THE HEBREW UNIVERSITY OF JERUSALEM

Re-examining the relationship between labor market concentration and monopsony power, using the minimum wage as a case study

Thesis by

Yotam Aflalo

Advisor

PhD. Michael Amior

in the

Faculty of Social Sciences

The Bogen Family Department of Economics

April 2023

Abstract:

In recent decades, the issue of monopsony in the labor market has received a lot of attention in the economic research field and sometimes even in the public media. The existence of monopsonies in the labor market directly impacts the desired policy on antitrust, the minimum wage, the attitude to labor organizations, and other issues related to the balance between employers and employees in the labor market.

Many studies have suggested that monopsony in the labor market can explain the results obtained in recent decades in research on the minimum wage, which show that raising the minimum wage does not always decrease employment.

Several methods have been developed to identify and measure monopsony power. One of these methods uses the level of concentration in employment in the local labor market as a proxy for "monopsony power."

This paper examines this method's credibility and success in identifying monopsony power in the labor market. As a case study, I examined how monopsony power estimated by this method affects the effect of the minimum wage on employment, inflation, and the concentration level. In my thesis, I focused on two different sectors: the retail sector (NAICS 452) and the restaurant sector (NAICS 722). These sectors are characterized by a high percentage of workers earning the minimum wage and a high variation in the concentration of employment between different regions.

According to the results of this study, concentration in the labor market is not a credible measure of monopsony power. Using concentration in the labor market as a measure of monopsony power leads to contradictory results in different sectors, which do not align with the economic research literature.

Section 1 presents a literature review on monopsony in the labor market and ways to measure monopsony power. **Section 2** presents a literature review on the effects of the minimum wage on employment, inflation, and the relationship between monopsony in the labor market and the minimum wage. **Section 3** presents the estimated results of the effect of concentration in the labor market on the effect of the minimum wage on employment. **Section 4** presents the estimated results of the effect of changes in the minimum wage and concentration in employment on the level of concentration itself. **Section 5** presents the estimated results of the effect of the minimum wage and concentration in the labor market on inflation. **Section 6**

summarizes the results and concludes whether concentration in the labor market is a credible measure of "monopsony power."

The main contributions of this paper to the literature are as follows:

(1) It shows that concentration in the labor market is not a good measure of monopsony power.

(2) It adds information on the effect of concentration in the labor market on the effect of the minimum wage on employment and inflation in different sectors.

(3) It examines the effect of changes in the minimum wage on labor market concentration under different market conditions.

(4) It shows the effect of the level of bindingness in the minimum wage on the effect of the minimum wage on various macroeconomic variables.

Section 1: Monopsony in the labor market:

1.1. What is a monopsony?

According to the classical theory of a market with perfect competition, employers have limited power to determine (and change) workers' wages. The employer is a "price taker" and can hire any number of workers at the market equilibrium wage. In technical terms, every employer faces an "infinite elastic" labor supply curve. Accordingly, employer cannot obtain workers at a wage level that is lower than the equilibrium wage (Manning, 2021).

The assumption behind this theory does not acknowledge non-wage utilities that affect employees' decisions regarding their workplace. This theory does not accommodate heterogeneous preferences of employees for non-wage utilities of workplaces, geographic isolation and variation in commuting time between different workplaces, transition costs between workplaces, social relations in the workplace, costs of temporary unemployment, and more.

Therefore, the result of these "frictions" is that the labor supply curve is not entirely flexible, so in certain situations, employers can offer a wage lower than the "equilibrium wage" without losing all their workers.

"Monopsony power" may be defined as the power of a particular employer to set the wages of some workers below the equilibrium wage without losing all his workers.

1.2. The sources of monopsony power

Manning (2021) modeled the sources of monopsony power by two different categories:

(a) Monopsony based on "small labor markets" deriving from heterogeneity in tastes among workers.

(b) Monopsony based on friction in the labor market.

Heterogeneity in tastes among workers:

According to this model, workers choose their workplace according to a "package" of different amenities and wages. In addition, the workers are heterogeneous regarding "their weights" to the different amenities.

Accordingly, working places are not entirely "substitutable." In a specific area, only a small number of firms may offer a particular package of wages and amenities. Accordingly**, labor market concentration may be an indicator of this type of monopsony power**.

Labor market frictions:

According to this model, employees pay certain costs when they want to switch jobs. These costs include losing working time (and wages) between leaving the first workplace and finding a new workplace, adjusting to the new workplace, and training costs. Accordingly, the employee has a particular "value" from continuing working in the same place he is already employed. This friction gives the employer power over his employees.

1.3. The relationship between concentration in the labor market and monopsony power:

According to the literature, concentration in the labor market may be a significant **source** of monopsony power (Azar, J., Marinescu, I., & Steinbaum, M. 2019).

First, concentration in the labor market, and a market with a small number of employers, can directly affect the monopsony power resulting from the two previous effects: (a) When there are fewer employers, fewer employers provide the same "package of amenities."

(b) When individual employers are responsible for a large part of the market's employment, the labor market's friction costs may be higher. For example, the time of unemployment between occupations may be longer.

In addition, concentration in the labor market may give employers monopsonistic power directly, the employer can reduce the market demand for workers, thus reducing wages.

On the other hand, concentration in the labor market may arise from various sources (which do not contribute to monopsony power). Accordingly, although labor market concentration may **be a source of monopsony power**, it is not clear that measuring labor market concentration **will identify monopsony power**.

1.5. Ways to measure monopsony power:

1.5.1. Measuring labor supply elasticity:

One of the ways to estimate monopsony power is to examine the labor supply curve to an individual employer. If the labor supply elasticity (in relation to wages) is low, firms have more monopsony power, and they can reduce workers' wages with minimum loss of workers. Accordingly, the elasticity of labor supply directly measures the firm's ability to exercise monopsony power. In this issue, see chapter 4.2 and tables 5 and 6 by Manning (2011), and the results of Staiger, Spetz, and Phibbs (2010) and Falch (2008).

1.5.2. Measuring monopsony power through concentration in the labor market:

High concentration in the labor market may indicate high monopsony power.

Labor markets vary in concentration levels across sectors, geographical locations, and over time. The level of concentration in the labor market can result from several factors, such as a natural advantage (for example, production technology with an advantage for size), non-competitive legislation (for example, patent rights), the size of the population in a certain labor market, or geographical isolation.

The research literature highlights several theoretical difficulties in using job market concentration as an estimate of monopsony power:

(a) Studies that use this method divide the labor market into discrete segments according to sectors and geographic boundaries. This approach assuming that workers cannot move across different sectors or counties. This assumption is problematic because workers can move between industrial sectors in the same

region and even move between different regions. In addition, there is no clear boundary for each local work area (Manning and Petrongolo. 2017). In this regard, Nimczik (2018) defines "concentration in employment" based on worker mobility patterns. Companies are considered in the same labor market if there is a movement of workers between them.

(b) Concentration in the labor market can only indicate **a potential** for the exercise monopsony power. This potential will not be realized, for example, due to the activity of labor organizations or a minimum wage that limits the firm's ability to lower wages (as detailed in the next chapter).

(c) Various factors affect the concentration level in the labor market. Some of these factors are correlated with a competitive labor market and non-existence of monopsony power. For example, when the labor market is competitive, and there is a flow of workers between firms - workers may concentrate on working at efficient firms that can pay high wages. This flow will increase concentration in those places.

On the other hand, according to the findings of Azar, Marinescu & Steinbaum (2019), concentration in the labor market is negatively correlated with the flexibility of the labor supply, so there is a certain equivalence in the use of these two methods for estimating monopsony power.

This study examines the empirical significance of these difficulties. According to the results presented in the following chapters, despite the findings of Azar, Marinescu & Steinbaum (2019), concentration in the labor market is not a reliable way to identify monopsony power, particularly in research regarding the effects of the minimum wage, or the restaurant industry.

1.6. Estimating the degree of concentration

1.6.1. Defining concentration in the labor market

Concentration in the labor market can be defined and measured in two alternative ways:

(a) Concentration in employment: this method is based on examining the relative share of each firm in employment in the same labor market.

(b) Concentration in the vacancies: this method estimates the relative share of each firm from the total number of vacancies advertised at any given time.

The advantage of using the concentration in "vacancies" is that this index indicates the concentration of the alternatives that employees who are not employed (or employees who want to improve their employment conditions) have.

However, this method has several significant disadvantages:

(a) Not all employees are required to choose a new job when the number of vacancies is measured (Manning, A. (2021)).
(b) The information regarding the "vacancies" does not exist in public government databases. This index can be calculated using information from private databases with varying sampling methods.
(c) The databases dealing with vacancies do not provide comprehensive data on the market. Mostly, these databases have limited geographic distribution, relatively small sampling period, and limited sectors surveyed. For example, the Burning Glass Technologies database used by (2019) Azar, José, et al. only contains information about job offers that are posted online. This database did not contain reliable information regarding the vacancies in the restaurant sector since, in this sector, most jobs are not advertised online.

Due to this response, I chose to measure concentration based on employment concentration. The information required to calculate this index is the number of employees in each firm in the economy. Relevant data is found in various public government databases, such as the CBP or the "Business Dynamics Statistics."

1.6.2. Herfindahl-Hirschman Index (HHI)

HHI is a standard index for measuring market concentration (see Nocke & Schutz (2018)). The index is calculated as the sum's squares of each company's shares out of the total labor market.

Equation (1) is the index formula, where w represents the number of employees in each firm, and W represents the total number of employees in all firms in the same sector, geographic area, and year.

$$\textbf{firm i size} = w_i, \qquad \boldsymbol{total\ employment\ at\ the\ county} = W$$

$$(1)\ HHI = \sum_{i=0}^{n} \left(\frac{w_i}{W}\right)^2, \quad W = \sum_{i=0}^{n} w_i$$

Sometimes w/W is expressed as a relative part (i.e., between 0 and 1), and sometimes as whole percentages (i.e., between 0 and 100). Accordingly, the index

can move in the range of (0,1] or in the range of (0,10000]. A concentration above 0.25 (or 2500, respectively) is considered high.

Section 2: Case study - monopsony and the minimum wage

2.1. The effect of the minimum wage on employment

In recent decades, many studies have researched the effect of the minimum wage on employment. Before the 1990s, the economic consensus was that the minimum wage increases unemployment (especially for young workers). This concept is consistent with the classic labor market model with full competition. According to this model, raising the minimum wage increases the supply of labor but decreases the demand for labor, thus increasing unemployment (See, for example: regarding the entire population: Mincer (1976) regarding the employment of young workers only: Brown, Gilroy & Kohen (1982), and Neumark, D., & Wascher, W. (1992)).

A significant turning point in the literature was the study by Card & Krueger (1993) that examined the effect of raising the minimum wage in New Jersey, using neighboring Pennsylvania (where the minimum wage did not change) as a control group. The study showed that raising the minimum wage in one of the states did not harm employment there, compared to the neighboring county. For expansion and responses to criticisms, see Card & Krueger (2000).

This study examined the impact of a single change in the minimum wage while focusing on a specific sector and a limited geographic area. Further studies examined the effect of changes in the minimum wage on employment, wages, inflation, and additional economic variables in a wide set of geographic areas (for example see Dube et al. (2010), Neumark et al. (2014) and Agan et al. (2018)).

These studies reached varied results regarding the effect of the minimum wage, and today there is still no consensus regarding the effect of the minimum wage on employment. For more on the research regarding the effect of the minimum wage, see Dube (2019). and Neumark (2019).

2.2. The minimum wage and labor market concentration

Several popular theories explain why the minimum wage does not harm employment, contrary to what would be expected according to a model of perfect competition. One of the theories that have gained momentum in recent decades links the lack of effect of the minimum wage on employment **to the existence of monopsony in the labor market**.

As detailed in the previous chapter, when employers have monopsony power in the labor market, they can set the wage bellow the equilibrium wage of a competitive market, which causes some decrease in employment.

According to the "monopsony theory", when the minimum wage rises, the monopsony is forced to pay its workers a higher wage. However, it does not reduce the number of workers it employs (as long as the new minimum wage is lower than a certain threshold). Accordingly, the presence of monopsony in the labor market can explain the finding that sometimes raising the minimum wage does not decrease employment.

Figure 1a shows the employment (L_{PC}) in a market with perfect competition. Figure 1b shows employment ($L_{min\ wage}$) in a market with perfect competition and a minimum wage higher than the equilibrium wage. According to the figures, increasing the minimum wage leads to decreased employment in a market with perfect competition.

Figure 2a shows the employment (L_M) in a labor market with monopsony. According to the theory, employment in a monopsony market is determined by the intersection between the labor supply curve and the marginal cost of labor. The employment obtained in the market with monopsony (L_M) is lower than the employment (L_{PC}) obtained in perfect competition.

Figure 2b shows employment in a labor market with monopsony when there is a small increase in the minimum wage. In this situation, the monopsony firm must pay the minimum wage, and it cannot offer lower wages. Accordingly, the number of workers it employs is determined according to the intersection between the new minimum wage and the demand curve. In this situation, the monopsony employs ($L_{min\ wage\ low}$) workers, which is more than it employed before raising the minimum wage (L_m).

On the other hand, figure 2c shows employment in a monopsony labor market when there is a "large" increase in the minimum wage. In this situation, the employer pays the new minimum wage. However, according to the intersection between the demand curve for workers and the new minimum wage, employment decreased following the change in the minimum wage.

In this situation, the workers will experience a significant increase in hourly wages but a decrease in total employment.

2.3. Direct examination of the monopsony theory - the effect of concentration on the effect of the minimum wage on employment

At this point, few studies have directly examined the effect of monopsony and concentration on the effect of the minimum wage on employment. Azar, Huet-Vaughn, Marinescu, Taska & Von Wachter (2019) Examined the impact of the minimum wage and employment concentration on employment. Azar J. et al. (2019) found that in areas with a high concentration of employment in the retail sector, an increase in the minimum wage is correlated with an increase in employment.

