)	(3)	(4)	(5)
HHI	-.101***	-.094***	-.037***	-.033***	-.033***
	(.003)	(.003)	(.002)	(.002)	(.002)
Employment	-.107***	-.104***	-.045***	-.042***	-.049***
	(.002)	(.002)	(.001)	(.001)	(.001)
Productivity			.341***	.341***	.351***
			(.001)	(.001)	(.001)
N of Obs.	2,207,926	2,207,888	2,199,026	2,198,988	2,198,522
N of Firms	493,056	493,054	490,894	490,892	490,808
Adj. *R*-squared	.692	.698	.751	.755	.784
	B: Panel IV				
	(6)	(7)	(8)	(9)	(10)
HHI	-.255***	-.272***	-.073***	-.102***	-.107***
	(.015)	(.006)	(.012)	(.006)	(.005)
Employment	-.166***	-.166***	-.060***	-.067***	-.074***
	(.006)	(.003)	(.005)	(.002)	(.002)
Productivity			.339***	.337***	.348***
			(.002)	(.001)	(.001)
First-stage results					
Dependent var.:ln(HHI)					
Avg. ln(1/N) in other mkts	.634***	-31.64***	.611***	-30.8***	-29.95***
	(.019)	(.937)	(.019)	(.925)	(.849)
Employment	-.353***	-.278***	-.362***	-.287***	-.271***
	(.003)	(.004)	(.003)	(.004)	(.003)
Productivity			-.053***	-.040***	-.034***
			(.001)	(.001)	(.001)
First-stage *F*-statistics	1097.6	1140.7	1013.8	1108.5	1245.2
N of Obs.	2,207,916	2,207,888	2,199,016	2,198,988	2,198,522
N of Firms	493,055	493,054	490,893	490,892	490,808
Year fixed effects	Y		Y		
Firm fixed effects	Y	Y	Y	Y	Y
Industry-by-year fixed effects		Y		Y	Y
Region-by-year fixed effects					Y

Note: Local labor market is defined at county by four-digit Chinese SIC. Robust standard errors clustered at the market level are in parentheses. All regressors are in natural log. The first-stage F-statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets, and *N* is the number of firms in the market.

* p< .1, ** p< .05, *** p< .01.

Table 3 Results of Plausibly Exogenous Instrument Regressions

Dependent variable: log of average wages					
	Conley et al. (2012) method for β's bounds				
	(1)	(2)	(3)	(4)	(5)
Bounds for β of HHI					
Upper bound	.035	.020	.034	.015	.015
Lower bound	-.268	-.093	-.271	-.109	-.112
Regressors (in log)					
$\hat{\gamma}$	-.162***	-.045***	-.861***	-.313***	-.320***
	(.008)	(.007)	(.031)	(.020)	(.017)
Employment	-.076***	-.033***	-.091***	-.037***	-.045***
	(.001)	(.001)	(.001)	(.001)	(.001)
Productivity		.343***		.341***	.351***
		(.001)		(.001)	(.001)
Year fixed effects	Y	Y			
Firm fixed effects	Y	Y	Y	Y	Y
Industry-by-year fixed effects			Y	Y	Y
Region-by-year fixed effects					Y
N of Obs.	2,207,916	2,199,016	2,207,888	2,198,988	2,198,522
N of Firms	493,055	490,893	493,054	490,892	490,808
Adj. *R*-squared	.602	.679	.610	.683	.717
γ_{max}	-.140	-.033	-.756	-.270	-.276
$(\gamma_{max}/\hat{\gamma}) * 100\%$	86%	73%	88%	86%	86%

Note: The bounds for β are obtained using Conley et al. (2012)'s union of confidence intervals method (UCI). γ_{max} is the value of the lower bound for γ that makes β insignificant. The ratio $\gamma_{max}/\hat{\gamma}$ suggests to what extent the direct effect of the instrument would have to be larger than the overall effect that renders the IV estimate insignificant. The instrumental variable is the average ln(1/N) in other markets, and N is the number of firms in the market. Robust standard errors clustered at the market level are in parentheses.

* p< .1, ** p< .05, *** p< .01.

Table 4 Estimates of Labor Market Concentration on Wages, by Ownership Type

Dependent variable: log of average wages												
	State-Owned Enterprises				Non-State-Owned Enterprises				Foreign-Invested Enterprises			
	Panel OLS		Panel IV		Panel OLS		Panel IV		Panel OLS		Panel IV	
Regressor (in log)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
HHI	-.101***	-.088***	-.242***	-.186***	-.032***	-.030***	-.049***	-.104***	-.028***	-.017***	-.017	-.065***
	(.007)	(.007)	(.032)	(.017)	(.003)	(.002)	(.014)	(.005)	(.004)	(.004)	(.018)	(.012)
Employment	-.115***	-.124***	-.149***	-.145***	-.039***	-.045***	-.045***	-.071***	-.028***	-.028***	-.023***	-.044***
	(.004)	(.005)	(.009)	(.006)	(.002)	(.001)	(.006)	(.002)	(.003)	(.003)	(.008)	(.005)
Productivity	.243***	.232***	.237***	.229***	.356***	.370***	.355***	.366***	.341***	.345***	.341***	.344***
	(.003)	(.004)	(.004)	(.004)	(.002)	(.001)	(.002)	(.002)	(.003)	(.003)	(.004)	(.004)
Year FE	Y		Y		Y		Y		Y		Y	
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry-year FE		Y		Y		Y		Y		Y		Y
Region-year FE		Y		Y		Y		Y		Y		Y
N of Obs.	200,677	196,210	200,674	196,210	1,695,312	1,693,958	1,695,305	1,693,958	237,722	233,051	237,722	233,051
N of Firms	44,793	44,232	44,792	44,232	406,143	405,920	406,142	405,920	49,578	48,668	49,578	48,668
Adj. *R*-squared	.846	.878			.730	.772			.739	.775		
First-stage *F*-stat.			534.88	461.24			668.45	953.12			562.13	738.59

Note: Local labor market is defined at county by four-digit Chinese SIC. Robust standard errors clustered at the market level are in parentheses. All regressors are in natural log. The first-stage F-statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets and N is the number of firms in the market. * p< .1, ** p< .05, *** p< .01.

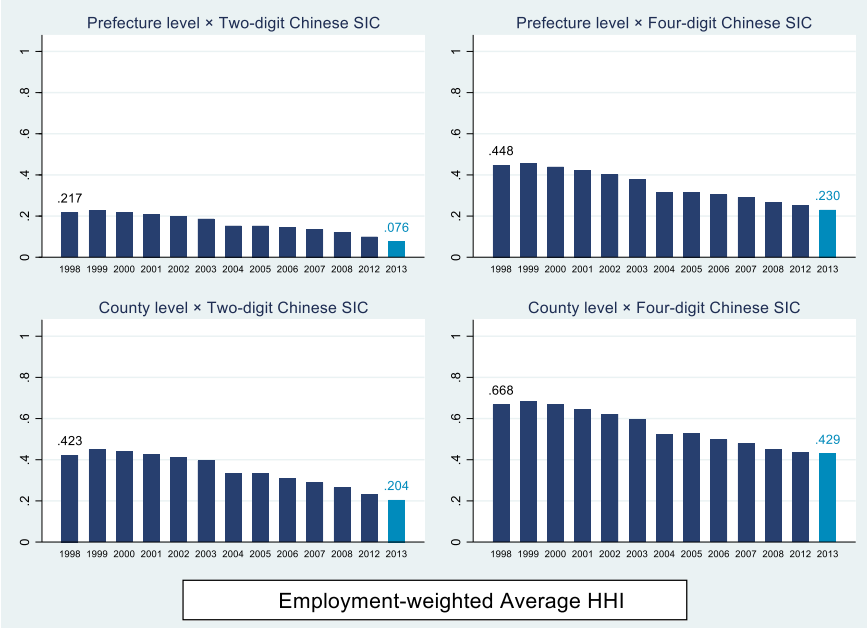
Table 5 Total Factor Productivity, Labor Market Competition, and Wages

	A: Panel OLS		
Dependent variable	TFP	ln(Avg. wages)	ln(Avg. wages)
Regressor	(1)	(2)	(3)
ln(HHI)	-.015***	-.004**	-.002
	(.004)	(.002)	(.002)
TFP			.072***
			(.001)
N of Obs.	1,716,746	1,716,746	1,716,746
N of Firms	398,949	398,949	398,949
Adj. *R*-squared	.773	.736	.741

	B: Panel IV		
Dependent variable	TFP	ln(Avg. wages)	ln(Avg. wages)
Regressor	(4)	(5)	(6)
ln(HHI)	-.047***	-.011***	-.008***
	(.007)	(.004)	(.004)
TFP			.072***
			(.001)
First-stage results			
Dependent var.:ln(HHI)			
Avg. ln(1/N) in other markets	-143.67***	-143.67***	-143.67***
	(5.44)	(5.44)	(5.44)
TFP			-.001
			(.001)
First-stage *F*-statistics	698.59	698.59	698.55
N of Obs.	1,716,746	1,716,746	1,716,746
N of Firms	398,949	398,949	398,949
Year fixed effects	Y	Y	Y
Industry-by-year fixed effects	Y	Y	Y
Region-by-year fixed effects	Y	Y	Y

Note: Local labor market is defined at county by four-digit Chinese SIC. Robust standard errors clustered at the market level are in parentheses. The first-stage *F*-statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets, and N is the number of firms in the market.
* p< .1, ** p< .05, *** p< .01.

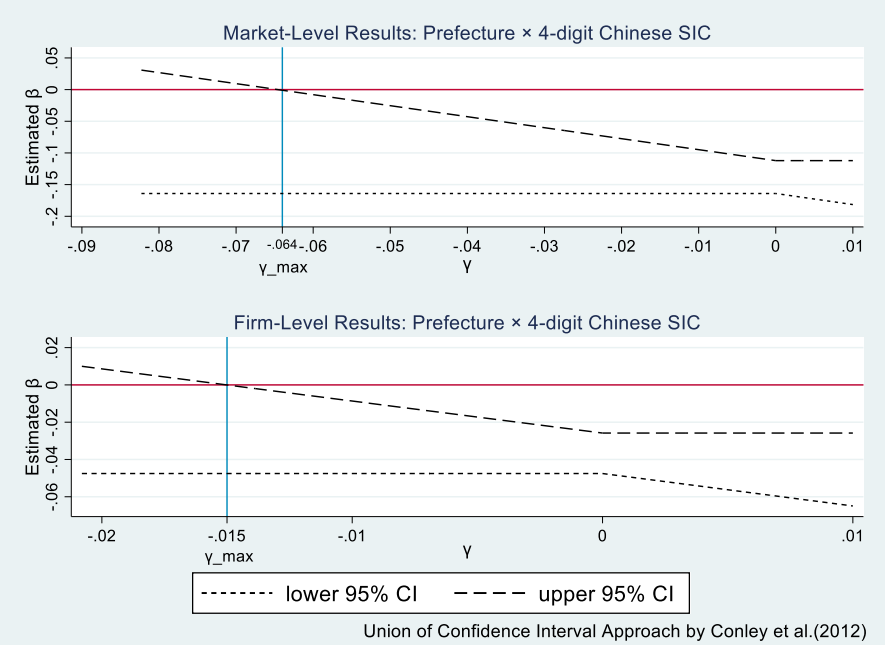
Figure 1 Trends in Average Local Labor Market Concentration, 1998–2013



Note: The average Herfindahl-Hirschman Index (HHI) is employment weighted. The indices are calculated by averaging across prefecture-two-digit industry-year, prefecture-four-digit industry-year, county-two-digit industry-year, and county-four-digit industry-year cells and using employment in the cell as the weight. Unweighted HHIs show the same trend and are shown in Online Appendix Figure 1. The information on employment or wages in 2009, 2010, and 2011 is unavailable.

