Together We Bargain, Divided We Beg The Question: How Do Minimum Wages Impact Labor Union Election Results?

Grace Tymann

Advised by Professor Geoffrey Sanzenbacher, Ph.D.

Boston College
Department of Economics
May 2022

A Senior Honors Thesis submitted to the faculty of the Boston College Department of Economics in partial fulfillment of the requirements for graduation from the Morrissey College of Arts and Sciences with a Bachelor of Arts honors degree in economics.

Acknowledgements

I began work on this thesis in August 2021, a time when labor unions felt nearly dormant. Elections were occuring, but were nowhere near the center of the public's attention. Since that time, there has been an estimated 60% increase in the number of union election petitions filed with the National Labor Relations Board – the largest gain in union activity since the 1930s (Tavernise & Schieber, 2022). Writing about, researching, and analyzing labor unions amidst this surge in momentum has been perfectly opportune.

First, I wish to thank my thesis advisor, Professor Geoffrey Sanzenbacher. Professor Sanzenbacher recommended that I explore the interaction between labor unions and minimum wages, a body of research gone largely unexplored. Over the course of this past year, his consistent wisdom and timely advice made my work effective, worthwhile, and enjoyable.

I am grateful for Professor Sanzenbacher and my academic advisor Professor Can Erbil for encouraging me to write a thesis in the first place. Professor Erbil told me that no one course or assignment would be nearly as impactful or momentous as writing a year-long honors thesis. A year later, I can say with full conviction that he was correct.

To all of the faculty and staff in the Boston College economics department that have supported me over these past four years – thank you. I am fortunate to have many friends that have been there for me throughout this process, notably my classmate Augusta Imperatore, who amidst writing her own economics thesis took a particular interest in my own work and even found the time to send me relevant articles and podcasts that helped to inform this analysis. Finally, to my parents, that make attending Boston College a reality: this thesis would not be possible without your love and support.

Table of Contents

Abstract

Labor unions are generally considered to be beneficial for workers wages and benefits, but have been on the decline for decades. This analysis questions why workers appear more hesitant to vote for labor unions now than in the past by investigating what factors influence individual labor union votes. Specifically, this analysis aims to pinpoint the effect that outside minimum wages have on union election outcomes. Using data from the United States National Labor Relations Board, Michigan State, IPUMS USA and the US Census Bureau, I generated two models – a logistic regression, and an ordinary least squares regression – that each predict the likelihood of union support based upon outside minimum wages, after controlling for a variety of factors including but not limited to the county unemployment rate, the existence of the Right to Work law, and county-level demographics. I find that the difference between state-level or city-level minimum wages and the federal minimum wage has a positive relationship with the likelihood of union certification. Specifically, I find that union support is most likely in areas where the local-level minimum wage is $4.18 higher than the federal minimum wage in the logistic model, and $5.13 higher than the federal minimum in the ordinary least squares model, ceteris paribus. Put differently, with a federal minimum wage of $7.25, areas with minimum wages around $12 are most likely to see union elections pass. Overall, these results suggest that workers are more likely to vote for a union when local exogenous economic environments are strong.

Keywords:

labor union, unionization, certification, election, vote, bargaining power, collective bargaining, organization, minimum wage, exogenous economic conditions, economic environment, outside options, threat of unionization effect, fear factor, Right to Work, Amazon, NLRB

Introduction

"Our time will come again." Emmit Ashford spoke with conviction at an Amazon news conference in April 2021. Ashford was one of many Amazon employees at an Alabama warehouse that had been fighting for unionization for months leading up to the April vote. The pro-union fight was met with strong force, however, most fervently by Amazon itself. The corporation posted flyers, sent out text messages, and created an anti-union website to reach as many employees as possible. In the end, Amazon won this battle by more than a 2:1 vote margin, leaving employees like Ashford disappointed and frustrated (Greene & De Vynck, 2021).

The results of the 2021 Amazon union election received plenty of coverage in the press. Following the vote in Alabama, President Biden came out in support of the workers, stating that employees should be able to make union vote decisions independent of corporations' opinions. Senator Bernie Sanders agreed, and encouraged Amazon workers to keep pushing for reform despite their recent defeat: "The history of struggle is that you don't always win the first time," Senator Sanders said. "You may have to come back and do it again" (ibid.).

