Minimum Wage Impact on Low-Wage Employment:

Does Concentration Matter?

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1.1 Introduction

Conventional wisdom holds that an increase in the minimum wage reduces employment as it becomes more expensive for companies to hire workers. This premise, based on competitive labor markets, has been challenged since the seminal work of Card & Krueger [1994], who found no evidence of reduction in employment after an increase in the minimum wage in fast food restaurants in New Jersey. Since then, many studies have corroborated a lack of impact or nonnegative impact of an increase in the minimum wage on employment in different contexts [2]. In fact, reviews of studies point in three directions: the minimum wage can reduce, increase, or have a negligible impact on employment [3, 4, 5, 6, 7, 8].

However, the mechanisms that explain such different outcomes have not been thoroughly explored in literature. A few studies examine whether minimum wages are non-binding, that is, whether labor market clearing wages exceed the minimum wage. In such cases imposing them may be inimical in certain industries or areas [9, 10]. In other cases, the ultimate impact depends on whether firms can pass the increased cost of labor on to output prices [11, 12]. However, a growing consensus in recent literature suggests that many firms and industries operate with monopsonistic power in labor markets [13, 14, 15]. Although the effects of monopsony power on wages have been well documented in the literature, there is a scarcity of studies explicitly accounting for monopsony power to measure the effects of minimum wage increases on employment.

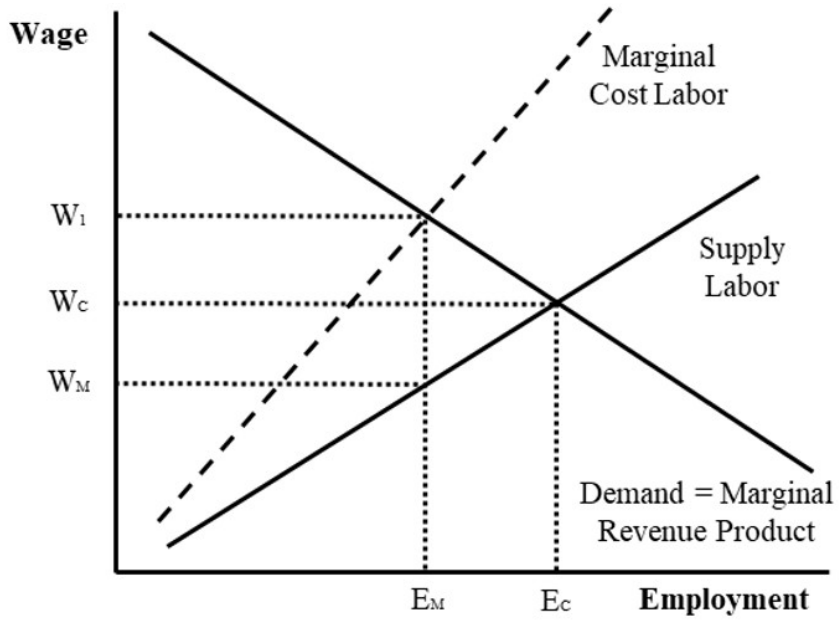
* This article is based on joint work with Rigoberto A. Lopez.

This paper makes three contributions to the literature. First, it adds to the small but growing literature on measuring the impact of minimum wages on employment that accounts for labor market concentration as a proxy for monopsony power, in the spirit of Azar et al. [16] and Munguía Corella [17], and our results suggest the potential presence of a policy-relevant labor market concentration range over which negative employment effects are no longer observable. Second, unlike Azar et al. [16] and others who use job postings or number of firms in a market or industry, we use firm employment to compute labor market concentration. More specifically, we compute county sector Herfindahl-Hirschman indexes (HHI) based on firm employment shares to measure employer concentration in local labor markets. Third, we provide new evidence from the two largest U.S. low-wage sectors:[1] Food Service and Drinking Places (NAICS[2] 722) and General Merchandise Stores (NAICS 452), using sector definitions that reflect plausible worker mobility within low-wage labor markets. We also document heterogeneity by minimum-wage exposure, metropolitan status, and robustness to adjustments for franchise no-poach restrictions.

Accounting for monopsony power or concentration is crucial for understanding the impacts of minimum wage increases, as emphasized by Manning [18]. Figure 1.1 illustrates alternative outcomes of minimum wage effects on employment in compet-

[1] As of January 2023, the General Merchandise Stores sector had approximately 3.1 million employees, while the Food Service and Drinking Places sector employed about 12.2 million people, as reported at `https://www.bls.gov/iag/tgs/iag452.htm`.

[2] The North American Sector Classification System (NAICS) is the standard used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.



Note: E_C and W_C represent the employment and wage levels where the market clears in a competitive market, while E_M and W_M represent the employment and wage levels in a monopsony equilibrium.

Fig. 1.1: Labor Market: Competitive vs. Monopsony Equilibrium.

itive and monopsonistic labor markets. In a competitive market without a minimum wage floor, the market clears at wage W_C and employment level E_C. Any minimum wage floor above W_C will reduce employment, and any minimum wage below it will be nonbinding. Under monopsony power, the market clears at wage W_M and employment level E_M. Any minimum wage between W_M and W_1 will increase employment, any minimum wage above W_1 will reduce employment, and if set at W_1, the minimum wage will not have an impact on the level of employment.[3] Our analysis employs labor

[3] The magnitude of the impact on employment will also depend on the labor supply elasticity and whether firms are able to pass an increased cost of labor on to output or retail prices, which would shift the marginal revenue product curve.

market concentration as a proxy for the extent of monopsony power. As Azar et al. [19] show, there is a negative correlation between labor market concentration and labor supply elasticity, implying a positive relation between labor market concentration and monopsony power.

In this paper, we use establishment-level employment data from the National Establishment Time Series (NETS) to construct county–sector HHI measures from 2005–2020. We exploit variation in minimum wage increases at the state and county levels, as well as across sectors and years. This allows us to assess the impact of labor market concentration on the effects of minimum wage increases in different local contexts. To the best of our knowledge, we are the first to use employment data at the individual firm level to investigate the employment effects of minimum wage increases, considering the varying levels of concentration in U.S. labor markets.

We follow a traditional approach that controls for heterogeneous time trends at the county level and incorporates variation in minimum wages across jurisdictions. The analysis centers on the interaction between the minimum wage and local labor market concentration, which allows the employment effects of minimum wage increases to vary across counties with different degrees of employer concentration. We further examine heterogeneity along two dimensions: minimum-wage exposure, measured using the pre-period Kaitz index, and local labor market context, distinguishing between metropolitan and nonmetropolitan counties. Second, no-poach agreements, common in franchise contracts, increase employer concentration by limiting employee mobil-

ity between franchisees [20]. We adjust the HHI by treating all firms within the same franchise chain as a single firm, a conservative adjustment that affects both current and prospective employees [21]. Third, we use a canonical two-way fixed effects model, addressing concerns raised by Neumark et al. [22, 23], who criticized local area controls for inadequately handling pre-existing trends.

In our preferred specification with county fixed effects, year fixed effects, and county specific linear trends, minimum wage increases reduce employment in less concentrated (more competitive) labor markets across both the Food Service and Drinking Places and the General Merchandise Stores sectors, with larger employment losses occurring where the exposure to the minimum wage is higher. In contrast, in the General Merchandise Stores sector, employment effects attenuate as employer concentration increases, becoming statistically indistinguishable from zero at moderate to high concentration levels (HHI above roughly 0.2) and turning positive only at the highest concentration levels.

Overall, the results suggest that minimum wages and antitrust policy operate along complementary margins. Wage floors appear to mitigate monopsony-related distortions in highly concentrated labor markets, particularly where worker voice is limited, while antitrust enforcement shapes the market structure by limiting the emergence of such concentration. At the same time, in highly competitive labor markets, minimum wage increases are more likely to be associated with employment reductions, especially where exposure to the minimum wage is high, highlighting the importance

of accounting for local labor market structure when evaluating minimum wage policies.

The rest of this paper is organized as follows. Section 2 presents the data, descriptive results, and the empirical approach used to identify the effects of minimum wage increases. Section 3 presents and discusses the main results, along with robustness checks. Section 4 concludes.

1.2 Data and Empirical Model

The main data source for employment and wages is the Quarterly Census of Employment and Wages (QCEW) from the Bureau of Labor Statistics (BLS).[4] QCEW provides annual county-level employment and earnings information[5] by sector, classified according to the North American Industry Classification System (NAICS), and covers more than 95% of jobs in the United States since 1990 through the Unemployment Insurance system. Since QCEW omits reporting sector-specific observations on employment and earnings in cases where the number of establishments in a county falls below a certain threshold in a given year, we utilize both balanced (that is, excluding counties with missing values for any year due to censorship) and unbalanced samples in the analysis to assess and ensure reliability.

Labor market concentration is constructed using the National Establishment Time Series (NETS),[6] a proprietary dataset produced by Walls & Associates using Dun &

[4] `https://www.bls.gov/cew/downloadable-data-files.htm`

[5] Average weekly earnings include most wage-like compensation, including tips, bonuses, stock options, and employer contributions to retirement plans.

[6] Walls & Associates. 2021. "National Establishment Time-Series (NETS) Database: 2021 Database Description." Internal document provided to the authors.

Bradstreet business records. Dun & Bradstreet collects business information from sources such as Secretaries of State, Yellow Pages, court records, credit inquiries, and direct contact with businesses.[7] Walls & Associates converts these records into a longitudinal establishment panel. NETS tracks business lines at unique physical locations with a Data Universal Number System (DUNS) identifier and reports employment, industry, location, and firm affiliation, including headquarters identifiers that allow establishments to be linked to firms.

This establishment-level structure makes NETS suitable for constructing local concentration measures at the county by sector level. Barnatchez et al. [24] find that NETS is useful for measuring static business activity at detailed geographic and industry levels, while noting greater measurement error among small establishments. Our approach is also consistent with studies that use NETS to construct county-level concentration measures, including Rossi-Hansberg et al. [25], Chava et al. [26], and Jha et al. [5], the latter two in minimum-wage-related settings. Appendix 1.5, Section A1.1, compares NETS and QCEW employment for the two sectors analyzed, showing that NETS closely matches QCEW county by sector employment levels, with positive but noisier long-run growth patterns.