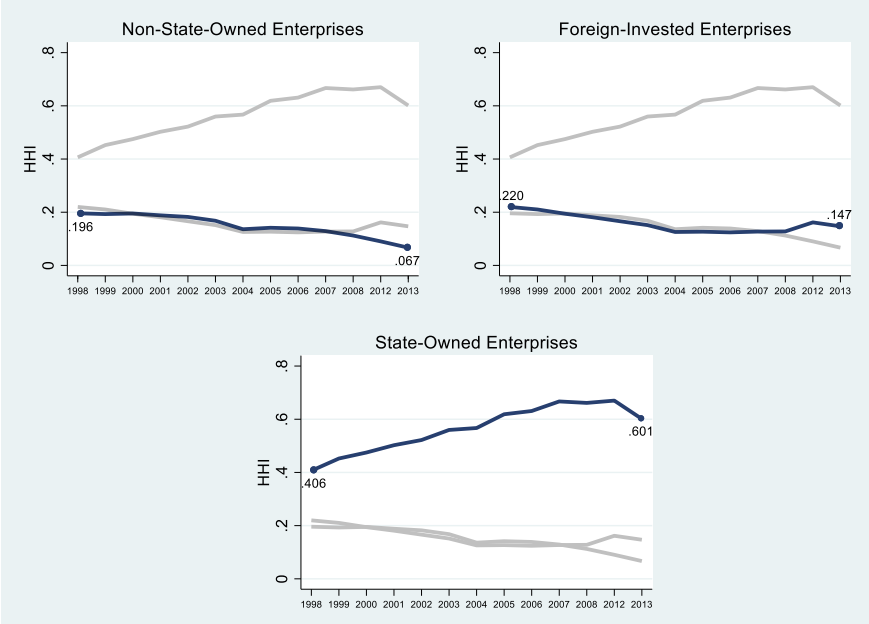
Source: Authors' elaborations based on the Chinese Annual Survey of Industrial Firms (CASIF), 1998–2013.

Figure 2 Estimated β by the Direct Effect of IV: Plausibly Exogenous Instrumental Regressions



Note: The market-level result is taken from model specification (6) in Online Appendix Table 3, and the firm-level result is taken from model specification (7) in Online Appendix Table 2.
Source: Authors' calculations based on the Chinese Annual Survey of Industrial Firms (CASIF).

Figure 3 Trends in Average Local Labor Market Concentration by Ownership Type, 1998–2013

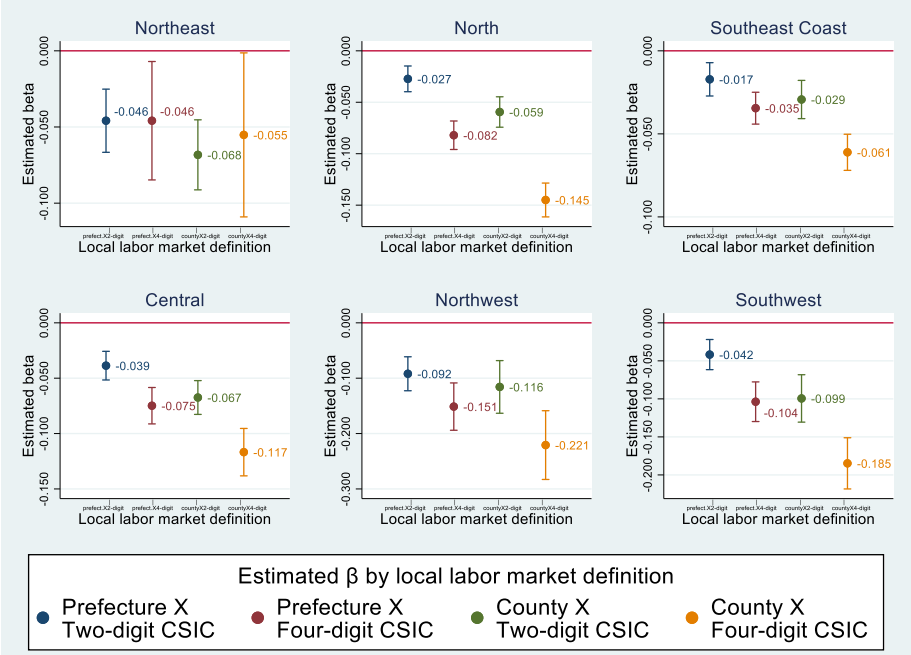


Note: The average Herfindahl-Hirschman Index (HHI) is employment weighted and is calculated by ownership type at the prefecture level and two-digit Chinese SIC codes. The computed HHI is averaged across prefecture-two-digit industry-year. The information on employment or wages in 2009, 2010, and 2011 is unavailable.
Source: Chinese Annual Survey of Industrial Firms (CASIF).

Figure 4 Industrial Regions in China

Note: We adopt the six industrial regions defined in Brandt et al. (2017). The map focuses on Mainland China only.
Source: Authors' own creation.

Figure 5 Estimates of Labor Market Concentration on Wages by Region



Note: Local labor market is defined at county by four-digit Chinese SIC. Estimated βs are from panel IV regressions that control for employment, worker productivity, firm fixed effects, industry-year fixed effects, and region-year fixed effects. Range bars are 95% confidence intervals.
Source: Authors' calculations.

Appendix A

Background: China's Economic Reform in the 1990s

A.1 The "Decision"

The economic reform that unfolded in China in the late 1970s marked a decisive juncture in the nation's history, with significant impacts that are still being felt today. The first phase of reform, initiated in 1978 and persisting through the 1980s, was a response to an array of economic and political challenges that China had been grappling with. The central objective of the reform was to address the difficulties encountered in the first three decades of the People's Republic of China (PRC), whilst encouraging greater openness and transitioning the country from a planned economy to a market-oriented system (Naughton, 2018).

In 1992, the Chinese economy found itself at a critical crossroads, amidst varying opinions on the direction the nation should take. After 1989, some economists and economic practitioners began to question the earlier "market-oriented" reforms, with a few even advocating a return to the planned economic system. Meanwhile, other economists maintained that "market-oriented" reforms should be upheld, with some proposing the implementation of a market economy system with macro-management (Zhang, 2012). This debate intensified in 1990 and 1991, with various articles expressing differing viewpoints published in newspapers and periodicals. This period of intense deliberation culminated in a pivotal turn of events on November 14, 1993, when the CCP Central Committee ratified a landmark legislation known as the "Decision on Certain Issues Concerning the Establishment of a Socialist Market Economy System," informally referred to as the "Decision." This resolution marked a watershed moment in China's economic history, serving as a strategic blueprint that decisively shifted the nation's economic orientation.

The "Decision" advanced an integrative model, combining the socialist ideology with market

economy principles. This hybrid approach aimed to instigate a system where the market played a "decisive role" in the allocation of resources, while the government retained a guiding function, thereby establishing what is often referred to as a "socialist market economy"—proposed by Jiang Zemin and endorsed by the Party Congress in October 1992 (as described in Section A.2). This resolution served as an official endorsement of market reforms that had been gradually implemented since the late 1970s. It encapsulated the strategic shift from a planned economy towards a market-oriented model that emphasized efficiency and competition, while maintaining state ownership of key industries.

The endorsement of this "Decision" had profound implications for China's economic trajectory, accelerating market reforms, and paving the way for remarkable economic growth and development. Its impact extended beyond economic spheres, fundamentally altering the labor market dynamics, driving wage growth, and transforming living standards for hundreds of millions of Chinese citizens. In the context of our study, the "Decision" forms a critical backdrop to understanding the evolving competitiveness of China's labor market and its consequential wage implications, thereby highlighting the importance of institutional changes in shaping labor market outcomes.

A.2 Legacy of the 1990s Economic Reform

In the 1990s, China's economic reform entered a new phase, as the government pursued a series of policy changes aimed at deepening and broadening the reform process. These policies built on the successes of the previous decade, but also addressed some of the challenges and limitations that had emerged. The 1990s economic reform had significant impacts on the country's business environment, particularly for private enterprises and SOEs. During this period, the government implemented policies to encourage the growth of private enterprises and

increase their role in the economy. Private companies were given greater freedom to operate, and were allowed to compete with SOEs in more sectors. As a result, the number of private enterprises in China grew rapidly, and they began to play an increasingly important role in driving economic growth.

At the same time, the government also implemented policies to reform the SOE sector, which had previously dominated the economy. The aim of the reform was to make SOEs more efficient and competitive, by introducing market-oriented mechanisms such as shareholding and allowing them to operate more independently. The SOE reform, however, was slower and more contentious than those for private enterprises, and many SOEs continued to face significant challenges.

One key policy change that impacted both private enterprises and SOEs was the establishment of a new legal framework for business. The Company Law, which was passed in 1993, provided a legal basis for the establishment and operation of companies in China. This law allowed for the creation of different types of companies, including private and state-owned, and helped to create a more level playing field for businesses of all types.

The reforms also had significant impacts on the relationship between private enterprises and SOEs. In some cases, private companies were able to acquire or partner with SOEs, which helped them to expand their operations and gain access to new markets. In other cases, however, SOEs were seen as dominant players in their respective sectors, and were able to use their influence to limit the growth of private companies.

Overall, the reform of the 1990s had a significant impact on China's business environment, by promoting greater competition and innovation and encouraging the growth of private enterprises. At the same time, the reform also sought to modernize and reform the state sector,

although these efforts were often slower and more contentious. The legacy of the reform can still be seen in China's business landscape today, with private enterprises playing an increasingly important role in the economy, while SOEs continue to be major players in many key sectors.

Appendix B

Robustness Analyses

B.1 Alternative Definitions of a Local Labor Market

Table B1 exhibits the outcomes using alternative definitions of a local labor market. The first column shows the results when using county as the geographical area coupled with a broader industry category; the second column replaces the definition with prefecture by four-digit Chinese SIC codes; the third column presents our most extensive local labor market definition that uses prefecture as the geographical area and two-digit Chinese SIC codes as the industry. Compared to four-digit Chinese SIC codes used in Section 4.1, these definitions involve larger geographic regions and more extensive industry categories, which reduces the HHI; hence, we anticipate smaller effects. The results indeed corroborate this hypothesis and reaffirm our principle finding that the decrease in employer concentration in China's labor market has contributed to higher wages for workers.

The first column in Table B1 portrays the OLS results using county by two-digit Chinese SIC codes as the local labor market definition in Panel A and the IV results in Panel B. Upon controlling for labor productivity, we discern that the OLS estimate is -0.005 and the IV estimates fall within the -0.030 to -0.061 range. The third column unveils results for our most comprehensive labor market definition, indicating that the OLS estimates are near zero and statistically insignificant, whereas the IV estimates range from -0.012 to -0.034, with the latter as our preferred model, demonstrating statistical significance at the 1% level.

[Insert Table B1 here]

Alternatively, the second column of Panel A in Table B1 displays the outcomes using prefecture by four-digit Chinese SIC codes as the local labor market and consistently evidences

that local employer concentration negatively correlates with wages. After controlling for firm-level labor productivity, we find the OLS estimate of $lnHHI$ to be approximately -0.010 or -0.011, and the IV-estimated elasticities fall between -0.036 and -0.061. With broader local market definitions, our preferred IV estimates—controlling for firm fixed effects, industry-year fixed effects, and region-year fixed effects—range from -0.012 to -0.061. Consequently, these results underscore the main finding in Section 4.3 that enhanced labor market competition leads to higher wages.

B.2 Estimations at the Market Level

To assess the robustness of our firm-level estimation results, and considering that the variation of local labor market concentration stems from the market level, we examine whether our findings remain consistent by estimating the following market-level equation:

$$lnW_{mt} = \beta lnHHI_{mt} + X'_{mt}\theta + \alpha_t + \mathcal{M}_m + \mathcal{R}_{R(m)t} + \phi_{I(m)t} + \varepsilon_{mt}.$$

Here, the dependent variable lnW_{mt} represents the natural logarithm of the average wage of all firms in local labor market m (a combination of region r and industry i) at year t. Geographic region r can be a prefecture or a county, while industry i is defined by either two-digit or four-digit Chinese SIC codes. The average wage of each local labor market is calculated using the mean wage of all firms, weighted by each firm's employment within the local market; thus, it represents the average wage earned by each worker in the local market. Our key variable of interest, $lnHHI_{mt}$, which measures local employer concentration, is the natural log of the HHI in market m in year t. We include year fixed effects α_t and market fixed effects $\mathcal{M}_m$ to mitigate potential issues arising from unobserved factors that are constant across markets but vary over time, or differ across markets but remain unchanging over time. To further alleviate such unobserved heterogeneity concerns, in alternative specifications, we successively include region-

year fixed effects $\mathcal{R}_{R(m)t}$ to account for changes in location-specific factors common to all firms within a region, and industry-year fixed effects $\phi_{I(m)t}$, where $R(m)$ and $I(m)$ are indicator functions such that market m is in region $R(m) = r$ and industry $I(m) = i$, to control for time-varying heterogeneity across industries. Moreover, we include, X'_{mt}, the log of total employment at the market-by-year level, to account for the size of the local labor market at the market-by-year level, and ε_{mt} is an error term. In line with our firm-level estimation, we use and report clustered standard errors at the market level as our primary results and apply different clustering at either the prefecture or the county level.

