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ABSTRACT

Why is the employment effect of the minimum wage frequently found to be close to zero? Theory tells us that when wages are below marginal productivity, as with monopsony, employers are able to increase wages without laying off workers, but systematic evidence directly supporting this explanation is lacking. In this paper, we provide empirical support for the monopsony explanation by studying a key low-wage retail sector and using data on labor market concentration that covers the entirety of the United States with fine spatial variation at the occupation-level. We find that more concentrated labor markets – where wages are more likely to be below marginal productivity – experience significantly more positive employment effects from the minimum wage. While increases in the minimum wage are found to significantly decrease employment of workers in low concentration markets, minimum wage-induced employment changes become less negative as labor concentration increases, and are even estimated to be positive in the most highly concentrated markets. Our findings provide direct empirical evidence supporting the monopsony model as an explanation for the near-zero minimum wage employment effect documented in prior work. They suggest the aggregate minimum wage employment effects estimated thus far in the literature may mask heterogeneity across different levels of labor market concentration.

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1 Introduction

Many papers document the employment effect of the minimum wage (Neumark and Wascher (1992); Card and Krueger (1994); Dube, Lester and Reich (2010*a*); Meer and West (2016); Jardim et al. (2018); Clemens and Wither (2019); Cengiz et al. (2019), to name only a few). Despite the volume of work there is still considerable debate about whether there is, in fact, an appreciable disemployment effect of the minimum wage, with many studies finding null results while many others indeed show a negative employment effect of varying intensity.

A common explanation for the many null findings is the existence of substantial labor market monopsony or oligopsony (Manning, 2011; Naidu, Posner and Weyl, 2018). Under perfect competition, the expectation is a clear and unambiguous reduction in employment caused by a binding increase in the minimum wage. While firms' ability to adjust in other ways, e.g. by increasing prices for consumers, may buffer the employment decline, under perfect competition employment never increases as a result of the minimum wage. However, when one departs from the assumption of a perfectly competitive labor market, the minimum wage can increase employment, as Stigler (1946) noted three quarters of a century ago. This is particularly true in the case of labor market monopsony. More generally, employment under oligopsony may increase with the minimum wage, and, when it does decrease, it can be shown to fall by less under monopsonistic competition than perfect competition (Bhaskar, Manning and To, 2002).

However, to date there has been no strong empirical confirmation of the monopsony explanation for the limited negative employment effects of the minimum wage. In this paper, we provide the first direct test for the mediating role of labor market concentration - a key source of monopsony and oligopsony power[1] (Azar, Marinescu and Steinbaum, 2019) - on the minimum

[1]Besides employer concentration in the labor market, two other leading sources of monopsony power, job differentiation and search frictions, imply reductions in the wage elasticity of labor supply (e.g. they result in wage decreases having a limited effect on workers' quitting). Empirically, Azar, Marinescu and Steinbaum (2019) show that labor market concentration and the labor supply elasticity are significantly and negatively correlated across markets - in more concentrated markets, the wage elasticity of job applications is lower - making labor market concentration not only a direct source of monopsony power in its own right, but, also a proxy for these other sources as well.

wage employment effect. The prediction we test empirically is that the employment elasticity of the minimum wage is more positive in cases of greater labor market concentration.

Such a direct empirical test of the monopsony minimum wage story has been hindered in the past by the lack of fine grained data on labor market concentration. Traditional data sets on occupational labor markets (e.g. JOLTS, HWOL) are limited in their granularity. We exploit an exceptionally rich data set from Burning Glass Technologies that gives us record of all U.S firms' online job vacancy announcements at the level of the county, month, and occupation (defined at a six digit standard occupational code level). Based on these data, we can measure occupational labor market concentration using the standard Herfindahl-Hirschman index (HHI) defined over these job vacancies (Azar, Marinescu and Steinbaum, 2019; Azar et al., 2018; Azar, Marinescu and Steinbaum, 2017). This allows us to test whether the employment effects of the minimum wage are more positive in more concentrated (high-HHI) occupational labor markets, thus, assessing the common explanation for the above-mentioned null findings.

The data from Burning Glass Technologies covers the near universe of online US job vacancy postings, found on some 40,000 websites. While the data is very detailed, a downside of the data is that for a much-studied sector in the existing minimum wage literature, the restaurant sector, a good deal of the hiring is done offline, making the Burning Glass data ill-suited to study this sector.[2] To leverage the online job posting data, then, we focus on another key minimum-wage employing industry that is more likely (we show) to hire online, the general merchandise store sector (NAICS 452).[3] Leading firms in this sector, the largest sector in retail, include Walmart and Macy's.[4] Taken together, the large fraction of very low-wage workers in

[2]In Section 3, we provide evidence from the data grounding the common intuition that restaurants are places where the canonical "Help Wanted" sign in the window is still a typical form of job advertisement (and/or that other forms of non-internet-based job posting, e.g. word of mouth search through current employees or worker drop-ins with paper resumes, are common).

[3]Together, the accommodation/food service and the retail sectors are known to employ 50% of US minimum wage workers (Dube, Lester and Reich, 2010*a*), and, as such have been the subject of much of the prior minimum wage research in the US. Restaurants are contained in the accommodation/food service industry and general merchandise stores are the largest employer in the retail industry.

[4]Typical general merchandise stores are discount stores like Target and Walmart, and department stores like Macy's and Kohl's. More specifically, general merchandise stores are defined as firms that sell a wide range of general merchandise except fresh, perishable foods, and, which have central customer checkout areas, generally

this industry, the tendency of industry hiring managers to post jobs for these minimum wage-affected occupations online, and, the significant variation we find in the measured local labor market concentration for these occupations, make the setting an ideal one to test the predictions of the monopsony model.

Our results indicate that, consistent with theory, more concentrated labor markets exhibit more positive employment effects from the minimum wage. This is true for a variety of specifications, and when separately using concentration measures for three different minimum wage-heavy occupational labor markets: stock clerks, retail sales, and cashiers. To give a sense of scale, a standard deviation increase in the measure of labor market concentration is associated with a significant 0.2 *increase* in the employment elasticity of the minimum wage. The results are robust to a number of sensitivity tests. One important concern is omitted variable bias: there may be a variable correlated with concentration that causally modulates the impact of the minimum wage on employment. We note that, even if it were the case, concentration is still a useful proxy for this variable and can allow policy makers to predict the effects of a minimum wage increase. We are nevertheless interested in testing for potential alternative mechanisms that explain the heterogeneity of the minimum wage employment effects and we focus on two key candidates for the omitted variable: population density and productivity, which are both correlated with HHI and could also modulate minimum wage effects. We find that results are robust to allowing for a different effect of the minimum wage by both population density and a productivity proxy (economy-wide earnings in an area conditional on population). This robustness test supports our main findings: concentration has a significant modulating effect on the employment elasticity of the minimum wage even after we allow other key variables to have their own modulating effects.

Overall, then, our results indicate the size and sign of the minimum wage's employment effects vary substantially on the basis of underlying labor market concentration. Employment elasticities of the minimum wage are significantly negative with point estimates of approxi-

in the front of the store, and may have additional cash registers located in one or more individual departments.

mately -0.2 for the 33% of least concentrated labor markets, approximately zero for the middle concentration group, and significantly *positive* with point estimates of approximately 0.35 for the 33% of most concentrated of labor markets (which are very concentrated by typical measures). The related own-wage elasticity of labor demand, which we also derive, spans the range of comparable elasticities estimated in the minimum wage literature (see Figure 6), with the 33% of least concentrated markets on the outer left (i.e. the most negative) of the prior work's estimate range, the 33% of most concentrated markets forming the outer rightward bound (most positive) of this range, and, the middle third's estimates being close to zero. This indicates that differences in the degree of monopsony power could play an important role in accounting for the divergent elasticity estimates in prior studies, drawn from a wide range of labor markets that, themselves, have differences in underlying market concentration.

The remainder of the paper proceeds as follows. Section 2 provides a brief review of the theoretical considerations motivating the analysis. Section 3 reviews our data and discusses the design considerations motivating our empirical strategy. Section 4 presents our main results and robustness checks. Section 5 concludes.

2 Theoretical background

A brief review of the theory characterizing the interplay between labor market concentration and minimum wage policy is useful before we further pursue an empirical test of this theory. In the standard treatment under perfect competition, absent other margins of adjustment by the firm, there is a clear and unambiguous reduction in employment (either on the intensive or extensive margin) caused by a binding increase in the minimum wage. While other margins of adjustment may indeed exist for an employer operating in a perfectly competitive labor market - in particular, through the pass through of costs via increased consumer prices, renegotiation of prices for other inputs and capital, or reduction in profit - even in these cases there is no prediction that minimum wage increases should result in increases in employment,

but, rather, at the boundary, that they simply cause no change in employment.

In a monopsonistic labor market, however, employment *can increase* as a result of a minimum wage increase. In the status quo sans minimum wage, workers in such a labor market are paid below marginal productivity. The firm is assumed to pay all workers the same wage. Therefore, to hire more workers, it must increase not only wages of new hires, but also the wages of incumbents. A profit-maximizing firm, given the choice, chooses a wage that will induce a level of labor input (i.e. employment) such that the marginal cost of that labor input (the wage of the new employee, plus the increase in the wage bill for all incumbents) is equal to its marginal productivity. Absent a wage floor, under monopsony this optimal wage is lower than that under perfect competition, ceteris paribus. When a wage floor is introduced, the same profit maximizing logic applies with one key difference. Assume the minimum wage is introduced at a level higher than the equilibrium wage under monopsony but equal to or lower than the equilibrium wage under perfect competition. Now, the profit-maximizing firm will still only choose to hire additional workers if the productivity of the marginal worker is equal to their marginal cost. Critically, however, the existence of a minimum wage means that the marginal cost of hiring a worker (starting from the equilibrium level of employment under monopsony) is just the minimum wage, and does not include wage increases given to incumbents (who must already be paid the minimum wage by law). The monopsonist, then, faces a reduced marginal cost (relative to the pre-minimum-wage status quo) of increasing labor beyond the prior equilibrium level, and, can hire additional workers until the productivity of the marginal worker is equal to the minimum wage (Bhaskar, Manning and To, 2002). To summarize, when the minimum wage increases while staying below the competitive level, employment increases in a monopsonistic labor market.