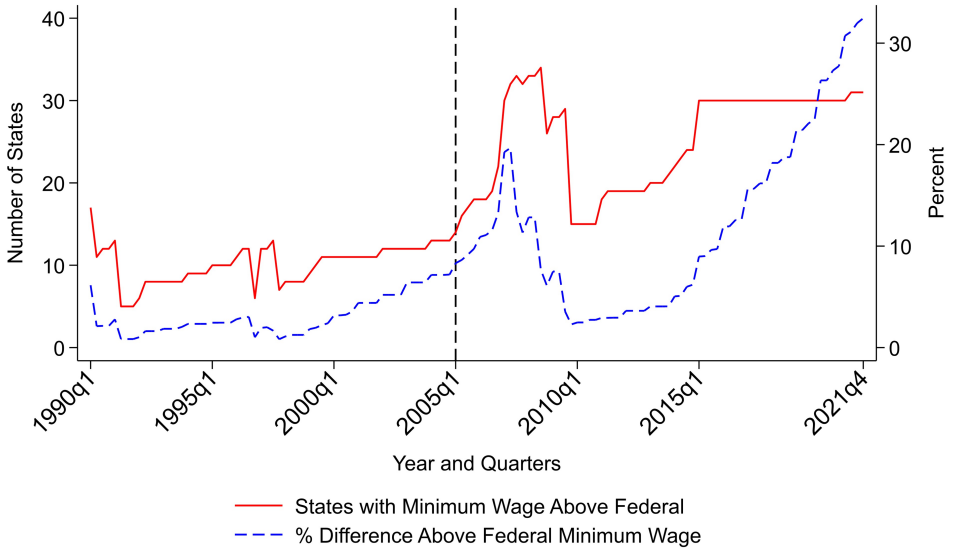
NETS records are annual, but the underlying business information is collected throughout the year rather than on a uniform payroll date. In our data, the NETS file dated year $t+1$ reflects business activity during year t. We therefore align NETS-based

[7] While there is no legal obligation for establishments to participate or report truthfully, D&B has strong profit-based incentives to compile accurate data, and individual businesses' access to credit and other business relationships may depend on the quality of the information they provide [24].

concentration measures from year $t + 1$ with QCEW employment outcomes for year t, which are measured as annual averages. For example, January 2021 NETS employment is used to construct employer concentration for QCEW outcomes in 2020.

Our primary measure of concentration is the HHI. For comparison, we also compute alternative concentration measures based on the employment share of the largest firm (CR_1), the four largest firms (CR_4), and the 20 largest firms (CR_{20}). We focus on firms categorized under 3-digit NAICS codes for the two sectors in question, based on the reasonable assumption that employees typically search for jobs within their sector and county due to specialized skills and job search costs. In addition, we estimate concentration measures by accounting for no-poach agreements, which are embedded in many franchise contracts and restrict employees within a chain from obtaining jobs from other franchisees within the same chain. In the fast food sector, for instance, 58 percent of major franchises in the United States employed no-poach agreements among their franchisees in 2016, a significant increase from 36 percent in 1996 [20]. We identify franchises with no-poach agreements using data from Callaci et al. [21] and Krueger and Ashenfelter [20]. We treated all establishments within the same chain as a single firm in the HHI and concentration measure estimates.

The prevailing minimum wage in each county is defined as the highest of the county (when applicable), state, or federal minimum wage. Minimum wage data is obtained from Vaghul and Zipperer [27], and earnings and minimum wages are deflated to 2020 dollars using the Consumer Price Index for All Urban Consumers by



Note: Includes all 50 states and the District of Columbia.

Fig. 1.2: Number of States with Minimum Wage above Federal Level and Average Minimum Wage Differential.

census region [28]. We construct a yearly, sector-specific Kaitz index as the annualized minimum wage relative to average weekly earnings (median not available), adjusting for sector-level hours from Bureau of Labor Statistics Current Employment Statistic (CES),[8] using lagged county–sector QCEW earnings to avoid mechanical contemporaneous effects. Figure 1.2 shows that, after 2005, most states set minimum wages above the federal level, with the average gap increasing from 10 to 30 percent between 2005 and 2020.

The data set is supplemented with time-varying covariates that capture local labor

[8] `https://www.bls.gov/ces/data/`

Table 1.1: Definition of Variables and Data Sources.

Definition	Data source
Average yearly weekly wage by sector ($)	QCEW
Average yearly employment by sector	QCEW
Average yearly weekly wage total private sector ($)	QCEW
Average yearly employment total private sector	QCEW
Yearly county minimum wage ($)	U.S. Department of Labor
Yearly census-level urban consumers price index	BLS
Yearly average weekly hours worked (national)	BLS CES
Yearly average county-level unemployment rates	Local Area Employment Survey
Yearly mid-average population	Census
Yearly Herfindahl Index	NETS
Yearly CR1/CR4/CR20	NETS
Yearly per capita income	BEA/Census
House Price Index (state level)	Federal Housing Finance Agency
2013 Metro-nonmetro	USDA Rural–Urban Continuum Codes

Note: All information available used is at the county level, except where noted.

demand, labor supply, and broader economic conditions commonly used in minimum wage employment studies [9, 16, 29]. From QCEW, we include total private employment and average weekly earnings across all private industries, which account for local economic scale and prevailing wage conditions. From the U.S. Census Bureau and the Bureau of Economic Analysis,[9] we include population and per capita income, which capture market size, potential labor supply, and local purchasing power. From the Local Area Unemployment Survey,[10] we include county unemployment rates to control for local labor market slack. From the Federal Housing Finance Agency,[11] we include the state-level house price index to capture broader changes in housing costs and lo-

[9] https://www.bea.gov/data/income-saving/personal-income-county-metro-and-other-areas
[10] https://www.bls.gov/lau/
[11] https://www.fhfa.gov/DataTools/Downloads/Pages/House-Price-Index.aspx

Table 1.2: Descriptive Statistics 2005–2020.

	452 [1]		722 [2]		722 [2] (No poach agreements)	
	Mean	s.d.	Mean	s.d.	Mean	s.d.
Panel A: Concentration Measures						
Herfindahl Index (HHI) [0, 1]	0.48	0.25	0.07	0.12	0.08	0.12
Counties (HHI > 0.25) (%)	78.28		5.27		5.33	
CR1 [0%, 100%]	60.79	22.86	13.63	14.02	14.82	13.70
CR4 [0%, 100%]	90.31	11.91	33.53	23.82	35.55	22.79
CR20 [0%, 100%]	99.60	1.64	67.55	27.92	69.67	25.93
Weighted HHI [0, 1] [3]	0.25	0.02	0.01	0.00	0.01	0.00
Weighted CR1 [0%, 100%] [3]	40.21	1.97	4.61	0.57	6.22	0.74
Weighted CR4 [0%, 100%] [3]	73.27	1.14	11.42	1.72	14.68	1.96
Weighted CR20 [0%, 100%] [3]	97.43	0.22	27.93	4.11	33.22	4.47
N	47,980		50,077		50,077	
Panel B: Balance Panel [4]						
Population (Thousand)	201.47	460.02	156.20	406.86	156.20	406.86
Private employment (Thousand)	74.57	188.86	57.14	166.67	57.14	166.67
Private weekly earnings (2020 $)	833.63	211.34	813.29	201.92	813.29	201.92
Sector employment [5]	1989.26	3852.97	5204.97	14448.28	5204.97	14448.28
Sector weekly earnings (2020 $) [5]	448.96	70.67	296.64	64.84	296.64	64.84
Kaitz index [0, 1]	0.59	0.10	0.75	0.13	0.75	0.13
Herfindahl Index (HHI) [0, 1]	0.34	0.18	0.03	0.05	0.04	0.05
Counties (HHI > 0.25) (%)	59.73		0.58		0.61	
CR1 [0%, 100%]	49.09	18.87	8.52	7.41	10.04	7.32
CR4 [0%, 100%]	82.78	12.58	22.33	14.51	25.07	13.84
CR20 [0%, 100%]	99.15	2.31	53.57	24.72	56.73	22.85
Per capita income (2020 $000s)	49.16	112.07	52.14	196.46	52.14	196.46
Minimum wage (2020 $)	8.26	1.12	8.26	1.13	8.26	1.13
Unemployment rate (%)	6.51	2.80	6.29	2.74	6.29	2.74
Annual house price indexes	201.39	38.43	206.82	43.20	206.82	43.20
Nonmetropolitan Counties (%)	44.08		53.90		53.90	
Number of counties	1402		1857		1857	
Number of States + DC	51		51		51	
N	22,432		29,712		29,712	

Notes:
[1] General Merchandise Stores Sector.
[2] Food Service and Drinking Places Sector.
[3] Weighted HHI/CR by 3-digit NAICS sector are calculated as follows: $\text{HHI}_t = \sum_{i=1}^{N} S_{it}^{L} \text{HHI}_{it}$, where S_{it}^{L} denotes the employment share of county i at year t over national employment in year t, and HHI_{it} represent county HHI at year t (replace HHI_{it} by CR_{it} to get the weighted CR ratios).
[4] The sample includes only counties that appear in all 16 years.
[5] Specific sector displays the information for sectors 452 and 722, respectively.

cal economic conditions. We classify counties as metropolitan or nonmetropolitan using the 2013 USDA Rural Urban Continuum Codes:[12] codes 1–3 denote metropolitan counties, and codes 4–9 denote nonmetropolitan counties. Table 1.1 summarizes the variables used and their data sources, while Table 1.2 presents descriptive statistics.

To specify our main econometric model, we follow a traditional approach that controls for heterogeneous time trends, as advocated by Allegretto et al. [29] and conventionally adopted by previous minimum wage studies:

$$y_{icst} = \alpha + \beta_1 mw_{icst} + \psi_1 HHI_{icst} + \beta_2 \left(mw_{icst} \times HHI_{icst}\right) + \rho X_{icst} + \phi_c + \tau_t + \xi_{ct} + \varepsilon_{icst}, \tag{1.1}$$

where y_{icst} is the log of employment for sector i in county c of state s ($c \subseteq s$) in year t, mw_{icst} is log of the minimum wage, HHI_{icst} is the labor Herfindahl index, and X_{icst} is a vector of covariates: log of the total population, log of total employment in the private sector across all sectors, log of total average weekly earnings across all sectors, log of the county unemployment rate, the log of per capita income, and the State House Price index. In this specification, β_1 measures the effect of the minimum wage under perfect competition (HHI = 0) and β_2 is the estimation of the difference between the effect of the minimum wage in monopsonistic labor markets (HHI = 1) and the effect in a competitive market (HHI = 0). The regression includes county fixed effects ϕ_c, year fixed effects τ_t, and county-specific linear time trends ξ_{ct}.