Corella (2020) examined the effect of the minimum wage on youth employment, depending on the concentration level in employment and labor mobility. The study found that youth employment in non-concentrated areas decreases when the minimum wage increases. However, youth employment in concentrated areas increases when the minimum wage increases. This finding is consistent with the monopsony theory and suggests that there is a connection between labor market concentration and monopsony power.

2.4. The effect of the minimum wage on inflation

In the recent decades, there has been a development in the literature in identifying the effect of the minimum wage on inflation and product prices, especially in the retail and restaurant sectors, which are characterized by sizeable minimum wage employment.

The effect of the minimum wage on inflation is vital by itself (as part of inflation research). However, it can also give us more information about the effect of the minimum wage on employment.

2.4.1. The effect of the minimum wage on the product market - a game of demand and supply

The prices of products are determined in the product market as a function of demand and supply. Inflation is the rate of change in product prices between different periods. The minimum wage can affect prices through an effect on product supply or demand.

2.4.1.1 The effect of the minimum wage on the supply of products

Labor is one of the critical inputs in producing products and services.

According to Figure 1: when the labor market is competitive, an increase in the minimum wage leads to a decrease in employment. The employment decrease

causes a decrease in the supply of products (at a given price P) which may cause an increase in the price level (and thus inflation).

According to Figure 2: when the labor market is monopsony, an increase in the minimum wage leads to an increase in employment, or at most, a slight decrease in employment. Accordingly, raising the minimum wage does not lead to a decrease in the supply of products and therefore it is not expected to increase inflation.

2.4.1.2. The effect of the minimum wage on demand for products

Raising the minimum wage affects the distribution of wages and capital across the economy. This change can be expressed as: an increase in the capital of workers who earn the minimum wage, a decrease in the capital of workers who are fired following the minimum wage increase, or a decrease in the capital of company owners forced to pay employees a higher minimum wage.

If minimum wage workers consume differently from other workers (both in terms of the consumption-saving ratio and the type of consumption) - changing the minimum wage may affect the demand for different products.

Alonso (2016) found that a 10% increase in the minimum wage increases sales of nondurable goods by 1.1%. This finding implies that changing the minimum wage may affect the way of consumption. On the other hand, Harasztosi, P., & Lindner, A. (2019) argued that "rich and poor households spend a very similar fraction of their income on goods produced by minimum wage workers".

In this paper, I have ignored these issues. A future study should include a robustness test that also considers this parameter.

2.4.2. Tradable products versus non-tradable products and the elasticity of demand for products

A significant factor in the effect of the minimum wage on inflation (in a specific product) is the demand elasticity and the product's **tradability**.

Tradable products are goods or services that can be sold or traded on international markets. Common tradable products include manufactured goods, raw materials, and agricultural products. Accordingly, the price of tradable products is often determined in a global market. Therefore, it is unlikely that a change in the minimum wage at the local market will significantly change the price of these products.

In contrast, non-tradable products are goods or services that cannot be easily sold or traded on international markets. These products are typically consumed in the area where they were produced and are not easily transportable.

The price of non-tradable goods is determined in the local market. Accordingly, the effect of the minimum wage on the price level depends on the elasticity of demand.[1]

Harasztosi & Lindner (2019) examined the effect of changing the minimum wage in Hungary on employment, revenue, and the price level in different sectors. The researchers identified heterogeneity in the effect of the minimum wage on revenue and production between different sectors **based on the tradability of the products**.

According to the study, raising the minimum wage reduced total sales and employment in the tradable sectors, and did not significantly reduce employment in the non-tradable sectors. In addition, the increase in the minimum wage led to an increase in the prices of products in the non-tradable sectors.

Accordingly, in my research, I focused on "non-tradable" sectors, such as the restaurant sector and the retail sector.[2]

2.4.3. Empirical results with data from the USA

The series of studies by Aaronson (2001), MacDonald and Aaronson (2006), Aaronson and French (2007), and Aaronson, French & MacDonald (2008) examined the effect of changing the minimum wage on the prices of products and services in the U.S.

According to the results of the studies, the increase in the minimum wage causes an increase in the price level ("pass-through") while the size of this pass-through suggests that the low-wage labor markets are competitive (and not monopsonist).

On the other hand, MacDonald & Nilsson (2016) found that there is a weak positive relationship between an increase in the minimum wage and inflation in the restaurant

[1] As the demand for a product is less elastic, an increase in the minimum wage will likely cause an increase in the price level without a significant decrease in output and employment. On the other hand, if the demand for products is flexible, an increase in the minimum wage will likely cause a slight increase in the price level but a decrease in its output and employment.

[2] Although the food products themselves (sold in these sectors) are tradable, the service provided by these sectors is not tradable.

sector. According to their study, this result indicates that the labor market in that sector is monopsony (at least to a certain extent).[3]

Section 5 in this study explores the relationship between the minimum wage, monopsony (measured by concentration in the labor market), and inflation. To test this relationship, the study looks at the effect of the minimum wage on inflation while controlling the level of concentration in the economy, which is used as an indicator of monopsony power. The findings in section 5 show that there is no correlation between the concentration in the labor market and the impact of the minimum wage on inflation. This result joins the rest of the research results and emphasizes that concentration in the labor market is not a reliable measure of monopsony power

Section 3: Examining the effect of concentration in the labor market on the effect of the minimum wage on employment

3.1. preview

Azar José et al. (2019) study the effect of labor market concentration **in the retail** sector on the effect of the minimum wage on employment in the **retail sector**. This study estimated concentration in the labor market as the **concentration of vacancies** using data from the Burning Glass Technologies database.

Azar José et al. (2019) found a positive relationship between concentration in the labor market and the effect of the minimum wage on employment (i.e., the higher the concentration, the less an increase in the minimum wage reduces employment). The study presents similar results both in a model with a continuous HHI estimate and in a model with a binary HHI estimate. Azar José et al. (2019) attributed these results to the existence of monopsony in the labor market, while assuming that concentration in the labor market indicate monopsony power.

In this part of the study, I will use the model used by Azar, José, et al. (2019). **However, I will make the following changes:**

1. I used data from both the retail and restaurant sectors (instead of just the retail sector).

2. I used data from a broader range of years: in this section, I used data from the years 1990-2016, while Azar José et al. (2019) used data from 2010-2016.

[3] In addition, according to their study's results, the size of the minimum wage change affects product prices, similar to what is described in figures B2 and B3.

3. I used the employment concentration instead of the vacancy's concentration.

My results in this chapter highlight the difficulty in identifying monopsony power through "concentration in the labor market". While in the retail sector, my results were similar to those obtained by Azar José et al. (2019), **in the restaurant sector, I obtained the opposite result to those obtained by Azar José et al. (2019).**

3.2 Data

Employment data: My employment measure (in the general merchandise store sector (452) and the restaurants' sector (722)) comes from the **Quarterly Census of Employment and Wages** (QCEW). This database is widely used in the minimum wage literature. The QCEW provides quarterly, county-level payroll data by detailed industrial classification, including employment counts and average weekly wages by sector during the years 1990-2016.

Concentration data: I used data from the **County Business Patterns** database (**CBP**) to estimate the concentration level in a particular sector in a specific county.

The database contains data on the number of employees employed in each sector in each county. In addition, the database indicates how many firms operated in each sector in each county, divided by the size of the firms, according to the number of employees each firm employed. The database indicates how many firms operated in each sector and employed 1-5 workers, how many firms employed 5-9 workers, how many firms employed 10-19 workers, etc. for the following ranges 20-49, 50-99, 100-249, 250-500, 500-1000, 1000-1499, 1500-2499, 2500-4999, and 5000 or more.

For example, This is what the data in the database looks like for employment in the restaurant sector in 2000 in Maricopa County in the state of Arizona:

fipstate	fipscty	naics	empflag	emp	qp1	ap	est	n1_4	n5_9	n10_19	n20_49	n50_99	n100_249	n250_499	n500_999	n1000
04	013	722///	*NA*	100643	277091	1127490	4726	1279	733	963	1266	378	98	7	2	0

In 2000, there ware 1279 firms with 1 to 4 workers, 733 firms with 5-9 workers, 963 firms with 10 to 19 workers, 1266 firms with 20-49 workers, 378 firms with 50-99 workers, 98 firms with 100-249 workers, 7 firms with 250-499 workers, 2 firms with 500 to 999 workers and zero firms with more than 1000 workers.

According to equation (1), to calculate the HHI index, we need to know the number of employees each firm employs. However, in the CBP database, we are given a "range" of the number of employees employed in each firm. Accordingly, I defined an "**estimated firm size**" according to the following calculation:

$$\textbf{estimated firm size} = \widehat{w}_i \equiv \left(\frac{Upper\ bound_i - lower\ bound_i}{2}\right)$$

$$\textbf{estimated } \boldsymbol{total\ employment} = \widehat{W} = \sum_{i=0}^{n} \widehat{w}_i$$

The Upper bound is the maximum amount of workers firm i may employ according to his range. Accordingly, the "lower bound" is the minimum amount of workers firm i may employ according to his range. For example, firm in the range n20_49 employ between 20 to 49 workers. It lower bound will be 20 and upper bound will be 49. So $\widehat{w}_i = \frac{49-20}{2} = 14.5$

I defined an estimate for the HHI index as follows:

$$\widehat{HHI} = \sum_{i=0}^{n} \left(100 * \frac{\widehat{w}_i}{\widehat{W}}\right)$$

As detailed in the next chapter, the results obtained in the retail sector using the concentration index (HHI) estimated in this paper match the results obtained in the study by Azar et al. (2019), which uses the HHI index based on "vacancy" data.

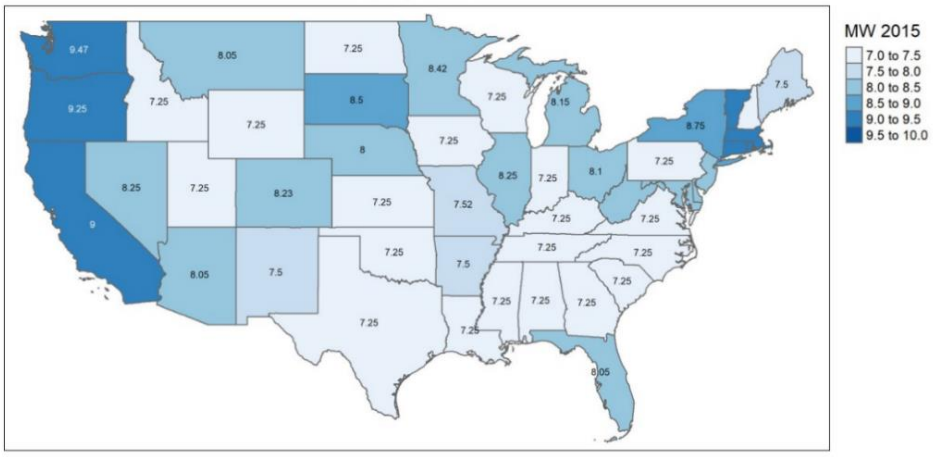
Population size: The population size data in my study comes from the **Survey of Epidemiology and End Results (SEER)** database, which contains information on U.S. state and county population data by age, race, and sex from 1969. I used this data both as controls and as "weights" in the regressions.

Unemployment data: I used unemployment as a control variable in my research. This data is collected by the U.S. Bureau of Labor Statistics and compiled in an online database by FRED, Federal Reserve Bank of St. Louis. The data contains the level of unemployment in each U.S. state each year.

The minimum wage: In the U.S., there are three different "tiers" of the minimum wage: federal, state, and sometimes municipal. In my research, the minimum wage will be defined as the effective minimum wage in each state (i.e., the maximum between the state's and the federal's minimum wage in the same county each year). In my research, I used the data from the database Vaghul & Zipperer (2016), which includes a table with all minimum wage changes in the U.S. between 1975-2016. This database is widely used in the minimum wage literature.

The minimum wage varies from state to state in terms of the actual dollar amount, the rate of changes over time, and when the changes occur.

Figure 3 shows the minimum wage in each US state in 2015. Figures 4-6 show the minimum wage percentage change between the years 1975-2016, 1990-2000, and 2000-2010.



(Figure 3: the minimum wage in 2015)

Minimum Wage Bindingness:

The level of the bindingness of the minimum wage is determined by the number of employees whose wages will be directly affected if the minimum wage increases.

The impact of the minimum wage change on various macroeconomic variables is more likely to be significant if more workers are affected by the change. Therefore, taking into account how the minimum wage is binding can improve the accuracy of various models.

The ideal way to measure the level of the bindingness of the minimum wage is calculating the percentage of workers earning the minimum wage in each county, each year, and sector. Unfortunately, I do not have access to this data.

The way I chose to identify the level of the bindingness of the minimum wage is to use the **ratio between the minimum wage and the average wage**. This method is sometimes called the "Kaitz index" (Kaitz, H. (1970)). Alonso, C. (2016) Used the same method, while David, H., Manning, A., & Smith, C. L. (2016) used a similar method - the median and minimum wage ratio.[4]

[4] Autor et al (2006) used the bindingness level under the IV strategy to address potential biases that arise from the relationship between the bindingness variable (which is calculated as the gap between the log minimum wage and the log wage in the 50th percentile) and the outcome variable they measure (the gap between the wage in the 'p' percentile and the wage in the 50th percentile). In my study this concern is negligible because the outcome variables do not consist of the minimum wage or the median wage.