In a more general setting, with more than a single firm, the marginal productivity of workers varies across firms within a market. Therefore, the overall employment effect of a minimum wage increase in a market depends on the distribution of firm types: it could be positive or negative depending on the level of the minimum wage and the distribution of marginal revenue

product curves across firms. With levels of market concentration below monopsony (HHI<1) but still high, minimum wage increases can also increase employment (Bhaskar and To (1999); Walsh (2003); Aaronson and French (2007)). Crucially, even when the underlying assumptions of these models of highly (but not perfectly) oligopsonistic labor markets yield predictions of disemployment from the minimum wage, it is possible to show that under oligopsony with free entry employment falls less than under perfect competition (Bhaskar, Manning and To, 2002). Overall, we should expect the employment elasticity of the minimum wage to become more positive in more concentrated labor markets, as these are markets where workers are more likely to be paid less than their marginal productivity. We test this prediction below using the job vacancies Herfindahl-Hirschman Index as a measure of monopsony power.

3 Data and Design

3.1 Data

Our outcome measure – industry-level employment and weekly wages in the general merchandise store sector – comes from the Quarterly Census of Employment and Wages (QCEW), a widely used data set in the minimum wage literature. The QCEW provides a near census of quarterly, county-level payroll data by detailed industrial classification, including employment counts and average weekly wages.

Additional control variables, including the log of county total population, log of total average weekly earnings (across all sectors) in the county, and the log of total employment (across all sectors) in the county, also come from the QCEW, while the log of the county unemployment rate is taken directly from the Bureau of Labor Statistics. Minimum wage variation includes all federal, state, and county-level minimum wage changes.

Job postings data, used to measure the degree of labor market concentration, comes from Burning Glass Technologies and covers the near universe of online US job vacancy postings

(culled from some 40,000 websites). This data has recently been used in Azar et al. (2018), Hershbein and Kahn (2018), Deming and Kahn (2018), Modestino, Shoag and Ballance (2016). Importantly, BGT data is fairly similar in terms of industry composition to all vacancies recorded in the nationally representative Job Openings and Labor Turnover Survey (JOLTS) (Hershbein and Kahn, 2018). Furthermore, the occupational distribution in BGT data is similar to the one found in the Occupational Employment Statistics (Hershbein and Kahn, 2018).

The job postings data is cleaned by Burning Glass to remove vacancy duplicates and extract key characteristics for each vacancy. Of interest to our work are the location of the vacancy (county), the time of the initial posting for the job, the name of the employer, and the occupation (categorized by a six digit standard occupation code (SOC) identifier). The name of the employer is normalized by BGT so that similar employer names are grouped together into a single employer: for example, "Bausch and Lomb", "Bausch Lomb", and "Bausch & Lomb" would be grouped together. Still, 35.9% of employer names are missing, partly due to staffing companies not disclosing on whose behalf they are posting a given job. To calculate concentration, we will assume that all these missing employer names are different, thus providing a lower bound for labor market concentration. We utilize uninterrupted data from the first quarter of 2010 until the last quarter of 2016, as there is a gap in the data in 2009.

3.2 Design

When seeking to test for differential employment effects of a minimum wage policy in more vis-a-vis less concentrated labor markets, an ideal setting is one where we have 1) an occupation that earns a low median wage (i.e. the minimum wage "bites" from the workers' perspective), 2) where the occupation is a sizable fraction of the associated industry employment, implying the associated industry is a low median wage industry (i.e. a minimum wage increase is meaningful, or "bites", from the firm's perspective so that any firm-level employment effects are detectable), 3) the industry primarily recruits online (so that the Burning Glass data can yield a valid measure of HHI), and, 4) the labor market has enough natural variation across the

country in HHI to include both concentrated and competitive occupational labor markets (for meaningful differences in underlying market concentration). This set of criteria can be summarized in the following statement: an ideal design will study a (near) minimum-wage-earning occupation in a low-wage industry that primarily uses online advertisements to fill jobs and that has a range of high and low labor market concentration levels.

Previous work serves as a guide in choosing the ideal setting. It is well documented that the industries that most intensively use a near-minimum wage workforce are the accommodation/food service and the retail sectors, accounting for 50% of all employees in the US who are paid within 10% of the minimum wage (Dube, Lester and Reich (2010*a*)). The largest (by number of employees) 3-digit NAICS categories within the food & accommodation and the retail sectors are the Food Service and Drinking Places sector (NAICS code 722000) and the General Merchandise Stores sector (NAICS code 452000), respectively.

The two sectors do not, however, use the internet to recruit low wage jobs at the same rates. As a benchmark for what is typical usage of online recruitment, we take the ratio of Burning Glass Technologies (BGT) job postings for an occupation over the total stock of jobs in the occupation (available from the Occupational Employment Statistics, OES). For the economy as a whole we have a median ratio of 0.09. For the key minimum wage earning occupations in the food service sector (contained in SOC 35-3xxx) the ratio is about half the size (0.05), while, for the key minimum wage earning occupations in the General Merchandise sector (contained in SOCs 43-5xxx and 41-2xxx) this ratio is 0.08 and 0.09, respectively, suggesting more typical rates of online hiring, and, making the Burning Glass data more suitable for study of the latter sector.

As such, we focus on the main minimum wage-heavy occupations in the General Merchandise sector - stock clerks and order fillers (SOC 43-5081), retail salespersons (SOC 41-2031), and cashiers (SOC 41-2011) - which each represent between roughly 20-30% of the General Merchandise work force, and, cumulatively, 65% of all employees.[5] The Burning Glass data also

[5]This is based on the 2016 National Industry-Specific Occupational Employment and Wage Estimates from the

reveals that these occupations exhibit significant spatial variation in labor market concentration levels, with many high and many low concentration areas, an essential feature for our design and testing the question at hand.

To demonstrate this final point, we require greater precision regarding what constitutes high vs. low labor market concentration. This in turn necessitates a measure of concentration, and, for this we rely on the standard definition of the Herfindahl-Hirschman Index (HHI):

$$HHI_{m,t} = \sum_{j=1}^{J} s_{j,m,t}^2$$

where for any firm j in a given occupational labor market m and at quarter t, its market share s of job postings for the occupational labor market is defined as the sum of Burning Glass vacancies posted by the firm in the market and quarter divided by the total number of such vacancies posted in that market and quarter. Azar et al. (2018) discuss in more detail the construction of this measure and its interpretation.

By construction, HHI measures run from 0 to 1, with larger values indicating greater concentration. By Department of Justice/Federal Trade Commission 2010 horizontal merger guidelines, an HHI above 0.15 is considered "moderately concentrated" and an HHI above 0.25 is considered "highly concentrated." As mentioned, an ideal design would include a significant fraction of labor markets above and below the highly concentrated 0.25 threshold. In fact, the three SOCs we work with all have distributions for our HHI measure with coverage throughout the HHI scale's range, so that they are not too skewed in the direction of perfect competition or monopsony and allow for considerable natural variation in labor market concentration. The full distribution of these SOCs' HHIs is presented and discussed in the following section.

In our analysis, we use the average HHI across all available quarters of data in the sample period to give a broadly representative characterization of the underlying labor market concentration. A natural concern this raises, however, is that this may introduce endogeneity if

Bureau of Labor Statistics for the 452000 "General Merchandise Store" NAICS. Within the industry, stock clerks and order fillers, retail salespersons, and cashiers comprise 17%, 27%, and 21% of total employees, respectively.

minimum wage changes affect HHI. However, the data suggest this is not the case, as there is no significant relationship at all between minimum wage and HHI level (either at the quarterly HHI level or for the average of quarterly HHIs we use). Furthermore, if we use the first two years (2010-2011) to construct an alternative, baseline average HHI measure for each county and then run the equivalent specifications presented below using this alternative HHI measure, but, with only 2012-2016 data for all other variables (thus, eliminating the concern that the analyzed period's minimum wage changes may affect this HHI, since it is defined over the pre-analysis period) we get very similar results to those presented below, both qualitatively and in terms of statistical significance.

4 Results

4.1 Main Results

Before turning to the main results on employment, we begin by exploring the "first-stage" result of the minimum wage's effect on earnings. A positive and significant earnings elasticity (with respect to the minimum wage) for workers in the general merchandise store sector is to be expected given the large fraction of workers in the industry in very low wage occupations who are likely to have their wages increased as the minimum wage goes up (in particular, the 65% of the workforce referenced in the previous section who work as stock clerks and order fillers, retail salespersons, and cashiers). However, confirming this empirically is important for the interpretation of later estimates of the minimum wage employment elasticities, as we are interested in explaining real employment responses to *binding* minimum wages (a zero employment elasticity of the minimum wage means something entirely different in an industry where there is no detectable earnings elasticity to begin with vis-a-vis one with a significant earnings elasticity). [6]

[6] A similar need for a research setting where the studied minimum wage increases have bite (are binding) has largely motivated the focus in prior work on populations of restaurant workers, retail workers, and teen workers,

Table 1 reports these minimum wage earnings elasticity estimates for the general merchandise sector. The three columns all have the same outcome: average monthly earnings in the general merchandise sector. Each column reflects one of the three alternative baseline samples subsequently used throughout the paper (each constructed using one of our three distinct SOCs in the industry to compute the HHI measure, thus, yielding somewhat different sample sizes, as explained further in the discussion of Table 2 that immediately follows). The general finding in Table 1 is a positive and significant (at the 1% level) earnings elasticity with respect to the minimum wage, with a point estimate between 0.09 and 0.10; minimum wage increases are found to yield significant earnings increases in the sector, indicating significant bite of the minimum wage for general merchandise stores. Thus, as expected, the sector is confirmed to be an appropriate setting to study potential employment responses by firms to (actual) minimum-wage-induced increases in labor costs. For further details of the specifications in the table see the footnotes to Table 1 and the discussion that immediately follows of the related employment regressions.[7]

Turning to the study of the minimum wage's employment effects, we outline our baseline specifications in greater detail. As above, all regressions are performed at the county-quarter level of observation. Our left hand side variable is now the log of general merchandise store employment in the county-quarter. While the log of the governing minimum wage level remains a primary regressor of interest, given our research question, we are especially interested in the interaction of this variable with our measure of labor market concentration, HHI. We construct HHIs for each of the three occupational labor markets identified in the previous section as being large (in their share of total sectoral employment) and minimum-wage heavy occupations: stock clerks and order fillers, retail salespersons, and cashiers. The distribution of county average HHI measures (averaged for each county across the 2010-2016 sample period) is presented for each of the occupational labor market in Figures 1 - 3. As each of these

respectively.