Fortunately for pro-union workers like Ashford, and to the liking of Senator Sanders and President Biden, Amazon workers did come back and 'do it again,' this time in Staten Island. On April 1, 2022, Amazon employees at the New York facility 'JFK8' voted in favor of unionization by a margin of over 500 votes, making history as the first ever Amazon union in the USA (Hsu & Selyukh, 2022). This triumphant effort came after two years of grassroots organizing and helped to kickstart unionization efforts at other workplaces, notably the Amazon facility 'LDJ5' also located in Staten Island. It only took Amazon a few days following the JFK8 vote to come forward with strong opposition, however, as the corporation filed objections with the National

Labor Relations Board (NLRB) regarding the Amazon Labor Union victory and called for a do-over election (O'Brien, 2022).

Ashford and his colleagues in Alabama also got to vote in a do-over election after the NLRB announced in November of 2021 that Amazon's anti-union campaign at the warehouse 'BHM' was improper, preventative and unfair (Selyukh, 2021). As a result of this intimidation and interference, Amazon workers re-voted in April 2022. With 875 votes for, 993 votes against, and 416 votes challenged, this vote remains too close to call (Palmer, 2022).

Labor unions have not always been this divisive. In previous decades, union membership was not only common but often encouraged, especially in manufacturing sectors. Over time, this trend has not persisted. There has been a clear downward trend in labor union abundance, with the Bureau of Labor Statistics estimating that while 20% of employees in the United States were union members in 1983, this value fell below 11% in 2020 (Hess, 2021). Still, despite unions historically providing quantifiable benefits and universally being considered as advantageous for workers, people are still hesitant to vote for them. It is estimated that while about 75% of non-union employees believe that union membership is beneficial for wages and quality of work, only 33% of non-union workers would vote for a union, and even fewer workers will ever get the chance (Deshpande & Fiorito, 1989). In 2017, 58 million non-union workers responded positively to whether or not they would vote for unionization given the opportunity, but there were only 50,000 new union members in that same year (Lafer & Loustaunua, 2020). This begs the question: what makes unionization so rare, despite being so popular? (ibid.).

To contextualize the decades-long decline in unionization, it is important to consider exogenous trends in the United States occurring over the same time period. Specifically, one can point towards the minimum wage. The federal minimum wage has remained stagnant at $7.25

since 2009, even though $7.25 in 2022 has the same purchasing power as $5.44 in 2009 (US Bureau of Labor Statistics). Combined with the decline in labor unions, this real-value decline in the minimum wage has been found to exaggerate wage inequality and make unionization efforts more difficult (Krueger, 2018). This effect is more pronounced in some states than others. Over time, some states have kept up with inflation – Massachusetts, New York and California offer minimum wages upwards of $11 per hour – whereas other states (Georgia, South Carolina, and Oklahoma, to name a few) abide by the federal minimum wage of $7.25.[1] Union certification may be less likely in states such as Georgia, South Carolina, and Oklahoma, therefore. Regardless, the large discrepancies between state-level minimum wages are significant. How do deviations in minimum wages across the US affect someone's propensity to vote for a union?

Theories exist to support either direction of the correlation between minimum wages and union votes. Some employees view higher minimum wages as a reason to vote for a union, because they have a strong fallback plan, are less intimidated by employers' anti-union messaging, and can use existing outside wages as bargaining leverage (Baumann et al, 2017). Other employees may think the opposite, and deem unionization unnecessary when existing wages are already sufficient (Herrera, 2021). This paper investigates how the minimum wage in an area affects union voting, given the effect could go either way.

The discussion proceeds as follows. First, background information on labor union trends and relevance is provided to contextualize the discussion. The literature review section then looks at what research has been done in regards to labor union voting models, including case studies on labor union elections. The data section describes the datasets used within this analysis, and the methodological approach section presents the regressionary equations and hypotheses used to analyze data. The empirical results section details the logistic and ordinary least squares

[1] See Appendix A for a map of US state minimum wages as of 2019.

regression results found in this analysis. The results of these regressions suggest that on average, areas with minimum wages higher than the federal minimum wage will have a higher likelihood of union certification up until the local minimum wages reaches about $4 - $5 above the federal minimum wage, at which point this effect begins to wear off. This paper concludes with a discussion section that considers the implications of these findings, before finally summarizing these findings in the conclusion section.