I obtained the average salary in each county each year from the QCEW database. To estimate the level of bindingness, I divided the minimum wage by the average wage:

$$bindingness_{c,t} = \frac{\min wage_{c,t}}{avarge\ wage_{c,t}}$$

The bindingness index is a measure of how close the average wage in an industry or region is to the minimum wage. The index ranges from 0 to 1, with higher values indicating that the minimum wage is more closely tied to the average wage, or more "binding." When the bindingness index is 1, it means that all employees earn the minimum wage, and any change in the minimum wage will directly affect the wages of all employees. But when the bindingness index is closer to 0, it means that there is a larger gap between the average wage and the minimum wage, and a change in the minimum wage is less likely to affect the wages of many workers, and therefore it will hardly affect macroeconomic variables such as employment or inflation

3.3 The Model:

The model presented in this chapter aims to examine the effect of concentration on the effect of changes in the minimum wage on employment.

$$(1)\ \ln(emp_{c,y}) = \alpha_0 + \alpha_1 \ln(\mathrm{MW}_{S,y}) + \alpha_2 \ln(\mathrm{MW}_{c,y}) * \mathrm{HHI}_{sector,c,y} + \alpha_3 \mathrm{HHI}_{sector,c,y} + \alpha_4 \ln(pop_{c,y}) + \alpha_5 \ln(totalEarning_{c,y}) + \alpha_6 \ln(totalemp_{c,y}) + \alpha_7 \ln(\mathrm{unemplyment}_{c,y}) + \mathrm{year} + \mathrm{county} + state + \alpha_8 X + \epsilon$$

where the outcome $\ln(emp_{s,c,y})$ is the log of employment in the state 's,' in county 'c' and year 'y', $\ln(\mathrm{MW}_{S,y})$ is the log of the minimum wage in the state 's' in year 'y', $\mathrm{HHI}_{sector,c,y}$ is the level of concentration in employment in the sector, in county 'c' in year 'y', and $\ln(\mathrm{MW}_{c,y}) * \mathrm{HHI}_{sector,c,y}$ is the interaction between the minimum wage and concentration. Additional control variables added to the model are total wages, total employment at each county, and the unemployment rate at each state, as well as fixed effects variables per year, county, and state.

Adding the interaction variable to the model enables us to identify the effect of the minimum wage on employment depending on the concentration.

The effect of the minimum wage on the concentration in the model is: $\alpha_1 \ln(\mathrm{MW}_{S,y}) + \alpha_2 \ln(\mathrm{MW}_{c,y}) * \mathrm{HHI}_{sector,c,y} = (\alpha_1 + \alpha_2 * \mathrm{HHI}_{sector,c,y}) \ln(\mathrm{MW}_{S,y})$

The coefficient α_2 identifies the effect of the minimum wage on employment which depends on the concentration level. According to the monopsony theory, we expect a positive estimator for α_2.

In addition, I used an alternative model, which uses a binary HHI index (which receives the value one if the HHI index is above 0.25 and the value 0 if the HHI index is below 0.25).

$$(2)\ \ln(emp_{c,y}) = \alpha_0 + \alpha_1 \ln(\mathrm{MW}_{S,y}) + \alpha_2 \ln(\mathrm{MW}_{c,y}) * I_{\mathrm{HHI>0.25}_{sector,c,y}} + \alpha_3 I_{\mathrm{HHI>0.25}_{sector,c,y}} + \alpha_4 \ln(pop_{c,y}) + \alpha_5 \ln(totalEarning_{c,y}) + \alpha_6 \ln(totalemp_{c,y}) + \alpha_7 \ln(\mathrm{unemplyment}_{c,y}) + \mathrm{year} + \mathrm{county} + state + \alpha_8 X + \epsilon$$

In this model, the minimum wage's effect on employment in a county is expressed by two estimators: α_1 and α_2. In counties with a concentration below 0.25, the effect is solely α_1. In counties with a concentration above 0.25, the effect is $\alpha_1 + \alpha_2$.

In both models, I used the size of the population as a weight. I clustered the standard errors at the state level to account for possible serial correlation (due to the fact that the minimum wage is the same within a state) (Bertrand, Duflo, and Mullainathan (2004)). The same technique has been used by Dube, Lester, and Reich (2010).

3.4 Results:

In this section, I will present the results of models 1 and 2 using data from the retail and restaurant sector. In addition, I will present the results of an alternative model that takes into account the minimum wage's bindingness level in each county.

My results in the retail sector are consistent with the monopsony theory. Also, the results are consistent with the relationship between concentration in the labor market and monopsony power (similar to Azar J. et al. (2019) results). On the other hand, my results in the restaurant sector do not match the assumption that concentration in the labor market is an adequate indicator of monopsony power in the labor market.

These results suggest that labor market concentration is not a reliable measure of monopsony power

In the retail sector, including the bindingness level of the minimum wage in the regressions increased the effect of the interaction variable of the minimum wage and concentration on employment.

On the other hand, in the restaurant sector, including the bindingness level of the minimum wage in the regressions weakened the negative impact of the minimum wage and concentration interaction variable and made it statistically insignificant.

3.4.1. Results in the retail sector (NAICS 452)

Table 1 shows the results obtained when I used the data from the retail sector (NAICS 452). Column 1 shows the result of a regression that examines the effect of the minimum wage on employment without the concentration variables in the model. Column 2 shows the effect of the minimum wage, concentration, and an interaction variable of the minimum wage and concentration on employment. Column 3 shows the effect of the minimum wage, a binary variable of high/low concentration, an interaction variable of the minimum wage, and the binary variable of high/low concentration on employment.

According to the three models examined, the minimum wage by himself has no significant effect on employment at the retail sector.

According to the results of model 1 shown in column 2, the interaction variable of the minimum wage and employment concentration has a positive and significant effect on the employment in the retail sector.

According to the results of model 2 shown in column 3, in areas with a concentration above 0.25, raising the minimum wage by 1% led to an increase of 0.46% in employment, compared to counties where the concentration is lower than 0.25. This effect is significant.

The results of both models 1 and 2 show that, when all other factors are equal, raising the minimum wage leads to an increase in employment in the retail sector in areas with high concentration compared to areas with low concentration.

These results are consistent with the monopsony theory and the assumption that concentration in the labor market is a means of identifying monopsony power.

Similar results were obtained by Azar J. et al. (2019), which indicates a similarity between the concentration index I created, using the employment data, and the concentration index used by the researchers in this study (which was based on job offer data).

I will note that the coefficient that Azar J. et al. (2019) found for the interaction between the minimum wage and concentration is higher than I found. This gap may be due to this reasons:

A. To calculate the concentration, I used the concentration of employment in the retail sector (including all employees: cashiers, storekeepers, managers, cleaners, and more). This is because the database I used does not allow a distinction between types of jobs within the sector. On the other hand, Azar J. et al. (2019) used the employment data of specific occupations in the sector, which are characterized by receiving a minimum wage (stock clerks, retail sales and cashiers).

B. Differences in the sample periods: I used data from the years 1990-2016, while and Azar J. et al. (2019) used data just from the years 2010-2016. This gap could possibly affect the gap in the results, but even when I use data from the years 2010-2016 I do not get Azar J. et al. (2019) results (see Table 1c).

Moreover, according to columns 2 and 3 of the table, there is a significant negative relationship between labor market concentration and employment. This result is consistent with the monopsony theory

3.4.2 Results in the restaurant sector (NAICS 722)

According to the three models examined, the minimum wage has a significant and negative effect on the employment in the restaurant sector. The coefficient of the minimum wage on employment ranges between 0.052-0.063 (A 1% increase in the minimum wage leads to a decrease of about 0.052% in employment).

The results in column 2 shows that in areas with high concentration, a rise in minimum wage results in a steeper decrease in employment compared to areas with low concentration. The effect is statistically significant at a 1% level.

Column 3 shows the results of Model 2. When the minimum wage increased by 1%, areas with concentration above 0.25 experienced a 0.28% decrease in employment, **compared to areas with lower concentration**. The effect is statistically significant.

These results are opposite to the results obtained in the retail sector.

This finding supports the "alternative theory" that workers in highly competitive and flexible job markets opt to work for high-paying "efficient" employers. High concentration in such areas may indicate a competitive job market.

As explained in section 2, employment in a competitive market decrease when the minimum wage increases. This theory can explain why the interaction between

concentration and minimum wage has a negative impact on employment in the restaurant sector.

3.5 Robustness test

Bindingness of the minimum wage

The employment data from the QCEW database covers the employment of all workers in each sector without distinguishing between workers with different wage levels. Accordingly, the database does not differentiate between a change in the employment of workers earning a minimum wage and workers earning a higher wage.

Therefore, the results in Tables 1-2 could be impacted by changes in employment among workers who don't receive minimum wage.

To reduce this concern, I repeated the regressions, taking into account the bindingness level of the minimum wage in each county each year, according to the following models:

To address this issue, I repeated the regressions while controlling the bindingness level of the minimum wage in each county each year, using the following models:

$$(1b)\ \ln(emp_{s,c,y}) = \alpha_0 + \boldsymbol{\alpha_1 \ln(MW_{S,y})} * \boldsymbol{bindingness_{c,y}} + \boldsymbol{\alpha_2 \ln(MW_{c,y})} * \boldsymbol{HHI_{sector,c,y}} * \boldsymbol{bindingness_{c,y}} + \alpha_3 \mathrm{HHI}_{sector,c,y} + \alpha_4 \ln(pop_{c,y}) + \alpha_5 \ln(totalEarning_{c,y}) + \alpha_6 \ln(totalemp_{c,y}) + \alpha_7 \ln(\mathrm{unemplyment}_{c,y}) + \mathrm{year} + \mathrm{county} + state + \alpha_8 X + \epsilon$$

$$(2b)\ \ln(emp_{c,y}) = \alpha_0 + \boldsymbol{\alpha_1 \ln(MW_{S,y})} * \boldsymbol{bindingness_{c,y}} + \boldsymbol{\alpha_2 \ln(MW_{c,y})} * \boldsymbol{I_{HHI>0.25_{sector,c,y}}} * \boldsymbol{bindingness_{c,y}} + \alpha_3 I_{\mathrm{HHI}>0.25_{sector,c,y}} + \alpha_4 \ln(pop_{c,y}) + \alpha_5 \ln(totalEarning_{c,y}) + \alpha_6 \ln(totalemp_{c,y}) + \alpha_7 \ln(\mathrm{unemplyment}_{c,y}) + \mathrm{year} + \mathrm{county} + state + \alpha_8 X + \epsilon +$$

(For convenience, I bolded the changes from equations 1-2)

Table 1b shows the results of models 1b and 2b in the retail sector. According to tables 1, 1b: including the bindingness level of the minimum wage in the regressions increased the effect of the interaction variable of the minimum wage and concentration on employment. This result is obtained both for a continuous variable of employment concentration and for a binary variable of employment concentration.

The results show that the impact of minimum wage and concentration on employment is due to workers earning near minimum wage, and it is not due to changes in employment among workers earning higher wages.

Table 2b shows the results of models 1b and 2b in the restaurant sector. According to the table, the binding minimum wage negatively affects employment under the three specifications examined.

However, unlike the results in Table 2, When the minimum wage bindingness level is taken into account, the impact of minimum wage, bindingness, and employment concentration on employment **is not significantly negative**. This suggests that the negative effect seen in Table 2 may be due to changes in employment of workers that are at the top of the wage distribution.

3.5.3 Summary of the results obtained in the two sectors:

The summaries results of table 1-2:

	$\ln(\mathrm{MW}_{c,y})$	$\ln(\mathrm{MW}_{c,y}) * \mathrm{HHI}_{sector,c,y}$	$\ln(\mathrm{MW}_{c,y}) * I_{\mathrm{HHI}>0.25_{sector,c,y}}$	$\mathrm{HHI}_{sector,c,y}$
Retail sector	No effect	Positive	Positive	Negative
restaurant sector	Negative	Negative	Negative	Positive

The summaries results of table 1b-2b:

	$\ln(\mathrm{MW}_{c,y}) * \boldsymbol{bindingness}_{c,y}$	$\ln(\mathrm{MW}_{c,y}) * \mathrm{HHI}_{sector,c,y} * \boldsymbol{bindingness}_{c,y}$	$\ln(\mathrm{MW}_{c,y}) * I_{\mathrm{HHI}>0.25_{sector,c,y}} * \boldsymbol{bindingness}_{c,y}$	$\mathrm{HHI}_{sector,c,y} * \boldsymbol{bindingness}_{c,y}$
Retail sector	No effect	Positive	Positive	Negative
restaurant sector	Negative	**No effect**	**No effect**	**No effect**

3.6. Conclusion

According to the results of this chapter, employment in the retail sector and the restaurant sector reacts differently to changes in concentration and the minimum wage. The effect of concentration on employment (when changing the minimum

wage) in the restaurant sector **is in the opposite direction** from the effect we would expect to see if the concentration was correlated with monopsony power.

Accordingly, labor market concentration is not a reliable measure for monopsony power.

Section 4: The effect of the minimum wage on the concentration

According to the theory, employment in monopsony firms is expected to increase when the minimum wage increases. According to the method in which we identified monopsony power (concentration in the labor market), monopsony firms are also expected to be a relatively large employers in their region.

On the other hand, according to the classical theory regarding the effect of the minimum wage on employment, small firms (that do not exercise monopsony power) are expected to reduce the size of their employment after raising the minimum wage.

Accordingly, in a county where there are firms with monopsony power, **an increase in the minimum wage is expected to increase market concentration**. But, at the same time**, the same increase in the minimum wage restricts the ability of the monopsony to use its market power to lower salaries (below the new minimum wage)**.

This theoretical result undermines the assumption that concentration in the labor market is an adequate measure of real monopsony power. Because after raising the minimum wage, concentration is expected to increase, **but the ability of firms to exercise monopsony power is expected to decrease.**

In this section, I will examine how the minimum wage affects labor market concentration. My results in this chapter will help us understand the effect of the minimum wage on the concentration in the labor market, and on the ability to identify monopsony power through concentration in the labor market.