In alternative specifications, we allow the effect of minimum wages to vary across

[12] https://www.ers.usda.gov/data-products/rural-urban-continuum-codes

discrete measures of labor market concentration. First, following the 2010 Department of Justice and Federal Trade Commission Horizontal Merger Guidelines (DOJ–FTC),[13] we classify county–sector labor markets with an HHI of at least 0.25 as highly concentrated and estimate the interaction specification shown in model 1.2. Second, to assess monotonicity and potential nonlinearity, we estimate specifications that partition labor market concentration into HHI tertiles.

$$y_{icst} = \alpha + \beta_1 mw_{icst} + \psi_1 \mathbf{1}\mathrm{HHI}_{icst} \geq 0.25 + \beta_2 \left(mw_{icst} \times \mathbf{1}\mathrm{HHI}_{icst} \geq 0.25\right) + \rho X_{icst} + \phi_c + \tau_t + \xi_{ct} + \varepsilon_{icst}, \tag{1.2}$$

To identify causal effects of minimum wage changes, we follow Finkelstein et al. [30] and assess parallel pre-trends by estimating scaled event study models. Events are defined as year-on-year increases of at least 25 cents in the applicable minimum wage, with no change in the preceding two years to allow for pre-trend testing. Subsequent increases are permitted, reflecting phased-in policies. Crucially, the federal minimum wage increase in 2007–2009 will be a qualifying event for most of the states, except those already above the federal level. We retain events with three to four years of data before and after the initial increase; to accommodate the federal increase, the event study sample begins in 2003. These criteria yield 61 events across 46 states, with 12 states experiencing two events (Table A1.2). Identification comes from variation in the timing and intensity of policy changes. For each event, we define δ_{cs} as the change in the log of the real minimum wage over the event window ($\log mw_{cs}^{\max} - \log mw_{cs}^{\min}$). We

[13] The 2010 Horizontal Merger Guidelines have since been withdrawn and replaced by the 2023 Merger Guidelines; however, we use the 2010 threshold here to classify concentration during the study period. See `https://www.justice.gov/atr/horizontal-merger-guidelines-08192010`.

then write an event study specification as

$$y_{icst} = \alpha + \rho X_{icst} + \sum_{k=-3,\ k\neq -1}^{4} (\pi_k(cs,t) \times \delta_{cs})\, \phi^k + \varsigma_c + \tau_t + \varepsilon_{icst}, \tag{1.3}$$

where y_{icst} is the log of employment for sector i in county c of state s ($c \subseteq s$) in year t, and X_{icst} is the vector of covariates described in model 1.1. The regression includes event county fixed effects ς_c and year fixed effects τ_t. County linear trends are omitted because the stacked event study relies on a short event-centered window, where trends are weakly identified. The coefficients of interest are the vector ϕ, which capture outcome dynamics around the policy change. We follow convention and normalize the last pre-increase period to zero, i.e. $\phi^{-1} = 0$. Event time indicators $\pi_k(cs,t)$ are interacted with the aggregate change in the log minimum wage over the event window, so the estimated coefficients can be interpreted as semi-elasticities of employment with respect to the minimum wage. We then classify counties using HHI tertiles and a 0.25 HHI threshold, based on average HHI over 2005–2007, and estimate model 1.3 separately for each group.

Finally, we examine heterogeneity in the minimum-wage–concentration relationship along two dimensions. First, we split counties into two groups based on minimum-wage exposure, using the median of the average Kaitz index over the 2005–2007 pre-period, and estimate specifications by HHI tertiles based on the average county–sector HHI over the same 2005–2007 pre-period. Second, we estimate separate specifications for metropolitan and nonmetropolitan counties. All specifications retain the baseline fixed-effects structure and control variables. The results, along with evidence on labor

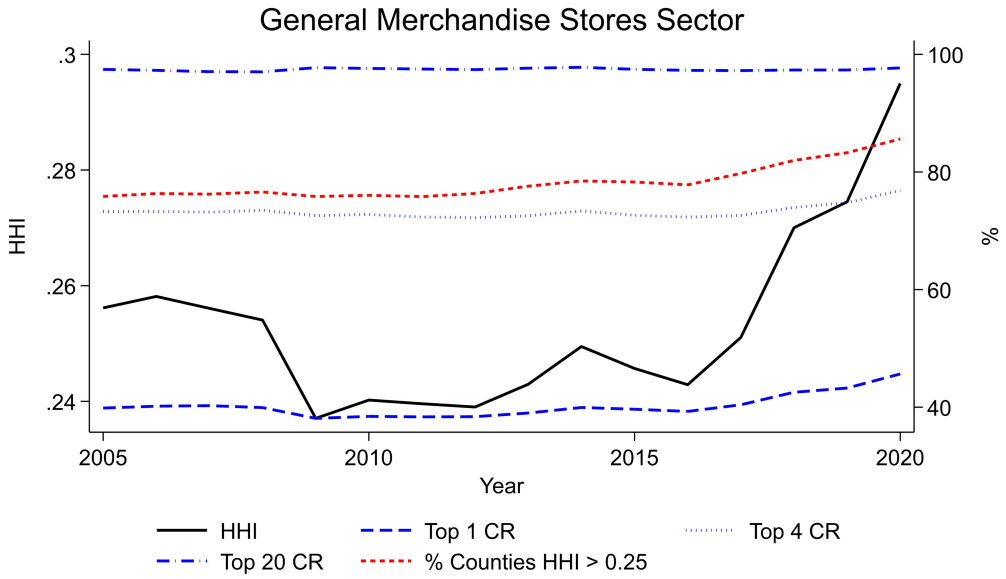
market concentration, are presented below.

1.3 Results and Discussion

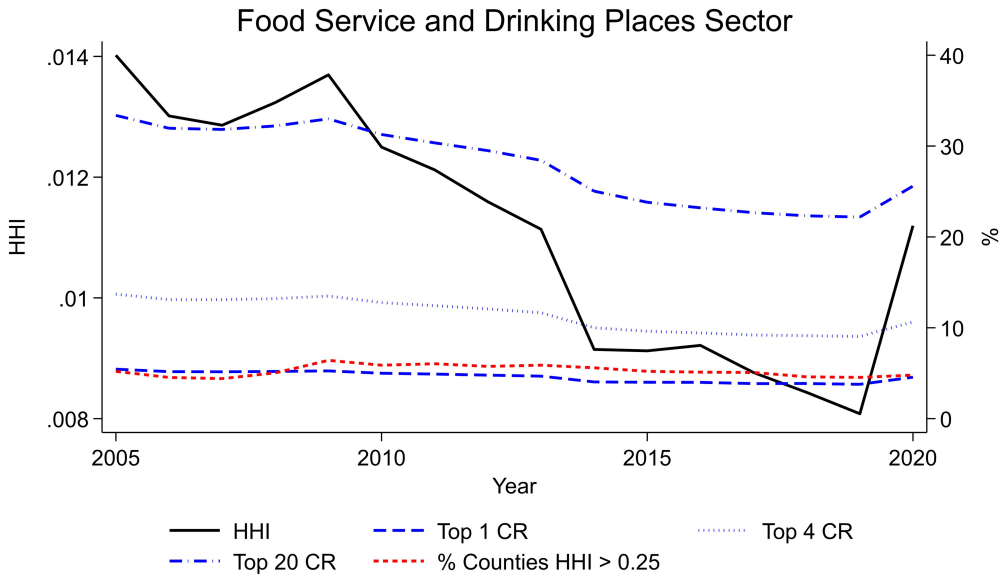
1.3.1 Labor Concentration Results

The estimated labor concentration measures are presented in Table 1.2 and Figure 1.3. Overall, our results reveal prominent disparities between the General Merchandise Stores and Food Service and Drinking Places sectors. The former shows notable labor market concentration, with dominant firms wielding considerable influence, while the latter portrays a landscape of highly fragmented markets, with a discernible trend towards decreasing concentration. These distinctive market structures align with the oligopsony model in the case of General Merchandise Stores and with the ideal competitive model in the food service sector, providing an excellent backdrop for rigorously examining the impact of a minimum wage increase on employment.

The General Merchandise Stores sector presents a clear picture of labor market concentration, as shown in Table 1.2 Panel A. This sector shows a remarkable concentration of employers, with around 78 percent of counties registering an HHI surpassing the 0.25 threshold, thus categorizing them as highly concentrated labor markets over the period 2005–2020. The largest firm (CR1) consistently holds a commanding 61 percent share of the market, while the top four firms together command an impressive 90 percent. Moreover, as shown in Figure 1.3, labor market concentration in this sector has been increasing over time. Particularly noteworthy is the ascent of the largest firms



(a) General Merchandise Stores Sector



(b) Food Service and Drinking Places Sector

Fig. 1.3: Labor Market Concentration Measures by Sector

Notes: HHI is computed using the formula $HHI_t = \sum_{i=1}^{N} s_{it}^{L} HHI_{it}$, where s_{it}^{L} denotes the employment share of county i at year t over national employment in year t, and HHI_{it} represents county HHI at year t. For Concentration Ratio (CR), replace HHI_{it} with CR_{it}. The percentage of counties with HHI > 0.25 is showed.

in the labor markets. Walmart emerged as the dominant employer, with over 40 percent of the sector's employment.[14] Target was found to be the second-largest employer, holding roughly 11 percent of employment in this sector, while the remaining top 10 firms collectively share about 5 percent of the market with a myriad of even smaller employers. Walmart dominance is particularly stark in rural areas.[15]

In sharp contrast, the Food Service and Drinking Places sector tells a different story, one of local labor markets that lean more towards perfect competition, as shown in Panel A of Table 1.2. Notably, a mere 5 percent of counties exhibit an HHI exceeding 0.25, with the largest firm's concentration ratio averaging a 14 percent share of the labor market from 2005 to 2020. Moreover, the combined market share of the top four firms amounts to 33 percent, depicting labor markets that are highly fragmented and atomistic. In addition, rather than increasing over time like the General Merchandise Stores sector, this sector exhibits a declining trend in concentration. The sole exception is 2020, which saw an uptick, potentially reflecting establishment closures due to stay-at-home ordinances and fear of infection during the Covid-19 pandemic, as shown in Figure 1.3.

Panel A of Table 1.2 shows the concentration measures in the Food Service and Drinking Places sector after adjusting for no-poach agreements. The results show an average 0.01 increase in the HHI (0.03 vs 0.04), which is much lower than the 0.06 reported by Callaci et al. [34]. This difference likely reflects limitations in their data in

[14] Computed from NETS 2021.