[7] Additionally, we find no significant difference in the minimum wage earnings elasticity estimates across high and low levels of the market concentration measure introduced in Table 2, as can be seen in Appendix Table 4.

labor markets have distinct variation in HHI - while still each being large relative to the sector's total employment, so that any resulting changes in occupational employment induced by the minimum wage should yield visible changes in total employment - we separately estimate regressions with log minimum wage interacted with each occupational HHI. The basic linear specification takes the form

$$ln(Y_{it}) = \alpha + \beta ln(MW_{it}) + \psi HHI_i + \delta ln(MW_{it}) * HHI_i + \phi ln(TotEmployed_{it}) +$$

$$\zeta ln(TotEarnings_{it}) + \eta ln(Pop_{it}) + \tau_t * ln(Unemp_{it}) + \gamma_i + \tau_{ct} + \chi I_s * t$$

where the outcome $ln(Y_{it})$ is the log of general merchandise store employment in county i and quarter t, $ln(MW_{it})$ is the log of the governing minimum wage, HHI_i is the labor market's average HHI over the sample period, and, the interaction term $ln(MW_{it}) * HHI_i$ is the main variable of interest. Additional control variables include the log of county total population, the log of total average weekly earnings (across all sectors) in the county, the log of total employment (across all sectors) in the county, the log of the county unemployment rate, and county fixed effects γ_i, census division specific quarter fixed effects τ_{ct}, and state-specific linear time trends $\chi I_s * t$. Standard errors are clustered at the state level.

As an alternative specification we also include a binary HHI variable that separates high and low concentration labor markets using the Department of Justice/ Federal Trade Commission 2010 horizontal merger guideline threshold of 0.25 for highly concentrated markets.

$$ln(Y_{it}) = \alpha + \beta ln(MW_{it}) + \psi \mathbb{1}(HHI_i \geq 0.25) +$$

$$+\delta ln(MW_{it}) * \mathbb{1}(HHI_i \geq 0.25) + \phi ln(TotEmployed_{it}) + \zeta ln(TotEarnings_{it})$$

$$\eta ln(Pop_{it}) + \tau_t * ln(Unemp_{it}) + \gamma_i + \tau_{ct} + \chi I_s * t$$

Table 2 presents the results using both the linear (odd numbered columns) and binary specifications (even numbered columns) for the HHI. In Columns 1 and 2, we present estimates

using the HHI measure defined over the stock clerks and order fillers labor market (SOC 43-5081). Columns 3-4 and columns 5-6, respectively, present estimates using the HHI measure defined over the retail sales labor market (SOC 41-2031) and the cashiers labor market (SOC 41-2011).

Across specifications and across each of the HHIs defined over the three alternative occupational labor markets, Table 2 shows negative and significant point estimates on the main effect of the minimum wage employment elasticity (see the first row), which corresponds to a low level of labor market concentration. In odd numbered columns, this estimate characterizes the employment effects of the minimum wage in extremely *un*concentrated labor markets (i.e. those approaching the competitive ideal of an infinite number of small firms posting advertisements in equal number for stock clerk jobs, for instance, to take the example of column 1). In even numbered columns, this estimate characterizes the average employment elasticity for those occupational labor markets below the DOJ-threshold for concentrated markets (HHI below 0.25). This negative point estimate is consistent with the standard prediction, based on a competitive labor market setting, of employment reductions resulting from minimum wage increases. Quantitatively, we find that in these more competitive labor markets, a 10% increase in the minimum wage reduces employment in general merchandise stores by just under 2%.

Across the second and third rows of Table 2, however, there is a consistent finding of a statistically significant and positive log minimum wage-HHI interaction term. This indicates that the more concentrated the occupational labor market is, the more positive the employment elasticity of the minimum wage becomes. To give a sense of scale for the estimates in the second row, taking column 1 as an example, a standard deviation increase in the stock clerk labor market HHI makes the employment elasticity increase by 0.21 (for columns 3 and 5, the equivalent increase is 0.22 and 0.20). The third row estimates indicate the increase in the employment elasticity for those occupational labor market with HHIs above the DOJ concentrated markets threshold: the elasticity is higher by about 0.3. In all cases, these estimates indicate a common finding: as labor markets become more concentrated, the dis-employment effect from

minimum wage is significantly reduced.

Figure 4 presents the estimated employment elasticities for the high and low concentration areas (again, using the 0.25 HHI threshold) that result from the binary specifications in Table 2. As can be seen across occupations, when moving from low concentration areas to high concentration areas, the employment elasticity changes dramatically, going from approximately -0.2 to a *positive* point estimate, though it is only statistically significant at the 5% level for the retail sales occupation.

Table 3 and Figure 5 make the pattern even clearer. Here we separate labor markets into HHI terciles, rather than simply binary bins (otherwise following the specifications of Table 2). As can be seen across the columns (again, corresponding to the alternative occupational labor markets) of Table 3, we estimate a negative point estimate for the minimum wage employment elasticity in the lowest HHI tercile, with the elasticity significantly increasing (becoming more positive) for upper terciles, and the size of that increase being considerably larger in magnitude for the upper HHI tercile-log minimum wage interaction.[8]

Figure 5 plots the point estimates and 95% confidence intervals for the minimum wage employment elasticities in each HHI tercile group (based on the specifications of Table 3). For the bottom HHI tercile group, the employment elasticity is significantly negative (at or very near the 5% level) across each panel of the figure, at about -0.2. For the middle HHI tercile group, the employment elasticity is not significantly different than zero (with a point estimate that is essentially zero across all panels). For the top HHI tercile group, the employment elasticity increases further, with positive point estimates of about 0.35 that are significantly different than 0 at the 5% level in all panels.

Figure 6 presents a comparison of our estimates, taking labor market concentration into consideration, and estimates from the existing literature, that do not explicitly account for the level of labor market concentration. For the survey of the existing literature, we make use of

[8]For stock clerks, the terciles run from 0 to 0.346, 0.346 to 0.713, and, 0.713 to 1. For retail sales, the terciles run from 0 to 0.144, 0.144 to 0.507, and, 0.507 to 1. For cashiers, the terciles run from 0 to 0.362, 0.362 to 0.690, and, 0.690 to 1.

estimates provided by Harasztosi and Lindner (2019) (see their Web Appendix), who report the employment elasticity with respect to the wage (own-wage elasticity of labor demand) derived from minimum wage-based research designs published in peer-reviewed academic journals. This elasticity is distinct from the canonical employment elasticity with respect to the minimum wage focused on so far, but, it can easily be computed using both the employment elasticity with respect to the minimum wage and the earnings elasticity with respect to the minimum wage (it is effectively, the ratio of the two). In the figure, we present the own-wage employment elasticity for each HHI tercile and for each occupation that results from our above estimates.[9] A general pattern emerges. In comparison to the estimates from the broader literature, our low concentration estimates are on the outer left (most negative) of the range of prior work's point estimates, and include only prior estimates with negative elasticites in their 95% confidence intervals. Our middle-range concentration estimates are centered around zero and are not significant. Our upper-range concentration estimates, representing very highly concentrated labor markets, are to the far right of the existing range of estimates from the prior literature and have 95% confidence intervals that include only positive values. Such a pattern is to be expected if indeed labor market concentration is an important, previously unobserved and unaccounted for, factor in determining the employment effects of the minimum wage.

4.2 Robustness

We now consider the robustness of the above-reported findings. We first consider a simplified version of the specifications in Table 2.

In recent years, there has been debate in the minimum wage literature over the appropriateness of including census-division-by-period fixed effects and linear state-specific time trends a la Dube, Lester and Reich (2010*a*) (Neumark, Salas and Wascher (2014) Allegretto et al. (2013)

[9]To construct our HHI-tercile-specific own-wage employment elasticities for Figure 6 we utilize the minimum wage earnings elasticity estimates from Table 1, which are averaged for the entire HHI distribution, because, as with the binary HHI measure-log minimum wage interactions presented in Appendix Table 4, there is no significant difference in the minimum wage earnings elasticity estimates across HHI terciles.

Allegretto et al. (2017)). Neumark, Salas and Wascher (2014) have been particularly critical of this approach, and, have instead argued for the basic two-way fixed-effect estimator commonly used in the literature in the 2000s and before. In Table 5 in the Appendix, we report a two-way fixed-effect version of Table 2. Results are similar across the two tables, and reveal the same pattern of significantly more positive employment effects of the minimum wage as labor market concentration increases. This convergence across specifications is consistent with the recent work of Cengiz et al. (2019), who find that differences across specifications disappear when focusing on minimum wage changes in recent years (as we do given our reliance on the Burning Glass data).