4.2 The model

The main model in this chapter is a panel model, which examines how changes in the minimum wage affect labor market concentration.

$$(3)\ \Delta hhi_{sector,c,y} = \alpha_0 + \alpha_1 \Delta\log(MW_{c,y}) + \alpha_2 hhi_{sector,c,y} + \alpha_3 \Delta\log(MW_{c,y}) * hhi_{sector,c,y} + \alpha_4 \ln(pop) + \alpha_5 hhi_{sector,State,y} + \text{year} + \text{county} + state + \alpha_3 X + \epsilon$$

The outcome $\Delta hhi_{sector,c,y}$ is the **change** in concentration at the sector at county 'c' in year 'y'. $\Delta\text{Log}\,(MW_{c,y})$ is the **change** in the log minimum wage in state 's' in year 'y', $hhi_{sector,c,y}$is the concentration at the county. $\alpha_3\Delta\log\,(MW_{c,y}) * hhi_{sector,c,y-1}$ is the interaction between the **change** in the log minimum wage and the concentration at the sector. Additional control variables added to the model are the log of population, the concentration **at the state**, and a fixed effect variable for the year, state, and county.

The interaction variable between the change in the minimum wage and concentration allows us to identify the effect of the minimum wage on concentration as a function of the concentration in the job market (at the sector).

For example, in a county with a single employer, the level of concentration will be 1, and the effect of changing the minimum wage on concentration will be:

$$\alpha_1\log\,(MW_{c,y}) + \alpha_3\Delta\log\,(MW_{c,y}) * hhi_{sector,c,y} = (\alpha_1 + \alpha_3)\Delta\log\,(MW_{c,y})$$

In a county with many employers without concentrated employment (where HHI tends to be 0), the effect of a minimum wage change on concentration will be:

$$\alpha_1\Delta\log\,(MW_{c,y}) + \alpha_3\Delta\log\,(MW_{c,y}) * lag.hhi_{sector,c,y} \approx (\alpha_1)\Delta\log\,(MW_{c,y})$$

In addition, I used an alternative model, which uses a binary index for the level of concentration, which receives one if the concentration is higher than 0.25 and 0 if it is lower than 0.25.

$$(4)\ \Delta hhi_{sector,c,y} = \alpha_0 + \alpha_1\Delta MW_{c,y} + \alpha_2 I_{\text{HHI}>0.25_{sector,c,y}} + \alpha_3\Delta MW_{c,y} *$$
$$\text{I}_{\text{HHI}>0.25_{\text{sector,c,y}}} + \alpha_4\ln(pop) + \alpha_5 hhi_{sector,state,y} + \text{year} + \text{county} + state + \alpha_3 X + \epsilon$$

Suppose we accept the monopsony theory and the assumption that concentration in the labor market indicates monopsony power. In that case, we are expected to see that there is a positive relationship between the change in the concentration and the interaction variable of the change in the minimum wage and the concentration (α_3).

Including concentration at the state level in the models eliminates potential alternate explanations. For instance, it helps rule out the possibility that the minimum wage increase was due to an increase in concentration, which can create an inverse correlation between the minimum wage and concentration.

4.2.2 Controlling for the level of bindingness

In order to identify the impact of the minimum wage and filter changes in other parts of the wage distribution, I used a model that controls the minimum wage's bindingness level in each county. I used the following two models:

$$(3b)\ \Delta hhi_{sector,c,y} = \alpha_0 + \alpha_1 \Delta\log(MW_{c,y}) * \boldsymbol{bindingness_{c,y}} + \alpha_2 hhi_{sector,c,y} + \alpha_3 \Delta\log(MW_{c,y}) * \boldsymbol{bindingness_{c,y}} * hhi_{sector,c,y} + \alpha_4 \ln(pop) + \alpha_5 hhi_{sector,State,y} + \text{year} + \text{county} + state + \alpha_3 X + \epsilon$$

$$(4b)\ \Delta hhi_{sector,c,y} = \alpha_0 + \alpha_1 \Delta\log(MW_{c,y}) * \boldsymbol{bindingness_{c,y}} + \alpha_2 \mathrm{I}_{\mathrm{HHI}>0.25_{\mathrm{sector,c,y}}} + \alpha_3 \Delta\log(MW_{c,y}) * \boldsymbol{bindingness_{c,y}} * \mathrm{I}_{\mathrm{HHI}>0.25_{\mathrm{sector,c,y}}} + \alpha_4 \ln(pop) + \alpha_5 hhi_{sector,S,y} + \text{year} + \text{county} + state + \alpha_3 X + \epsilon$$

4.3. Results:

4.3.1. Retail sector (NAICS 452)

Table 3 shows the results I got using models 3 and 4 in the retail sector, using data from the years 1975-2016.

Column 1 in Table 3 shows the effect of concentration in employment on the change in concentration with a control variables of population size, the average concentration in the state in the previous year, and fixed-effects of the county, state, and year. Column 3 in Table 3 shows the results of model 3, which includes also the change in the minimum wage. Column 3 shows the results of model 4, which also includes the interaction variable between the change in the minimum wage and concentration.

Table 3b shows the results I got using models 3b and b4 in the retail sector when I control the minimum wage bindingness level.

According to the models' results, the change in the concentration is correlated with the concentration itself. This estimator may be biased because the change in concentration is defined as the concentration in the current year minus the concentration in the previous year (however, my study does not focus on this estimator)

As shown in column 3 in Table 3, the interaction variable (of the minimum wage log change and concentration) has a positive and significant effect on the change in the concentration. This finding is consistent with the monopsony theory, In an environment with high concentration, when the minimum wage increases the

concentration increases even more. However, according to column 3 in Table 3b, these results are weakened when the level of bindingness is controlled.

As shown in column 4 of Table 3, when I used a binary variable for the level of concentration, I found that the interaction (between the minimum wage log change and a binary variable for high concentration) **also has a positive and significant effect on the change in the concentration**. These results are maintained when the level of bindingness is taken into account.

4.3.2. Results in the Restaurant sector (NAICS 722)

Table 4 shows the results I got for models 3 and 4 in the restaurant sector.

As shown in column 3 in Table 4, the interaction variable (of the change in the log of the minimum wage and the concentration) has a **negative and significant effect on the change in the concentration** (However, according to column 3 in Table 4b, these results are weakened when the level of bindingness is controlled).

This result **contradicts the theory that concentration in the labor market indicates monopsony power**, or that the existence of monopsony in the labor market causes monopsony companies to increase their employment when the minimum wage increases.

Section 5: The effect of the minimum wage on inflation

According to the theory, in a market with perfect competition, when the minimum wage increases, production costs are expected to increase and employment (and the amount of production) to decrease (as detailed at in figure 1). **Accordingly, the supply is expected to decrease, and therefore the price of the products is expected to increase**.

On the other hand, in a market with employers with monopsony power, an increase in the minimum wage is not expected to result in a decrease in employment (or production), as detailed in figure 2. **Accordingly, the supply is not expected to decrease, so the price of the products is not expected to increase**.

Accordingly, **the effect of the minimum wage on inflation can be another type of indication of the existence (or non-existence) of monopsony in the labor market**, as well as an indicator of the relationship between concentration in the labor market and monopsony power.

Suppose employment concentration (HHI) identifies monopsony power. In that case, when there is high concentration in the labor market, the minimum wage is not expected to cause inflation. On the other hand, when there is low concentration in the labor market, an increase in the minimum wage is expected to lead to an increase in inflation.

In addition, the effect of the minimum wage likely depends on the % of workers earning the minimum wage. As more workers earn this wage, raising the minimum wage has a greater impact on production costs. Accordingly, controlling the level of bindingness of the minimum wage is expected to strengthen the significance of the results.

In this chapter, I examined how the change in the minimum wage affects inflation, and I will also examined how the level of concentration in the labor market affects the effect of the minimum wage on inflation.

5.1 Inflation Data:

In my research, I used inflation data from the U.S. Bureau of Labor Statistics (BLS) database. The BLS reports number of inflation series for some metropolitan areas (MSAs). In this chapter, I used three different inflation series: total inflation, food away from home CPI (FAFH CPI), and food at home CPI (FAH CPI).

The FAFH series includes food purchased and consumed outside of the home. This series represents the price level of the products and services produced in the NAICS 722 sector.

The FAH series includes the prices of all the food and drinks brought into the home.

These products are generally sold in businesses belonging to the NAICS 452 sector, but they do not represent all the products sold in this sector.

I chose to use this series to represent the price level in the NAICS 452 sector because it includes the prices of one of the non-tradable products sold in this sector. Additionally, since both FAFH and FAH deal with food product prices, they are likely to be affected by similar shocks (unrelated to the minimum wage). Accordingly, using the FAH series will make it possible to make more meaningful comparisons between the results obtained in the two sectors.

My regression included data between the years 1976-2016 (since this is the range of years in which we have concentration data).

It should be noted that in 1999 the BLS changed how they calculated the inflation series. The formula used by the BLS since 1999 can imatate consumers' substitution between the products they buy in response to changes in relative prices, something the previous equation did not do. Therefore, the inflation data from the years prior to 1999 may be slightly biased upwards (for more detail, see Dalton, K. V., Greenlees, J. S., & Stewart, K. J. (1998).)

As will be detailed later, in my model, I used a control variable for each year, which should absorb this change and yield a relatively unbiased result.

5.2. Adjusting the level of aggregation:

5.2.1. Using the same time measures:

In this chapter I used data with different frequencies:

A. The inflation series from the BLS database comes with an annual, bimonthly, and monthly frequency (depending on the series and the year).

B. The minimum wage from the database Vaghul & Zipperer (2016) comes with a monthly frequency throughout the study period.

C. The employment data from the CBP database, from which I estimated the concentration level in each county, comes with an annual frequency.

Accordingly, in my model, I used annual data. I averaged the minimum wage and inflation over the year to calculate the annual minimum wage and inflation.

5.2.2. Using the same geographic units:

The data I used comes in different geographic aggregation levels:

A. The inflation data from the BLS database comes at the MSA level and only for specific MSAs.

B. The minimum wage data comes at the state level.

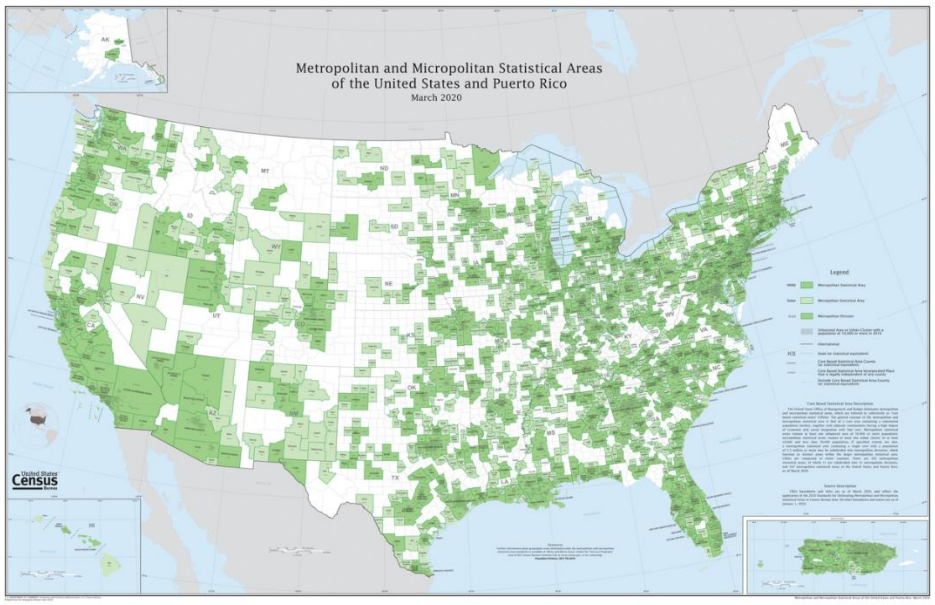
C. The employment data from the CBP database comes at the county level.

d. The population data and other control variables also come at the county level.

5.2.3. Metropolitan or micropolitan statistical area

According to the Census Bureau, "The United States Office of Management and Budget (OMB) delineates metropolitan and micropolitan statistical areas according to

published standards that are applied to Census Bureau data. The general concept of a metropolitan or micropolitan statistical area is that of a core area containing a substantial population nucleus, together with adjacent communities having a high degree of economic and social integration with that core".[5]



(Map of Metropolitan and Micropolitan Statistical Areas of the United States and Puerto Rico, from https://www.census.gov/geographies/reference-maps/2020/geo/cbsa.html)

Multi-state MSAs:

According to the map, the inflation data provided by the BLS are at the MSA level, which may include several different states. For example, in the case of *New York-Northern New Jersey-Long Island* metropolitan area, the inflation data composed prices measured in four different states: New York, Pennsylvania, New Jersey, and Connecticut.

Accordingly, the inflation in each MSA may be affected by changes in the minimum wage in several states.

5.3. Data processing:

5.3.1. Weighted minimum wage:

In my study, I calculated the "log change in minimum wage" in each MSA each year as follows:

[5] See https://www.census.gov/programs-surveys/metro-micro/about.html

1) I calculated the log minimum wage in each county and the change in the (log) minimum wage in each county.

2) I used a "county-MSA-CSA-crosswalk" key to assign the counties into MSA groups.

3) I summed the "changes in log minimum wage" in all counties in each MSA using weights constructed by the county's population out of the MSA's total population.

$\Delta \log(mw_{msa,t}) = \sum_{county} \alpha_{msa,c,t} * \Delta \log(mw_{msa,c,t})$

$\Delta \log(mw_{msa,t})$ is the weighted change in the log minimum wage in each MSA (for each year), $\alpha_{msa,c,t}$ is the share of the population in county 'c' out of the population of the whole MSA, $\Delta \log(mw_{msa,c,t})$ is the change in the log minimum wage in the county c.

Accordingly, the weighted minimum wage in each MSA each year is the average of the minimum wages in all the counties in the MSA, while weighted by the counties' population.

5.3.2. Weighted concentration:

I calculated the weighted concentration according to the following equation:

$$\log(HHI_{msa,t}) = \sum_{county} \alpha_{msa,county,t} * \log(HHI_{msa,county,t})$$

$\log(HHI_{msa,t})$ is the weighted change in the log HHI in each MSA (at each year), $\alpha_{msa,c,t}$ is the share of the population in county c out of all the population of the MSA, and $\log(HHI_{msa,c,t})$ is the change in the log HHI in the county c.