Background

Labor Unions: Definitions and Benefits

Labor unions are no new phenomenon. They have been around for decades and exist to benefit workers worldwide. At its core, the definition of the term "labor union" is as follows: a group of workers that join together to enhance their bargaining power with employers in regards to wages, time-off, working conditions, and other benefits. Unions focus on collectivism as opposed to individualism, helping to give a voice to workers that may be suppressed otherwise. The slogan "together we bargain, divided we beg" is central to union movements.

The success of union bargaining is evident. In 2019, union workers earned an estimated $1,095 per week versus $892 per week for non-union workers (Hess, 2021). These results are consistent with research that found that union workers earn 28% higher compensation and benefits, are 18-28% more likely to have health insurance provided by an employer, receive 26% more vacation time, 14% more paid leave, and get 28% more in their pension plans from employer contributions than non-union workers (Walters, 2003). Unions have also been found to decrease income inequality, since the increases in wages that come from unionization tend to be

larger for unskilled workers than skilled workers (Valenti, 2018). These benefits are especially valuable against the backdrop of the real-value decline in minimum wages across the US.

NLRB Filing Requirement for a Union Election

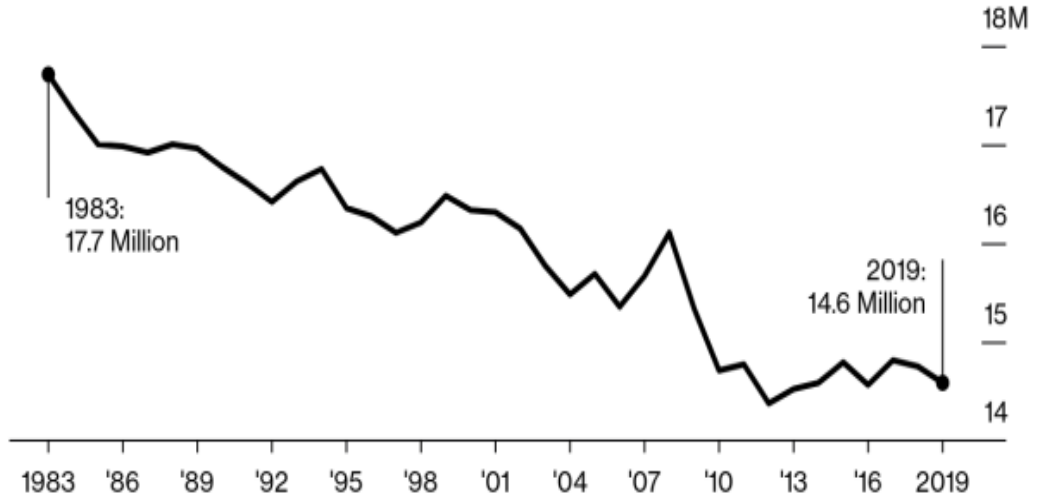
Even though labor union participation is largely an individual's choice, a union cannot just be created out of thin air. Before a union election can take place, a petition with support from at least 30% of company employees must be filed with an agency called the National Labor Relations Board (NLRB). It follows, therefore, that if a petition receives less than 30% support, a union election cannot take place, and the union will not be certified by the federal government.

The 30% petition is important to consider because it creates a filtering effect in data analysis. Available data on union elections are limited only to those organizations that passed this initial requirement. Controlling for this effect in analysis is complicated, as the union votes observed in data may be coming from organizations that have individuals with extreme opinions in regards to unionization, or from areas with high levels of indifference towards unionization.

The Fall of Labor Unions

Despite measurable benefits to unionization in place, people are not flocking to unions as frequently as in the past. From 1983 to 2019, it is estimated that the number of union workers dropped by 10% – more than 3 million people (Bureau of Labor Statistics). This trend is pictured in Figure 1.

Figure 1: *Number of USA Union Members, 1983 - 2019*



Source: Bureau of Labor Statistics Data

There are numerous explanations that exist regarding this downward trend. On the supply side, there may be fewer union members today because there are fewer union-friendly industries in the labor market. Historically, unions have been popular within the manufacturing sector. The decline in unionization is therefore estimated in part because of the shift away from the manufacturing industry and towards the service industry in much of the developed world. Typical jobs associated with unions have not been replaced with other or new industries, eliminating many union-friendly roles (Hess, 2021).