[Insert Table B2 here]

Table B2 exhibits the OLS and IV outcomes of the market-level panel data regressions using the identical local labor market definition (county by four-digit Chinese SIC codes) as in Section 4.3. The table consistently illustrates that lower local employer concentration seems to contribute to higher wages. Notably, when accounting for potential endogeneity issues by using the IV, the estimated effect becomes more pronounced.[24]

In Panel A, Model (1) controls for both year and market fixed effects, demonstrating that a 10% reduction in local employer concentration increases Chinese workers' wages by about 0.34%. Model (2) additionally controls for employment (an essential factor in wage determination), and we find that the wage effect for a 10% decrease in the HHI is 1.76%. Model (3) controls for employment, market fixed effects, and region-year fixed effects (i.e., county-year fixed effects to mitigate changes in local factors common to all markets in the same county) and demonstrates a wage effect of about 1.73%, similar to Model (2). Model (4) further includes

[24] The results under different local labor market definitions at the market level consistently show that lower employer concentration results in higher wages. These results are available in Online Appendix Table 4.

industry-year fixed effects to address concerns about time-varying unobserved confounders across industries and indicates that a 10% decrease in local employer concentration leads to a significant 1.63% increase in the wages of Chinese workers.

Panel B of Table B2 also displays the IV estimates along with the first-stage results and corroborates the OLS finding that lower local employer concentration results in higher wages, with the effects even more pronounced. The first-stage results of the four models all indicate that the IV is significant and highly relevant. Model (5), which uses the same specification as Model (1), produces an estimate of -0.064, statistically significant at the 1% level. Models (6) to (8) additionally control for employment and include the same fixed effects as Models (2) to (4), respectively, revealing a significant and larger effect—a 10% decrease in local employer concentration results in a wage increase between 2.45% and 3.05%, with 2.61% in Model (8) being our preferred effect.

In summary, the market-level estimation results in Table B2 suggest that our finding of reduced employer concentration leading to higher wages for Chinese workers is robust to different industry definitions and numerous specifications. These findings thus provide additional evidence of the negative relationship between labor market monopsony power and wages, as observed in recent studies.

B.3 Excluding Perfect Monopsony Markets (HHI = 1)

The summary statistics in Table 1 reveal that a few of the local labor markets consist of only one firm, with percentages ranging from 14% for our broadest definition (prefecture by two-digit Chinese SIC codes) to 57% for our narrowest definition (county by four-digit Chinese SIC codes). To test the sensitivity of our results, we exclude markets where the HHI equals one and present the OLS and IV estimates using county-four digit Chinese SIC as the local market at the

firm level in Table B3, with alternative definitions results available in Online Appendix Table 5 and those at the market level in Online Appendix Table 6.

[Insert Table B3 here]

The OLS results in Panel A, which control for employment, labor productivity, and various combinations of fixed effects, exhibit estimates that are negative and statistically significant, ranging from -0.05 to -0.10. For the IV results in Panel B, Model (3) shows no effect. However, for our preferred specification, which controls for employment, labor productivity, firm fixed effects, industry-year fixed effects, and region-year fixed effects, the results reveal that the IV estimates are negative and significant at the 1% level—a 10% decrease in employer concentration results in a 0.49% increase in wages. In summary, after excluding markets with monopsony, our key finding—that decreased labor market concentration leads to higher wages for Chinese workers—remains robust.

B.4 Controlling for National-level Employer Concentration

As outlined in Section 4.2, the rise in China's labor productivity throughout our analysis period led to a positive correlation between product market concentration and local labor market concentration. Benmelech et al. (2022) suggest that the observed negative relationship between local labor market concentration and wages might merely mirror the negative association between product market concentration and labor shares, as highlighted by Autor et al. (2020).

To address this concern, in addition to our IV strategy, we employ the method used by Benmelech et al. (2022) to construct a national employer concentration measure as a proxy for national-level product market competition, incorporating the national-level HHI as a control in Equation (1). Consistent with the findings of Benmelech et al. (2022), Table B4 demonstrates that the estimated coefficients of the national-level HHI are positive and statistically significant.

Most notably, the estimates of the local labor market concentration HHI are uniformly negative (with only a few insignificant exceptions) and slightly larger than those of the panel OLS in Table 2. Thus, the results presented in Table B4 align with our findings and prove robust to the inclusion of national-level employer concentration.[25]

[Insert Table B4 here]

B.5 Excluding the Great Recession Period

The Global Financial Crisis of 2008 (also known as the Great Recession) had a significant impact on the Chinese economy, leading to bankruptcy and the closure of many firms, predominantly small and medium enterprises. These closures resulted in an increase in employer concentration in certain local labor markets post-2008, especially in highly disaggregated industry classifications.[26]

The economic recession exerted downward pressure on wages and was correlated with the HHI, which raises the possibility of endogeneity in the results. However, our OLS and IV regressions, which include year fixed effects or industry-year and region-year fixed effects, should mitigate this concern. To test the sensitivity of the results, we examine the relationship between wages and employer concentration over the subsample period of 1998–2007. The firm-level results using county-four-digit Chinese SIC as the local labor market are presented in Table B5, with alternative definitions of firm-level estimates available in Online Appendix Table 8 and those of market-level estimates reported in Online Appendix Table 9.

[25] The results under different local labor market definitions also consistently show that lower employer concentration results in higher wages. These results are available in Online Appendix Table 7.

[26] China experienced a significant drop in GDP growth rate due to the onset of the economic crisis. In 2008, the quarterly growth rate declined from an initial high of 10.6% in the first quarter, to 10.1% in the second, 9% in the third, and 6.3% in the fourth. In the first quarter of 2009, the growth rate fell further to 6.1%, a decrease of 4.5 percentage points from the same period in 2008. This economic downturn had substantial consequences for businesses, resulting in the closure of 670,000 small companies in China by the end of 2008, as reported by Schüller and Schüler-Zhou (2009). Furthermore, data from the Department of Small and Medium Enterprises of the National Development and Reform Commission reveals that an additional 60,000 small and medium firms shuttered in the first quarter of 2009 (Li 2009).

[Insert Table B5 here]

These results are consistent with our primary finding: a decrease in employer concentration results in higher wages. Panel OLS results display estimates that are uniformly negative and statistically significant at the 1% level, ranging from -0.023 to -0.055. Similarly, panel IV results indicate a stronger effect, with estimates falling between -0.055 and -0.152. Essentially, the analysis of the subsample period confirms our main findings, albeit with a slightly smaller effect, suggesting that increased labor market competition results in higher wages for Chinese workers.

B.6 Using a Balanced Sample of Firms

As noted in Section 3, the CASIF data encompasses all state-owned industrial firms in the country and "above-scale" non-state-owned industrial firms, with a one-time increase in the threshold from 5 million yuan to 20 million yuan in 2011. The increased threshold could introduce either an upward or downward bias in measures of labor market concentration, depending on how the adjustment of the threshold compares with the increase in sales values. However, since our models incorporate various fixed effects, such as year fixed effects, year-by-industry fixed effects, or year-by-region fixed effects, it mitigates the potential bias on our wage effect estimates. Besides, the above analyses using the subsample period of 1998-2007 also address the concern associated with the change in the threshold. To further address this concern regarding sample selection, we use a balanced sample of firms spanning 1998 to 2007 and estimate similar firm-level regressions. The results presented in Table B6 remain similar.

[Insert Table B6 here]

B.7 Alternative Definition of the Dependent Variable

The main dependent variable used is average worker wages, i.e. employee compensation, which contains employee earnings (calculated as wage rate multiplied by units of time worked)

and benefits such as pension, insurance, and housing subsidies. Other factors like changes in non-wage amenities and pension contributions, could influence employee labor costs. Although our dataset primarily captures direct compensation and statutory benefits and lacks detailed data on amenities or voluntary employer contributions, it contains information on total labor costs of the firm. To address potential concerns about the robustness of our results given these compensation components, we opt for average employer labor costs as an alternative dependent variable in our baseline firm-level regressions. These costs, derived from available data, encompass the disparity between total employer expenditures and the wages employees receive. In Table B7, the OLS results displayed in Panel A and the IV estimates shown in Panel B are consistent with our main findings.

One limitation of our data is that it does not include detailed records on full-time versus part-time status or variations in working hours, which may shift worker wages as well. With more detailed data, future research could explore these aspects to gain a deeper understanding of the wage structure.

[Insert Table B7 here]

B.8 Expanding the Instrumental Variable Set

To enhance the information extracted from our instrumental variable, we incorporate a lagged term of our primary instrumental variable into the instrumental variable set and proceed with the estimation of the baseline firm-level regressions using the Generalized Method of Moments (GMM). Including both the contemporaneous and lagged terms of the instrumental variable could capture the dynamic relationships between labor market concentration and wages. It could further account for potential serial correlation in the error term and improve the efficiency of the estimates. The results presented in Table B8 indicated that expanding the instrumental variable

set does not substantially affect the baseline results.

[Insert Table B8 here]

B.9 Alternative Model Specifications

Though similar to Benmelech et al. (2022), our empirical strategy estimates the log-linear relationship between labor market concentration and wages. To ensure that our model appropriately captures the underlying relationships in the data, particularly in light of potential non-linear effects, we subsequentially include polynomial terms of the log of HHI—squared and cubic—to investigate the non-linear relationships. The results, presented in Table B9, indicate a significant relationship when the squared term of log HHI is included, suggesting a non-linear component in the effects of HHI on wages. The addition of the cubic term, however, does not yield significant results, indicating that the quadratic model may adequately capture the complexity of the data in this context. Overall, it acknowledges some evidence of non-linearity while affirming that our original log-linear specification effectively captures the primary relationships.

[Insert Table B9 here]

Table B1 Robustness Analysis 1: Alternative Definitions of the Local Labor Market

Dependent variable: log of average wages

	A: Panel OLS					
	Local labor market					
	County×2-digit Chinese SIC		Prefecture×4-digit Chinese SIC		Prefecture×2-digit Chinese SIC	
Regressor (in log)	(1)	(2)	(3)	(4)	(5)	(6)
HHI	-.005*	-.005***	-.011***	-.010***	.004	-.000
	(.003)	(.002)	(.002)	(.001)	(.003)	(.002)
Employment	-.016***	-.026***	-.023***	-.024***	-.011***	-.013***
	(.002)	(.001)	(.001)	(.001)	(.002)	(.002)
Productivity	.346***	.357***	.340***	.344***	.342***	.347***
	(.002)	(.002)	(.001)	(.001)	(.002)	(.002)
N of Obs.	2,199,026	2,198,560	2,982,049	2,982,031	2,982,049	2,982,044
N of Firms	490,894	490,810	645,119	645,118	645,119	645,119
Adj. *R*-squared	.750	.781	.752	.767	.752	.765
	B: Panel IV					
	Local labor market					
	County×2-digit Chinese SIC		Prefecture×4-digit Chinese SIC		Prefecture×2-digit Chinese SIC	
	(7)	(8)	(9)	(10)	(11)	(12)
HHI	-.030***	-.061***	-.036***	-.061***	-.012	-.034***
	(.011)	(.004)	(.006)	(.004)	(.008)	(.003)
Employment	-.003	-.041***	-.034***	-.041***	-.018***	-.020***
	(.004)	(.002)	(.003)	(.002)	(.004)	(.002)
Productivity	.347***	.357***	.340***	.343***	.341***	.347***
	(.002)	(.002)	(.001)	(.001)	(.002)	(.002)
First-stage results						
Dependent var.:ln(HHI)						
Avg. ln(1/N) other mkts	.764***	-267.9***	.580***	-24.66***	.560***	-178.0***
	(.030)	(20.94)	(.018)	(.91)	(.020)	(8.73)
Employment	-.329***	-.098***	-.356***	-.200***	-.311***	-.206***
	(.007)	(.013)	(.005)	(.006)	(.013)	(.023)
Productivity	-.028***	-.002**	-.030***	-.011***	-.021***	-.005***
	(.002)	(.001)	(.001)	(.001)	(.002)	(.001)
First-stage *F*-statistics	654.6	163.7	1089.1	733.5	773.4	415.1
N of Obs.	2,199,026	2,198,560	2,982,034	2,982,027	2,982,049	2,982,044
N of Firms	490,894	490,810	645,118	645,118	645,119	645,119
Year fixed effects	Y		Y		Y	
Firm fixed effects	Y	Y	Y	Y	Y	Y
Industry-by-year fixed effects		Y		Y		Y
Region-by-year fixed effects		Y		Y		Y

Note: Robust standard errors clustered at the market level are in parentheses. All regressors are in the natural log. The first-stage *F*-statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets, and *N* is the number of firms in the market. * p< .1, ** p< .05, *** p< .01.