Unfortunately, the weighting of concentration at the MSA level significantly reduces the variation in the value of concentration in the sample. This due to two main reasons:

1. In large counties, the concentration is significantly lower (see in this regard the results in tables 3-4).
2. In addition, large counties receive greater weight in the calculation of concentration in the MSA (because I weight the counties according to their population size).

For example, Harris County, Texas (County FIPS: 48201) is part of the **Houston-The Woodlands-Sugar Land, TX MSA**. In 2016, the county counted 4,589,928 residents

out of 6,772,470 residents in the entire MSA, so two-thirds of the MSA residents live in Harris County. The county's concentration in the retail sector was 76 (out of 10,000). On the other hand, the average concentration in all the other MSA counties in the same year was 14 times greater, over 1,050.

For example, the Liberty County is also part of the **Houston-The Woodlands-Sugar Land, TX MSA**. in 2016 it had 81,704 residents and a concentration of 3,696, almost 50 times more then at Harris County. Due to the high weight of Harris' County, the concentration of the **Houston-The Woodlands-Sugar Land** MSA is only 393 (a very low concentration level).

In addition, even when comparing different MSAs, MSA's with a large population has lower concentration level, but bigger weight in the regressions.

As a results, the average HHI level in the restaurant sector in all MSAs is 79.322, less than 1% of the maximum value obtained at the county level.

5.4. The Model

The model presented in this chapter aims to examine the effect of concentration on the effect of changes in the minimum wage on the log of the inflation.

$$(5)\ \Delta\log\left(prices\right)_{sector,m,t} = \alpha_1 + \alpha_2\Delta\log\left(\min wage\right)_{m,t} + \alpha_3\Delta\log\left(\min wage\right)_{m,t} * \log(HHI)_{m,t} + \alpha_4\log(HHI)_{m,t} + \alpha_5\Delta\log\left(prices\ at\ all\ sectors\right)_{m,t} + pop_{m,t} + year + msa + \epsilon$$

The outcome $\Delta\log\left(prices\right)_{sector,\mathrm{MSA},t}$ is the log inflation at the sector at the MSA 'm' in year 't' (FAFH for the restaurants' sector and FAH for the retail sector). $\Delta\mathrm{Log}\left(\min wage\right)_{m,t}$ is the weighted change in the minimum wage in the MSA 'm' in year 't'. $\log(HHI)_{m,t}$ is the weighted concentration in the MSA 'm' in year 't'. $\Delta\mathrm{Log}\left(\min wage\right)_{m,t} * \log(HHI)_{m,t}$ is the interaction between the weighted change in the minimum wage and the weighted concentration in the MSA 'm' in year 't'. Additional control variables added to the model are the log of the general inflation at the MSA (in all the products), the log of population, and a fixed effect variable for the year and for the MSA.

In addition, I used an alternative model, which uses a binary index for the level of concentration, which receives one if the concentration is higher than its average in the sample and 0 otherwise.

$$(6)\ \Delta\log(prices)_{sector,m,t} = \alpha_1 + \alpha_2\Delta\log(\min wage)_{m,t} + \alpha_3\Delta\log(\min wage)_{m,t} * I_{\text{HHI>mean}_{m,t}} + \alpha_4 I_{\text{HHI>mean}_{m,t}} + \alpha_5\Delta\log(prices\ at\ all\ sectors)_{m,t} + pop_{m,t} + year + msa + \epsilon$$

The interaction variable between the change in the minimum wage and concentration allows us to identify the effect of the minimum wage on inflation and the effect of the minimum wage on the log inflation subject to the concentration of employment in the sector.

The control variable "log price in all areas" should absorb general effects on the price level that is not related to the minimum wage or to the concentration of the labor market in the examined sector.

The standard errors are clustered at the MSA level.

5.4.1 Bindigness of the minimum wage

Alongside models 5 and 6, I created a model which controls the level of the bindingness of the minimum wage in each county.

I calculated the "change in the bindingness minimum wage in each MSA" according to the following equation, which added the bindingness component already at the county level itself (and not at the level of the entire MSA):

$$\Delta\log(mw_{msa,t}) * bindigness = \sum_{county} \alpha_{msa,county,t} * \boldsymbol{bindigness_{county,t}} * \Delta\log(mw_{msa,county,t})$$

Where $\alpha_{msa,county,t}$ is the share of the population in county out of all the population of the MSA, $\boldsymbol{bindigness_{county,t}}$ is the minimum wage bindingness level at the county, and $\Delta\log(mw_{msa,county,t})$ is the change in the log minimum wage at the county.

Controlling the level of bindingness increases the weight given to minimum wage changes in county's where the change affects a larger share of workers.

Tables 5b and 6b show the results obtained according to the following models:

$$(5b)\ \Delta\log(prices)_{sector,m,t} = \alpha_1 + \alpha_2\Delta\log(\min wage) * \boldsymbol{bindingness_{m,t}} + \alpha_3\Delta\log(\min wage) * \boldsymbol{bindingness_{m,t}} * \log(HHI)_{m,t} + \alpha_4\log(HHI)_{m,t} + \alpha_5\Delta prices\ at\ all\ sectors_{m,t} + pop_{m,t} + year + msa + \epsilon$$

$$(6b)\ \Delta\log(prices)_{sector,m,t} = \alpha_1 + \alpha_2 \Delta\log(\min wage) * \boldsymbol{bindingness}_{m,t} + \alpha_3 \Delta\log(\min wage) * \boldsymbol{bindingness}_{m,t} * I_{\text{HHI>mean}_{m,t}} + \alpha_4 I_{\text{HHI>mean}_{m,t}} + \alpha_5 \Delta prices\ at\ all\ sectors_{m,t} + pop_{m,t} + year + msa + \epsilon$$

5.5. Results

Table 5 shows the results obtained when I used the data from the restaurant sector (772), and "food away from home" (FAFH) inflation series. Table 6 shows the results obtained when I used the data from the retail sector (NAICS 452), and "food at home" (FAH) inflation series.

In all models the dependent variable is the log of the inflation in the sector. Column 1 shows the results of a reduced model that includes only the minimum wage, all products' inflation, the MSA population's size, and control variables. Column 2 shows the results of the full model as shown in equation 5. Column 3 shows the results of the model shown in equation 6, which includes an indicator for high/low concentration.

5.5.1 Results in the restaurant sector

According to the three models, raising the minimum wage has a positive and significant effect on the inflation in the restaurant sector. A 10% increase in the minimum wage causes a 0.3% increase in prices in the restaurant sector. In the reduced model, this relationship exists at a significance level of 5%, and in the models presented in columns 2-3 at a significance level of 1%. These results are consistent with the findings of MacDonald & Nilsson (2016).

In addition, as expected, there is a positive and significant correlation between inflation in all products and inflation in the restaurant sector.

However, **I didn't find a significant relationship between the interaction variable (minimum wage and concentration) and inflation in the restaurant sector**, both when I used concentration itself and when I used a binary variable of above-average concentration.

5.5.2 Results in the retail sector

As expected, there is a positive and significant correlation between inflation in all products and inflation in the food-at-home series.

However, I didn't find a significant relationship between the minimum wage and log inflation in the 'food-at-home' series. In addition, no significant relationship was found between the interaction variable (a change in the minimum wage and concentration in the retail sector) and the log of the inflation in the food-at-home index.

5.5.3 Results when controlling the Bindingness of the minimum wage

Tables 5B and 6B show the results of models 5b and 6b, which include the minimum wage bindingness level.

According to the results in the restaurant sector shown in Table 5B, when controlling the level of bindingness, the effect of the minimum wage on the log of the inflation (in FAFH) increases. A 10% increase in the minimum wage causes a roughly 1% increase in prices in the restaurant sector, at a 5% significant level.

Despite this, even when controlling the level of bindingness, no significant result was obtained in the retail sector.

Section 6: Conclusions

According to the economic theory, in a labor market with employers with monopsony power, raising the minimum wage is not expected to decrease employment. Conversely, in a competitive labor market, an increase in the minimum wage is expected to decrease employment or cause an increase in prices in the sectors affected by the increase in the minimum wage.

In the literature, researchers sometimes use "concentration in the labor market" as a measure of monopsony power. According to this assumption, increasing the minimum wage is less likely to decrease employment in areas with high concentration. This claim was made, for example, by Azar et al. (2019).

My study challenges the assumption that labor market concentration is a good measure of monopsony power, particularly concerning the employment of minimum wage workers. In my research, I showed that using concentration in the labor market as a substitute for monopsony power leads to results that are not consistent with economic theory. In addition, this study showed that using the bindingness level of the minimum wage may improve models that examine how changes in the minimum wage affect different macroeconomic variables.

I re-examined Azer's model in this study, using a wider variety of data over time and in different sectors. Like Azar et al. (2019), I found that in the retail sector, when the minimum wage increases, employment decreases less in counties with higher

concentration. On the other hand, I found that there is an opposite effect in the restaurant sector: when the minimum wage increases, employment decreases more as the concentration is higher. However, this result is weakened when considering the level of the bindingness of the minimum wage.

These results reduces the credibility of using the concentration in the labor market as a measure of monopsony power.

In addition, according to economic research, an increase in the minimum wage is expected to increase the prices of non-tradable goods produced by minimum wage workers. However, the price increase is expected to be weaker in places with monopsony employers (who do not reduce the supply of their products in response to raising the minimum wage). According to tables 5-6, I did not find a connection between concentration in the labor market and the effect of the minimum wage on inflation, even when I used the minimum wage's bindingness level.

This result also indicates the difficulties in using concentration in the labor market as a measure of monopsony power.

Furthermore, according to economic theory, an increase in the minimum wage is expected to cause monopsony employers to increase the number of workers they employ (or at least not reduce employment), and non-monopsony employers to decrease the number of workers they employ.

Accordingly, increasing the minimum wage in areas with monopsony employers it is expected to increase concentration in the labor market. According to the results I presented in Table 3B, under certain conditions, raising the minimum wage does lead to an increase in the level of concentration in the labor market in counties with high concentration.

These results are consistent with the monopsony theory**, but it reduces the credibility of using labor market concentration as an estimate of monopsony power**. This is due to the fact that concentration increases after the minimum wage increase, **but firms' ability to exercise monopsony power decreases**.

In total, this paper's results suggest that at this stage of the literature, labor market concentration is not a credible variable for estimating monopsony power and evaluating the effect of the minimum wage on employment and inflation.

It is possible that better filtering of the "source of variation" in labor market concentration will produce a better estimate of monopsony power in the future.

References

Aaronson, D. (2001). Price pass-through and the minimum wage. *Review of Economics and Statistics*, *83*(1), 158–169.

Aaronson, D., & French, E. (2007). Product market evidence on the employment effects of the minimum wage. *Journal of Labor Economics*, *25*(1), 167–200.

Aaronson, D., French, E., & MacDonald, J. (2008). The minimum wage, restaurant prices, and labor market structure. *Journal of Human Resources*, *43*(3), 688–720.

Agan, A. Y., & Makowsky, M. D. (2018). *The minimum wage, EITC, and criminal recidivism* (No. w25116). National Bureau of Economic Research.

Alan, M. (2011). Imperfect competition in the labor market. In *Handbook of labor economics* (Vol. 4, pp. 973–1041). Elsevier.

Alonso, C. (2016). Beyond Labor Market Outcomes: The Impact of the Minimum Wage on Nondurable Consumption. *Available at SSRN 2818623*.

Azar, J., Huet-Vaughn, E., Marinescu, I., Taska, B., & Von Wachter, T. (2019). *Minimum wage employment effects and labor market concentration* (No. w26101). National Bureau of Economic Research.

Azar, J., Marinescu, I., & Steinbaum, M. (2019, May). Measuring labor market power two ways. In *AEA Papers and Proceedings* (Vol. 109, pp. 317-21).

Azar, J., Marinescu, I., & Steinbaum, M. (2022). Labor market concentration. *Journal of Human Resources*, *57*(S), S167-S199.

Benmelech, E., Bergman, N. K., & Kim, H. (2022). Strong Employers and Weak Employees How Does Employer Concentration Affect Wages?. *Journal of Human Resources*, *57*(S), S200-S250.

Bertrand, M., Duflo, E., & Mullainathan, S. (2004). How much should we trust differences-in-differences estimates?. *The Quarterly journal of economics*, *119*(1), 249-275.

Brown, C., Gilroy, C., & Kohen, A. (1982). *The effect of the minimum wage on employment and unemployment: a survey* (No. w0846). National Bureau of Economic Research.

Card, D., & Krueger, A. B. (1993). Minimum wages and employment: A case study of the fast food industry in New Jersey and Pennsylvania.

Card, D., & Krueger, A. B. (2000). Minimum wages and employment: a case study of the fast-food industry in New Jersey and Pennsylvania: Reply. *American Economic Review*, *90*(5), 1397–1420.

Cengiz, D., Dube, A., Lindner, A., & Zipperer, B. (2019). The effect of minimum wages on low-wage jobs. *The Quarterly Journal of Economics*, *134*(3), 1405-1454.

Corella, L. F. M. (2020). Minimum wages in monopsonistic labor markets. *IZA Journal of Labor Economics*, *9*(1).

Dalton, K. V., Greenlees, J. S., & Stewart, K. J. (1998). Incorporating a geometric mean formula into the CPI. *Monthly Lab. Rev.*, pp. *121*, 3.

David, H., Manning, A., & Smith, C. L. (2016). The contribution of the minimum wage to U.S. wage inequality over three decades: a reassessment. *American Economic Journal: Applied Economics*, *8*(1), 58–99.

Dube, A. (2019). Impacts of minimum wages: review of the international evidence. *Independent Report. U.K. Government Publication*, pp. 268–304

Dube, A., Jacobs, J., Naidu, S., & Suri, S. (2020). Monopsony in online labor markets. *American Economic Review: Insights*, *2*(1), 33–46.