[15] The dominance of Walmart in rural areas is consistent with the "superstar firms" model [13, 31, 32, 33].

Table 1.3: Minimum Wage Effects on Earnings (2005–2020)

Dependent Variable: Ln Earnings		
	452	722
	(1)	(2)
mw	0.05***	0.18***
	(0.02)	(0.02)
R^2	0.942	0.990
N	22432	29712

Notes: All specifications use the balanced sample and include county fixed effects, year fixed effects, county-specific linear time trends, and the following control variables: log of total county population, log of total average weekly earnings (across all sectors) in the county, log of total employment (across all sectors) in the county, log of the county unemployment rate, log per capita income, and State House Price index. The specification excludes the Herfindahl-Hirschman Index (HHI) and its interaction term with the minimum wage. Standard errors (in parentheses) are clustered at the state level, and the regression is weighted by average employment in the sector during the sample period. *p < 0.10, **p < 0.05, ***p < 0.01.

identifying multi-location franchises, which tend to operate within the same local labor market, attenuating observable effects in our setting. For the largest firms, the gain is greater, with a two-percentage-point increase in their labor share.

1.3.2 Econometric Results

1.3.2.1 Main Results

Table 1.3 shows that, on average, an increase in the minimum wage results in higher workers' earnings in both sectors. For a 10% increase in the minimum wage, labor earnings in the General Merchandise Stores sector increase, on average, by 0.5%, and by 1.8% in the Food Service and Drinking Places sector. This larger response in food services is consistent with higher minimum-wage exposure in that sector, where the average Kaitz index equals 0.75, compared with 0.59 in General Merchandise Stores, reflecting a greater share of workers earning wages close to the minimum.

Table 1.4 shows that a 10% increase in the minimum wage reduces employment by about 0.9% in General Merchandise Stores and 1% in Food Service and Drinking Places (column 1). These elasticities are modest but negative. For General Merchandise Stores, our estimate is similar to that of Azar et al. [16], whose estimate implies a modest employment decline of about 0.7% for a 10% minimum wage increase but is not statistically different from zero. For Food Service and Drinking Places, our estimate is close to traditional two-way fixed effects estimates, but more negative than many border design estimates, which often find smaller or null employment effects

Table 1.4: Main Results: Impact of the Minimum Wage on Employment via Concentration, 2005–2020

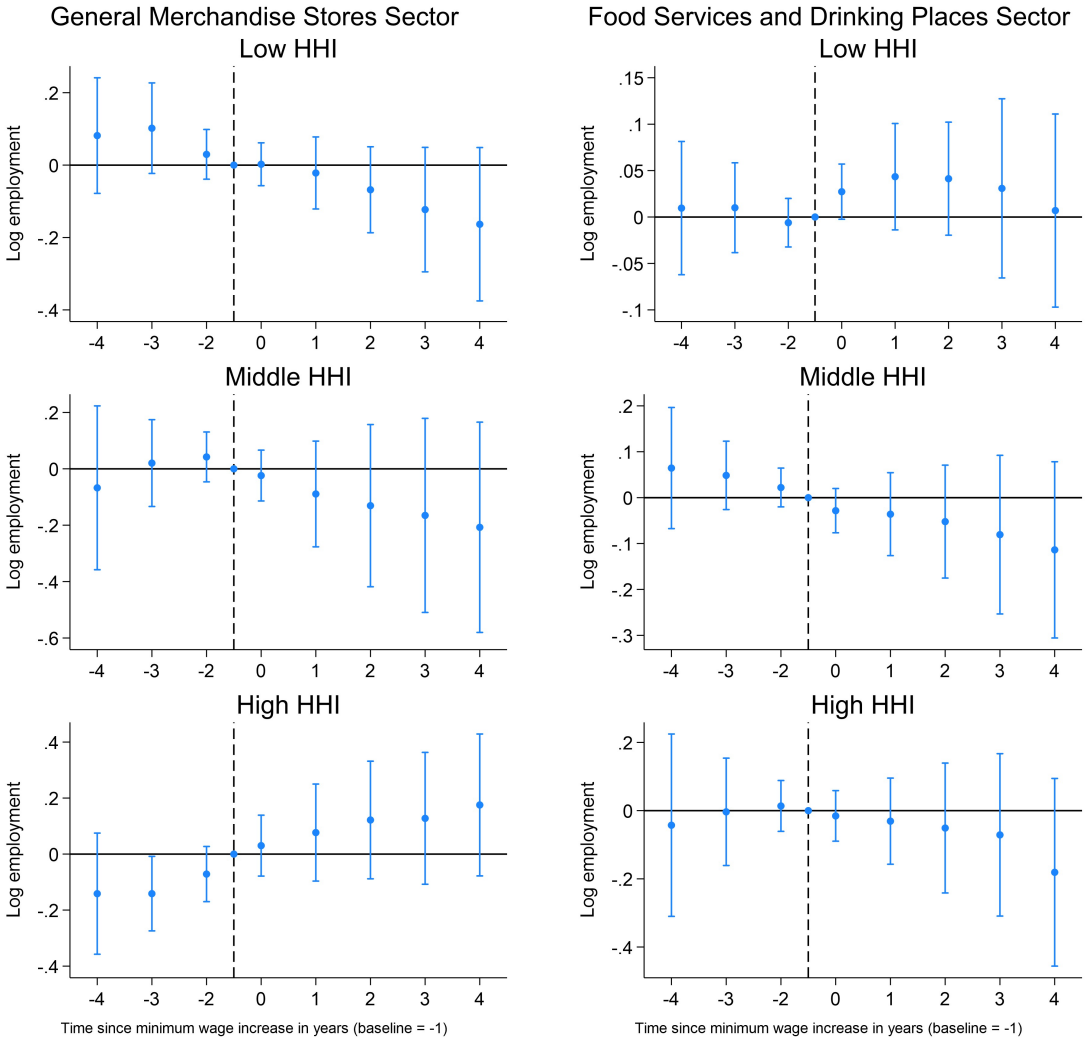
Dependent Variable: Ln Employment **Panel A: 452 General Merchandise Stores Sector**				
	(1)	(2)	(3)	(4)
mw	-0.09**	-0.16***	-0.11***	-0.10***
	(0.04)	(0.04)	(0.04)	(0.04)
HHI		-0.66***		
		(0.20)		
HHI × mw		0.39***		
		(0.09)		
High HHI (≥0.25)			-0.22***	
			(0.06)	
High HHI (≥0.25) × mw			0.11***	
			(0.03)	
Middle HHI				-0.10
				(0.07)
Top HHI				-0.21***
				(0.08)
Middle HHI × mw				0.05
				(0.04)
Top HHI × mw				0.11***
				(0.04)
R^2	0.998	0.998	0.998	0.998
N	22432	22432	22432	22432
Panel B: 722 Food Service and Drinking Places Sector				
	(1)	(2)	(3)	(4)
mw	-0.10***	-0.10***	-0.10***	-0.10***
	(0.03)	(0.04)	(0.03)	(0.04)
HHI		-0.44		
		(0.97)		
HHI × mw		0.26		
		(0.47)		
High HHI (≥0.25)			0.45	
			(0.32)	
High HHI (≥0.25) × mw			-0.21	
			(0.15)	
Middle HHI				-0.02
				(0.04)
Top HHI				-0.04
				(0.06)
Middle HHI × mw				0.01
				(0.02)
Top HHI × mw				0.03
				(0.03)
R^2	0.999	0.999	0.999	0.999
N	29712	29712	29712	29712

Notes: All specifications use the balanced sample and include county fixed effects, year fixed effects, county-specific linear time trends, and the following control variables: log of total county population, log of total average weekly earnings (across all sectors) in the county, log of total employment (across all sectors) in the county, log of the county unemployment rate, log per capita income, and State House Price index. Column 1 applied model 1.1 without including HHI or the interaction term with minimum wage. Column 2 applied model 1.1. Column 3 applied model 1.2, and Column 4 separates labor markets into HHI terciles. Standard errors (in parentheses) are clustered at the state level, and the regression is weighted by average employment in the sector during the sample period. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

[29]. Recent restaurant evidence remains mixed, with Wiltshire et al. [7] finding no disemployment effects in fast food, while Jha et al. [5] and Taylor and West [6] report negative restaurant or limited-service restaurant employment effects under alternative local comparison designs.

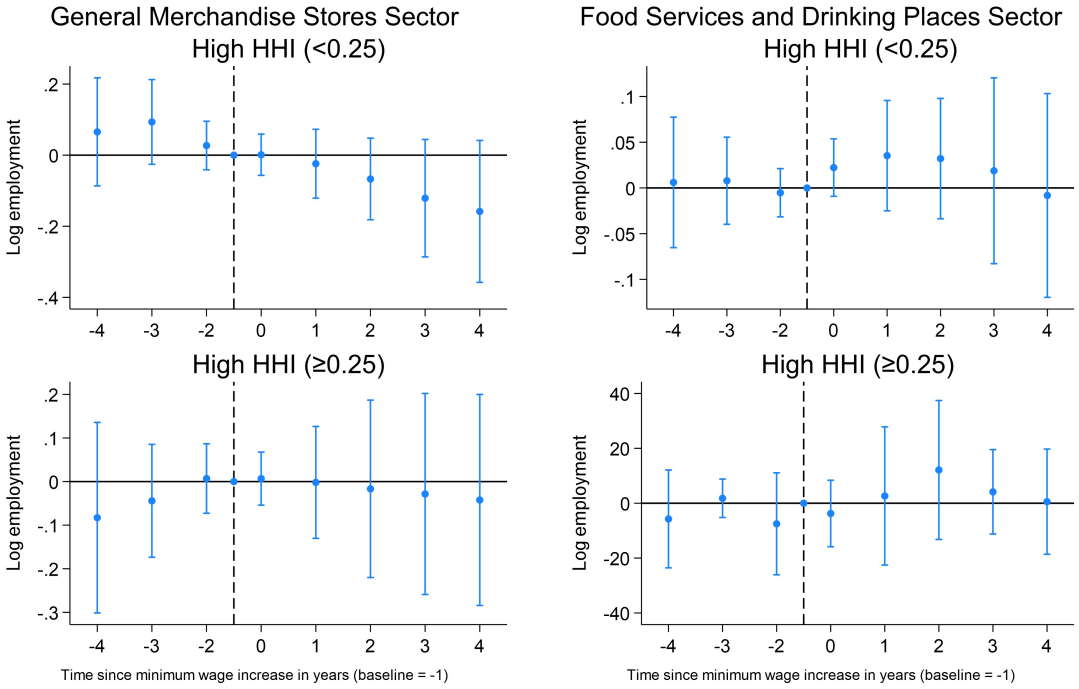
Allowing employment responses to vary with labor market concentration reveals sharp sectoral heterogeneity. In competitive labor markets (HHI = 0), minimum wage increases reduce employment in both sectors (column 2). In the General Merchandise Stores sector, employment effects become less negative and eventually positive as concentration increases: employment rises by 2.3% following a 10% minimum wage increase under monopsony conditions (HHI = 1). Specifications for areas of high concentration, using either an indicator for HHI > 0.25 (column 3) or HHI tertiles (column 4), show no evidence of disemployment effects in concentrated labor markets. By contrast, in the Food Service and Drinking Places sector,[16] employment effects remain negative across all specifications. The interaction between minimum wages and concentration is consistently statistically insignificant, and concentration levels are low throughout the distribution; even counties in the highest HHI tertile exhibit relatively low concentration. Across all columns, a 10% minimum wage increase reduces employment by roughly 1%. Estimates based on the HHI > 0.25 threshold in the Food Service and Drinking Places sector should be interpreted with caution, however, as fewer than 1% of counties meet this concentration criterion (Panel B of Table 1.2).