In Table 6 of the Appendix we explore the robustness of our main results to the exclusion of counties where Burning Glass data is more limited. Specifically, Appendix Table 6 uses in the analysis only the counties for which an occupational average HHI can be formed from at least 8 quarters of BG job advertisement data. This adjustment can be thought of as a way of getting an HHI average that is potentially more reflective of the overall time period. The downside is that the exclusion of counties with limited Burning Glass data reduces the sample size somewhat. However, the change has little effect on the results. The specifications of Table 2 are repeated on this revised sample in Appendix Table 6, with estimates being very similar in size and significance, and, a repeat of the main finding of a significantly more positive employment effect of the minimum wage as labor market concentration increases.

Next, as a minimal test to reveal a possible spurious correlation we perform a placebo test in a relatively high wage industry that has virtually no minimum wage jobs. To guide the selection of industry and occupation, we start by focusing on the highest paid of the 10 largest (by employment) occupations in the US, registered nurses (SOC 291141). BLS Occupational Employment Statistics data on the distribution of this occupation's wages indicates that under no circumstances should we expect these workers to be affected by minimum wage increases, either marginally or inframarginally. OES occupation-industry matrices further indicate that the largest industry to employ this occupation while also employing essentially

no minimum wage-level workers[10] is the offices of physicians (NAICS code 621100), which is also the second-largest employer of the occupation overall. This setting is ideal because we can focus on the non-minimum wage occupation in the sector without any likelihood that firm adjustments to pay for other minimum wage-level occupations will have ripple effects on the former group's employment. Our placebo test explores whether variation in labor market concentration for this non-minimum wage occupation mediates the way sectoral employment correlates with the minimum wage, looking to see if we find the same relationship observed in the general merchandise store sector. If so, our prior results would be called into question as evidence of labor market concentration's effect on the minimum wage employment elasticity.

Table 7 in the Appendix presents equivalent specifications to those in Table 2 using the physicians' office employment numbers as the outcome and registered nurse HHI in columns 1 and 2. In the other columns of the table, we also include two other HHIs for two related medical occupations in the sector that also have moderate, above-minimum-wage earnings. These are medical assistants (SOC 319092) and Licensed Practical and Licensed Vocational Nurses (SOC 292061). The former has the advantage of being the largest detailed occupational category in the physician's office industrial sector, comprising 15% of the workforce (compared to 8% for registered nurses), making it non-trivial to firms in the industry and another attractive placebo setting; on the other hand, its median wage of $15 an hour in 2016 is closer (than the $30 an hour for registered nurses) to the range of concern for possible minimum wage ripple effects from upward wage pressure in the broader economy. The LPN/LVN occupation enjoys an intermediate wage ($19 an hour) but is a smaller fraction of the industry workforce (4%).

In all three cases, across all specifications of Table 7 of the Appendix, the results do not yield a positive, significant interaction term between HHI and the minimum wage - just as we would expect in a setting where the underlying theoretical considerations governing monopsony and minimum wage do not apply. These results provide some additional confidence that in the validity of the positive interaction term seen in the main results of Table 2 and related

[10]No minimum-wage level occupation makes up more than 1 percent of the work force

specifications.

4.3 Discussion and Interpretation

Throughout the paper, we are estimating minimum wage effects on employment as a function of labor market concentration. The variation in labor market concentration is cross-sectional, and, unlike the variation in the minimum wage, this variation cannot be easily mapped to sudden policy shocks. Therefore, the question arises as to whether HHI is correlated with some other omitted variable in the market that is the true reason behind the variation in the impact of the minimum wage on employment. We address this concern below, but, first note that, from a policy perspective, even if the differential employment effects of the minimum wage are ultimately caused by something else than concentration, concentration measures still allow policy makers to assess which markets are likely to have zero or even positive employment effects when the minimum wage is increased.

One possible area of concern for an omitted variable bias arises from the fact that HHIs tend to be higher in more rural areas (Azar et al., 2018) while rural areas are plausibly less productive. Independent of labor market concentration measures, then, this productivity difference might affect employment responses to the minimum wage. Our expectation, however, would be that the minimum wage depresses employment more in less productive areas because increases in the minimum wage above the federal level are more likely to result in local minimum wages above workers' marginal productivity. This kind of bias goes against our finding that the minimum wage tends to increase employment in the most concentrated areas.

However, this is something that can be assessed empirically. In Appendix Table 8, we attempt to control for the main factors we believe to determine wages and be correlated with HHI: productivity and population density. We control for population density directly and approximate productivity through the log of total average weekly earnings in the county across all sectors.[11] We find that there are no marked changes to the estimated coefficients, as can be

[11]The log of total average weekly earnings in the county across all sectors is already included in the set of

seen in Appendix Table 8 which yields results that are very similar in magnitude and significance to our main results in Table 2.

While including these controls in the main results allows the employment level to be different in lower density or lower productivity counties, and partially addresses the omitted variable bias channel, there is an additional question of whether the minimum wage-HHI interactions remain significant and positive when also controlling for the way these additional characteristics moderate the minimum wage employment response. Appendix Table 9 allows for interactions of the minimum wage with population density as well as total earnings in the county. Our main finding remains: a higher HHI is associated with a more positive minimum wage effect on employment. These results lend further credence to the idea that labor market concentration is not merely a proxy for other factors like productivity or population density, but can by itself modulate the employment effect of the minimum wage.

From a policy perspective, our findings suggest that the potential employment costs of a minimum wage policy are reduced when monopsony power is pervasive, while the benefits are especially great (because monopsony already depresses wages below the competitive level). As the latter feature of concentrated labor markets motivates policies that address monopsony power in its own right – such as antitrust enforcement – the indirect consequence of such regulation is to increase the cost (reduced employment) of minimum wage policy. Of course, if regulations to reduce monopsony power cause wages to rise, as intended, minimum wage policies become less necessary.

5 Conclusion

Economic theory predicts that the minimum wage reduces employment in a competitive labor market. However, empirical evidence has often failed to find a negative impact. The common explanation: monopsony power by the firm. In this paper, we present the first direct

regressors for our baseline results as well.

empirical evidence showing labor market concentration – a key determinant of monopsony power – modulates the impact of the minimum wage on employment in the general merchandise sector in the US, a key employer of workers affected by the minimum wage. We find a robust and significant increase in the employment elasticity with respect to the minimum wage in more concentrated occupational labor markets. In the most concentrated third of these, the minimum wage employment elasticity is even estimated to be significantly positive. Compared to the existing literature, these results yield related own-wage elasticity of labor demand estimates for the lowest tercile of labor market concentration on par with the lowest estimates from the minimum wage literature, effects close to zero and statistically insignificant for the middle tercile, and, positive estimates that are larger than most in the literature for the highest tercile. The findings, thus, offer an empirically-founded candidate explanation as to why null employment effects from the minimum wage abound in the literature (due to the averaging of real underlying positive and negative effects), as well as insight into why we may see significant variation in the employment effect of the minimum wage across studies (due, in part, to differing underlying levels of labor market concentration in a studies' settings).

In total, these results suggest that labor market concentration, unmeasured and (empirically) overlooked in prior minimum wage research, is a key variable in moderating the cost of minimum wage policy, and, that the employment effects of a minimum wage increase should be assessed with this heterogeneity in mind. Additionally, the results bolster the evidence for monopsony power in the labor market by demonstrating that key policy effects conform to the predictions of the monopsony model.

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Table 1. Minimum Wage Effect on Earnings

	Dependent Variable: Log Earnings		
	(1)	(2)	(3)
Log Min Wage	0.0901***	0.0923***	0.0949***
	(0.0309)	(0.0307)	(0.0323)
County Fixed Effects	Y	Y	Y
Cen. Div. Period Fixed Effects	Y	Y	Y
State-Specific Time Trends	Y	Y	Y
Additional Controls	Y	Y	Y
adj. R^2	0.839	0.840	0.841
N	56536	57280	56592

Notes: The table presents estimates of the earnings elasticity with respect to the minimum wage in the General Merchandise Store industrial sector (NAICS industry code 452). All specifications in the table take the log of county-quarter general merchandise store average monthly earnings as the outcome. The three columns report estimates using the alternative baseline samples subsequently used throughout the paper (see Table 2) to compute HHI. Each sample is constructed using information from a different low-wage occupational labor market in the industry, resulting in different sample sizes. Column 1 corresponds to the sample for stock clerks and order fillers (SOC 435081); Column 2 to retail salespersons (SOC 412031); Column 3 to cashiers (SOC 412011). In addition to the log of the governing minimum wage as a regressor, all specifications include county fixed effects, census division specific period fixed effects, state-specific linear time trends, and, the following additional control variables: log of county total population, the log of total average weekly earnings (across all sectors) in the county, the log of total employment (across all sectors) in the county, the log of the county unemployment rate. Standard errors (in parenthesis) are clustered at the state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2. Minimum Wage Effect on Employment by Concentration in Occupational Labor Market

	Dependent Variable: Log Employment					
	Stock Clerks		Retail Sales		Cashiers	
	(1)	(2)	(3)	(4)	(5)	(6)
Log Min Wage	-0.312***	-0.179**	-0.220***	-0.168**	-0.311***	-0.184**
	(0.0814)	(0.0738)	(0.0629)	(0.0706)	(0.0925)	(0.0749)
Log Min Wage * Avg HHI	0.702***		0.802***		0.729***	
	(0.152)		(0.220)		(0.194)	
Log Min Wage × High HHI		0.291***		0.432***		0.309***
		(0.0600)		(0.0820)		(0.0668)
County Fixed Effects	Y	Y	Y	Y	Y	Y
Cen. Div. Period Fixed Effects	Y	Y	Y	Y	Y	Y
State-Specific Time Trends	Y	Y	Y	Y	Y	Y
Additional Controls	Y	Y	Y	Y	Y	Y
adj. R^2	0.994	0.994	0.994	0.994	0.994	0.994
N	56536	56536	57280	57280	56592	56592