Dube, A., Lester, T. W., & Reich, M. (2010). Minimum wage effects across state borders: Estimates using contiguous counties. *The review of economics and statistics*, *92*(4), 945-964.

Falch, T. (2008). Estimating the elasticity of labor supply utilizing a quasi-natural experiment.

Falch, T. (2010). The elasticity of labor supply at the establishment level. *Journal of Labor Economics*, *28*(2), 237–266.

Harasztosi, P., & Lindner, A. (2019). Who Pays for the minimum wage? *American Economic Review*, *109*(8), 2693-2727.

Hirsch, B., Schank, T., & Schnabel, C. (2010). Differences in labor supply to monopsonistic firms and the gender pay gap: An empirical analysis using linked employer-employee data from Germany. *Journal of Labor Economics*, *28*(2), 291-330.

Kaitz, H. (1970). Experience of the past: the national minimum. *Youth unemployment and minimum wages*, pp. 30–54.

MacDonald, D., & Nilsson, E. (2016). The effects of increasing the minimum wage on prices: Analyzing the incidence of policy design and context.

MacDonald, J. M., & Aaronson, D. (2006). How firms construct price changes: Evidence from restaurant responses to increased minimum wages. *American Journal of Agricultural Economics*, *88*(2), 292–307.

Manning, A. (2021). Monopsony in labor markets: A review. *ILR Review*, *74*(1), 3–26.

Manning, A., & Petrongolo, B. (2017). How local are labor markets? Evidence from a spatial job search model. *American Economic Review*, *107*(10), 2877–2907.

Mincer, J. (1976). Unemployment effects of minimum wages. *Journal of political economy*, *84*(4, Part 2), S87-S104.

Neumark, D. (2019). The econometrics and economics of the employment effects of minimum wages: Getting from known unknowns to known knowns. *German Economic Review*, *20*(3), 293–329.

Neumark, D., Salas, J. I., & Wascher, W. (2014). Revisiting the minimum wage—Employment debate: Throwing out the baby with the bathwater?. *Ilr Review*, *67*(3), 608-648.

Neumark, D., & Wascher, W. (1992). Employment effects of minimum and subminimum wages: panel data on state minimum wage laws. *ILR Review*, *46*(1), 55-81.

Nocke, V., & Schutz, N. (2018). *An aggregative games approach to merger analysis in multiproduct-firm oligopoly* (No. w24578). National Bureau of Economic Research.

Nimczik, J. S. (2017). Job mobility networks and endogenous labor markets.

Staiger, D. O., Spetz, J., & Phibbs, C. S. (2010). Is there monopsony in the labor market? Evidence from a natural experiment. *Journal of Labor Economics*, *28*(2), 211-236.

Vaghul, K., & Zipperer, B. (2016). Historical state and sub-state minimum wage data. *Washington Center for Equitable Growth*.

Table 1: The effect of the minimum wage and concentration on employment at General Merchandise Stores sector (NAICS 452).

Dependent Variable:	log employment in sector NAICS 452		
Model:	(1)	(2)	(3)
Variables			
log(MW)	0.0008	-0.0339	0.0007
	(0.0929)	(0.0885)	(0.0894)
HHI452		-1.742***	
		(0.2241)	
log(MW) × HHI452		1.080***	
		(0.1394)	
$I_{(HHI452>0.25)}$			-0.8117***
			(0.0892)
log(MW) × $I_{(HHI452>0.25)}$			0.4625***
			(0.0511)
Fixed-effects			
State	Yes	Yes	Yes
County	Yes	Yes	Yes
Year	Yes	Yes	Yes
Fit statistics			
Observations	49,086	49,024	49,024
R^2	0.98800	0.98871	0.98861
Within R^2	0.31141	0.34656	0.34071

Clustered (State) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 1b: The effect of binding minimum wage and concentration on employment at the General Merchandise Stores sector (NAICS 452).

Dependent Variable:	log employment in sector NAICS 452		
Model:	(1)	(2)	(3)
Variables			
log(MW) × bindingness	0.1799	-0.0915	0.0286
	(0.1238)	(0.1309)	(0.1277)
HHI452		-0.8200***	
		(0.1115)	
log(MW) × bindingness × HHI452		1.624***	
		(0.1849)	
$I_{(HHI452>0.25)}$			-0.3735***
			(0.0479)
log(MW) × bindingness × $I_{(HHI452>0.25)}$			0.6341***
			(0.0787)
Fixed-effects			
State	Yes	Yes	Yes
County	Yes	Yes	Yes
Year	Yes	Yes	Yes
Fit statistics			
Observations	49,086	49,024	49,024
R^2	0.98803	0.98844	0.98836
Within R^2	0.31283	0.33060	0.32613

Clustered (State) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 1c: The effect of the minimum wage and concentration on employment at General Merchandise Stores sector (NAICS 452) **between the years 2010-2016**.

Dependent Variable:	log employment in sector NAICS 452		
Model:	(1)	(2)	(3)
Variables			
log(MW)	0.0569	0.0344	0.0644
	(0.0772)	(0.0795)	(0.0828)
HHI452		-0.4025	
		(0.3742)	
log(MW) × HHI452		0.2571	
		(0.1912)	
$I_{(HHI452>0.25)}$			0.2817
			(0.4465)
log(MW) × $I_{(HHI452>0.25)}$			-0.1532
			(0.2400)
Fixed-effects			
State	Yes	Yes	Yes
County	Yes	Yes	Yes
year	Yes	Yes	Yes
Fit statistics			
Observations	14,530	14,516	14,516
R^2	0.99808	0.99809	0.99809
Within R^2	0.06916	0.07127	0.07141

Clustered (State) standard-errors in parentheses

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 2: The effect of the minimum wage and concentration on employment at the Food Services and Drinking Places sector (NAICS 722)

Dependent Variable:	log employment in sector NAICS 722		
Model:	(1)	(2)	(3)
Variables			
log(MW)	-0.0526	-0.0630	-0.0539
	(0.0506)	(0.0479)	(0.0504)
HHI722		1.596**	
		(0.6228)	
log(MW) × HHI722		-0.9564**	
		(0.3727)	
$I_{(HHI722>0.25)}$			0.4573***
			(0.1038)
log(MW) × $I_{(HHI722>0.25)}$			-0.2812***
			(0.0637)
Fixed-effects			
State	Yes	Yes	Yes
county	Yes	Yes	Yes
Year	Yes	Yes	Yes
Fit statistics			
Observations	67,566	67,535	67,535
R^2	0.99746	0.99749	0.99747
Within R^2	0.50249	0.50843	0.50480

Clustered (State) standard-errors in parentheses

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 2b: The effect of binding minimum wage and concentration on employment at the Food Services and Drinking Places sector (NAICS 722)

Dependent Variable:	log employment in sector NAICS 722		
Model:	(1)	(2)	(3)
Variables			
log(MW) × bindingness	-0.1634***	-0.1620**	-0.1620***
	(0.0580)	(0.0605)	(0.0581)
HHI722		0.3458	
		(0.3311)	
log(MW) × bindingness × HHI722		-0.2179	
		(0.4435)	
$I_{(HHI722>0.25)}$			0.0402
			(0.0459)
log(MW) × bindingness × $I_{(HHI722>0.25)}$			-0.0160
			(0.0771)
Fixed-effects			
State	Yes	Yes	Yes
County	Yes	Yes	Yes
Year	Yes	Yes	Yes
Fit statistics			
Observations	67,566	67,535	67,535
R^2	0.99748	0.99749	0.99748
Within R^2	0.50518	0.50811	0.50643

Clustered (State) standard-errors in parentheses

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 3: The effect of the change in the minimum wage and the concentration on the change in concentration at the General Merchandise Stores sector (NAICS 452)

Dependent Variable:	change in HHI in the sector NAICS 452			
Model:	(1)	(2)	(3)	(4)
Variables				
log(pop)	0.0221***	0.0221***	0.0220***	0.0076***
	(0.0032)	(0.0032)	(0.0031)	(0.0011)
HHI 452	0.1772***	0.1773***	0.1717***	
	(0.0055)	(0.0055)	(0.0057)	
d.state HHI 452	0.9006***	0.9005***	0.8939***	0.9092***
	(0.0260)	(0.0260)	(0.0259)	(0.0238)
d.log(MW)		0.0021	-0.0242***	-0.0113***
		(0.0017)	(0.0054)	(0.0034)
d.log(MW) × HHI 452			0.1940***	
			(0.0333)	
$I_{(HHI452>0.25)}$				0.0271***
				(0.0012)
d.log(MW) × $I_{(HHI452>0.25)}$				0.0780***
				(0.0171)
Fixed-effects				
state	Yes	Yes	Yes	Yes
county	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes
Fit statistics				
Observations	115,753	115,753	115,753	115,753
R^2	0.11150	0.11150	0.11281	0.04505
Within R^2	0.09860	0.09860	0.09994	0.03120

Clustered (state) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 3b: The effect of the change in binding minimum wage and the concentration on the change in concentration at the General Merchandise Stores sector (NAICS 452)

Dependent Variable:	change in HHI in the sector NAICS 452			
Model:	(1)	(2)	(3)	(4)
Variables				
HHI 452	0.1772***	0.1783***	0.1771***	
	(0.0055)	(0.0056)	(0.0060)	
log(pop)	0.0221***	0.0220***	0.0220***	0.0075***
	(0.0032)	(0.0031)	(0.0031)	(0.0011)
d.state HHI 452	0.9006***	0.8989***	0.8987***	0.9102***
	(0.0260)	(0.0262)	(0.0262)	(0.0242)
d.log(MW) × bindingness		0.0017	-0.0022	-0.0029
		(0.0016)	(0.0032)	(0.0022)
d.log(MW) × bindingness × HHI 452			0.0201	
			(0.0169)	
$I_{(HHI452>0.25)}$				0.0285***
				(0.0011)
d.log(MW) × bindingness × $I_{(HHI452>0.25)}$				0.0164*
				(0.0092)
Fixed-effects				
state	Yes	Yes	Yes	Yes
county	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes
Fit statistics				
Observations	115,753	114,370	114,370	114,370
R^2	0.11150	0.11163	0.11169	0.04385
Within R^2	0.09860	0.09867	0.09872	0.02989

Clustered (state) standard-errors in parentheses

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 4: The effect of the minimum wage and the lag concentration on the concentration at the Food Services and Drinking Places sector (NAICS 722)

Dependent Variable:	change in HHI in the sector NAICS 722			
Model:	(1)	(2)	(3)	(4)
Variables				
log(pop)	0.0047**	0.0047**	0.0048**	0.0006
	(0.0019)	(0.0018)	(0.0018)	(0.0005)
HHI 722	0.2307***	0.2307***	0.2356***	
	(0.0110)	(0.0110)	(0.0109)	
d.state HHI 722	0.8789***	0.8794***	0.8774***	0.9593***
	(0.0066)	(0.0069)	(0.0067)	(0.0060)
d.log(MW)		-0.0029***	-0.0005	-0.0006*
		(0.0008)	(0.0011)	(0.0003)
d.log(MW) × HHI 722			-0.1201***	
			(0.0367)	
$I_{(HHI722>0.25)}$				0.0492***
				(0.0020)
d.log(MW) × $I_{(HHI722>0.25)}$				0.0092
				(0.0195)
Fixed-effects				
state	Yes	Yes	Yes	Yes
county	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes
Fit statistics				
Observations	123,822	123,822	123,822	123,822
R^2	0.22321	0.22322	0.22345	0.17111
Within R^2	0.15890	0.15892	0.15916	0.10249

Clustered (state) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 4b: The effect of the binding minimum wage and the lag concentration on the concentration at the Food Services and Drinking Places sector (NAICS 722)

Dependent Variable:	change in HHI in the sector NAICS 722			
Model:	(1)	(2)	(3)	(4)
Variables				
HHI 722	0.2307***	0.2301***	0.2309***	
	(0.0110)	(0.0111)	(0.0113)	
log(pop)	0.0047**	0.0047**	0.0047**	0.0005
	(0.0019)	(0.0018)	(0.0018)	(0.0005)
d.state HHI 722	0.8789***	0.8812***	0.8807***	0.9603***
	(0.0066)	(0.0073)	(0.0074)	(0.0063)
d.log(MW) × bindingness		-0.0039***	-0.0035***	-0.0023***
		(0.0010)	(0.0011)	(0.0004)
d.log(MW) × bindingness × HHI 722			-0.0145	
			(0.0192)	
$I_{(HHI722>0.25)}$				0.0490***
				(0.0020)
d.log(MW) × bindingness × $I_{(HHI722>0.25)}$				0.0091
				(0.0094)
Fixed-effects				
state	Yes	Yes	Yes	Yes
county	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes
Fit statistics				
Observations	123,822	122,323	122,323	122,323
R^2	0.22321	0.22491	0.22492	0.17320
Within R^2	0.15890	0.15961	0.15962	0.10353

Clustered (state) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 5: The effect of the minimum wage and concentration at the Food Services and Drinking Places sector (NAICS 722) on the log of the inflation at "food away from home" (FAFH).

Dependent Variable:	d.log(inflation food away from home (FAFH))		
Model:	(1)	(2)	(3)
Variables			
d.log(MW)	0.0279**	0.0352***	0.0295***
	(0.0121)	(0.0119)	(0.0098)
d.log(inflation)	0.2715***	0.2676***	0.2929***
	(0.0785)	(0.0794)	(0.0748)
pop	1.18×10^{-9}	1.19×10^{-9}	
	(1.06×10^{-9})	(1.01×10^{-9})	
log(HHI722)		0.0011	
		(0.0030)	
d.log(MW) × log(hhi722)		-0.0092	
		(0.0071)	
$I_{(HHI722>mean)}$			-0.0012
			(0.0018)
d.log(MW) × $I_{(HHI722>mean)}$			-0.0070
			(0.0370)
Fixed-effects			
MSA	Yes	Yes	Yes
year	Yes	Yes	Yes
Fit statistics			
Observations	880	880	880
R^2	0.74787	0.74814	0.74573
Within R^2	0.05193	0.05294	0.04386

Clustered (MSA) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 5b: The effect of the binding minimum wage and concentration at the Food Services and Drinking Places sector (NAICS 722) on the log of the inflation at "food away from home" (FAFH).