[16] Most no-poach agreements, especially in the fast-food sector, were voluntarily terminated by the end of 2020 due to antitrust scrutiny.



Notes: Figure reports scaled event study estimates from model 1.3. Events are defined as minimum wage increases of at least $0.25, with no change in the preceding two years. The sample includes up to four years before and after each event, with the event study window beginning in 2003 to capture the 2007–2009 federal increase. Estimates are normalized to the last pre-increase period. Coefficients are interpreted as semi-elasticities with respect to the real minimum wage. Blue vertical lines denote 95 percent confidence intervals. Counties are grouped by HHI tertiles, constructed using average county-level HHI over 2005–2007 within each sector. Regressions include event-county, year fixed effects and the following additional control variables and their interactions with minimum wage: log of total county population, log of total average weekly earnings (across all sectors) in the county, log of total employment (across all sectors) in the county, log of the county unemployment rate, log per capita income, and State House Price index. Standard errors are clustered at the state level.

Fig. 1.4: Event Study Estimates by Labor Market Concentration and Sector.



Notes: Figure reports scaled event study estimates from model 1.3. Events are defined as minimum wage increases of at least $0.25, with no change in the preceding two years. The sample includes up to four years before and after each event, with the event study window beginning in 2003 to capture the 2007–2009 federal increase. Estimates are normalized to the last pre-increase period. Coefficients are interpreted as semi-elasticities with respect to the real minimum wage. Blue vertical lines denote 95 percent confidence intervals. Counties are classified using the 0.25 HHI threshold, constructed using average county-level HHI over 2005–2007. Regressions include event-county and year fixed effects and the following additional control variables and their interactions with minimum wage: log of total county population, log of total average weekly earnings across all sectors in the county, log of total employment across all sectors in the county, log of the county unemployment rate, log per capita income, and State House Price index. Standard errors are clustered at the state level.

Fig. 1.5: Event Study Estimates by Labor Market Concentration Threshold and Sector.

Figures 1.4 and 1.5 present event-study estimates underlying these average effects. Pre-treatment trends are broadly flat across sectors, with no systematic evidence of differential pre-trends. An exception arises in high-HHI General Merchandise Stores, where employment declines prior to minimum wage increases, biasing against finding positive post-event effects. While the dynamic estimates are imprecise due to wide confidence intervals, short event windows, and the use of scaled minimum wage changes, the absence of systematic pre-trends supports a causal interpretation of the minimum wage effects underlying the baseline results.

1.3.2.2 Heterogeneity

We next examine heterogeneity in employment responses by minimum-wage exposure, and local market structure. Table 1.5 shows that, in the General Merchandise Stores sector, statistically significant employment losses occur only in high-exposure, low-concentration markets, where mean HHI is well below the DOJ–FTC threshold for high concentration (HHI = 0.25). As concentration increases beyond this benchmark, employment effects attenuate and become statistically indistinguishable from zero. In contrast, in low-exposure markets, employment effects are small and statistically insignificant across all concentration groups. In the Food Service and Drinking Places sector, concentration levels are substantially lower across tertiles, and employment effects remain negative across exposure and concentration groups, although estimates in the top HHI tertile are noisier and statistically indistinguishable from zero. Overall,

Table 1.5: Employment Effects of Minimum Wages by Kaitz Exposure and Labor Market Concentration

Sector	Kaitz group[(1)]	HHI group[(2)]	Employment effect	
452 – General Merchandise	Low Kaitz	Low HHI	-0.08	(0.06)
		Middle HHI	0.10	(0.06)
		Top HHI	0.05	(0.08)
	Top Kaitz	Low HHI	-0.18***	(0.04)
		Middle HHI	-0.03	(0.05)
		Top HHI	-0.00	(0.07)
722 – Food Services	Low Kaitz	Low HHI	-0.11***	(0.03)
		Middle HHI	-0.07*	(0.04)
		Top HHI	-0.04	(0.05)
	Top Kaitz	Low HHI	-0.11*	(0.06)
		Middle HHI	-0.09**	(0.04)
		Top HHI	-0.09	(0.05)

Notes: The table reports implied employment effects of minimum wages, computed from linear combinations of coefficients from regressions interacting the log minimum wage with labor market concentration (HHI tertiles), constructed using average HHI over the 2005–2007 period and estimated separately for two equally sized minimum-wage exposure groups defined by the average Kaitz index (2005–2007). Estimates are obtained from a balanced county–sector panel and correspond to the marginal effect of the minimum wage evaluated at each Kaitz and HHI category. All specifications include county and year fixed effects, county-specific linear time trends, and controls for log county population, log total employment and average weekly earnings (across all sectors), the county unemployment rate, log per capita income, and the State House Price Index. Regressions are weighted by average sector employment over the sample period. Standard errors, reported in parentheses, are clustered at the state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

(1) Minimum-wage exposure groups are defined using the sector-specific median of the average Kaitz index over the 2005–2007 pre-period. In Sector 452, the average Kaitz index equals 0.49 (range 0.25–0.54) in Low-Kaitz counties and 0.62 (range 0.54–1.00) in Top-Kaitz counties. In Sector 722, corresponding averages are 0.61 (range 0.26–0.71) and 0.82 (range 0.71–1.00).

(2) Labor market concentration is measured using an employment-based Herfindahl–Hirschman Index (HHI) and grouped into Low, Middle, and Top categories based on sector-specific terciles of the pre-period distribution. In Sector 452, average HHI equals 0.16 (range 0.02–0.22), 0.30 (range 0.23–0.38), and 0.54 (range 0.38–1.00) across Low-, Middle-, and Top-HHI counties, respectively. In Sector 722, corresponding averages are 0.01 (range 0.00–0.02), 0.03 (range 0.02–0.04), and 0.07 (range 0.04–0.51).

employment responses are more negative in settings with higher minimum-wage exposure, reflecting the fact that aggregate employment can increase only if expansion at surviving firms outweighs job losses from firm exit, a condition that may fail even in the presence of monopsony when product market competition is intense.

Table 1.6 shows that the minimum wage–concentration relationship differs by metropolitan status. In the General Merchandise Stores sector, higher concentration is associated with more positive employment responses in metropolitan counties, whereas in nonmetropolitan counties interaction estimates are often statistically insignificant or negative. This pattern suggests that high measured concentration in rural areas is unlikely to be the primary driver of the overall employment patterns observed in the main results. In the Food Service and Drinking Places sector, interaction estimates vary across specifications and are not robust, providing limited evidence that the role of concentration differs systematically between metropolitan and nonmetropolitan counties. These findings suggest that the concentration-related response to minimum wage increases in nonmetropolitan counties may reflect more binding minimum wages and differences in business structure. Consistent with this pattern, establishments in nonmetropolitan counties in the General Merchandise Stores sector employ about 26 workers, on average, compared with about 44 in metropolitan counties, and the average Kaitz index is about 4 percent higher in nonmetropolitan areas. Together, these features suggest that measured concentration is a noisier proxy for monopsony power in rural than in urban labor markets.

Table 1.6: Impact of the Minimum Wage on Employment via Concentration by Metro and Nonmetro Counties, 2005–2020

Dependent Variable: Ln Employment						
Panel A: 452 General Merchandise Stores Sector						
	(1)		(2)		(3)	
	Metro	Non-Metro	Metro	Non-Metro	Metro	Non-Metro
HHI x mw	0.58***	-0.29*				
	(0.16)	(0.14)				
High HHI (≥0.25) x mw			0.12***	-0.06		
			(0.04)	(0.05)		
Middle HHI x mw					0.04	-0.05
					(0.04)	(0.05)
Top HHI x mw					0.15***	-0.10*
					(0.05)	(0.06)
R^2	0.998	0.982	0.998	0.982	0.998	0.982
N	12544	9888	12544	9888	12544	9888
Panel B: 722 Food Service and Drinking Places Sector						
	(1)		(2)		(3)	
	Metro	Non-Metro	Metro	Non-Metro	Metro	Non-Metro
HHI x mw	1.39	-0.30				
	(1.19)	(0.35)				
High HHI (≥0.25) x mw			-1.01***	-0.17		
			(0.33)	(0.16)		
Middle HHI x mw					0.00	0.02
					(0.02)	(0.02)
Top HHI x mw					0.06	0.02
					(0.04)	(0.03)
R^2	0.999	0.996	0.999	0.996	0.999	0.996
N	13696	16016	13696	16016	13696	16016

Notes: All specifications use the balanced sample and include county fixed effects, year fixed effects, county-specific linear time trends, and the following control variables: log of total county population, log of total average weekly earnings (across all sectors) in the county, log of total employment (across all sectors) in the county, log of the county unemployment rate, log per capita income, and State House Price index. Column 1 applied model 1.1. Column 2 applied model 1.2, and Column 3 separates labor markets into HHI terciles. Standard errors (in parentheses) are clustered at the state level, and the regression is weighted by average employment in the sector during the sample period. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Overall, the main findings indicate that in sectors where employer buying power is higher, minimum wage increases are not associated with employment losses, and employment changes become positive only at very high levels of concentration. But in more competitive labor sectors when minimum wages increase, a decrease in employment follows, particularly when facing higher minimum-wage exposure and where labor costs represent a significant share of total costs, in line with what traditional economic textbook theory predicts.