Table B2 Robustness Analysis 2: Market Level Estimates

Dependent variable: log of average wages				
	A: Panel OLS			
Regressor (in log)	(1)	(2)	(3)	(4)
HHI	-.034***	-.176***	-.173***	-.163***
	(.002)	(.003)	(.003)	(.003)
Employment		-.135***	-.140***	-.132***
		(.002)	(.002)	(.002)
N of Obs.	857,283	857,283	856,874	856,817
N of Markets	144,285	144,285	144,245	144,236
Adj. *R*-squared	.686	.696	.737	.745
	B: Panel IV			
	(5)	(6)	(7)	(8)
HHI	-.064***	-.305***	-.245***	-.261***
	(.013)	(.021)	(.019)	(.006)
Employment		-.165***	-.156***	-.154***
		(.005)	(.005)	(.002)
First-stage results				
Dependent var.:ln(HHI)				
Avg. ln(1/N) in other markets	.863***	.580***	.588***	-43.8***
	(.013)	(.011)	(.010)	(1.472)
Employment		-.225***	-.217***	-.156***
		(.001)	(.001)	(.002)
First-stage *F*-statistics	4417.30	2873.41	3171.41	886.27
N of Obs.	857,277	857,277	856,868	856,817
N of Markets	144,283	144,283	144,243	144,236
Year fixed effects	Y	Y		
Market fixed effects	Y	Y	Y	Y
Region-by-year fixed effects			Y	Y
Industry-by-year fixed effects				Y

Note: Local labor market is defined at county by four-digit Chinese SIC. Robust standard errors clustered at the market level are in parentheses. All regressors are in natural log. The first-stage *F*-statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets, and *N* is the number of firms in the market.

* p< .1, ** p< .05, *** p< .01.

Table B3 Robustness Analysis 3: Excluding Perfect Monopsony Markets (HHI = 1)

Dependent variable: log of average wages				
	Panel OLS		Panel IV	
Regressor (in log)	(1)	(2)	(3)	(4)
HHI	-.010***	-.005***	.000	-.049***
	(.003)	(.002)	(.017)	(.005)
Employment	-.019***	-.023***	-.015**	-.037***
	(.002)	(.001)	(.007)	(.002)
Productivity	.354***	.368***	.355***	.367***
	(.002)	(.002)	(.002)	(.002)
First-stage results				
Dependent var.:ln(HHI)				
Avg. ln(1/N) in other markets			.649***	-47.57***
			(.028)	(1.742)
Employment			-.312***	-.209***
			(.005)	(.006)
Productivity			-.023***	-.008***
			(.002)	(.001)
First-stage *F*-statistics			804.23	649.43
N of Obs.	1,648,798	1,648,492	1,648,796	1,648,492
N of Firms	388,995	388,933	388,994	388,933
Adj. *R*-squared	.744	.781		
Year fixed effects	Y		Y	
Firm fixed effects	Y	Y	Y	Y
Industry-by-year fixed effects		Y		Y
Region-by-year fixed effects		Y		Y

Note: Local labor market is defined at county by four-digit Chinese SIC. Robust standard errors clustered at the market level are in parentheses. All regressors are in natural log. The first-stage *F*-statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets, and *N* is the number of firms in the market.

* p< .1, ** p< .05, *** p< .01.

Table B4 Robustness Analysis 4: Controlling for National-Level Employer Concentration

Dependent variable: log of average wages					
Regressors (in log)	(1)	(2)	(3)	(4)	(5)
HHI	-.102***	-.100***	-.039***	-.037***	-.037***
	(.006)	(.006)	(.004)	(.003)	(.003)
Employment	-.107***	-.111***	-.045***	-.047***	-.052***
	(.005)	(.005)	(.003)	(.003)	(.003)
National-level HHI	.006***	.024***	.006***	.018***	.015***
	(.002)	(.003)	(.001)	(.002)	(.002)
Productivity			.341***	.341***	.352***
			(.004)	(.003)	(.003)
Year fixed effects	Y	Y	Y	Y	
Firm fixed effects	Y	Y	Y	Y	Y
Industry fixed effects		Y		Y	Y
Region-by-year fixed effects					Y
N of Obs.	2,207,926	2,207,926	2,199,026	2,199,026	2,198,560
N of Firms	493,056	493,056	490,894	490,894	490,810
Adj. *R*-squared	.692	.693	.751	.751	.781

Note: Local labor market is defined at county by four-digit Chinese SIC. Robust standard errors clustered at the market level are in parentheses. All regressors are in natural log.
* p< .1, ** p< .05, *** p< .01.

Table B5 Robustness Analysis 5: Excluding the Great Recession Period

Dependent variable: log of average wages					
	A: Panel OLS				
Regressor (in log)	(1)	(2)	(3)	(4)	(5)
HHI	-.055***	-.055***	-.023***	-.024***	-.027***
	(.003)	(.003)	(.002)	(.002)	(.002)
Employment	-.057***	-.062***	-.026***	-.029***	-.033***
	(.002)	(.002)	(.001)	(.001)	(.001)
Productivity			.234***	.233***	.237***
			(.002)	(.002)	(.001)
N of Obs.	1,426,693	1,426,659	1,421,072	1,421,038	1,420,764
N of Firms	329,925	329,924	328,835	328,834	328,808
Adj. *R*-squared	.722	.726	.749	.752	.776
	B: Panel IV				
	(6)	(7)	(8)	(9)	(10)
HHI	-.135***	-.152***	-.055***	-.067***	-.072***
	(.015)	(.006)	(.013)	(.006)	(.005)
Employment	-.085***	-.092***	-.037***	-.043***	-.047***
	(.005)	(.003)	(.005)	(.002)	(.002)
Productivity			.232***	.232***	.236***
			(.002)	(.002)	(.001)
First-stage results					
Dependent var.:ln(HHI)					
Avg. ln(1/N) in other mkts	.650***	-29.47***	.633***	-28.9***	-28.10***
	(.021)	(.958)	(.021)	(.950)	(.863)
Employment	-.326***	-.246***	-.335***	-.254***	-.236***
	(.004)	(.004)	(.004)	(.004)	(.004)
Productivity			-.041***	-.031***	-.026***
			(.001)	(.001)	(.001)
First-stage *F*-statistics	994.11	945.72	947.39	924.58	1,061.1
N of Obs.	1,426,683	1,426,659	1,421,062	1,421,038	1,420,764
N of Firms	329,924	329,924	328,834	328,834	328,808
Year fixed effects	Y		Y		
Firm fixed effects	Y	Y	Y	Y	Y
Industry-year fixed effects		Y		Y	Y
Region-year fixed effects					Y

Note: Local labor market is defined at county by four-digit Chinese SIC. Robust standard errors clustered at the market level are in parentheses. All regressors are in natural log. The first-stage F-statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets, and *N* is the number of firms in the market.

* p< .1, ** p< .05, *** p< .01.

Table B6 Robustness Analysis 6: Using a Balanced Sample of Firms

Dependent variable: log of average wages					
	A: Panel OLS				
Regressor (in log)	(1)	(2)	(3)	(4)	(5)
HHI	-.043***	-.046***	-.017***	-.019***	-.021***
	(.005)	(.004)	(.004)	(.004)	(.003)
Employment	-.052***	-.057***	-.022***	-.026***	-.027***
	(.003)	(.003)	(.003)	(.003)	(.003)
Productivity			.236***	.239***	.243***
			(.004)	(.004)	(.004)
N of Obs.	184,658	184,457	184,607	184,405	182,675
N of Firms	18,467	18,462	18,467	18,462	18,304
Adj. *R*-squared	.701	.715	.730	.741	.773
	B: Panel IV				
	(6)	(7)	(8)	(9)	(10)
HHI	-.132***	-.135***	-.083***	-.068***	-.061***
	(.024)	(.010)	(.021)	(.010)	(.009)
Employment	-.089***	-.090***	-.049***	-.045***	-.041***
	(.010)	(.005)	(.009)	(.005)	(.004)
Productivity			.232***	.236***	.241***
			(.004)	(.004)	(.004)
First-stage results					
Dependent var.:ln(HHI)					
Avg. ln(1/N) in other mkts	.653***	-32.694***	.645***	-32.303***	-31.994***
	(.029)	(1.429)	(.029)	(1.413)	(1.176)
Employment	-.378***	-.281***	-.383***	-.286***	-.262***
	(.006)	(.007)	(.006)	(.007)	(.006)
Productivity			-.054***	-.044***	-.041***
			(.004)	(.003)	(.003)
First-stage *F*-statistics	497.96	523.79	488.57	522.67	739.74
N of Obs.	184,657	184,457	184,606	184,405	182,675
N of Firms	18,467	18,462	18,467	18,462	18,304
Year fixed effects	Y		Y		
Firm fixed effects	Y	Y	Y	Y	Y
Industry-year fixed effects		Y		Y	Y
Region-year fixed effects					Y

Note: Local labor market is defined at county by four-digit Chinese SIC. Robust standard errors clustered at the market level are in parentheses. All regressors are in natural log. The first-stage F-statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets, and *N* is the number of firms in the market.

* p< .1, ** p< .05, *** p< .01.

Table B7 Robustness Analysis 7: Alternative Definition of the Dependent Variable

Dependent variable: log of average labor costs					
	A: Panel OLS				
Regressor (in log)	(1)	(2)	(3)	(4)	(5)
HHI	-.050***	-.050***	-.021***	-.021***	-.022***
	(.003)	(.002)	(.002)	(.002)	(.001)
Employment	-.042***	-.045***	-.014***	-.016***	-.024***
	(.001)	(.001)	(.001)	(.001)	(.001)
Productivity			.230***	.229***	.232***
			(.001)	(.001)	(.001)
N of Obs.	1,684,670	1,684,636	1,678,819	1,678,785	1,678,488
	372,012	372,011	370,911	370,910	370,879
Adj. *R*-squared	.730	.734	.755	.758	.789
	B: Panel IV				
	(6)	(7)	(8)	(9)	(10)
HHI	-.125***	-.128***	-.042***	-.045***	-.055***
	(.013)	(.006)	(.012)	(.005)	(.005)
Employment	-.070***	-.071***	-.022***	-.024***	-.034***
	(.005)	(.002)	(.004)	(.002)	(.002)
Productivity			.229***	.228***	.231***
			(.002)	(.001)	(.001)
First-stage results					
Dependent var.:ln(HHI)					
Avg. ln(1/N) in other mkts	.654***	-30.308***	.638***	-29.723***	-29.051***
	(.019)	(.971)	(.019)	(.963)	(.885)
Employment	-.337***	-.257***	-.345***	-.265***	-.248***
	(.004)	(.004)	(.004)	(.004)	(.004)
Productivity			-.041***	-.031***	-.027***
			(.001)	(.001)	(.001)
First-stage *F*-statistics	1,218.70	974.25	1,156.56	952.26	1,077.75
N of Obs.	1,684,660	1,684,636	1,678,809	1,678,785	1,678,488
	372,011	372,011	370,910	370,910	370,879
Year fixed effects	Y		Y		
Firm fixed effects	Y	Y	Y	Y	Y
Industry-year fixed effects		Y		Y	Y
Region-year fixed effects					Y

Note: Local labor market is defined at county by four-digit Chinese SIC. Robust standard errors clustered at the market level are in parentheses. All regressors are in natural log. The first-stage F-statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets, and *N* is the number of firms in the market.