Notes: The table presents estimates of the employment elasticity with respect to the minimum wage, and, variation in this estimate across places with differing levels of labor market concentration for key low-wage occupations. All specifications in the table take the log of county-quarter general merchandise store employment as the outcome. In addition to the log of the governing minimum wage as a regressor, all specifications include the interaction of this variable with labor market concentration (HHI). We construct HHI for each of the three key low-wage occupational labor markets in the industry: stock clerks and order fillers (SOC 435081) in columns 1-2; retail salespersons (SOC 412031) in columns 3-4; cashiers (SOC 412011) in columns 5-6. In odd-numbered columns, this concentration measure is the county's Herfindahl-Hirschman Index (HHI) for the relevant labor market (averaged across all quarters of the 2010-2016 sample period), and, we report its interaction with the log minimum wage. In even-numbered columns, we instead report the interaction of log minimum wage with a binary concentration measure that separates high and low concentration labor markets based on whether their labor market HHI is above or below 0.25 (the Department of Justice/ Federal Trade Commission threshold for highly concentrated markets). All specifications further include county fixed effects, census division specific period fixed effects, state-specific linear time trends, and, the following additional control variables: log of county total population, the log of total average weekly earnings (across all sectors) in the county, the log of total employment (across all sectors) in the county, the log of the county unemployment rate. Standard errors (in parenthesis) are clustered at the state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3. Minimum Wage Effect on Employment by HHI Terciles

	Dependent Variable: Log Employment		
	(1)	(2)	(3)
	Stock Clerks	Retail Sales	Cashiers
Log Min Wage	-0.201**	-0.190**	-0.154*
	(0.0772)	(0.0720)	(0.0772)
Log Min Wage * Mid HHI	0.161**	0.232**	0.177*
	(0.0742)	(0.0949)	(0.0939)
Log Min Wage × High HHI	0.586***	0.554***	0.475***
	(0.138)	(0.139)	(0.150)
County Fixed Effects	Y	Y	Y
Cen. Div. Period Fixed Effects	Y	Y	Y
State-Specific Time Trends	Y	Y	Y
Additional Controls	Y	Y	Y
adj. R^2	0.994	0.994	0.994
N	56536	57280	56592

Notes: The table presents estimates of the employment elasticity with respect to the minimum wage by labor market concentration (HHI) terciles. HHI is constructed for each of the three key low-wage occupational labor markets in the general merchandise store industry: stock clerks and order fillers (SOC 435081) in column 1; retail salespersons (SOC 412031) in column 2; cashiers (SOC 412011) in column 3. All specifications in the table take the log of county-quarter general merchandise store employment as the outcome. Specifications 1-3 are identical to specifications 2,4,6, respectively, in Table 2 with the exception that log minimum wage is here interacted with two indicator variables identifying high and medium HHI terciles (rather than simply a binary measure as in Table 2). All specifications include county fixed effects, census division specific period fixed effects, state-specific linear time trends, and, the following additional control variables: log of county total population, the log of total average weekly earnings (across all sectors) in the county, the log of total employment (across all sectors) in the county, the log of the county unemployment rate. Standard errors (in parenthesis) are clustered at the state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

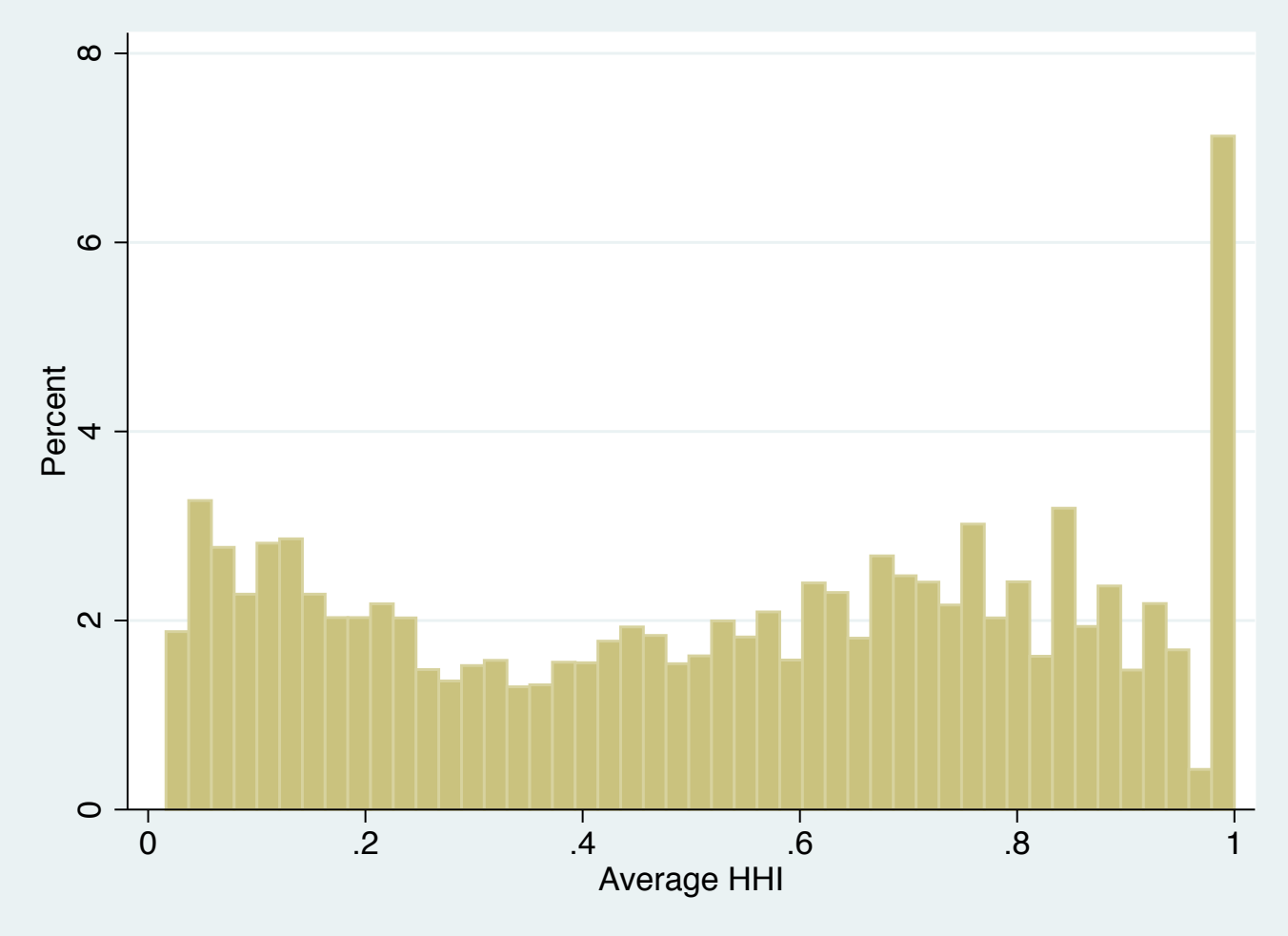

Figure 1. Distribution of County Avg. HHI Measure for Stock Clerks Occupational Labor Market
Notes: The figure plots the distribution across counties of the average HHI measure used in the "Stock Clerks" regressions (Columns 1 and 2 of Table 2 and equivalent samples in other tables).

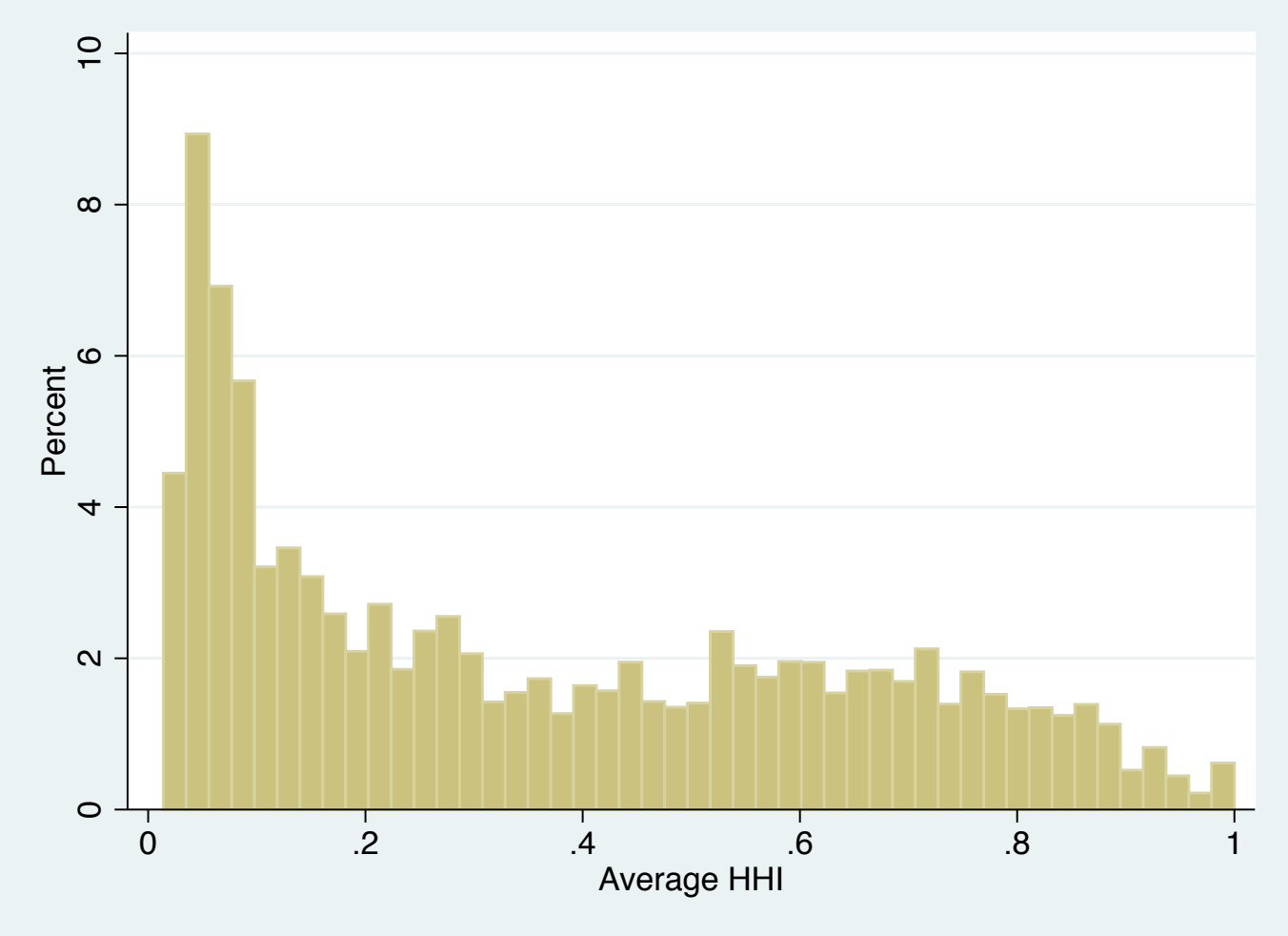

Figure 2. Distribution of County Avg. HHI Measure for Retail Sales Occupational Labor Market
Notes: The figure plots the distribution across counties of the average HHI measure used in the "Retail Sales" regressions (Columns 3 and 4 of Table 2 and equivalent samples in other tables).