1.4 Robustness checks

1.4.1 Alternative model specifications

These results are presented in Appendix 1.5. Following Neumark et al. [22, 23], who suggest using a basic two-way fixed-effects (TWFE) regression without county-specific linear trends, we estimate this model for comparison with our main results. The results are presented in Table A1.3. For both the General Merchandise Stores sector and the Food Service and Drinking Places sector, the role of concentration is similar to the main results. However, in competitive labor markets, the main effect of the minimum wage on employment, while still negative, is smaller in magnitude and not statistically significant. Following Allegretto et al. [29], we also estimate a model that includes census division by period fixed effects and state-specific linear trends. The results are reported in Table A1.4. Again, concentration plays a similar role in both sectors, while the main effect of the minimum wage remains negative but is smaller and not statistically precise.

Across these alternative specifications, the main concentration pattern remains stable. In General Merchandise Stores, higher employer concentration is associated with a more favorable employment response to minimum wage increases. In Food Service and Drinking Places, the concentration interaction remains small and statistically imprecise across specifications. This pattern is consistent with the low levels of employer concentration observed in this sector.

1.4.2 Sensitivity to control variables

We test the sensitivity of the results to the choice of time-varying controls. Table A1.5 reports estimates from a parsimonious specification that includes only county population as a time-varying control, while retaining the fixed effects and trend structure used in the main model. We view population as the minimum necessary control because employment growth in county-level sectors is closely related to changes in local market size.

The main pattern is unchanged. In General Merchandise Stores, the interaction between the minimum wage and concentration remains positive and statistically precise. In Food Service and Drinking Places, the average minimum wage coefficient remains negative but less precise, while the concentration interaction remains weak and statistically insignificant.

1.4.3 Omitted variable bias

It is possible that variables not included in the empirical model may be related to HHI and influence how the minimum wage affects employment when accounting for concentration. One potential source of omitted variable bias is that labor markets in rural areas may be more concentrated, and their economic conditions and productivity may evolve differently from those in urban areas. To address these concerns, our main specification includes measures of productivity and other economic conditions that may influence wages and HHI. Specifically, we incorporate the log of average weekly earnings across all sectors in a county, the log of real per capita income at the county level from the Bureau of Economic Analysis, and the housing price index at the state level from the Federal Housing Finance Agency as indicators of economic conditions [35].

Including these controls in the main results allows employment levels to differ across less dynamic or lower-productivity counties. The results in Table A1.6, allowing for interactions of the minimum wage with all control variables in our regression, show that higher HHI continues to be linked to a more favorable impact of the minimum wage on employment within the General Merchandise Stores sector, while a positive or no discernible effect is observed within the Food Service and Drinking Places sector. Even if some of these effects are absorbed by county and time fixed effects, the main results remain robust to missing variable specifications.

1.4.4 Endogeneity of concentration

Concerns that contemporaneous labor market concentration may be correlated with local economic shocks that affect employment, or mechanically respond to minimum wage changes through their effect on employment shares, motivate robustness specifications using predetermined measures of concentration. We replace contemporaneous HHI with (1) the average county–sector HHI over 2005–2007 and (2) the average HHI over the longer pre-period 1990–2004, computed over the set of county–sector observations available in the data prior to 2005. These measures are fixed over time and interacted with the time-varying minimum wage, with county fixed effects absorbing their levels. Table A1.7 reports interaction estimates that are comparable to the baseline results, suggesting that the observed heterogeneity in minimum wage effects is unlikely to be driven by simultaneity between employment, concentration, and minimum wage changes, and therefore, mitigates concerns about endogeneity of concentration in the estimating models.

1.4.5 Sample definition

As noted, before, the QCEW omits sector-specific data on employment and earnings when the number of establishments in a county drops below a certain threshold each year. To maintain the credibility of our results, we employ unbalanced samples in our analysis. In other words, we include all counties in the analysis, even if some were excluded temporarily due to data limitations. Table A1.8 confirms that the main

findings remain consistent: a higher HHI is linked to a more positive minimum wage impact on employment in the General Merchandise Stores sector, while there is no effect on employment in the Food Service and Drinking Places sector.

1.4.6 Alternative Lags of Employer Concentration

NETS employment is observed as a snapshot in January of each year but reflects employment information accumulated over the preceding calendar year, whereas QCEW employment outcomes correspond to annual averages within a given year. In the baseline specification, we therefore use January 2021 NETS employment to construct the Herfindahl–Hirschman Index for QCEW outcomes in 2020, aligning the NETS snapshot with the year over which employment is measured in QCEW. As robustness checks, we re-estimate all main specifications using January 2020 NETS employment matched to QCEW outcomes in 2020 (contemporaneous HHI) and January 2019 NETS employment to construct concentration for QCEW outcomes in 2020 (one-year lag). Across these alternative timing assumptions (Table A1.9), the estimated interaction between minimum wages and labor market concentration remains similar in magnitude and statistical precision, indicating that the results are not sensitive to the specific timing used to reconcile NETS and QCEW data.

1.5 Conclusion and Limitations

This study explores the impact of the minimum wage, accounting for employer labor market concentration as measured by the HHI. It utilizes establishment-level data of the two largest low-wage sectors in the U.S. economy: the Food Service and Drinking Places and the General Merchandise Stores sectors. By combining variation in minimum wages with detailed measures of employer concentration, the analysis provides new evidence on how wage floors interact with local labor market structure.

The results point to a wide range of concentration across sectors, time, and space, from predominantly low levels of labor concentration for the Food Service and Drinking Places to widespread high levels of concentration for the General Merchandise Stores sector. The econometric results show that in competitive labor markets, where concentration is low, minimum wage increases reduce employment in both sectors, with larger employment losses where there is a higher exposure to the minimum wage.

However, when concentration is considered, raising the minimum wage leads to employment effects that become statistically indistinguishable from zero at high levels of concentration in the General Merchandise Stores sector, becoming positive at the highest concentration levels. By contrast, in highly competitive labor sectors like Food and Drinking Places, labor market concentration is uniformly low and did not appear to play a significant role.

In our empirical analysis, employment responses consistent with monopsony emerge when labor market concentration exceeds an HHI of about 0.2. This threshold

aligns with recent antitrust guidance that treats moderate to high concentration levels as warranting closer scrutiny in merger review, reinforcing the relevance of labor market concentration as a policy-relevant screening metric [36]. In Food Service and Drinking Places, concentration remains far below this level even after accounting for no-poach agreements, increasing only from 0.03 to 0.04. At the same time, concentration alone is not sufficient: monopsony-consistent responses appear only in metropolitan General Merchandise markets.

Interpreted through a policy lens, these findings underscore the complementary roles of wage floors and antitrust policy. Minimum wages can mitigate the employment and wage distortions associated with high employer concentration, while antitrust policy complements wage floors by limiting the emergence of such concentration in the first place, including through merger review and scrutiny of mobility-restricting practices such as no-poach agreements and non-compete clauses, as emphasized by Naidu et al. [37]. More broadly, our findings fit within a framework in which minimum wages are one of several institutional mechanisms that can counteract monopsony power in highly concentrated labor markets.

Recent evidence shows that worker voice through unionization can mitigate the earnings penalties associated with employer concentration: the union wage premium steeply increases with concentration and appears to accrue almost entirely in highly concentrated markets [38]. While our analysis does not examine unions directly, unionization in the United States is historically low and concentrated in a few industries:

overall union membership rate was just 9.9 percent in 2024, and private-sector unionization was 5.9 percent, with retail trade unionization even lower at around 4 percent [39]. This context suggests that in settings where independent worker-voice institutions are weak or absent, such as much of the U.S. labor market, minimum wages may play a comparatively more important role as a counterweight to monopsony power, whereas in environments with strong collective bargaining, coordination mechanisms may reduce reliance on a uniform wage floor.

From a policy design perspective, our results suggest that minimum wage increases may be most effective in labor markets with high employer concentration, where they can help mitigate monopsony-related distortions with limited employment costs. In competitive labor markets, where concentration is low, minimum wage increases appear more likely to be associated with employment reductions, underscoring the importance of antitrust policy in limiting the emergence of concentrated labor markets.

This study has limitations that provide opportunities for future research. First, the data sets used do not distinguish between part-time and full-time employment, and we do not have a measure of hours worked. Part-time work is more prevalent in low-wage industries. However, this concern is alleviated because our first-stage regression shows a positive and significant increase in weekly earnings, suggesting that even if there was a reduction in worked hours, it may not have been significant enough to offset the increase in the hourly wage. A related data limitation is that the wages used in this

study do not include employer-sponsored health and disability insurance, retirement, and other fringe benefits, although these types of benefits are less likely to exist for part-time and low-wage work.

Another limitation pertains to the definition of labor markets. Due to data necessity, we defined them at the county and 3-digit NAICS sector level. Our analysis could be extended by considering different geographic definitions, such as at the Metropolitan Statistical Area (MSA) level or at the Commuting Zone (CZ) level, and employing narrower sector definitions, such as 4- or 5-digit NAICS codes to provide a more granular analysis of minimum wage impacts. In addition, beyond the reduced-form regressions utilized in this study, which are the common tools for studies of this type, recent structural models of monopsony power in labor markets could be extended to include minimum wages, explicitly estimating labor supply elasticities [reviewed by 40]. Such approaches may need access to microdata, such as the Census or administrative data. However, such research investments appear promising.

In sum, while this study makes some contributions to understanding the effects of minimum wage adjustments on employment and business dynamics, these limitations highlight areas for further exploration and refinement in future research. Addressing these limitations can contribute to a more comprehensive and nuanced assessment of minimum wage policies and their implications for various labor markets and sectors.

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A1.1 NETS Employment Data: Measurement and Validation

We benchmark NETS employment against the Quarterly Census of Employment and Wages (QCEW), the primary administrative data source used in the minimum wage literature. The comparison focuses on employment levels and long-run employment growth at the county–sector level for the two sectors analyzed: NAICS 452 and NAICS 722.

Table A1.1 reports simple correlations between NETS and QCEW employment aggregated to the county–sector–year level. Employment levels are highly correlated across the two data sources in both sectors, with correlations exceeding 0.97 overall. These correlations remain similarly high when the sample is split into metropolitan and nonmetropolitan counties, indicating that NETS closely matches the spatial distribution of employment observed in QCEW across different local labor market environments. In addition, simple regressions of NETS employment levels on QCEW employment levels yield slopes close to one and R^2 above 0.95 in both sectors, indicating an approximately proportional relationship in levels. Correlations in employment growth, measured as percentage changes between 2005 and 2020, remain positive, though smaller than level correlations, ranging from approximately 0.3 to 0.6 depending on sector and metro status. This pattern is consistent with the fact that growth measures are more sensitive to measurement noise, particularly in smaller county–sector cells.