* p< .1, ** p< .05, *** p< .01.

Table B8 Robustness Analysis 8: Expanding the Instrumental Variable Set

Dependent variable: log of average wages					
	GMM				
Regressor (in log)	(1)	(2)	(3)	(4)	(5)
HHI	-.249***	-.261***	-.066***	-.096***	-.101***
	(.015)	(.007)	(.012)	(.006)	(.005)
Employment	-.166***	-.162***	-.056***	-.063***	-.070***
	(.006)	(.003)	(.005)	(.002)	(.002)
Productivity			.345***	.343***	.354***
			(.002)	(.002)	(.001)
First-stage results					
Dependent var.:ln(HHI)					
Avg. ln(1/*N*) in other mkts	.481***	-36.101***	.466***	-35.257***	-34.258***
	(.030)	(1.100)	(.030)	(1.089)	(1.011)
Lag. Avg. ln(1/*N*) in other mkts	.209***	0.033	.200***	.012	.036
	(.029)	(.033)	(.028)	(.033)	(.031)
Employment	-.353***	-.271***	-.363***	-.280***	-.264**
	(.004)	(.004)	(.004)	(.004)	(.004)
Productivity			-.052***	-.038***	-.031***
			(.001)	(.001)	(.001)
First-stage *F*-statistics	524.26	545.48	486.32	533.48	591.59
N of Obs.	1,936,607	1,936,554	1,929,550	1,929,497	1,929,084
N of Firms	450,517	450,510	448,660	448,653	448,597
Year fixed effects	Y		Y		
Firm fixed effects	Y	Y	Y	Y	Y
Industry-year fixed effects		Y		Y	Y
Region-year fixed effects					Y

Note: Local labor market is defined at county by four-digit Chinese SIC. Robust standard errors clustered at the market level are in parentheses. All regressors are in natural log. The first-stage F-statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets, and *N* is the number of firms in the market.

* p< .1, ** p< .05, *** p< .01.

Table B9 Robustness Analysis 9: Alternative Model Specifications

Dependent variable: log of average wages Regressors (in log)	(1)	(2)	(3)	(4)
HHI	.018	.018*	.063	-.072
	(.020)	(.010)	(.145)	(.059)
$(HHI)^2$	-.004***	-.003***	-.010	.009
	(.001)	(.001)	(.020)	(.008)
$(HHI)^3$			.000	-.001
			(.001)	(.000)
Employment	-.046***	-.049***	-.046***	-.050***
	(.001)	(.001)	(.001)	(.001)
Productivity	.341***	.351***	.341***	.351***
	(.001)	(.001)	(.001)	(.001)
N of Obs.	2,199,026	2,198,522	2,199,026	2,198,522
N of Firms	490,894	490,808	490,894	490,808
Adj. *R*-squared	.751	.784	.751	.784
Year fixed effects	Y		Y	
Firm fixed effects	Y	Y	Y	Y
Region-by-year fixed effects		Y		Y
Industry-by-year fixed effects		Y		Y

Note: Local labor market is defined at county by four-digit Chinese SIC. Robust standard errors clustered at the market level are in parentheses. All regressors are in natural log.
* p< .1, ** p< .05, *** p< .01.

Appendix C

Constructing the TFP Measure

To estimate the firm-level TFP measure, we consider a firm with a Cobb-Douglas production function,

$$Y_{ft} = A_{ft} L_{ft}^{\alpha_l} K_{ft}^{\alpha_k} \tag{1}$$

Where Y_{ft} is output for firm f at year t, as a function of labor, L_{ft}, and capital, K_{ft}. A_{ft} is the TFP of the firm, which could be represented by the baseline TFP, A_{f0}, and the growth rate, $ln\gamma$, such that,

$$A_{ft} = A_{f0}\gamma^t = e^{(ln\gamma)t} A_{f0} \tag{2}$$

After plugging equation (2) into equation (1) and taking natural logs of equation (1), we can then estimate the following equation,

$$lnY_{ft} = \alpha_l \cdot lnL_{ft} + \alpha_k \cdot lnK_{ft} + \underbrace{ln\gamma \cdot t + lnA_{f0}}_{lnTFP_{ft}} \tag{3}$$

However, the OLS estimate will likely suffer from issues of reverse causality and selection bias. On the one hand, the optimal inputs of labor and capital are related to the TFP of the firm, on the other hand, the likelihood of survival due to shocks to the TFP is linked to the amounts of labor and capital it employs Several methods have been established to address the above issues, among which the OP method (Olley & Pakes, 1996) and the LP method (Levinsohn & Petrin, 2003) are widely used. While the OP method relies on firms' investment as the proxy variable, the LP method employs the intermediate inputs, which are relatively easier to obtain and avoids the problem associated with zero investment.

Consequently, we implement the LP method to address these concerns In our model, a firm's output is defined via its value added, which is determined by subtracting the costs of

intermediate inputs from the industrial sales revenue and subsequently adding the value-added tax. Capital is measured by the value of fixed assets and labor is represented by the number of employees. All values of input and output are deflated by input and output price indices reported in Brandt et al. (2012). Intermediate inputs are used as a proxy for unobserved variables such as firm characteristics or macroeconomic shocks, which could determine the levels of both labor and capital as well as output. Then we estimate different production functions for each of the 2-digit industries using the firm-level data and obtain the TFP measure for each firm in each year. Given the unavailability of data on intermediate inputs post-2007, this analysis is confined to a subset of firms operating between 1998 and 2007.

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Online Appendix

Online Appendix Table 1 List of Two-digit Chinese SIC Codes

Two-digit Chinese SIC codes	Description	Percentage	Percent changes in weighted HHI
Mining			
06	Coal Mining and Dressing	1.99	-.44
07	Petroleum and Natural Gas Extraction	0.03	-.07
08	Ferrous Metals Mining and Dressing	0.75	-.82
09	Nonferrous Metals Mining and Dressing	0.56	-.53
10	Nonmetal Minerals Mining and Dressing	0.92	-.66
11	Mining auxiliary activity	0.04	-.25
12	Other Mining and Dressing	0.00	
Manufacturing			
13	Food Processing	5.78	-.73
14	Food Production	2.17	-.50
15	Beverage Production	1.49	-.40
16	Tobacco Processing	0.08	.23
17	Textile Industry	7.71	-.60
18	Garments and Other Fiber Products	4.14	-.58
19	Leather, Furs, Down and Related Products	2.69	-.47
20	Timber Processing, Bamboo, Cane, Palm Fiber and Straw Products	2.12	-.78
21	Furniture Manufacturing	2.17	-.72
22	Paper Making and Paper Products	2.50	-.57
23	Printing and Record Medium	1.70	-.62
24	Cultural, Educational and Sports Goods	2.51	-.49
25	Petroleum Processing and Coking	0.66	-.56
26	Raw Chemical Materials and Chemical	6.75	-.78
27	Medical and Pharmaceutical Products	1.86	-.49
28	Chemical Fiber Products	0.50	-.70
29	Rubber and Plastic Products	5.06	-.75
30	Nonmetal Mineral Products	7.81	-.69
31	Smelting and Pressing of Ferrous Metals	3.30	-.63
32	Smelting and Pressing of Nonferrous	1.68	-.63
33	Metal Products	5.60	-.79
34	Ordinary Machinery Manufacturing	6.09	-.76
35	For Special Purposes Equipment	3.98	-.69
36	Automobile Manufacturing	2.89	-.69
37	Railway, Watercraft, Aerospace and Other Transport Equipment	1.50	-.56
38	Electric Equipment and Machinery	5.80	-.70
39	Electronic and Telecommunications	3.28	-.45

40	Instruments and Meters Machinery	1.17	-.67
41	Other Manufacturing	0.49	-.49
42	Comprehensive Utilization of Waste	0.19	
43	Repair of Metal Products, Machinery and	0.10	-.32
Electricity, Heat, Gas, and Water Production and Supply			
44	Production and Supply of Electric Power, Steam and Hot Water	1.95	-.12
45	Production and Supply of Gas	0.21	-.53
46	Production and Supply of Tap Water	0.77	-.20

Note: This table shows the list of two-digit Chinese SIC codes and the description of each industry. It also gives the percentage of total employment in each industry. The percent changes in weighted HHI are calculated with the employment weighted HHI in 1998 and 2013 of each industry, where the local labor market is defined with prefecture and two-digit Chinese SIC codes.
Source: "Industrial Classification for National Economic Activities", Standardization Administration of the P.R.C. (2017).

Online Appendix Table 2 Plausibly Exogenous Instrument Regressions, Firm-Level Results

Conley et al. (2012)'s results	Prefecture									
	Two-digit Chinese SIC					Four-digit Chinese SIC				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Bounds for β										
Lower bound	-.054	-.028	-.134	-.036	-.039	-.126	-.048	-.173	-.067	-.066
Upper bound	.022	.009	.024	.005	.008	.021	.010	.022	.007	.009
Dependent variable: ln(avg. wage)										
$\hat{\gamma}$	-.021***	-.007	-.233***	-.045***	-.061***	-.069***	-.021***	-.446***	-.153***	-.150***
	(.006)	(.004)	(.013)	(.008)	(.006)	(.005)	(.004)	(.0176)	(.010)	(.009)
ln(empl.)	-.024***	-.014***	-.073***	-.022***	-.027***	-.045***	-.022***	-.063***	-.028***	-.029***
	(.003)	(.002)	(.004)	(.003)	(.002)	(.001)	(.001)	(.002)	(.001)	(.001)
ln(productivity)		.342***		.342***	.346***		.341***		.339***	.344***
		(.002)		(.002)	(.002)		(.001)		(.001)	(.001)
Year FE	Y	Y				Y	Y			
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ind-year FE			Y	Y	Y			Y	Y	Y
Reg-year FE					Y					Y
Observations	2,997,396	2,982,049	2,997,396	2,982,049	2,982,044	2,997,380	2,982,034	2,997,378	2,982,032	2,982,027
Adj. R-squared	.605	.683	.609	.685	.699	.606	.684	.614	.688	.701
γ_{max}	-.009	-.002	-.195	-.037	-.048	-.056	-.015	-.395	-.135	-.128
$(\gamma_{max}/\hat{\gamma})$	.43	.29	.84	.81	.79	.81	.71	.89	.88	.85

Conley et al. (2012)'s results	County				
	Two-digit Chinese SIC				
	(11)	(12)	(13)	(14)	(15)
Bounds for β					
Lower bound	-.075	-.022	-.204	-.060	-.066
Upper bound	.024	.044	.039	.010	.014
Dependent variable: ln(avg. wage)					
$\hat{\gamma}$	-.046***	.023***	-.594***	-.147***	-.163***
	(.009)	(.008)	(.004)	(.002)	(.002)
ln(empl.)	-.038***	-.013***	-.071***	-.021***	-.035***
	(.002)	(.001)	(.003)	(.002)	(.002)
ln(productivity)		.346***		.346***	.357***
		(.002)		(.002)	(.002)
Year FE	Y	Y			
Firm FE	Y	Y	Y	Y	Y
Ind-year FE			Y	Y	Y
Reg-year FE					Y
Observations	2,207,926	2,199,026	2,207,926	2,199,026	2,198,560
Adj. R-squared	.598	.678	.602	.680	.714
γ_{max}	-.027	-	-.490	-.120	-.130
$(\gamma_{max}/\hat{\gamma})$	.59	-	.82	.82	.80

Note: The bounds for β are obtained using Conley et al. (2012)'s union of confidence intervals method (UCI). γ_{max} is the value of the lower bound for γ that makes β insignificant. The ratio $\gamma_{max}/\hat{\gamma}$ suggests to what extent the direct effect of the instrument would have to be larger than the overall effect that renders the IV estimate insignificant. The instrumental variable is the average ln(1/N) in other markets and N is the number of firms in the market. * p< .1, ** p< .05, *** p< .01.