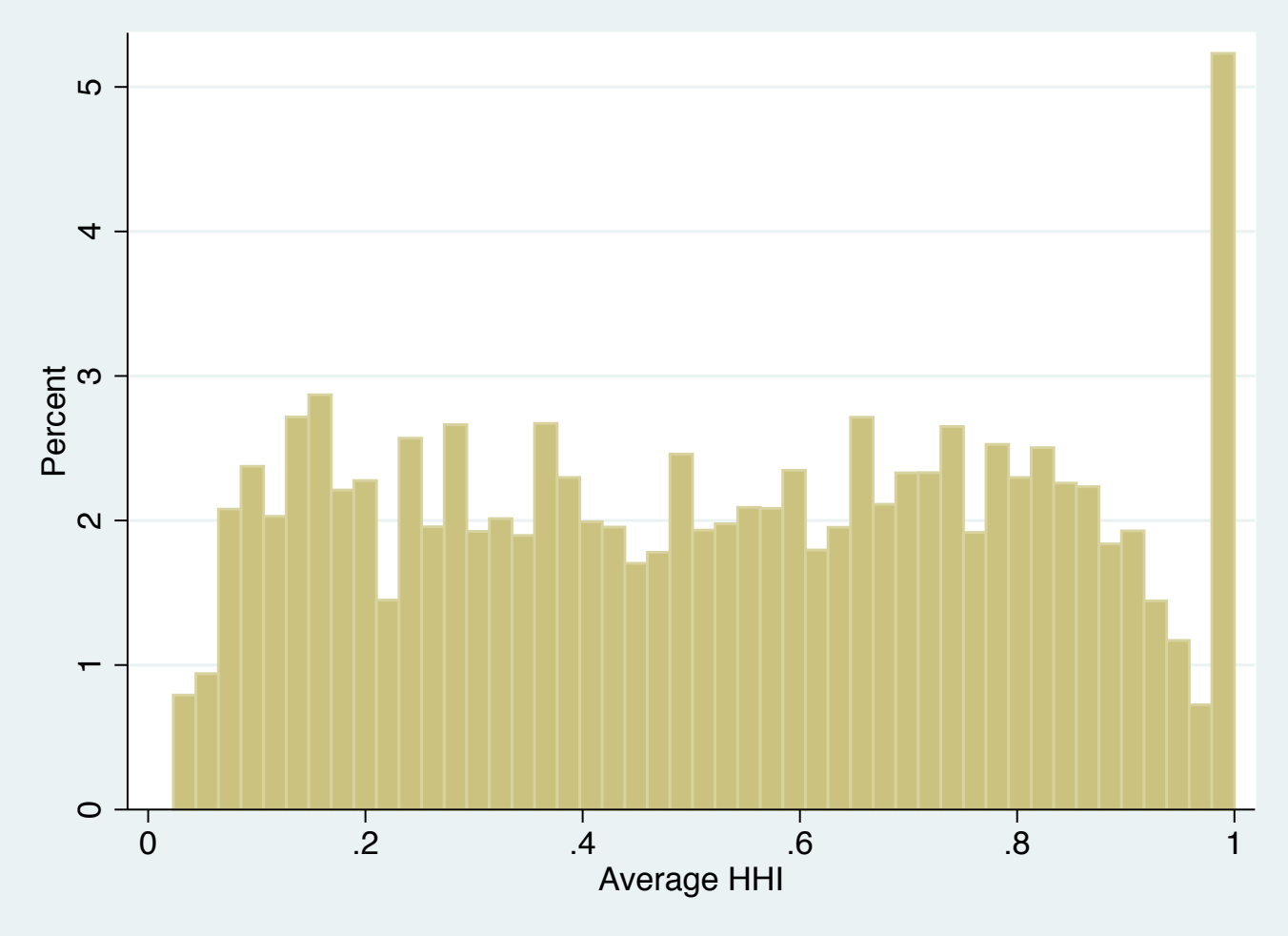

Figure 3. Distribution of County Avg. HHI Measure for Cashiers Occupational Labor Market
Notes: The figure plots the distribution across counties of the average HHI measure used in the "Cashiers" regressions (Columns 5 and 6 of Table 2 and equivalent samples in other tables).

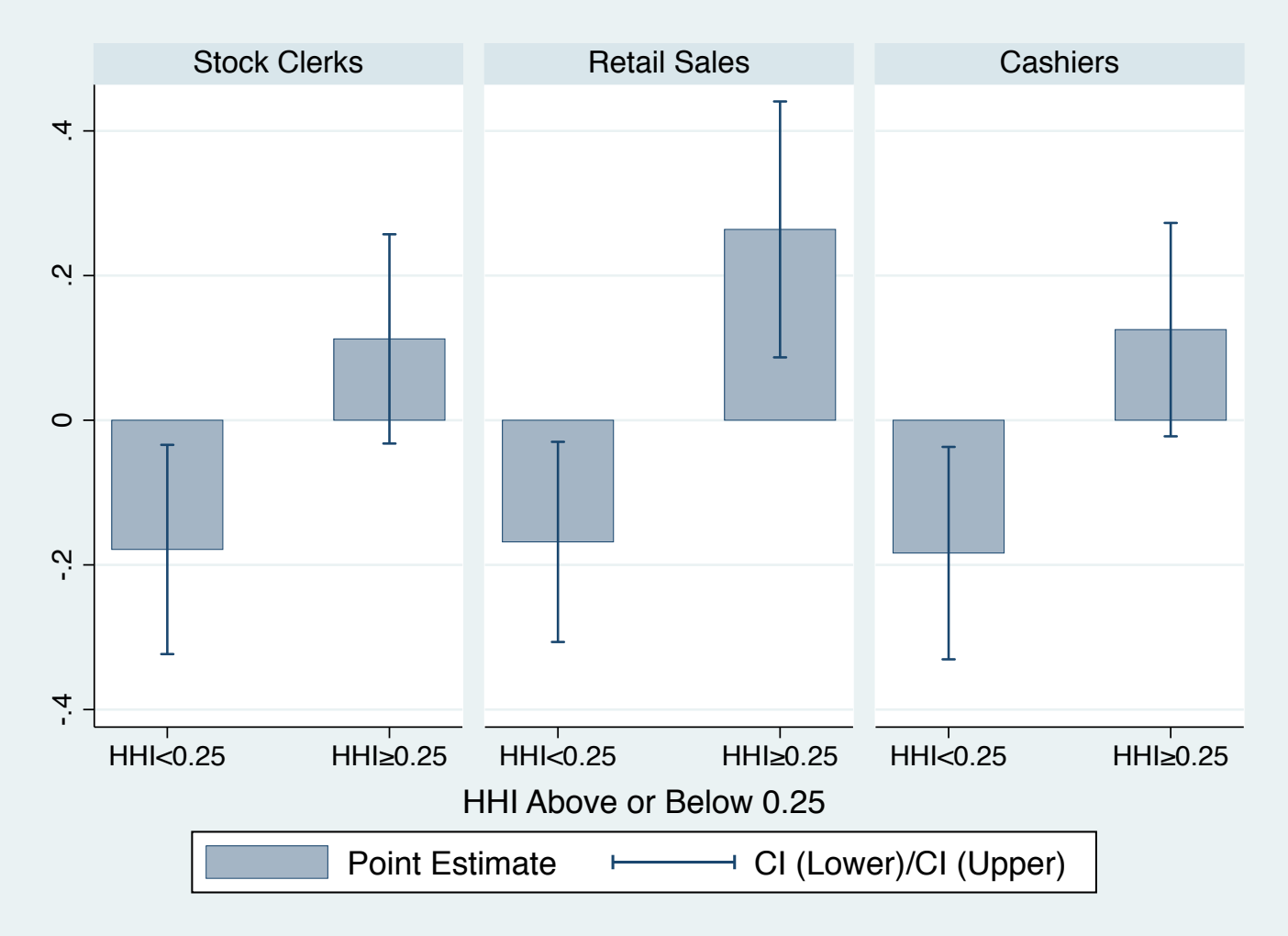

Figure 4. Employment Elasticities by High/Low Occupational Labor Market Concentration

Notes: The figure reports the estimated employment elasticity with respect to the minimum wage for occupational labor markets having high (HHI above 0.25) and low (HHI below 0.25) concentration. Each panel represents estimates using a different low-earning occupational labor market, with estimates corresponding to specifications in columns 2, 4, and, 6 of Table 2. As a reminder, Table 2 presents estimates of the employment elasticity with respect to the minimum wage, and, variation in this estimate across places with differing levels of labor market concentration for key low-wage occupations. All specifications in the table take the log of county-quarter general merchandise store employment as the outcome. In addition to the log of the governing minimum wage as a regressor, all specifications include the interaction of this variable with labor market concentration (HHI). We construct HHI for each of the three key low-wage occupational labor markets in the industry: stock clerks and order fillers (SOC 435081) in columns 1-2; retail salespersons (SOC 412031) in columns 3-4; cashiers (SOC 412011) in columns 5-6. In odd-numbered columns, this concentration measure is the county's Herfindahl-Hirschman Index (HHI) for the relevant labor market (averaged across all quarters of the 2010-2016 sample period), and, we report its interaction with the log minimum wage. In even-numbered columns, we instead report the interaction of log minimum wage with a binary concentration measure that separates high and low concentration labor markets based on whether their labor market HHI is above or below 0.25 (the Department of Justice/ Federal Trade Commission threshold for highly concentrated markets). All specifications further include county fixed effects, census division specific period fixed effects, state-specific linear time trends, and, the following additional control variables: log of county total population, the log of total average weekly earnings (across all sectors) in the county, the log of total employment (across all sectors) in the county, the log of the county unemployment rate. Standard errors are clustered at the state level. 95% confidence intervals are shown.