Other theories also exist about this decline, this time on the demand side. For example, it has been observed that workers have less authority in the workforce than in previous decades due to increased industrialization and internationalization, and may be reacting in a way that makes them hesitant to vote for unions (Tavernise & Schieber, 2022).[2] Unions also tend to be unpopular amongst employers, making employees more wary of joining one out of fear of being released

[2] When workers have to compete with machines and with people around the world, they are more easily replaceable. This makes collective bargaining more difficult, potentially lowering the demand for unions.

from their job (Lafer & Loustaunua, 2020).[3] The full extent of the demand side issue regarding unionization is explored in the literature review section of this paper, contained within the subsection *What Influences Labor Union Votes?*

The 2008 Great Recession and Labor Union Outcomes

The effect that the 2008 Great Recession had on unionization efforts offers a helpful case study for understanding union trends, specifically against the backdrop of weakened economic environments. As seen in Figure 1, there is a clear jump followed by a deep fall from 2008 to 2009. The decline around 2009 is likely a product of job loss during the Great Recession – with a smaller pool of United States workers, it is intuitive that there would be fewer union workers.

The jump in union members that occurred before this fall is more ambiguous. One explanation is that individuals wanted to join a union at the beginning of the Great Recession for increased job security and higher wages amidst a time of financial turmoil. This trend was observed in the 1930s during the Great Depression.[4] Experts also point towards the negative political attitudes surrounding institutional working environments in 2008, making workplace camaraderie especially valuable (Milkman, 2017). This being said, it was found to be more difficult for unions to successfully bargain with their employers during the Great Recession, making strikes less effective (Solman, 2021). While it is not generally believed that the 2008

[3] Anti-union attitudes amongst employers have been heightened by the shift towards the service industry over time. This makes labor costs relatively more expensive in service industries than in manufacturing industries. Unions want more predictable hours, more staffing, more flexibility and higher wages, whereas service industries want lower labor costs and fewer staff members (Tavernise & Schieber, 2022).

[4] The 1930s saw a huge expansion of union membership over a short period of time. Experts claim that the combination of income inequality, high levels of unemployment, poor working conditions, and a labor-friendly US President helped drive these unionization efforts. Notably, the 1935 National Labor Relations Act, explored in the *Right To Work* section of this paper, helped to define and protect collective bargaining during this decade (Tavernise & Schieber, 2022).

financial crisis had a lasting impact on labor union trends, many of these anti-union political attitudes have stuck, and continue to affect union outcomes.

Right To Work

Policy can also influence union membership. The Right to Work (RTW) law in particular has direct consequences for unions. In RTW states, unions cannot require non-union employees to participate in a labor union or pay union dues or 'fair share' fees.

Terminology surrounding the RTW law stems from the National Labor Relations Act (NLRA) of 1935. Under the NLRA, companies can choose to identify as a closed shop, a union shop, an agency shop, or an open shop. In closed shops, all employees must be union members. In union shops, non-union employees can be hired but must agree to join a union eventually. In agency shops, unionization is a choice but both union employees and non-union employees pay union fees. In open shops, unionization is entirely voluntary, non-union employees cannot be compelled to pay union dues, and employees cannot be fired for joining a union.[5]

RTW states require that unionized workplaces in their state operate under an open-shop model. As of 2022, there are 27 RTW states, and the US federal government also operates under open-shop rules.[6] Propants of the RTW law claim that it is neither anti-union nor pro-union, rather, the law simply exists to protect employee's freedoms to decide whether or not to join a union themselves. The other side of the argument commonly accuses RTW as being anti-union, since it makes it more difficult for unions to collect funding and resources (Shermer, 2021). The

[5] As part of the Taft-Hartley Act in 1947, closed shops were deemed unconstitutional, and union shops were outlawed in certain states. In 2018, following the supreme court case *Janus v. American Federation of State, County, and Municipal Employees,* agency shops were deemed unconstitutional for public sector employees (VanHeuvelen, 2019).

[6] See Appendix B for a map of right-to-work states in the USA.

analysis in this paper predicts whether or not this negative effect is occurring by estimating how likely union certification is in RTW states versus in non-RTW states.

Literature Review

Existing literature regarding unionization is multidirectional. Researchers have investigated both what influences labor union votes and labor union elections, as well as how unions influence the outside world.

How do Labor Unions Influence the Outside World?

The decline in labor unions have been found to have a negative impact on collective bargaining. This is expected to continue, most noticeably in areas that are not union dense. “Any model that shrinks for 50 years in a row in all 50 states is probably not a part of the future,” says David Rolf, Service Employees International Union Vice-President (Bergman, 2015). The fall in union abundance has also been found to negatively impact inequality measures, since unions historically help decrease wage inequality between skilled and unskilled workers (Valenti, 2018).