Figure A1.1 complements these results. Panel A shows a tight relationship between NETS and QCEW employment levels for both sectors, with observations clus-

Table A1.1: Correlation Between NETS and QCEW Employment

Outcome	Area	Sector 452	Sector 722
Employment levels	All counties	0.98	0.99
	Metro counties	0.97	0.99
	Nonmetro counties	0.88	0.95
Employment growth	All counties	0.52	0.50
	Metro counties	0.48	0.63
	Nonmetro counties	0.60	0.31

Notes: The table reports simple correlations between NETS and QCEW employment measures aggregated at the county–sector–year level. Employment levels refer to total employment, while employment growth is measured as the percent change in employment between 2005 and 2020. Correlations are reported separately for NAICS 452 (General Merchandise Stores) and NAICS 722 (Food Services and Drinking Places), and for all counties, metropolitan counties, and nonmetropolitan counties. Counties are classified using the 2013 USDA Rural–Urban Continuum Codes.

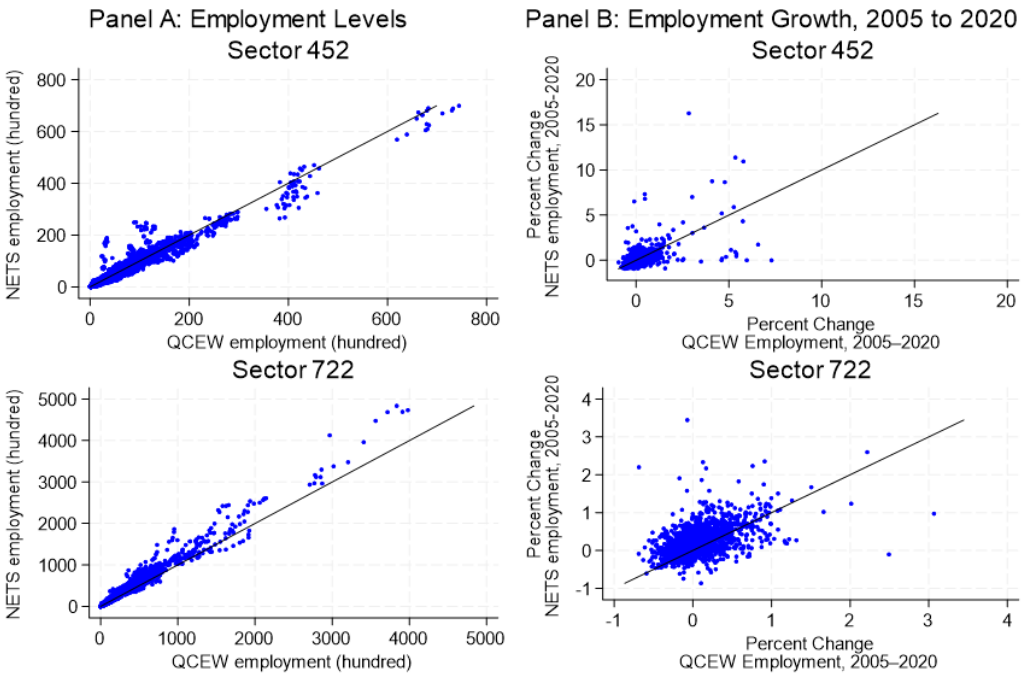

Fig. A1.1: Benchmarking NETS Employment Against QCEW

Notes: The figure plots NETS and QCEW employment aggregated to the county by year by sector level for NAICS 452 and NAICS 722. Panel A shows employment levels. Panel B shows employment growth from 2005 to 2020, defined as percent change between 2005 and 2020 within each county and sector. The solid line is the 45-degree line.

tering around the 45-degree line. Panel B shows a more dispersed but clearly positive relationship for long-run employment growth.

Taken together, the table and figure indicate close alignment between NETS and QCEW employment levels and broadly similar long-run growth patterns across sectors and geography. While growth measures are noisier, the strong agreement in employment levels supports the use of NETS for constructing local labor market concentration measures, which rely primarily on the distribution of employment across establishments.

A1.2 Timing of State Minimum Wage Events

Table A1.2: Timing of State Minimum Wage Events

State	First event	Second event	State	First event	Second event
Alabama	2007		Minnesota	2014	
Alaska	2010	2015	Mississippi	2007	
Arizona	2007		Missouri	2007	
Arkansas	2006	2015	Montana	2007	
California	2007	2014	Nebraska	2007	2015
Colorado	2007		New Hampshire	2007	
Connecticut	2014		New Jersey	2014	
Delaware	2007	2014	New Mexico	2007	2013/2014
District of Columbia	2014		New York	2014	
Florida	2012		North Carolina	2007	
Georgia	2007		North Dakota	2007	
Hawaii	2006	2015	Ohio	2007	
Idaho	2007		Oklahoma	2007	
Illinois	2017		Pennsylvania	2007	
Indiana	2007		Rhode Island	2013	
Iowa	2007		South Carolina	2007	
Kansas	2007		South Dakota	2007	2015
Kentucky	2007	2015/2016	Tennessee	2007	
Louisiana	2007		Texas	2007	
Maine	2017		Utah	2007	
Maryland	2007	2014/2015	Virginia	2007	
Massachusetts	2007	2015	West Virginia	2006	2015
Michigan	2006		Wyoming	2007	

Notes: The following states or counties are excluded from the event study for the following reasons. (1) Continuous minimum wage increases: San Francisco; Oregon; Vermont; Washington. (2) Insufficient post event period: Nevada. (3) Insufficient pre-event period: Wisconsin (two years).

A1.3 Robustness Checks

Table A1.3: Effects of the Log of the Minimum Wage Interacted with HHI on the Log of Employment, TWFE, 2005–2020

Dependent Variable: Ln Employment **Panel A: 452 General Merchandise Stores Sector**				
	(1)	(2)	(3)	(4)
MW	-0.03	-0.08*	-0.06	-0.05
	(0.03)	(0.05)	(0.04)	(0.04)
HHI		-0.55**		
		(0.24)		
HHI × MW		0.30***		
		(0.11)		
High HHI (≥0.25)			-0.27***	
			(0.08)	
High HHI (≥0.25) × MW			0.13***	
			(0.04)	
Middle HHI				-0.15**
				(0.07)
Top HHI				-0.28***
				(0.10)
Middle HHI × MW				0.07**
				(0.04)
Top HHI × MW				0.14***
				(0.05)
R^2	0.995	0.995	0.995	0.995
N	22432	22432	22432	22432
Panel B: 722 Food Service and Drinking Places Sector				
	(1)	(2)	(3)	(4)
MW	-0.02	-0.01	-0.02	-0.02
	(0.03)	(0.03)	(0.03)	(0.03)
HHI		3.71**		
		(1.64)		
HHI × MW		-1.71**		
		(0.76)		
High HHI (≥0.25)			0.23	
			(0.22)	
High HHI (≥0.25) × MW			-0.11	
			(0.10)	
Middle HHI				0.09
				(0.06)
Top HHI				0.15
				(0.09)
Middle HHI × MW				-0.04
				(0.03)
Top HHI × MW				-0.07
				(0.04)
R^2	0.999	0.999	0.999	0.999
N	29712	29712	29712	29712

Notes: All specifications use the balanced sample and apply a simplified TWFE model without county linear trends, but include county and year fixed effects and the following additional control variables: log of total county population, log of total average weekly earnings across all sectors in the county, log of total employment across all sectors in the county, log of the county unemployment rate, log per capita income, and State House Price index. Column 1 applies the TWFE specification without including HHI or the interaction term with minimum wage. Column 2 includes HHI and its interaction with minimum wage. Column 3 uses a high-HHI indicator, and Column 4 separates labor markets into HHI terciles. Standard errors in parentheses are clustered at the state level, and regressions are weighted by average employment in the sector during the sample period. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A1.4: Effects of the Log of the Minimum Wage Interacted with HHI on the Log of Employment, State-Level Trends and Division-Year Fixed Effects, 2005–2020

Dependent Variable: Ln Employment **Panel A: 452 General Merchandise Stores Sector**				
	(1)	(2)	(3)	(4)
MW	-0.00	-0.08**	-0.04	-0.03
	(0.03)	(0.04)	(0.03)	(0.03)
HHI		-0.79***		
		(0.21)		
HHI × MW		0.43***		
		(0.10)		
High HHI (≥0.25)			-0.31***	
			(0.06)	
High HHI (≥0.25) × MW			0.15***	
			(0.03)	
Middle HHI				-0.19***
				(0.06)
Top HHI				-0.33***
				(0.10)
Middle HHI × MW				0.09***
				(0.03)
Top HHI × MW				0.16***
				(0.04)
Division-Year FE	Y	Y	Y	Y
State Linear Trends	Y	Y	Y	Y
R^2	0.996	0.996	0.996	0.996
N	22432	22432	22432	22432
Panel B: 722 Food Service and Drinking Places Sector				
	(1)	(2)	(3)	(4)
MW	-0.03	-0.03	-0.03	-0.03
	(0.03)	(0.03)	(0.03)	(0.03)
HHI		1.25		
		(1.00)		
HHI × MW		-0.57		
		(0.46)		
High HHI (≥0.25)			0.13	
			(0.20)	
High HHI (≥0.25) × MW			-0.06	
			(0.09)	
Middle HHI				-0.01
				(0.05)
Top HHI				0.05
				(0.07)
Middle HHI × MW				0.00
				(0.02)
Top HHI × MW				-0.02
				(0.03)
Division-Year FE	Y	Y	Y	Y
State Linear Trends	Y	Y	Y	Y
R^2	0.999	0.999	0.999	0.999
N	29712	29712	29712	29712

Notes: All specifications use the balanced sample and apply a modified model that includes state linear trends, county fixed effects, and division-year fixed effects, along with the following additional control variables: log of total county population, log of total average weekly earnings across all sectors in the county, log of total employment across all sectors in the county, log of the county unemployment rate, log per capita income, and State House Price index. Column 1 applies the modified specification without including HHI or the interaction term with minimum wage. Column 2 includes HHI and its interaction with minimum wage. Column 3 uses a high-HHI indicator, and Column 4 separates labor markets into HHI terciles. Standard errors in parentheses are clustered at the state level, and regressions are weighted by average employment in the sector during the sample period. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A1.5: Effects of the Log of the Minimum Wage Interacted with HHI on the Log of Employment, Parsimonious Specification with County Trends, 2005–2020