Online Appendix Table 3 Plausibly Exogenous Instrument Regressions, Market-Level Results

Conley et al. (2012)'s results	Prefecture							
	Two-digit Chinese SIC				Four-digit Chinese SIC			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bounds for β								
Lower bound	-.079	-.151	-.137	-.133	-.024	-.164	-.128	-.205
Upper bound	.028	.041	.036	.031	.017	.031	.027	.029
Dependent variable: ln(avg. wage)								
$\hat{\gamma}$	-.047***	-.075***	-.072***	-.145***	-.007	-.082***	-.064***	-.463***
	(.012)	(.012)	(.012)	(.013)	(.008)	(.008)	(.007)	(.027)
ln(empl.)		-.032***	-.034***	-.049***		-.060***	-.059***	-.071***
		(.003)	(.004)	(.005)		(.002)	(.002)	(.002)
Year FE	Y	Y			Y	Y		
Market FE	Y	Y	Y	Y	Y	Y	Y	Y
Region-year FE			Y	Y			Y	Y
Industry-year FE				Y				Y
Observations	118,549	118,549	118,544	118,544	537,056	537,056	537,051	537,051
Adj. *R*-squared	.757	.758	.779	.785	.645	.649	.670	.680
γ_{max}	-.023	-.049	-.048	-.112	-	-.064	-.048	-.401
$(\gamma_{max}/\hat{\gamma})$	.49	.65	.67	.77	-	.78	.75	.87
Conley et al. (2012)'s results	County							
	Two-digit Chinese SIC				Four-digit Chinese SIC			
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Bounds for β								
Lower bound	-.140	-.237	-.178	-.193	-.089	-.339	-.277	-.267
Upper bound	.037	.051	.042	.044	.028	.050	.044	.031
Dependent variable: ln(avg. wage)								
$\hat{\gamma}$	-.102***	-.143***	-.114***	-.595***	-.055***	-.177***	-.144***	-1.114***
	(.017)	(.017)	(.016)	(-.056)	(.012)	(.012)	(.011)	(.045)
ln(empl.)		-.053***	-.066***	-.085***		-.097***	-.103***	-.113***
		(.002)	(.002)	(.003)		(.001)	(.001)	(.002)
Year FE	Y	Y			Y	Y		
Market FE	Y	Y	Y	Y	Y	Y	Y	Y
Region-year FE			Y	Y			Y	Y
Industry-year FE				Y				Y
Observations	373,617	373,617	373,189	373,189	857,277	857,277	856,868	856,868
Adj. *R*-squared	.667	.669	.711	.717	.623	.631	.669	.678
γ_{max}	-.066	-.106	-.080	-.468	-.031	-.148	-.119	-.980
$(\gamma_{max}/\hat{\gamma})$	.65	.74	.70	.79	.56	.84	.83	.88

Note: The bounds for β are obtained using Conley et al. (2012)'s union of confidence intervals method (UCI). γ_{max} is the value of the lower bound for γ that makes β insignificant. The ratio $\gamma_{max}/\hat{\gamma}$ suggests to what extent the direct effect of the instrument would have to be larger than the overall effect that renders the IV estimate insignificant. The instrumental variable is the average ln(1/N) in other markets, and N is the number of firms in the market. * p< .1, ** p< .05, *** p< .01.

Online Appendix Table 4 Effects of Labor Market Concentration on Wages, Market-Level Estimates

Geographic area	Prefecture								
Industry	Panel A: Two-digit Chinese SIC								
Dependent variable:	Panel OLS					Panel IV			
ln(avg. wage)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(HHI)	-.052***	-.002	-.026***	-.023***	-.018***	-.054***	-.117***	-.106***	-.116***
	(.003)	(.004)	(.005)	(.005)	(.005)	(.014)	(.019)	(.017)	(.010)
ln(empl.)			-.037***	-.036***	-.034***		-.064***	-.058***	-.056***
			(.004)	(.004)	(.004)		(.007)	(.006)	(.005)
First-stage results									
Dependent variable: ln(HHI)									
Avg. ln(1/N) in other markets						.877***	.640***	.679***	-90.26***
						(.020)	(.018)	(.018)	(7.93)
ln(empl.)							-.271***	-.227***	-.065***
							(.005)	(.005)	(.015)
Year FE	Y	Y	Y			Y	Y		
Market FE		Y	Y	Y	Y	Y	Y	Y	Y
Region-year FE				Y	Y			Y	Y
Industry-year FE					Y				Y
Observations	119,052	118,549	118,549	118,544	118,544	118,549	118,549	118,544	118,544
Adj. *R*-squared	.453	.780	.781	.807	.813				
First-state *F*-stat.						1960.5	1301.8	1473.1	129.6
Industry	Panel B: Four-digit Chinese SIC								
Dependent variable:	Panel OLS					Panel IV			
ln(avg. wage)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
ln(HHI)	-.115***	-.021***	-.101***	-.101***	-.096***	-.008	-.142***	-.106***	-.197***
	(.002)	(.002)	(.003)	(.003)	(.003)	(.008)	(.013)	(.012)	(.006)
ln(empl.)			-.084***	-.083***	-.077***		-.095***	-.084***	-.101***
			(.002)	(.002)	(.002)		(.004)	(.004)	(.002)
First-stage results									
Dependent variable: ln(HHI)									
Avg. ln(1/N) in other markets						.894***	.581***	.604***	-23.47***
						(.010)	(.008)	(.009)	(1.132)
ln(empl.)							-.249***	-.238***	-.151***
							(.002)	(.002)	(.055)
Year FE	Y	Y	Y			Y	Y		
Market FE		Y	Y	Y	Y	Y	Y	Y	Y
Region-year FE				Y	Y			Y	Y
Industry-year FE					Y				Y
Observations	551,267	537,068	537,068	537,063	537,048	537,056	537,056	537,051	537,048
Adj. *R*-squared	.360	.692	.697	.718	.729				
First-state *F*-stat.						8049.38	4806.35	5538.21	316.34

Geographic area	County								
Industry	Panel A: Two-digit Chinese SIC								
Dependent variable:	Panel OLS					Panel IV			
ln(avg. wage)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(HHI)	-.082***	-.025***	-.095***	-.087***	-.084***	-.106***	-.194***	-.142***	-.184***
	(.002)	(.003)	(.003)	(.003)	(.003)	(.018)	(.024)	(.021)	(.006)
ln(empl.)			-.079***	-.087***	-.084***		-.107***	-.101***	-.108***
			(.002)	(.002)	(.002)		(.007)	(.005)	(.003)
First-stage results									
Dependent variable: ln(HHI)									
Avg. ln(1/N) in other markets						.959***	.740***	.805***	-277.3***
						(.021)	(.018)	(.017)	(29.23)
ln(empl.)							-.277***	-.241***	-.126***
							(.002)	(.002)	(.012)
Year FE	Y	Y	Y			Y	Y		
Market FE		Y	Y	Y	Y	Y	Y	Y	Y
Region-year FE				Y	Y			Y	Y
Industry-year FE					Y				Y
Observations	382,130	373,617	373,617	373,189	373,189	373,617	373,617	373,189	373,189
Adj. *R*-squared	.385	.706	.710	.765	.769				
First-state *F*-stat.						2015.20	1709.78	2161.89	90.02

Note: The first-stage F statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets and N is the number of firms in the market. * p< .1, ** p< .05, *** p< .01.

Online Appendix Table 5 Effects of Labor Market Concentration on Wages Excluding Perfect Monopsony, Firm-Level Estimates

Geographic area	Prefecture							
Industry	Two-digit Chinese SIC				Four-digit Chinese SIC			
Dependent variable: ln(avg. wage)	Panel OLS		Panel IV		Panel OLS		Panel IV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(HHI)	.005*	-.000	-.011	-.030***	-.004*	-.003**	-.019***	-.036***
	(.003)	(.002)	(.008)	(.003)	(.002)	(.001)	(.007)	(.003)
ln(empl.)	-.010***	-.011***	-.017***	-.017***	-.016***	-.015***	-.023***	-.025***
	(.002)	(.002)	(.004)	(.002)	(.001)	(.001)	(.003)	(.001)
ln(productivity)	.342***	.347***	.342***	.347***	.343***	.347***	.343***	.347***
	(.002)	(.002)	(.002)	(.002)	(.001)	(.001)	(.001)	(.001)
First-stage results								
Dependent variable: ln(HHI)								
Avg. ln(1/N) in other markets			.605***	-22.49***			.630***	-39.83***
			(.020)	(6.581)			(.019)	(1.022)
ln(empl.)			-.253***	.320***			-.307***	-.102***
			(.011)	(.018)			(.005)	(.007)
ln(productivity)			-.018***	.006***			-.020***	-.002**
			(.002)	(.001)			(.002)	(.001)
Year FE	Y		Y		Y		Y	
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry-year FE		Y		Y		Y		Y
Region-year FE		Y		Y		Y		Y
Observations	2,964,599	2,964,598	2,964,599	2,964,598	2,759,363	2,759,341	2,759,357	2,759,337
Adj. *R*-squared	.752	.764			.750	.765		
First-state *F*-stat.			740.63	1044.51			863.41	1379.86

Geographic area	County			
Industry	Two-digit Chinese SIC			
Dependent variable: ln(avg. wage)	Panel OLS		Panel IV	
	(9)	(10)	(11)	(12)
ln(HHI)	.000	.001	.046***	-.042***
	(.003)	(.002)	(.011)	(.004)
ln(empl.)	-.008***	-.018***	.008*	-.028***
	(.002)	(.001)	(.004)	(.002)
ln(productivity)	.349***	.361***	.350***	.361***
	(.002)	(.002)	(.002)	(.002)
First-stage results				
Dependent variable: ln(HHI)				
Avg. ln(1/N) in other markets			.833***	-396.3***
			(.030)	(15.973)
ln(empl.)			-.267***	.008
			(.006)	(.010)
ln(productivity)			-.018***	.004***
			(.002)	(.001)
Year FE	Y		Y	
Firm FE	Y	Y	Y	Y
Industry-year FE		Y		Y
Region-year FE		Y		Y
Observations	2,057,435	2,057,170	2,057,435	2,057,170
Adj. *R*-squared	.747	.779		
First-state *F*-stat.			525.98	804.24

Note: The first-stage F statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets and N is the number of firms in the market. * p< .1, ** p< .05, *** p< .01.

Online Appendix Table 6 Effects of Labor Market Concentration on Wages Excluding Perfect Monopsony, Market-Level Estimates

Geographic area	Prefecture							
Industry	Two-digit Chinese SIC				Four-digit Chinese SIC			
Dependent variable:	Panel OLS		Panel IV		Panel OLS		Panel IV	
ln(avg. wage)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(HHI)	-.005	.008*	-.133***	-.052***	-.036***	-.026***	-.124***	-.099***
	(.005)	(.005)	(.020)	(.008)	(.003)	(.003)	(.014)	(.005)
ln(empl.)	-.033***	-.024***	-.069***	-.036***	-.055***	-.040***	-.078***	-.055***
	(.004)	(.004)	(.007)	(.005)	(.002)	(.002)	(.004)	(.002)
First-stage results								
Dependent variable: ln(HHI)								
Avg. ln(1/N) in other markets			.606***	-153.8***			.600***	-40.93***
			(.018)	(7.903)			(.010)	(1.214)
ln(empl.)			-.232***	.088***			-.220***	-.064***
			(.005)	(.015)			(.002)	(.005)
Year FE	Y		Y		Y		Y	
Market FE	Y	Y	Y	Y	Y	Y	Y	Y
Region-year FE		Y		Y		Y		Y
Industry-year FE		Y		Y		Y		Y
Observations	100,918	100,898	100,918	100,898	316,202	316,014	316,199	316,014
Adj. *R*-squared	.825	.859			.770	.809		
First-state *F*-stat.			1046.85	381.39			3016.57	1253.42