These effects may be worsened by the decline in real-value minimum wages. In a 2018 speech, economist Alan Krueger concluded that the decline in union representation coupled with the decline in real-value minimum wages has led to increased inequality and income polarization in the United States. This environment is not conducive to collective bargaining. Krueger does believe, however, that potential monetary policies, specifically a price stability mandate, can aid in enhancing worker bargaining power (Krueger, 2018).

Other evidence suggests that companies are increasing company-wide wages and benefits to disincentivize unionization, a phenomenon referred to as the ‘threat of unionization effect’ in

this analysis.[7] Generally speaking, big employers tend to be against unionization (Williams, 2021). By offering union wages to non-union employees, employers send a message that obtaining higher wages vis-a-vis unionization is unnecessary. The threat of unionization effect is found to be especially prevalent in union-dense areas and industries (Rosenfeld, Denise & Laird, 2016). One study found that "a high school graduate whose workplace is not unionized but whose industry is 25% unionized is paid 5% more than similar workers in less unionized industries" (Walter, 2003).

While the threat of unionization effect may be beneficial for employees at large companies or within union-dense areas, not all companies can afford these salary increases. Corporations unwilling to deviate from low wages – such as the federal minimum wage – are simultaneously struggling to fill open positions. This has led to a surge of collusion and anticompetitive practices. As an example, employers have been found to gather together in private to decide upon employee wages beneath market level for the roles and skill sets in question (Krueger, 2018). This type of collusion often gets thrown under the rug, either because people are unaware that it is occurring, or because people are too afraid to speak up against their employer in the absence of collective support. Gone unresolved, these anticompetitive practices will continue to harm the economy by increasing wage inequality (ibid.; Rosenfeld, Denise & Laird, 2016; Lafer & Loustaunua, 2020).

In conclusion, the impact of labor unions is felt in multiple areas of the economy. Union workers, non-union workers and employers each have something to gain or to lose from the existence of labor unions, making unionization a controversial topic.

---

[7] The 'threat of unionization effect' is defined in this analysis as when employers feel threatened by, or wish to discourage, unionization activity and therefore act in a manner that makes unionization more difficult or less necessary. Typically, employers disincentivize unionization by increasing company-wide wages.

What Influences Labor Union Votes?

Investigating the other directional effect – what influences union votes and elections – is of greater significance to this analysis, and is insightful for understanding what may be causing the larger decline in unionization. As goes for voting in any election, individuals will presumably weigh various factors before deciding on how to vote in a union election. These factors extend beyond pure work dissatisfaction (Summers, Betton & Decotiis, 1986). Research has shown that union votes are influenced through various mechanisms, including: 1) identities and beliefs, 2) exogenous economic conditions, 3) fear and intimidation, and 4) legislation. Pathway 2, exogenous economic conditions, encompasses outside minimum wages, central to this analysis. Other factors – notably general beliefs and fear – are difficult to approximate in regressionary analysis, but are still helpful in identifying model controls and understanding what else may be influencing labor union votes. All four of these mechanisms are explored in more detail below.

1) Personal and Social Identities & General Beliefs

The values and beliefs that an individual holds will inevitably help him/her decide how to vote in a union election. Economist Steven Blader analyzed survey data and found that procedural justice judgements (the degree to which an individual felt as though their workplace was fair, unbiased, and protected their freedom of expression) and social identity (the degree to which an individual identified and shared values with their employer and colleagues) were key to informing union votes. Specifically, after controlling for age, tenure, gender, and familial connection to unions, a one unit increase in the procedural justice judgment score decreased union support by 24 to 32% on average, and a one unit increase in the social identity score

increased support for union certification by 28% on average (Blader, 2007). These results suggest that workers are less likely to vote for a union when they feel that their workplace is fair, and more likely to vote for a union when they have shared values with their corporation.

Personal identities, such as age and education status, can also influence union support. Many modern-day union campaigns that gain traction include a high percentage of workers that have a college education (Tavernise & Schieber, 2022).[8] Additionally, reporting has shown that many workers currently in their 20s often do not know how they will vote in a union election (Williams, 2021). This finding on age is not surprising; since unions were more popular during the 1980s and 1990s, older demographics tend to be more familiar with unionization than younger workers. This may make age a significant influence in union voting today, whereas in 1995, age was not found to be significant. In this analysis from 1995, Deshpande found that social identities such as race, gender and age did not influence votes for unionization, rather, pressure from family, friends and colleagues, dissatisfaction with current employee associations, and general beliefs were most influential in union voting models (Deshpande, 1995).