Dependent Variable: Ln Employment **Panel A: 452 General Merchandise Stores Sector**				
	(1)	(2)	(3)	(4)
MW	-0.12***	-0.20***	-0.15***	-0.14***
	(0.04)	(0.04)	(0.04)	(0.03)
HHI		-0.64***		
		(0.19)		
HHI × MW		0.38***		
		(0.09)		
High HHI (≥0.25)			-0.21***	
			(0.06)	
High HHI (≥0.25) × MW			0.10***	
			(0.03)	
Middle HHI				-0.08
				(0.08)
Top HHI				-0.18**
				(0.08)
Middle HHI × MW				0.04
				(0.04)
Top HHI × MW				0.10**
				(0.04)
R^2	0.998	0.998	0.998	0.998
N	22432	22432	22432	22432
Panel B: 722 Food Service and Drinking Places Sector				
	(1)	(2)	(3)	(4)
MW	-0.12*	-0.13*	-0.12*	-0.13*
	(0.07)	(0.08)	(0.07)	(0.07)
HHI		-1.01		
		(1.30)		
HHI × MW		0.55		
		(0.63)		
High HHI (≥0.25)			0.04	
			(0.34)	
High HHI (≥0.25) × MW			-0.02	
			(0.16)	
Middle HHI				-0.04
				(0.05)
Top HHI				-0.05
				(0.07)
Middle HHI × MW				0.03
				(0.02)
Top HHI × MW				0.04
				(0.03)
R^2	0.998	0.998	0.998	0.998
N	29712	29712	29712	29712

Notes: All specifications use the balanced sample and include county fixed effects, year fixed effects, county-specific linear time trends, and log of total county population as a control variable. Column 1 applies the specification without including HHI or the interaction term with minimum wage. Column 2 includes HHI and its interaction with minimum wage. Column 3 uses a high-HHI indicator, and Column 4 separates labor markets into HHI terciles. Standard errors in parentheses are clustered at the state level, and regressions are weighted by average employment in the sector during the sample period. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A1.6: Effects of the Log of the Minimum Wage Interacted with HHI on the Log of Employment, Including Minimum Wage Interactions with Income Per Capita, Total Earnings, and Housing Price Index, 2005–2020

Dependent Variable: Ln Employment **Panel A: 452 General Merchandise Stores Sector**			
	(1)	(2)	(3)
HHI	-0.29		
	(0.29)		
HHI × MW	0.21		
	(0.14)		
High HHI (≥0.25)		-0.13*	
		(0.07)	
High HHI (≥0.25) × MW		0.07**	
		(0.03)	
Middle HHI			-0.04
			(0.06)
Top HHI			-0.05
			(0.10)
Middle HHI × MW			0.02
			(0.03)
Top HHI × MW			0.03
			(0.04)
MW × control variables	Y	Y	Y
R^2	0.998	0.998	0.998
N	22432	22432	22432
Panel B: 722 Food Service and Drinking Places Sector			
	(1)	(2)	(3)
HHI	-1.19		
	(0.98)		
HHI × MW	0.60		
	(0.47)		
High HHI (≥0.25)		0.39	
		(0.29)	
High HHI (≥0.25) × MW		-0.18	
		(0.14)	
Middle HHI			-0.04
			(0.04)
Top HHI			-0.11
			(0.07)
Middle HHI × MW			0.02
			(0.02)
Top HHI × MW			0.06*
			(0.03)
MW × control variables	Y	Y	Y
R^2	0.999	0.999	0.999
N	29712	29712	29712

Notes: All specifications use the balanced sample and include county fixed effects, year fixed effects, county-specific linear time trends, and the following control variables: log of total county population, log of total average weekly earnings across all sectors in the county, log of total employment across all sectors in the county, log of the county unemployment rate, log per capita income, and State House Price index. Specifications additionally include interactions between the minimum wage and selected county-level controls. Column 1 includes HHI and its interaction with minimum wage. Column 2 uses a high-HHI indicator, and Column 3 separates labor markets into HHI terciles. Standard errors in parentheses are clustered at the state level, and regressions are weighted by average employment in the sector during the sample period. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A1.7: Effects of the Log of the Minimum Wage Interacted with HHI on the Log of Employment, with HHI Averaged over 2005–2007 and 1990–2004, 2005–2020

Dependent Variable: Ln Employment						
Panel A: HHI Averaged over 2005–2007						
	(1)		(2)		(3)	
	452	722	452	722	452	722
MW	-0.17***	-0.11***	-0.12***	-0.10***	-0.12***	-0.11***
	(0.05)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
HHI × MW	0.46***	1.02				
	(0.12)	(0.66)				
High HHI (≥0.25) × MW			0.16***	-0.13		
			(0.04)	(0.25)		
Middle HHI × MW					0.17***	0.04
					(0.04)	(0.02)
Top HHI × MW					0.14**	0.04
					(0.06)	(0.04)
R^2	0.998	0.999	0.998	0.999	0.998	0.999
N	22432	29712	22432	29712	22432	29712
Panel B: HHI Averaged over 1990–2004						
	(1)		(2)		(3)	
	452	722	452	722	452	722
MW	-0.17***	-0.11***	-0.10**	-0.10***	-0.11**	-0.10***
	(0.05)	(0.04)	(0.04)	(0.03)	(0.04)	(0.03)
HHI × MW	0.51***	0.79*				
	(0.15)	(0.47)				
High HHI (≥0.25) × MW			0.10**	0.12		
			(0.04)	(0.09)		
Middle HHI × MW					0.08**	-0.01
					(0.03)	(0.02)
Top HHI × MW					0.17***	0.09**
					(0.06)	(0.04)
R^2	0.998	0.999	0.998	0.999	0.998	0.999
N	22336	29632	22336	29632	22336	29632

Notes: All specifications use the balanced sample and include county fixed effects, year fixed effects, county-specific linear time trends, and the following control variables: log of total county population, log of total average weekly earnings across all sectors in the county, log of total employment across all sectors in the county, log of the county unemployment rate, log per capita income, and State House Price index. Standard errors in parentheses are clustered at the state level, and regressions are weighted by average employment in the sector during the sample period. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Differences in observations reflect missing data for 6 counties in Sector 452 and 5 counties in Sector 722 during 1990–2004.

Table A1.8: Effects of the Log of the Minimum Wage Interacted with HHI on the Log of Employment, Unbalanced Sample, 2005–2020

Dependent Variable: Ln Employment **Panel A: 452 General Merchandise Stores Sector**				
	(1)	(2)	(3)	(4)
MW	-0.08***	-0.16***	-0.11***	-0.11***
	(0.04)	(0.04)	(0.04)	(0.04)
HHI		-0.68***		
		(0.18)		
HHI × MW		0.40***		
		(0.09)		
High HHI (≥0.25)			-0.24***	
			(0.06)	
High HHI (≥0.25) × MW			0.12***	
			(0.03)	
Middle HHI				-0.26***
				(0.07)
Top HHI				-0.22**
				(0.08)
Middle HHI × MW				0.13***
				(0.03)
Top HHI × MW				0.12***
				(0.04)
R^2	0.998	0.998	0.998	0.998
N	27857	27857	27857	27857
Panel B: 722 Food Service and Drinking Places Sector				
	(1)	(2)	(3)	(4)
MW	-0.10***	-0.10**	-0.10***	-0.10**
	(0.03)	(0.04)	(0.03)	(0.04)
HHI		-0.31		
		(0.70)		
HHI × MW		0.20		
		(0.33)		
High HHI (≥0.25)			0.25	
			(0.26)	
High HHI (≥0.25) × MW			-0.11	
			(0.12)	
Middle HHI				-0.02
				(0.05)
Top HHI				-0.05
				(0.06)
Middle HHI × MW				0.01
				(0.02)
Top HHI × MW				0.03
				(0.03)
R^2	0.999	0.999	0.999	0.999
N	37023	37023	37023	37023

Notes: All specifications use the unbalanced sample and include county fixed effects, year fixed effects, county-specific linear time trends, and the following control variables: log of total county population, log of total average weekly earnings across all sectors in the county, log of total employment across all sectors in the county, log of the county unemployment rate, log per capita income, and State House Price index. Column 1 applies the specification without including HHI or the interaction term with minimum wage. Column 2 includes HHI and its interaction with minimum wage. Column 3 uses a high-HHI indicator, and Column 4 separates labor markets into HHI terciles. Standard errors in parentheses are clustered at the state level, and regressions are weighted by average employment in the sector during the sample period. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A1.9: Effects of the Log of the Minimum Wage Interacted with HHI on the Log of Employment, Alternative Lags of Employer Concentration, 2005–2020

Dependent Variable: Ln Employment						
Panel A: Contemporaneous HHI						
	(1)		(2)		(3)	
	452	722	452	722	452	722
MW	-0.17***	-0.10***	-0.12***	-0.10***	-0.12***	-0.10***
	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
HHI × MW	0.44***	0.34				
	(0.10)	(0.45)				
High HHI (≥0.25) × MW			0.12***	-0.17		
			(0.03)	(0.16)		
Middle HHI × MW					0.11***	0.01
					(0.03)	(0.02)
Top HHI × MW					0.15***	0.02
					(0.04)	(0.03)
R^2	0.998	0.999	0.998	0.999	0.998	0.999
N	22432	29712	22432	29712	22432	29712
Panel B: HHI Lagged by One Year						
	(1)		(2)		(3)	
	452	722	452	722	452	722
MW	-0.16***	-0.10***	-0.10***	-0.10***	-0.11***	-0.10***
	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
HHI × MW	0.39***	0.36				
	(0.10)	(0.45)				
High HHI (≥0.25) × MW			0.08**	-0.09		
			(0.04)	(0.16)		
Middle HHI × MW					0.07**	0.01
					(0.03)	(0.02)
Top HHI × MW					0.13***	0.02
					(0.04)	(0.03)
R^2	0.998	0.999	0.998	0.999	0.998	0.999
N	22426	29707	22426	29707	22426	29707

Notes: All specifications use the balanced sample and include county fixed effects, year fixed effects, county-specific linear time trends, and the following control variables: log of total county population, log of total average weekly earnings across all sectors in the county, log of total employment across all sectors in the county, log of the county unemployment rate, log per capita income, and State House Price index. Standard errors in parentheses are clustered at the state level, and regressions are weighted by average employment in the sector during the sample period. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Differences in observations reflect missing data for 6 counties in Sector 452 and 5 counties in Sector 722 in 2004.