Geographic area	County							
Industry	Two-digit Chinese SIC				Four-digit Chinese SIC			
Dependent variable:	Panel OLS		Panel IV		Panel OLS		Panel IV	
ln(avg. wage)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
ln(HHI)	-.036***	-.022***	-.179***	-.095***	-.066***	-.045***	-.337***	-.125***
	(.003)	(.003)	(.028)	(.006)	(.003)	(.003)	(.031)	(.006)
ln(empl.)	-.044***	-.046***	-.083***	-.062***	-.067***	-.059***	-.135***	-.077***
	(.003)	(.003)	(.008)	(.003)	(.002)	(.002)	(.008)	(.003)
First-stage results								
Dependent variable: ln(HHI)								
Avg. ln(1/N) in other markets			.728***	-450.6***			.573***	-66.32***
			(.023)	(19.64)			(.017)	(1.761)
ln(empl.)			-.243***	-.016*			-.220***	-.117***
			(.003)	(.008)			(.002)	(.003)
Year FE	Y		Y		Y		Y	
Market FE	Y	Y	Y	Y	Y	Y	Y	Y
Region-year FE		Y		Y		Y		Y
Industry-year FE		Y		Y		Y		Y
Observations	230,633	228,451	230,633	228,451	319,238	316,076	319,237	316,076
Adj. *R*-squared	.767	.835			.754	.821		
First-state *F*-stat.			863.52	1134.49			881.84	1427.50

Note: The first-stage F statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets, and N is the number of firms in the market. * p< .1, ** p< .05, *** p< .01

Online Appendix Table 7 Effects of Labor Market Concentration on Wages, Controlling for National-Level Employer Concentration

Geographic area	Prefecture									
Dependent var.:	Two-digit Chinese SIC					Four-digit Chinese SIC				
ln(avg. wage)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ln(HHI)	-.020***	-.019***	-.001	-.003	-.003	-.045***	-.043***	-.013***	-.011***	-.012***
	(.005)	(.005)	(.003)	(.004)	(.002)	(.005)	(.005)	(.003)	(.003)	(.002)
ln(empl.)	-.025***	-.030***	-.009***	-.014***	-.014***	-.052***	-.061***	-.023***	-.027***	-.028***
	(.005)	(.006)	(.003)	(.004)	(.002)	(.005)	(.005)	(.003)	(.003)	(.002)
ln(national HHI)	.015***	.028***	.015***	.038***	.036***	.007***	.025***	.005***	.019***	.016***
	(.004)	(.005)	(.003)	(.005)	(.003)	(.002)	(.003)	(.002)	(.002)	(.002)
ln(productivity)			.342***	.342***	.347***			.340***	.340***	.346***
			(.005)	(.005)	(.006)			(.005)	(.005)	(.006)
Year FE	Y	Y	Y	Y		Y	Y	Y	Y	
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE		Y		Y	Y		Y		Y	Y
Region-year FE					Y					Y
Observations	2,997,396	2,997,396	2,982,049	2,982,049	2,982,044	2,997,396	2,997,396	2,982,049	2,982,049	2,982,044
Adj. *R*-squared	.691	.691	.752	.752	.764	.692	.692	.752	.752	.764

Geographic area	County				
Dependent var.:	Two-digit Chinese SIC				
ln(avg. wage)	(11)	(12)	(13)	(14)	(15)
ln(HHI)	-.038***	-.038***	-.007**	-.006*	-.004*
	(.005)	(.005)	(.003)	(.003)	(.002)
ln(empl.)	-.048***	-.050***	-.015***	-.017***	-.027***
	(.004)	(.004)	(.003)	(.003)	(.002)
ln(national HHI)	.012***	.026***	.013***	.030***	.027***
	(.003)	(.004)	(.002)	(.004)	(.003)
ln(productivity)			.346***	.346***	.358***
			(.003)	(.003)	(.003)
Year FE	Y	Y	Y	Y	
Firm FE	Y	Y	Y	Y	Y
Industry FE		Y		Y	Y
Region-year FE					Y
Observations	2,207,926	2,207,926	2,199,026	2,199,026	2,198,560
Adj. *R*-squared	.688	.688	.750	.750	.781

Note: * p< .1, ** p< .05, *** p< .01.

Online Appendix Table 8 Subsample Period Effects of Labor Market Concentration on Wages
Firm-Level Estimates, 1998–2007

Geographic area	Prefecture									
Industry	Two-digit Chinese SIC									
Dependent variable:	Panel OLS					Panel IV				
ln(avg. wage)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ln(HHI)	-.010***	-.011***	-.002	-.004	-.005***	-.043***	-.050***	-.003	-.007	-.021***
	(.003)	(.003)	(.003)	(.003)	(.002)	(.010)	(.005)	(.008)	(.005)	(.004)
ln(empl.)	-.013***	-.014***	-.001	-.004*	-.006***	-.024***	-.024***	-.001	-.005**	-.009***
	(.002)	(.002)	(.002)	(.002)	(.002)	(.004)	(.003)	(.003)	(.002)	(.002)
ln(productivity)			.238***	.237***	.238***			.238***	.237***	.238***
			(.002)	(.002)	(.002)			(.002)	(.002)	(.002)
First-stage results										
Dependent variable: ln(HHI)										
Avg. ln(1/N) in other markets						.562***	-162.1***	.560***	-162.1***	-162.4***
						(.022)	(8.28)	(.022)	(8.36)	(9.75)
ln(empl.)						-.264***	.134***	-.265***	.136***	.190***
						(.014)	(.023)	(.014)	(.023)	(.025)
ln(productivity)								-.010***	.002	.002***
								(.002)	(.002)	(.001)
Year FE	Y		Y			Y		Y		
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry-year FE		Y		Y	Y		Y		Y	Y
Region-year FE					Y					Y
Observations	1,994,402	1,994,402	1,983,191	1,983,191	1,983,189	1,994,402	1,994,402	1,983,191	1,983,191	1,983,189
Adj. *R*-squared	.725	.726	.753	.754	.763					
First-state *F*-stat.						666.10	383.06	657.41	376.71	277.02
Industry	Four-digit Chinese SIC									
Dependent variable:	Panel OLS					Panel IV				
ln(avg. wage)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
ln(HHI)	-.025***	-.025***	-.009***	-.010***	-.012***	-.071***	-.093***	-.021***	-.039***	-.044***
	(.002)	(.002)	(.002)	(.002)	(.001)	(.008)	(.004)	(.006)	(.004)	(.004)
ln(empl.)	-.028***	-.033***	-.011***	-.015***	-.018***	-.046***	-.054***	-.016***	-.024***	-.027***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.003)	(.002)	(.003)	(.002)	(.002)
ln(productivity)			.237***	.237***	.237***			.237***	.236***	.237***
			(.001)	(.001)	(.001)			(.001)	(.001)	(.001)
First-stage results										
Dependent variable: ln(HHI)										
Avg. ln(1/N) in other markets						.641***	-22.80***	.635***	-22.66***	-21.84***
						(.018)	(1.06)	(.018)	(1.06)	(1.04)
ln(empl.)						-.314***	-.180***	-.318***	-.183***	-.170***
						(.005)	(.007)	(.005)	(.007)	(.007)
ln(productivity)								-.024***	-.015***	-.010***
								(.001)	(.001)	(.001)
Year FE	Y		Y			Y		Y		
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry-year FE		Y		Y	Y		Y		Y	Y
Region-year FE					Y					Y
Observations	1,994,402	1,994,388	1,983,191	1,983,178	1,983,176	1,994,386	1,994,384	1,983,176	1,983,174	1,983,172
Adj. *R*-squared	.725	.728	.753	.756	.764					
First-state *F*-stat.						1,229.85	463.40	1,198.1	454.61	437.50

Geographic area	County									
Industry	Two-digit Chinese SIC									
Dependent variable:	Panel OLS					Panel IV				
ln(avg. wage)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ln(HHI)	-.022***	-.023***	-.006**	-.008***	-.009***	-.079***	-.098***	-.010	-.034***	-.044***
	(.003)	(.003)	(.003)	(.003)	(.002)	(.013)	(.006)	(.012)	(.006)	(.004)
ln(empl.)	-.030***	-.032***	-.010***	-.012***	-.017***	-.048***	-.054***	-.011***	-.020***	-.025***
	(.002)	(.002)	(.002)	(.002)	(.001)	(.005)	(.003)	(.004)	(.002)	(.002)
ln(productivity)			.236***	.235***	.239***			.236***	.235***	.239***
			(.002)	(.002)	(.002)			(.002)	(.002)	(.002)
First-stage results										
Dependent variable: ln(HHI)										
Avg. ln(1/N) in other markets						.758***	-290.3***	.751***	-289.1***	-261.6***
						(.030)	(25.97)	(.030)	(26.16)	(26.45)
ln(empl.)						-.295***	-.111***	-.299***	-.114***	-.069***
						(.007)	(.017)	(.007)	(.018)	(.017)
ln(productivity)								-.023***	-.008***	-.003**
								(.002)	(.002)	(.001)
Year FE	Y		Y			Y		Y		
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry-year FE		Y		Y	Y		Y		Y	Y
Region-year FE					Y					Y
Observations	1,426,693	1,426,693	1,421,072	1,421,072	1,420,798	1,426,693	1,426,693	1,421,072	1,421,072	1,420,798
Adj. *R*-squared	.721	.722	.748	.749	.774					
First-state *F*-stat.						648.79	124.98	634.20	122.09	97.84

Note: The first-stage F statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets and N is the number of firms in the market. * p< .1, ** p< .05, *** p< .0

Online Appendix Table 9 Subsample Period Effects of Labor Market Concentration on Wages
Market-Level Estimates, 1998–2007

Geographic area	Prefecture								
Industry	Panel A: Two-digit Chinese SIC								
Dependent variable:	Panel OLS					Panel IV			
ln(avg. wage)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(HHI)	-.069***	-.026***	-.045***	-.045***	-.038***	-.150***	-.229***	-.213***	-.093***
	(.004)	(.004)	(.005)	(.005)	(.005)	(.020)	(.027)	(.025)	(.013)
ln(empl.)			-.031***	-.029***	-.032***		-.077***	-.066***	-.043***
			(.005)	(.005)	(.005)		(.008)	(.007)	(.006)
First-stage results									
Dependent variable: ln(HHI)									
Avg. ln(1/N) in other markets						.764***	.579***	.606***	-75.83***
						(.024)	(.022)	(.021)	(8.22)
ln(empl.)							-.237***	-.198***	-.065***
							(.006)	(.005)	(.015)
Year FE	Y	Y	Y			Y	Y		
Market FE		Y	Y	Y	Y	Y	Y	Y	Y
Region-year FE				Y	Y			Y	Y
Industry-year FE					Y				Y
Observations	90,695	90,277	90,277	90,276	90,276	90,277	90,277	90,276	90,276
Adj. *R*-squared	.320	.776	.777	.798	.802				
First-state *F*-stat.						993.98	703.28	826.68	85.19
Industry	Panel B: Four-digit Chinese SIC								
Dependent variable:	Panel OLS					Panel IV			
ln(avg. wage)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
ln(HHI)	-.132***	-.035***	-.084***	-.087***	-.081***	-.118***	-.271***	-.235***	-.146***
	(.002)	(.002)	(.003)	(.003)	(.003)	(.012)	(.019)	(.017)	(.007)
ln(empl.)			-.054***	-.052***	-.055***		-.098***	-.086***	-.069***
			(.002)	(.002)	(.002)		(.005)	(.004)	(.002)
First-stage results									
Dependent variable: ln(HHI)									
Avg. ln(1/N) in other markets						.804***	.521***	.537***	-20.56***
						(.013)	(.011)	(.011)	(1.46)
ln(empl.)							-.226***	-.216***	-.135***
							(.002)	(.002)	(.005)
Year FE	Y	Y	Y			Y	Y		
Market FE		Y	Y	Y	Y	Y	Y	Y	Y
Region-year FE				Y	Y			Y	Y
Industry-year FE					Y				Y
Observations	399,949	391,331	391,331	391,329	391,313	391,319	391,319	391,317	391,313
Adj. *R*-squared	.281	.716	.718	.733	.740				
First-state *F*-stat.						3,915.3	2,261.4	2,536.6	197.4

Note: The first-stage F statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets, and N is the number of firms in the market. * p< .1, ** p< .05, *** p< .01.