One general belief that people hold regarding unionization stems from concern over the lack of individualism within a labor union (Williams, 2021). Unions are often hierarchical, creating a power dynamic that may not benefit or could even hurt those at the bottom of the totem pole. There are also fees associated with joining a union, and although unions have historically resulted in higher wages and more vacation time, none of these benefits are guaranteed. In other words, union fees have the potential to outweigh the added wages and

[8] Experts believe that this is at least in part due to the trajectory of workers that graduated college amidst the 2008 Recession. Students graduating into this financial crisis were largely underemployed, working at waged jobs below their skill set for years or even a decade following graduation. The pent up frustration of these workers generated a desire for higher wages, better protection, and collective organization. These frustrations were exacerbated by the COVID-19 pandemic, a time when workplaces became more unsafe but companies only experienced minor setbacks in their profits (Tavernise & Schieber, 2022).

benefits that a union may bring (Herrera, 2021). If outside wages are already sufficient, an individual may opt to avoid the burden of heavy union fees by not unionizing.

These studies suggest that age and education level are important to include in regressionary analyses on labor union election outcomes. In this paper, these identities will be included as control variables in order to better isolate the true effect that outside minimum wages are having on labor union certification odds.

2) Economic Conditions & Minimum Wages

The strength of outside options, which includes but is not limited to the local minimum wage, is another factor considered in labor union voting models. Most studies have found that stronger exogenous economic environments lead to higher union vote shares, and weaker exogenous environments make workers less likely to vote for a union. One reason for this may be because higher outside minimum wages raise the wage floor for unions, which is beneficial for negotiations (Bergman, 2015).

Workers also may be more willing to vote for a union when they feel better protected against income and unemployment risk, and thus less intimidated by employer threats. It has been observed that labor shortages – good for Main Street, bad for Wall Street – give employees a heightened sense of agency, which increases collective bargaining efforts. This is because during labor shortages, employers are competing for workers, which means that workers have an increased number of outside economic opportunities. This makes union organizing relatively less risky (Tavernise & Schieber, 2022).

Baumann put this theory to the test. In his analysis, Baumann defines the strength of economic environments by looking at two factors: 1.) the tightness of the labor market, measured

as the number of job vacancies against the number of employed workers, and 2.) unemployment insurance benefits (UIBs), measured by the amount and potential duration of UIBs. A tighter labor market and higher UIBs are indicators of better financial support and shielded exposure to income loss and unemployment risk. The results of this analysis found that a 1 SD change in the natural log of labor market tightness increases the vote percent for unions by between 1.5% and 3% on average, and that an increased duration of UIBs led to a higher percentage of votes for a union whereas the amount of UIBs were not statistically significant (Baumann et al, 2017). Put simply, Baumann's results suggest that stronger exogenous economic conditions make workers feel more comfortable engaging in pro-union activity.

On the other side of the same coin, weak exogenous environments usually decrease union vote shares. This was found to be the case at Kumho Tire in Georgia. Even though Kumho's $9.50 minimum wage was lower than many of its competitors, it was still higher than many other available jobs in the Georgia area. This lack of outside alternatives made people less willing to vote for unionization (Lafer & Loustaunua, 2020). "There are a lot of people around here… [that] had never even made what they were making here," a Kumho employee explained. "So they feel like… I can't mess this up [by voting for a union]" (ibid.).

The performance of an employee's company is also found to influence union activity. When companies are doing well, the desire to unionize may increase because of the general belief that employers can afford to pay higher wages. These efforts often come out of pent up frustrations, as people watch CEO compensation grow astronomically while wages and working conditions for employees do not change. If companies are doing well, why aren't workers sharing in the benefits? (Tavernise & Schieber, 2022).

The results of these analyses suggest that strong exogenous economic environments – which includes high minimum wages – increase labor union activity. Most workers feel more comfortable engaging in pro-union fights when economic conditions shift in a way that better shields them from unemployment and income loss. Of course, however, not every worker is the same. The degree to which workers feel comfortable operating under the assumption that they are protected from job and income loss depends upon individual behavior.