Dependent Variable:	d.log(inflation food away from home (FAFH))		
Model:	(1)	(2)	(3)
Variables			
d.log(MW) × bindingness	0.1148**	0.1222**	0.0976**
	(0.0430)	(0.0482)	(0.0417)
d.log(inflation)	0.2262**	0.2251**	0.2201**
	(0.0928)	(0.0920)	(0.0921)
pop	-1.01×10^{-9}	-9.8×10^{-10}	
	(1.1×10^{-9})	(1.11×10^{-9})	
log(HHI722)		0.0013	
		(0.0028)	
d.log(MW) × bindingness × log(HHI722)		-0.0089	
		(0.0195)	
$I_{(HHI722>mean)}$			-0.0005
			(0.0021)
d.log(MW) × bindingness × $I_{(HHI722>mean)}$			0.0826
			(0.0894)
Fixed-effects			
MSA	Yes	Yes	Yes
year	Yes	Yes	Yes
Fit statistics			
Observations	869	869	869
R^2	0.74794	0.74802	0.74720
Within R^2	0.03376	0.03405	0.03090

Clustered (MSA) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 6: The effect of the minimum wage and concentration at the General Merchandise Stores sector (NAICS 452) on the log of the inflation at "food at home" (FAH).

Dependent Variable:	d.log(inflation food at home(FAH))		
Model:	(1)	(2)	(3)
Variables			
d.log(MW)	0.0034	0.0407	0.0003
	(0.0104)	(0.0323)	(0.0119)
d.log(inflation)	0.2944***	0.2565***	0.2680***
	(0.0757)	(0.0777)	(0.0798)
pop	-5.14×10^{-10}**	-4.27×10^{-10}*	
	(2.34×10^{-10})	(2.3×10^{-10})	
log(HHI452)		0.0059*	
		(0.0029)	
d.log(MW) × log(HHI452)		-0.0111	
		(0.0109)	
$I_{(HHI452>mean)2}$			-0.0008
			(0.0014)
d.log(MW) × $I_{(HHI452>mean)}$			0.0109
			(0.0177)
Fixed-effects			
MSA	Yes	Yes	Yes
year	Yes	Yes	Yes
Fit statistics			
Observations	881	765	765
R^2	0.84780	0.85780	0.85701
Within R^2	0.04671	0.04653	0.04127

Clustered (MSA) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 6b: The effect of the binding minimum wage and concentration at the General Merchandise Stores sector (NAICS 452) on the log of the inflation at "food at home" (FAH).

Dependent Variable:	d.log(inflation food at home(FAH))		
Model:	(1)	(2)	(3)
Variables			
d.log(MW) × bindingness	0.0066	0.1127	-0.0094
	(0.0400)	(0.1189)	(0.0462)
d.log(inflation)	0.2870***	0.2527***	0.2691***
	(0.0761)	(0.0799)	(0.0842)
pop	-9.67×10^{-10}***	-7.18×10^{-10}**	
	(3.32×10^{-10})	(3.18×10^{-10})	
log(HHI452)		0.0068**	
		(0.0030)	
d.log(MW) × bindingness × log(HHI452)		-0.0315	
		(0.0398)	
$I_{(HHI452>mean)}$			-0.0010
			(0.0015)
d.log(MW) × bindingness × $I_{(HHI452>mean)}$			0.0488
			(0.0670)
Fixed-effects			
MSA	Yes	Yes	Yes
year	Yes	Yes	Yes
Fit statistics			
Observations	870	755	755
R^2	0.84262	0.85270	0.85165
Within R^2	0.04655	0.04596	0.03913

Clustered (MSA) standard-errors in parentheses

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Figure 1a

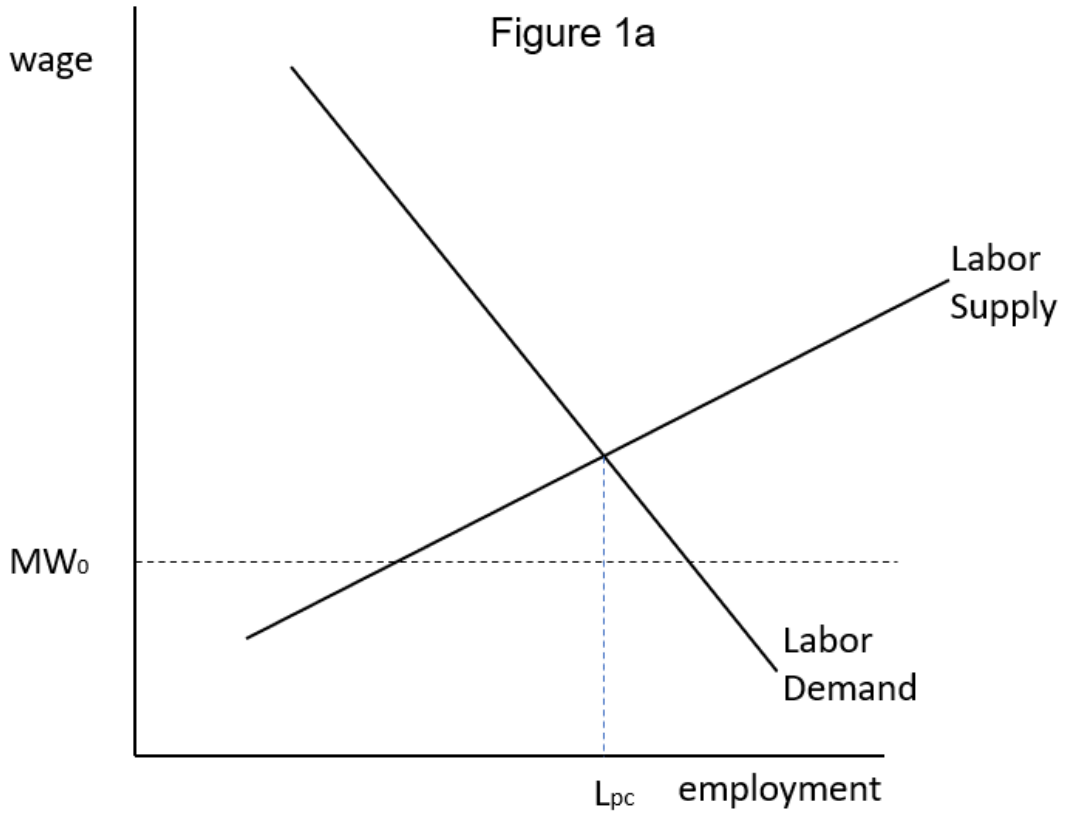


Figure 1b

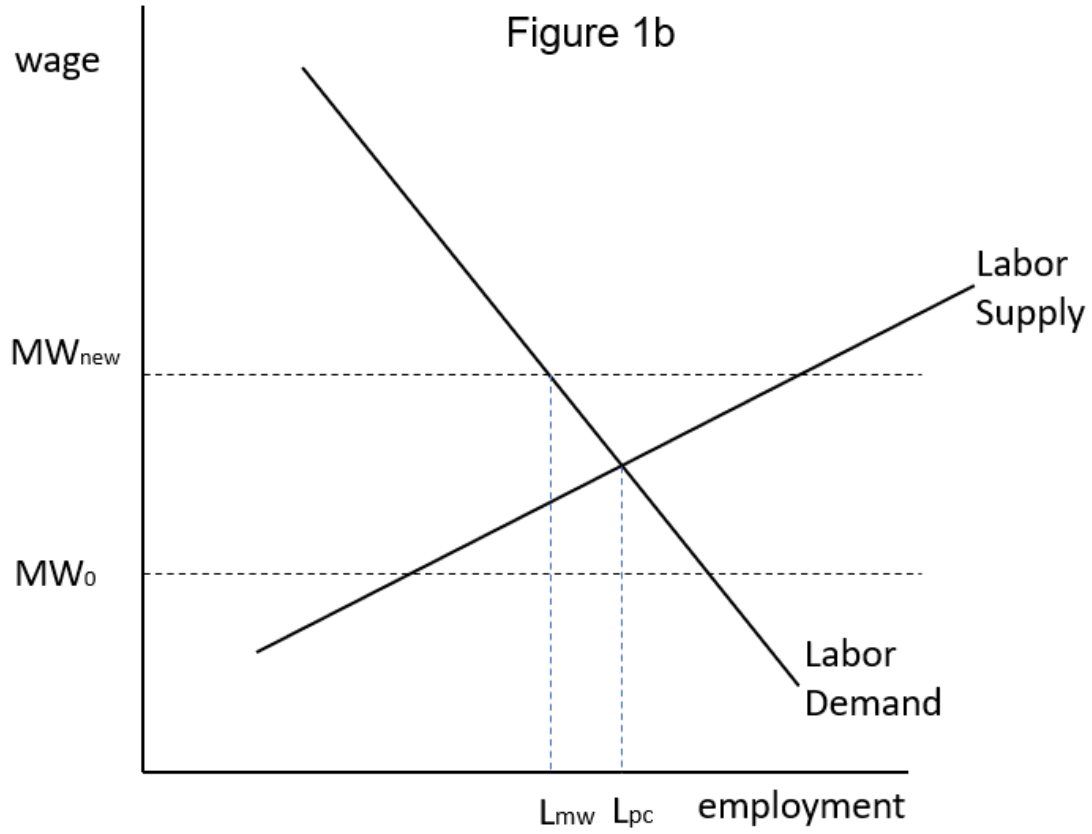


Figure 2a

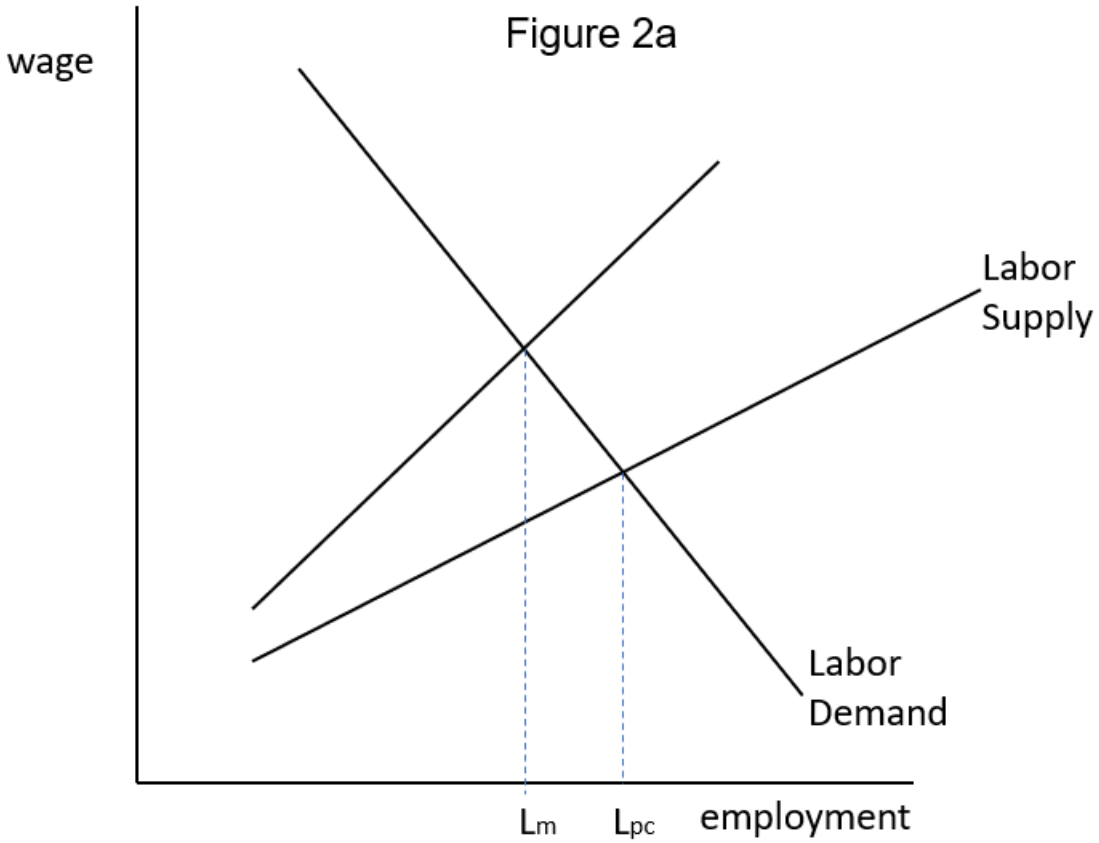
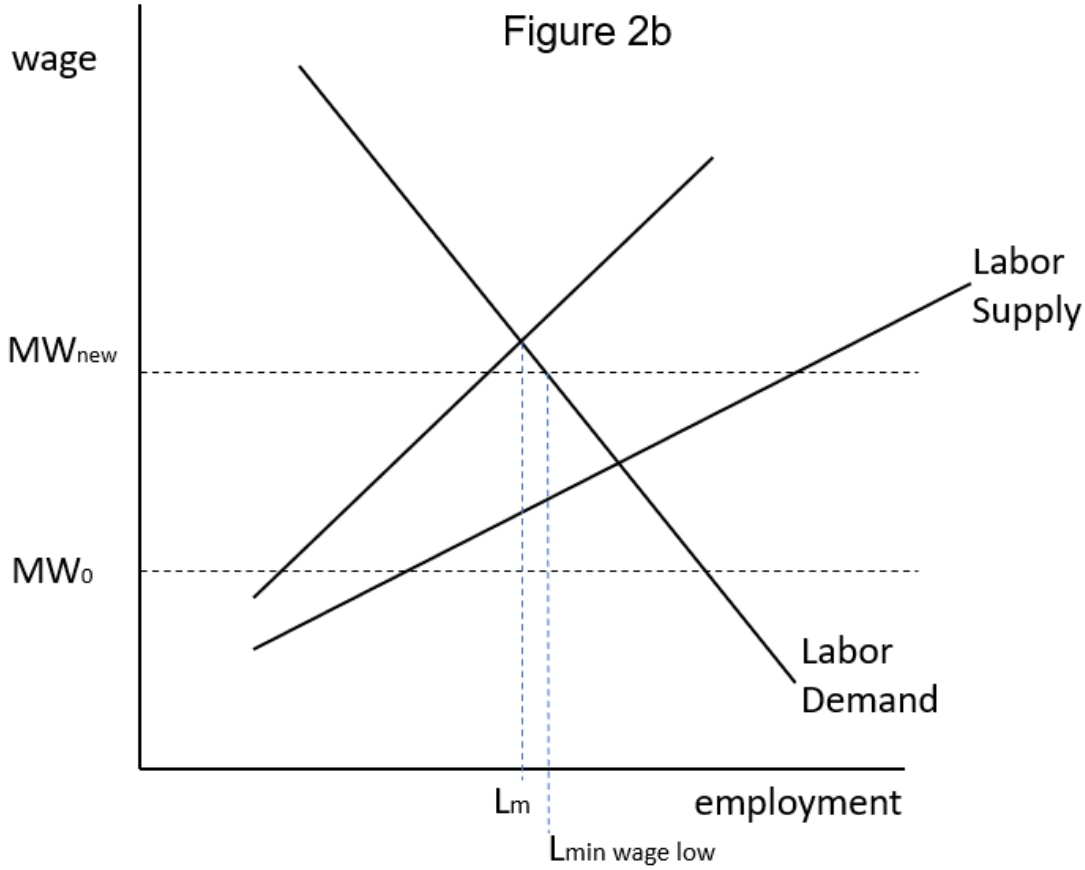