Geographic area	County								
Industry	Panel A: Two-digit Chinese SIC								
Dependent var.:	Panel OLS					Panel IV			
ln(avg. wage)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(HHI)	-.101***	-.047***	-.091***	-.084***	-.080***	-.297***	-.382***	-.361***	-.138***
	(.002)	(.003)	(.004)	(.004)	(.004)	(.024)	(.030)	(.029)	(.007)
ln(empl.)			-.051***	-.055***	-.057***		-.125***	-.115***	-.069***
			(.003)	(.003)	(.003)		(.008)	(.007)	(.003)
First-stage results									
Dependent variable: ln(HHI)									
Avg. ln(1/N) in other markets						.843***	.699***	.710***	-268.7***
						(.025)	(.022)	(.022)	(36.25)
ln(empl.)							-.251***	-.215***	-.101***
							(.003)	(.002)	(.015)
Year FE	Y	Y	Y			Y	Y		
Market FE		Y	Y	Y	Y	Y	Y	Y	Y
Region-year FE				Y	Y			Y	Y
Industry-year FE					Y				Y
Observations	280,447	276,810	276,810	276,499	276,499	276,810	276,810	276,499	276,499
Adj. *R*-squared	.300	.718	.719	.765	.767				
First-state *F*-stat.						1,129.21	1,022.60	1,089.68	54.96
Industry	Panel B: Four-digit Chinese SIC								
Dependent var.:	Panel OLS					Panel IV			
ln(avg. wage)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
ln(HHI)	-.121***	-.046***	-.122***	-.121***	-.118***	-.185***	-.365***	-.354***	-.174***
	(.002)	(.002)	(.003)	(.003)	(.003)	(.017)	(.026)	(.025)	(.006)
ln(empl.)			-.074***	-.076***	-.080***		-.127***	-.125***	-.091***
			(.002)	(.002)	(.002)		(.006)	(.006)	(.002)
First-stage results									
Dependent variable: ln(HHI)									
Avg. ln(1/N) in other markets						.771***	.538***	.534***	-39.59***
						(.016)	(.014)	(.013)	(1.52)
ln(empl.)							-.214***	-.203***	-.141***
							(.002)	(.002)	(.003)
Year FE	Y	Y	Y			Y	Y		
Market FE		Y	Y	Y	Y	Y	Y	Y	Y
Region-year FE				Y	Y			Y	Y
Industry-year FE					Y				Y
Observations	632,929	605,376	605,376	605,081	605,033	605,370	605,370	605,075	605,033
Adj. *R*-squared	.273	.715	.718	.750	.755				
First-state *F*-stat.						2,295.52	1,520.03	1,618.21	679.36

Note: The first-stage F statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets, and N is the number of firms in the market. * p< .1, ** p< .05, *** p< .01.

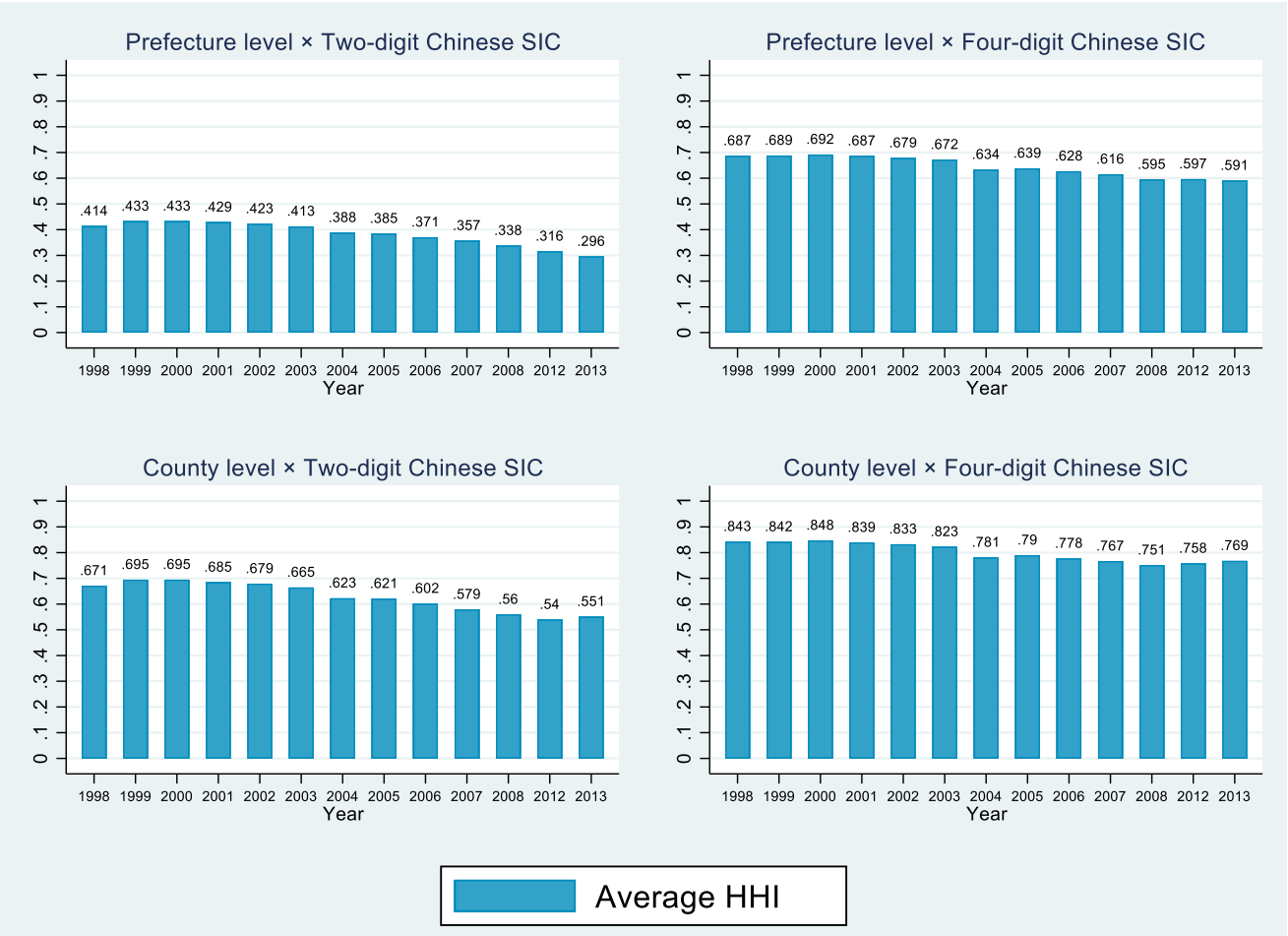
Online Appendix Table 10 Effects of Labor Market Concentration on Wages, By Ownership Type

Geographic area	Prefecture											
Industry	Two-digit Chinese SIC											
Dependent var.: ln(avg. wage)	State-Owned Enterprises				Non-State-Owned Enterprises				Foreign-Invested Enterprises			
	Panel OLS		Panel IV		Panel OLS		Panel IV		Panel OLS		Panel IV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ln(HHI)	-.012***	-.008*	-.090***	-.067***	.003	.000	-.014	-.029***	.009	-.001	-.026**	-.012*
	(.004)	(.004)	(.015)	(.009)	(.003)	(.002)	(.009)	(.004)	(.006)	(.003)	(.013)	(.006)
ln(empl.)	-.033***	-.038***	-.054***	-.046***	-.008***	-.009***	-.015***	-.015***	.006	-.007*	.014*	-.010**
	(.004)	(.004)	(.006)	(.004)	(.002)	(.002)	(.005)	(.002)	(.005)	(.004)	(.008)	(.004)
ln(productivity)	.253***	.247***	.252***	.247***	.357***	.365***	.357***	.365***	.346***	.344***	.346***	.344***
	(.004)	(.004)	(.004)	(.004)	(.002)	(.002)	(.002)	(.002)	(.004)	(.004)	(.004)	(.004)
Year FE	Y		Y		Y		Y		Y		Y	
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry-year FE		Y		Y		Y		Y		Y		Y
Region-year FE		Y		Y		Y		Y		Y		Y
Observations	270,107	270,079	270,107	270,079	2,228,000	2,227,963	2,228,000	2,227,963	392,281	391,799	392,281	391,799
Adj. *R*-squared	.843	.852			.729	.746			.740	.752		
First-state *F*-stat.			699.19	331.67			683.03	435.28			241.40	195.93
Industry	Four-digit Chinese SIC											
Dependent var.: ln(avg. wage)	State-Owned Enterprises				Non-State-Owned Enterprises				Foreign-Invested Enterprises			
	Panel OLS		Panel IV		Panel OLS		Panel IV		Panel OLS		Panel IV	
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
ln(HHI)	-.041***	-.034***	-.149***	-.136***	-.009***	-.008***	-.028***	-.054***	-.009***	-.009***	-.010	-.035***
	(.004)	(.004)	(.016)	(.016)	(.002)	(.001)	(.008)	(.004)	(.003)	(.003)	(.011)	(.007)
ln(empl.)	-.057***	-.062***	-.090***	-.086***	-.020***	-.022***	-.029***	-.037***	-.011***	-.015***	-.011*	-.024***
	(.003)	(.003)	(.006)	(.005)	(.001)	(.001)	(.004)	(.002)	(.002)	(.002)	(.006)	(.003)
ln(productivity)	.249***	.241***	.245***	.238***	.356***	.363***	.355***	.362***	.345***	.342***	.345***	.342***
	(.003)	(.003)	(.003)	(.003)	(.002)	(.002)	(.002)	(.002)	(.003)	(.003)	(.003)	(.003)
Year FE	Y		Y		Y		Y		Y		Y	
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry-year FE		Y		Y		Y		Y		Y		Y
Region-year FE		Y		Y		Y		Y		Y		Y
Observations	270,107	269,536	270,103	269,536	2,228,000	2,227,918	2,227,991	2,227,918	392,281	391,440	392,280	391,440
Adj. *R*-squared	.844	.858			.729	.748			.740	.758		
First-state *F*-stat.			1084.23	33.69			744.53	1039.39			714.94	638.67

Geographic area	County											
Industry	Two-digit Chinese SIC											
Dependent var.: ln(avg. wage)	State-Owned Enterprises				Non-State-Owned Enterprises				Foreign-Invested Enterprises			
	Panel OLS		Panel IV		Panel OLS		Panel IV		Panel OLS		Panel IV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ln(HHI)	-.044***	-.029***	-.221***	-.129***	-.005	-.004**	-.044***	-.054***	.006	.005	-.102***	-.023**
	(.006)	(.006)	(.028)	(.012)	(.003)	(.002)	(.012)	(.004)	(.006)	(.004)	(.022)	(.010)
ln(empl.)	-.065***	-.071***	-.114***	-.091***	-.010***	-.022***	.008*	-.035***	-.000	-.010***	.037***	-.017***
	(.004)	(.004)	(.009)	(.005)	(.002)	(.001)	(.005)	(.002)	(.004)	(.003)	(.009)	(.004)
ln(productivity)	.256***	.249***	.251***	.247***	.360***	.376***	.362***	.375***	.344***	.349***	.346***	.349***
	(.003)	(.004)	(.003)	(.004)	(.002)	(.002)	(.002)	(.002)	(.004)	(.004)	(.004)	(.004)
Year FE	Y		Y		Y		Y		Y		Y	
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry-year FE		Y		Y		Y		Y		Y		Y
Region-year FE		Y		Y		Y		Y		Y		Y
Observations	200,677	196,961	200,677	196,961	1,695,312	1,694,034	1,695,312	1,694,034	237,722	233,630	237,722	233,630
Adj. *R*-squared	.844	.871			.729	.769			.739	.766		
First-state *F*-stat.			587.89	147.87			743.93	326.70			87.92	285.37

Note: The first-stage F statistics is the Kleibergen-Paap rk Wald statistic. The instrumental variable is the average ln(1/N) in other markets and N is the number of firms in the market. * p< .1, ** p< .05, *** p< .01.

Online Appendix Figure 1 Trends in Average Local Labor Market Concentration, 1998–2013



Note: The computed Herfindahl-Hirschman Index (HHI) is not employment-weighted and is averaged across prefecture-two-digit industry-year, prefecture-four-digit industry-year, county-two-digit industry-year, and county-four-digit industry-year cells. The information of employment or wages in 2009, 2010, and 2011 is unavailable.
Source: Chinese Annual Survey of Industrial Firms (CASIF), 1998–2013.