3) Fear & Intimidation

In a national survey of workers that had been through a union election, respondents indicated that the foremost reason they voted against unionization was management pressure (Lafer & Loustaunua, 2020). Many employees end up voting 'no' on unionization out of a fear of job loss, despite termination on the basis of union membership being illegal under regulations such as the open-shop model and the National Labor Relations Act (Bevans et al., 2017). This 'fear factor' is observable in research, but difficult to control for in regressionary analysis.[9]

Employers are easily able to 'get around' union election rules and regulations because laws such as the NLRA are rarely enforced, and various loopholes exist. For instance, voters in union elections are not legally provided with freedom of speech, equal access to voter information, or equal access to media. Laws also do not protect employees against employer economic coercion. In addition, it is legal for employers to 'predict' but illegal to 'threaten' termination or company closure if unionization occurs (Lafer & Loustaunua, 2020).[10]

[9] The 'fear factor' is defined in this analysis as the effect that employers' threats and anti-union messaging have on employees. For example, many employers try to convince employees that they will lose their jobs if they vote for a union. Often, these threats manifest themselves into workers voting against unionization, regardless of whether or not that is what they truly believe.

[10] I.e. under the NLRA, employers cannot say to employees: "You will be terminated if you join a union," but are allowed to say: "I predict that you will be terminated if you join a union."

These gaps in legislation generate pathways for employers to bribe and threaten workers. Even when these threats surpass the legal threshold, the penalties outlined under the NLRA are not sufficient enough to provide economic disincentive for this behavior (Bevans et al., 2017). In other words, "even employers who willfully and repeatedly break the law" will never be fined "a single cent" (Lafer & Loustaunua, 2020) or penalized in any way, as many technically illegal tactics are difficult to prosecute since employers tend to use verbal and veiled threats that leave no paper trail (Bevans et al., 2017). These violations are measurable. For example, it is estimated that employers spend $340 million a year on union avoidance consultants (Lafer & Loustaunua, 2020). Employers can also lawfully mandate that workers attend 'captive audience meetings,' synonymous for anti-union meetings, as often as once a day. About 90% of employers will hold these meetings. At these meetings, employees may be banned from asking questions and can even be fired on the spot for doing so. Communication between employees and employers instead tends to be restricted to one-on-one discussions, where the same individual that gives an employee his/her weekly paycheck, benefits and duties, and holds the power to fire the employee, tells their direct subordinate about the horrors and risks of unionization (ibid.).[11]

Using both legal and illegal loopholes, employers have successfully and frequently instilled fear in their employees.[12] Unfortunately, many of these fears are justified. It is estimated that about one-in-three employers will fire workers during the course of a union campaign (Bronfenbrenner, 2009), and more than one-in-five union activists will be fired as a result of their campaigning (Schmitt & Zipperer, 2009). Many employees are not willing to take this risk. Firings interrupt campaign efforts and intimidate employees, resulting in more 'no' votes than

[11] A list of the most common anti-union employer tactics can be found in Appendix C.

[12] For unions that make it past this adversity and do get certified, employers can still delay unionization by challenging results and refusing to negotiate a contract. About 37% of newly formed private-sector unions still had no labor agreement two years after an election (Brofenbrenner, 2009).

'no' opinions. This fear factor has been found to drop union support from two-thirds of workers to under one-half of workers over the course of union campaigns (Lafer & Loustaunua, 2020).

The case study of Kumho Tire in Georgia, previously mentioned, offers first-hand insights into some of these anti-union tactics. In 2016, Kumho's union election ultimately failed with 43% support, despite there being an estimated 80% support at the beginning of the union campaign (ibid.). Workers accused their employer of making false claims, including that the Kumho plant would shut down if workers unionized. These threats came with such frequency and force that many pro-union employees began to lie about their beliefs. "Can I count on you for a no vote?," one union leader at Kumho was asked by his supervisor over the course of the campaign. "One day he kept at it for 10 minutes straight," the employee said, "so I told him 'yes,' just to get him off my back." Other employees would wear 'Vote No' hats out of fear of showing their true colors. This was especially problematic, as Lafer and Loustaunua pointed out:

> In union elections, everyone is looking around to see who else is in; to judge whether they believe that their co-workers are capable of coming together to force management to pay more than it wants. A large collective action — such as everyone wearing union buttons or t-shirts — gives employees confidence that they have the collective power to stand up to management. For the same reason, management strategies focus on intimidating union supporters into silence and quiescence — or into open betrayal of their cause — in order to convince others that even union supporters lack the fortitude to unite in opposition to management (Lafer & Loustauna, 2020).