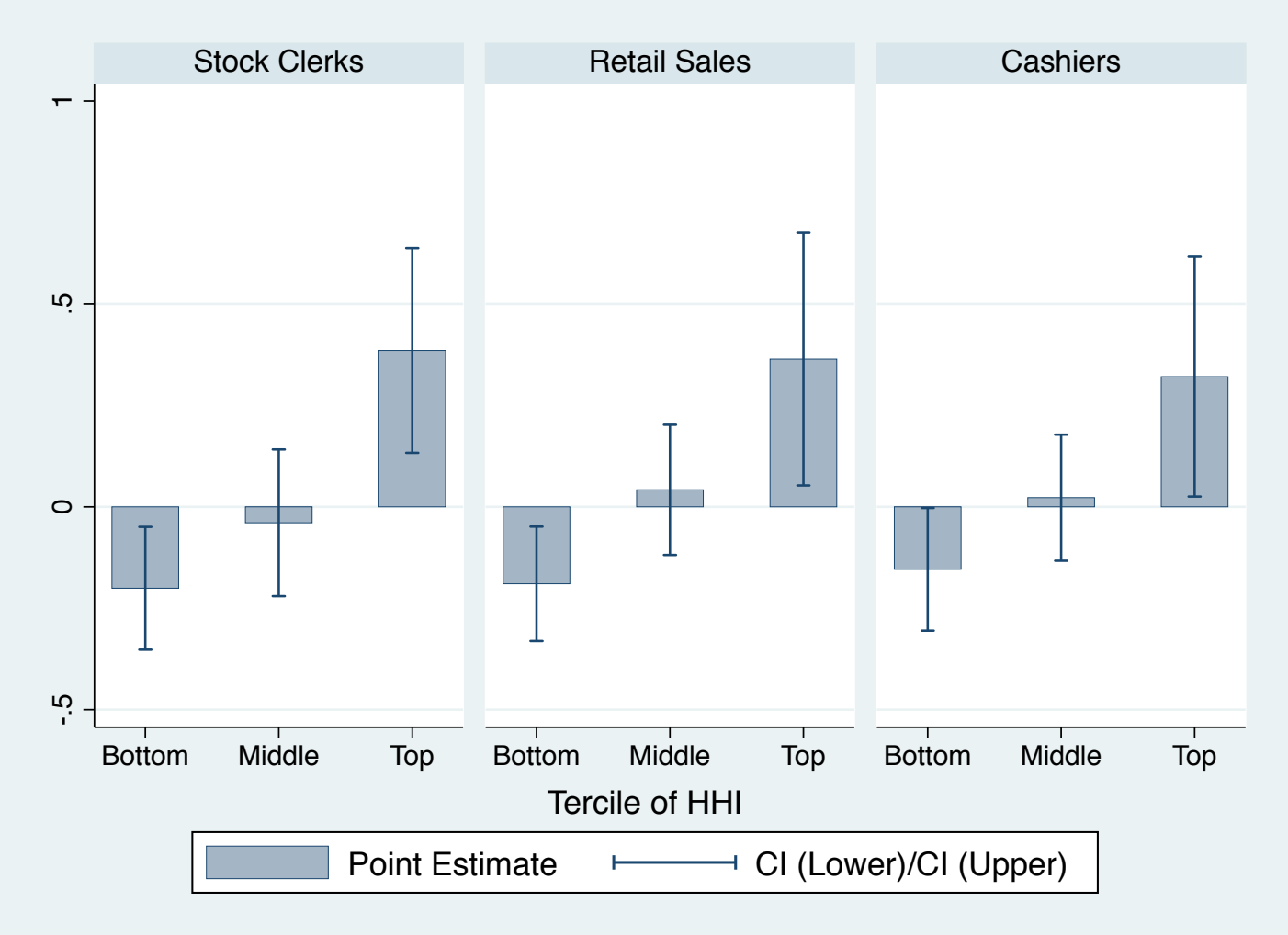

Figure 5. Employment Elasticities by Terciles of Occupational Labor Market Concentration
Notes: The figure reports the estimated employment elasticity with respect to the minimum wage for occupational labor markets having high, medium, and low concentration, as indicated by HHI tercile. Each panel represents estimates using a different low-earning occupational labor market, with estimates corresponding to specifications in columns 1, 2, and, 3 of Table 3. As a reminder, Table 3 presents estimates of the employment elasticity with respect to the minimum wage by labor market concentration (HHI) terciles. HHI is constructed for each of the three key low-wage occupational labor markets in the general merchandise store industry: stock clerks and order fillers (SOC 435081) in column 1; retail salespersons (SOC 412031) in column 2; cashiers (SOC 412011) in column 3. All specifications in the table take the log of county-quarter general merchandise store employment as the outcome. Specifications 1-3 are identical to specifications 2,4,6, respectively, in Table 2 with the exception that log minimum wage is here interacted with two indicator variables identifying high and medium HHI terciles (rather than simply a binary measure as in Table 2). All specifications include county fixed effects, census division specific period fixed effects, state-specific linear time trends, and, the following additional control variables: log of county total population, the log of total average weekly earnings (across all sectors) in the county, the log of total employment (across all sectors) in the county, the log of the county unemployment rate. 95% confidence intervals are shown.