Figure 2b



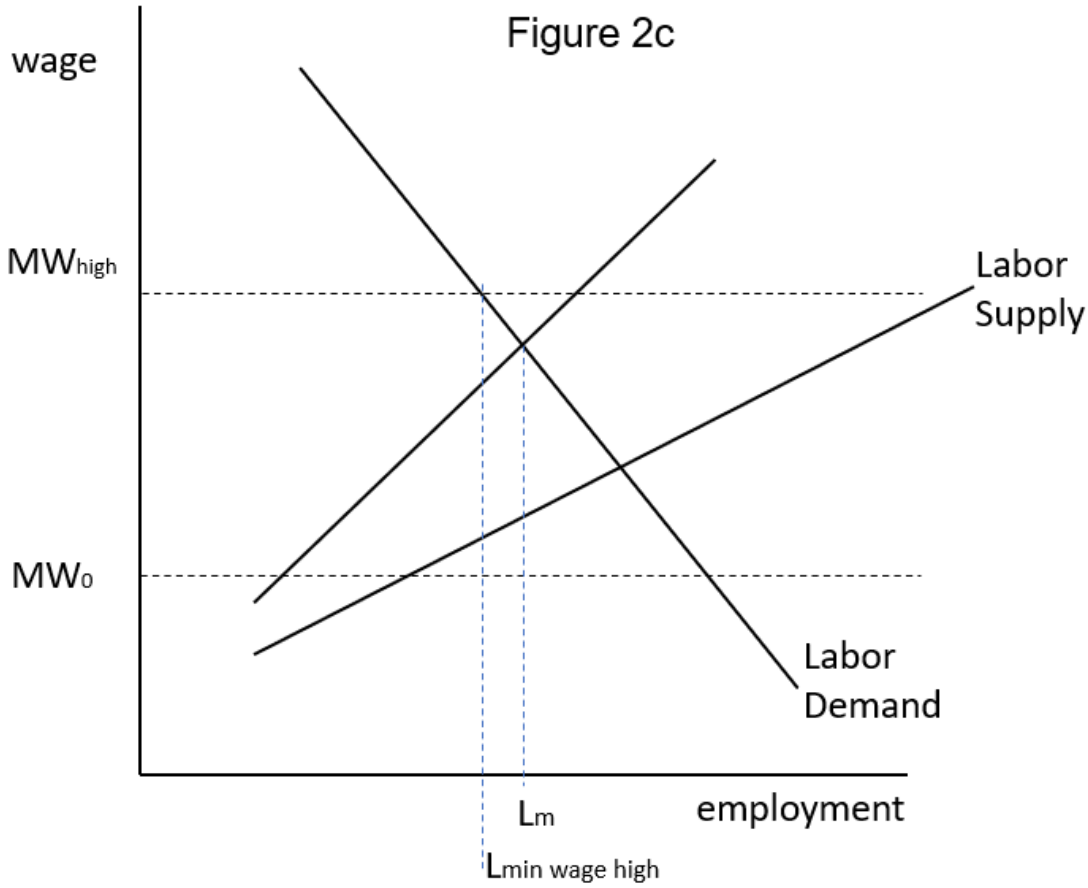


Figure 2c
wage
MWhigh
MW0
Labor Supply
Labor Demand
employment
Lm
Lmin wage high

Figure 4

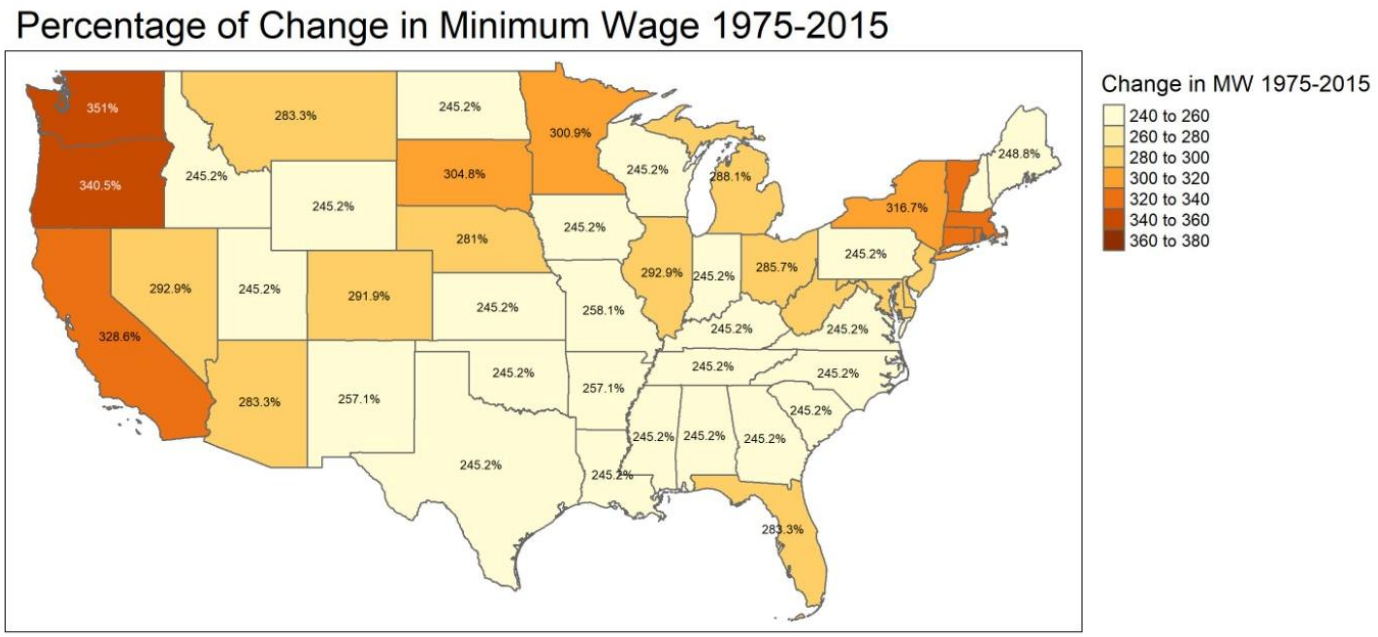


Figure 5

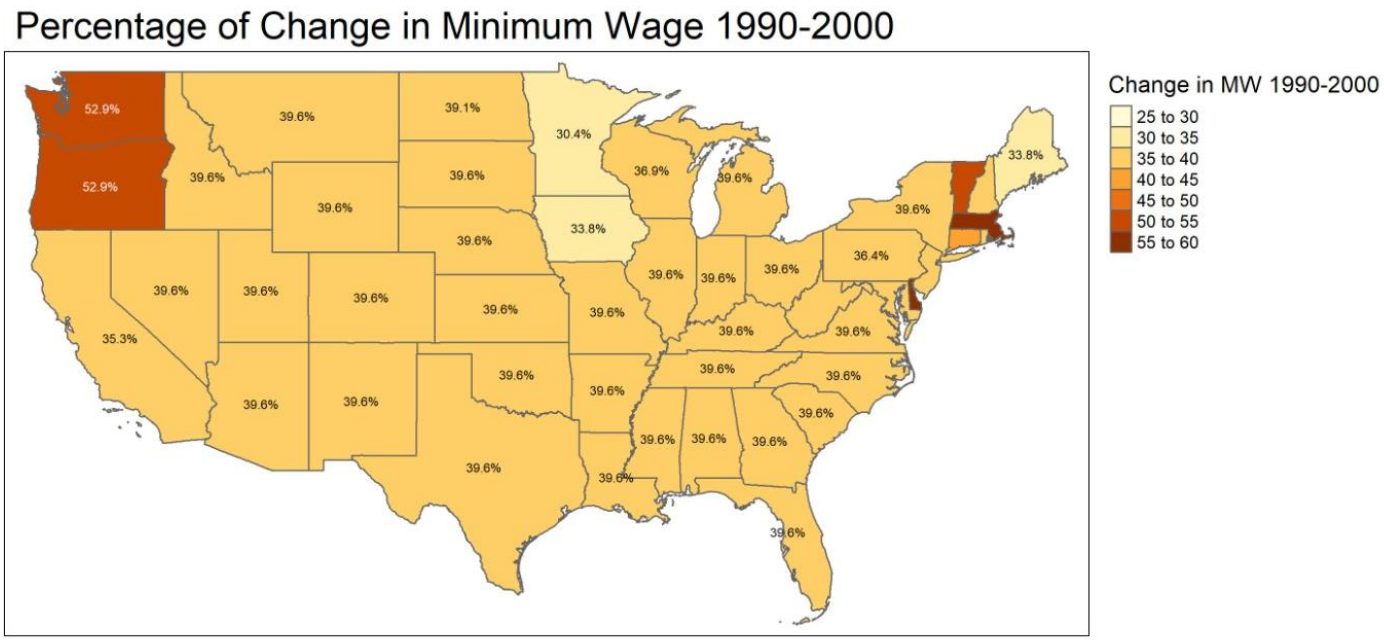
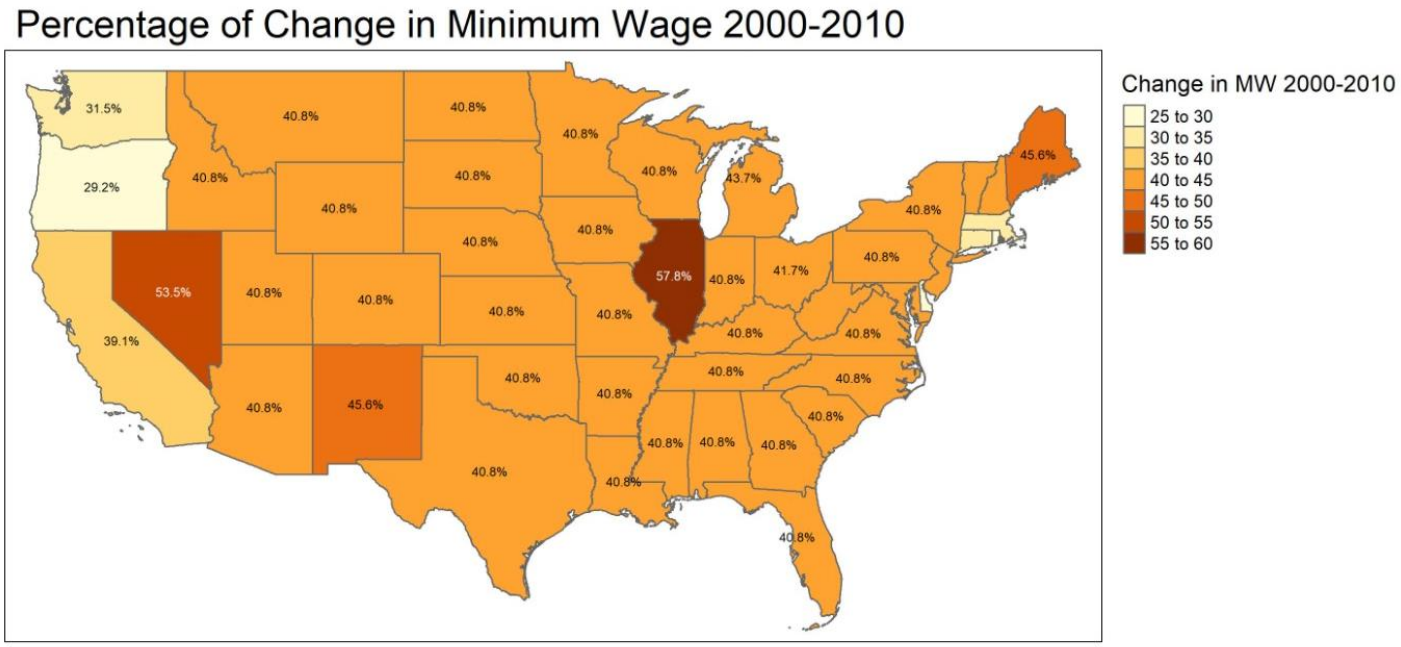


Figure 6


Percentage of Change in Minimum Wage 2000-2010
Change in MW 2000-2010
25 to 30
30 to 35
35 to 40
40 to 45
45 to 50
50 to 55
55 to 60
31.5%
29.2%
39.1%
53.5%
40.8%
45.6%
43.7%
57.8%
41.7%