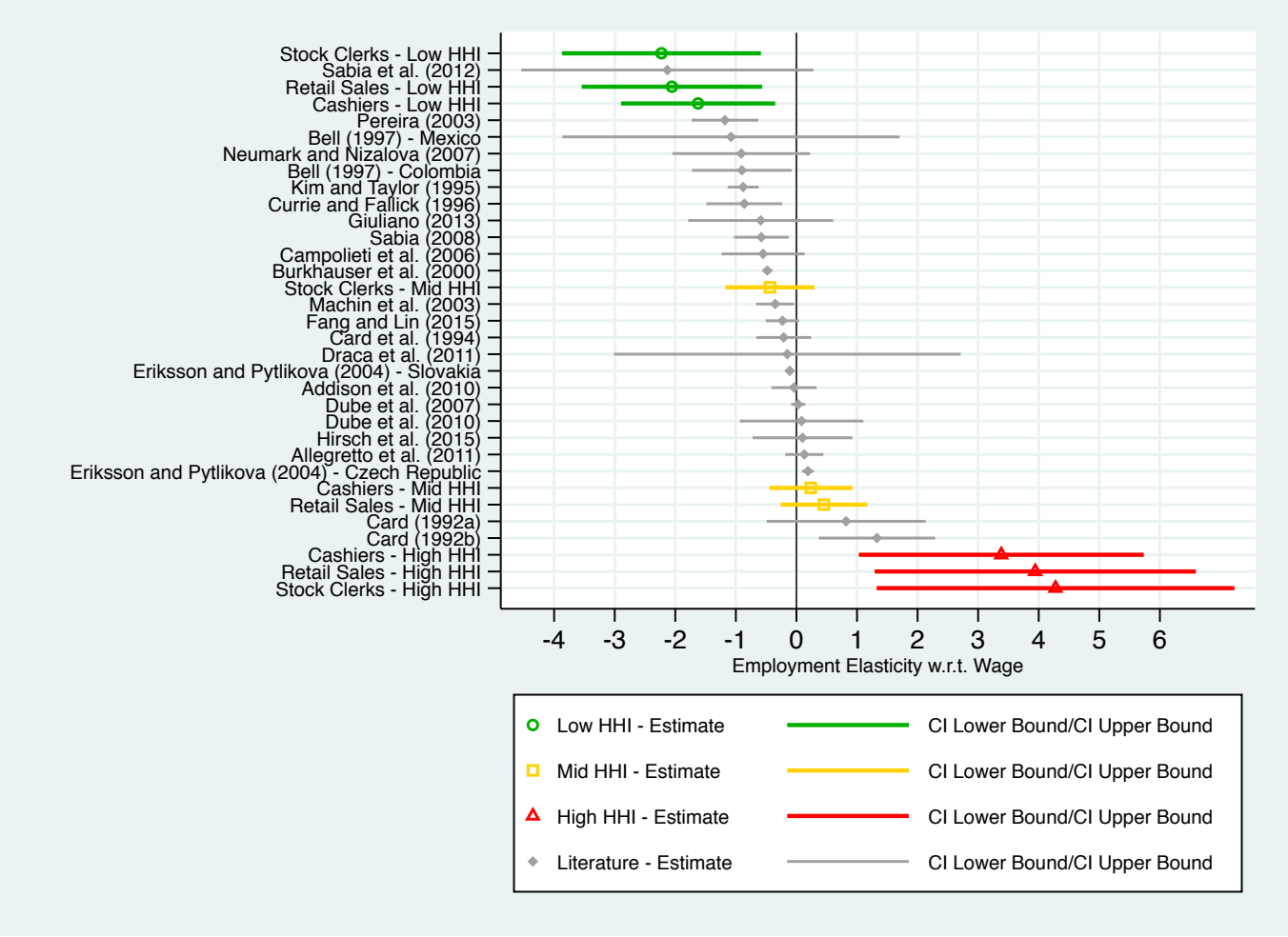

Figure 6. Our Elasticities Compared to Those in the Literature

Notes: The figure presents the employment elasticity with respect to the wage from other studies in the minimum wage literature (own wage elasticity of labor demand), as well as those estimated in this study based on Table 3 for the employment effect and Table 1 for the earnings effect. We utilize the review of the literature by Harasztosi and Lindner (2019). The estimates come from: Sabia, Burkhauser and Hansen (2012); Pereira (2003); Bell (1997); Neumark and Nizalova (2007); Kim and Taylor (1995); Currie and Fallick (1996); Giuliano (2013); Sabia (2009); Campolieti, Gunderson and Riddell (2006); Burkhauser, Couch and Wittenburg (2000); Machin, Manning and Rahman (2003); Fang and Lin (2015); Card, Katz and Krueger (1994); Draca, Machin and Van Reenen (2011); Eriksson and Pytlikova (2004); Addison, Blackburn and Cotti (2012); Dube, Naidu and Reich (2007); Dube, Lester and Reich (2010*b*); Hirsch, Kaufman and Zelenska (2015); Card (1992*b*,*a*).

6 Appendix

Table 4. Minimum Wage Effect on Earnings by High and Low HHI

	Dependent Variable: Log Earnings		
	(1)	(2)	(3)
Low HHI Earnings Elasticity	0.0784*	0.0686	0.0895**
	(0.0405)	(0.0409)	(0.0351)
High HHI Earnings Elasticity	0.0972***	0.1236***	0.0974***
	(0.0314)	(0.0314)	(0.0349)
P-Value on Low=High	0.58	0.20	0.79
County Fixed Effects	Y	Y	Y
Cen. Div. Period Fixed Effects	Y	Y	Y
State-Specific Time Trends	Y	Y	Y
Additional Controls	Y	Y	Y
adj. R^2	0.839	0.840	0.841
N	56536	57280	56592

Notes: The table replicates the specification of Table 1 with the addition of an interaction term between log minimum wage and an indicator for high HHI (HHI above or equal to 0.25), and reports the resulting earnings elasticity with respect to the minimum wage for the high and low HHI groups. See the notes to Table 2 for further discussion of this variable and the notes to 1 for additional details of the specifications. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The row 1 column 2 coefficient has a p-value of 0.100.

Table 5. Minimum Wage Effect on Employment by Occupational Labor Market Concentration - No Sub-National Time Trends (Simple Two Way FE)

	Dependent Variable: Log Employment					
	Stock Clerks		Retail Sales		Cashiers	
	(1)	(2)	(3)	(4)	(5)	(6)
Log Min Wage	-0.194**	-0.116	-0.147*	-0.134	-0.194**	-0.119
	(0.0841)	(0.0761)	(0.0821)	(0.0811)	(0.0895)	(0.0716)
Log Min Wage * Avg HHI	0.418***		0.502**		0.419**	
	(0.137)		(0.193)		(0.179)	
Log Min Wage $\times$ HHI$\geq$0.25		0.166**		0.309***		0.169**
		(0.0662)		(0.0793)		(0.0706)
County Fixed Effects	Y	Y	Y	Y	Y	Y
Cen. Div. Period Fixed Effects	N	N	N	N	N	N
State-Specific Time Trends	N	N	N	N	N	N
Additional Controls	Y	Y	Y	Y	Y	Y
adj. R^2	0.994	0.994	0.994	0.994	0.994	0.994
N	56536	56536	57280	57280	56592	56592

Notes: The table replicates Table 2 without the inclusion of census division period fixed effects or state-specific linear time trends. See the Table 2 notes for further details. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6. Minimum Wage Effect on Employment by Concentration in Occupational Labor Market - Using Only Counties with 8 Quarters or More of HHI Data

	Dependent Variable: Log Employment					
	Stock Clerks		Retail Sales		Cashiers	
	(1)	(2)	(3)	(4)	(5)	(6)
Log Min Wage	-0.300***	-0.122	-0.223***	-0.165**	-0.315***	-0.142*
	(0.0971)	(0.0764)	(0.0660)	(0.0707)	(0.0876)	(0.0779)
Log Min Wage * Avg HHI	0.886***		0.824***		0.871***	
	(0.180)		(0.236)		(0.151)	
Log Min Wage $\times$ HHI$\geq$0.25		0.278***		0.425***		0.288***
		(0.0585)		(0.0828)		(0.0670)
County Fixed Effects	Y	Y	Y	Y	Y	Y
Cen. Div. Period Fixed Effects	Y	Y	Y	Y	Y	Y
State-Specific Time Trends	Y	Y	Y	Y	Y	Y
Additional Controls	Y	Y	Y	Y	Y	Y
adj. R^2	0.994	0.994	0.994	0.994	0.994	0.994
N	47209	47209	56316	56316	49325	49325

Notes: The table replicates Table 2 on the sample of counties for which the average occupational HHI in the county is formed from at least 8 quarters of Burning Glass data (all other specification details are the same). See Table 2 notes for further information. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7. Placebo Test Using Occupational Labor Market Concentration in Moderate Income, Above-Minimum Wage Medical Professions

	Dependent Variable: Log Employment					
	Registered Nurses		Medical Assistants		Vocational Nurses	
	(1)	(2)	(3)	(4)	(5)	(6)
Log Min Wage	-0.195*	-0.163*	-0.00970	-0.0260	-0.131	-0.0964
	(0.102)	(0.0892)	(0.152)	(0.105)	(0.123)	(0.0917)
Log Min Wage * Avg HHI	0.0201		-0.377		-0.153	
	(0.384)		(0.246)		(0.332)	
Log Min Wage $\times$ HHI $\geq$ 0.25		-0.0684		-0.265**		-0.157
		(0.149)		(0.109)		(0.117)
adj. R^2	0.990	0.990	0.990	0.990	0.990	0.990
N	58025	58025	53677	53677	57817	57817

Notes: The table presents estimates of the employment elasticity with respect to the minimum wage in a sector with virtually no minimum wage workers - physicians' offices - reporting variation in this estimate across places with differing levels of labor market concentration for three moderate income, non-minimum-wage occupations - registered nurses (SOC 291141) in columns1-2, medical assistants (SOC 319092) in columns 3-4, and, practical and licensed vocational nurses (SOC 292061) in columns 5-6. All specifications in the table take the log of county-quarter employment in physicians' offices as the outcome. In addition to the log of the governing minimum wage as a regressor, all specifications include the interaction of this variable with either the average HHI for the occupation (in odd-numbered columns) or an indicator for whether this HHI is above 0.25 (in even-numbered columns), with everything else the same as in Table 2 (see notes). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8. Minimum Wage Effect on Employment by Occupational Labor Market Concentration Controlling for Productivity Proxy and Population Density

	Dependent Variable: Log Employment					
	Stock Clerks		Retail Sales		Cashiers	
	(1)	(2)	(3)	(4)	(5)	(6)
Log Min Wage	-0.315***	-0.181**	-0.220***	-0.169**	-0.314***	-0.187**
	(0.0826)	(0.0758)	(0.0633)	(0.0707)	(0.0948)	(0.0770)
Log Min Wage * Avg HHI	0.709***		0.804***		0.736***	
	(0.153)		(0.221)		(0.197)	
Log Min Wage $\times$ HHI$\geq$0.25		0.296***		0.433***		0.314***
		(0.0617)		(0.0810)		(0.0680)
County Fixed Effects	Y	Y	Y	Y	Y	Y
Cen. Div. Period Fixed Effects	Y	Y	Y	Y	Y	Y
State-Specific Time Trends	Y	Y	Y	Y	Y	Y
Additional Controls	Y	Y	Y	Y	Y	Y
adj. R^2	0.994	0.994	0.994	0.994	0.994	0.994
N	56536	56536	57280	57280	56592	56592

Notes: The table replicates Table 2 with the inclusion of population density as a regressor * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9. Minimum Wage Effect on Employment by Occupational Labor Market Concentration - MW Also Interacted with Productivity and Population Density

	Dependent Variable: Log Employment					
	Stock Clerks		Retail Sales		Cashiers	
	(1)	(2)	(3)	(4)	(5)	(6)
Log Min Wage	-1.553	-0.301	-0.814	-0.515	-1.226	-0.366
	(1.193)	(1.280)	(0.902)	(1.022)	(1.157)	(1.239)
Log Min Wage * Avg HHI	0.802***		0.854***		0.815***	
	(0.174)		(0.228)		(0.231)	
Log Min Wage $\times$ HHI$\geq$0.25		0.315***		0.451***		0.334***
		(0.0773)		(0.0856)		(0.0841)
County Fixed Effects	Y	Y	Y	Y	Y	Y
Cen. Div. Period Fixed Effects	Y	Y	Y	Y	Y	Y
State-Specific Time Trends	Y	Y	Y	Y	Y	Y
Additional Controls	Y	Y	Y	Y	Y	Y
MW * Density Interaction	Y	Y	Y	Y	Y	Y
MW * Total Earnings Interaction	Y	Y	Y	Y	Y	Y
adj. R^2	0.994	0.994	0.994	0.994	0.994	0.994
N	56536	56536	57280	57280	56592	56592

Notes: The table replicates Table 2 with the addition of the following: an interaction term between log minimum wage and the proxy for productivity, the log of total employment (across all sectors) in the county; and, an interaction term between log minimum wage and population density. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$