The relationships between employees and supervisors at Kumho paint an important picture – workers are scared. They are being intimidated into believing that unionization is of great risk, but are not convinced of the merits of remaining unorganized. This means that in union elections, some workers are not voting their true conscience. Controlling for this fear factor is difficult. The models in this analysis can observe union votes that have taken place, but cannot always observe the true opinions of workers. Strong exogenous economic environments may lessen the blow of this fear factor, but there is still a lot that these models cannot capture.

4) Legislation - Right to Work

Although supporters of the Right to Work policy claim that the law is not anti-union, evidence suggests that states that passed RTW during the 1940s and 1950s (largely the US South) have experienced severe drops in union membership. This is estimated in part because early-era RTW laws were designed to stop union organization, whereas RTW laws introduced in later eras were put in place to reduce union power (VanHeuvelen, 2019). Additionally, RTW laws are found to be especially consequential in places with high union-density. VanHeuvelen finds statistically significant negative correlations between RTW and union membership among states with a mean union membership level above 16%. RTW states had 2% to 5.5% fewer union members than in states without RTW, on average.

RTW laws can also make unionization efforts more difficult because of the 'free-rider' problem. Under RTW, workplaces cannot require non-union workers to pay 'fair share fees,' which are costs associated with employee representation, but not costs directly related to union organization. Eliminating these fees means that unionized workers often receive the same benefits as non-unionized workers, despite only union members paying dues. This disparity leads some non-union workers to decide not to vote for unionization, and some union workers to decide to leave their union (Bevans et al., 2017).

As mentioned in the background section, the RTW law can be included as a control variable in the regressionary models in this analysis. Including the law helps to further isolate the effect of minimum wages and provides insight as to how the strength of outside wages alter the outcomes of labor union elections both in RTW states and in non-RTW states.

Case Studies: Amazon Labor Union Elections

For the reasons presented above and more, opinions on unions vary greatly. Perhaps some of the most compelling evidence of union vote behavior, however, exists within accounts of Amazon workers that recently faced a union vote themselves: BHM in Alabama, JFK8 in New York, and LDJ5 in New York.

The environments in which these elections took place are of particular importance. The economic situation, and in particular the minimum wage, is different in Alabama than in New York. One of the elections in New York passed, whereas the vote failed in Alabama – suggesting that differences in minimum wages can yield differences in union election outcomes. At the same time, the fact that the two Staten Island votes turned out differently is evidence that there is more at play in union votes than just minimum wages.

The timing of these union efforts is also important to note. Following the COVID pandemic in 2020, workers yearned for added protection and felt immense frustration when companies such as Amazon bounced back from the pandemic and grew in profits, while employee working conditions and wages did not change. Additionally, these union elections coincided with pro-labor attitudes in the US government, including President Biden and various senators. This support helped unionization efforts gain traction (Tavernise & Schieber, 2022).[13]

[13] This also happened during the Great Depression. Similar to President Biden today, President Franklin D. Roosevelt (inaugurated in 1933) was pro-union. FDR was the main force behind the NLRA. In 1935, when companies started to bounce back from the depression, workers felt frustrated that they were not sharing in the gains. The case of General Motors is perhaps the most influential labor union election in US history. GM workers faced psychologically and physically challenging jobs while GM exploded in profits, creating a heightened demand for worker protection and increased wages.

BHM: Bessemer, Alabama

Amazon workers at the BHM facility in Bessemer, Alabama, first voted on unionization in April 2021. This initial vote did not pass – with 1,798 votes against unionization and 738 votes for unionization, the 70.9% vote against was nowhere near the 50% plus one ballot needed for a union to pass (Williams, 2021). Arguments of interference existed on both sides following this election. Amazon employees claimed that Amazon removed information on unionization from break rooms, and forced employees to attend meetings with anti-union messaging (Herrera, 2022). The NLRB launched an investigation on these claims, ultimately recommending that the Bessemer election be redone. Amazon appealed this recommendation, but a second election was still held. This vote remains too close to call as of May 1, 2022, with 875 votes for, 993 votes against, and 416 votes challenged (Palmer, 2022).

Certain Amazon employees in Alabama claimed to be against unionization from the start. Many of these individuals felt as though Amazon already offered them everything that a union would. The minimum wage sits at $15.30 at the facility in Bessemer, two times higher than the $7.25 minimum wage in Alabama, and jobs at the facility include a decent benefits package (Greene & De Vynck, 2021). These benefits are especially important in Bessemer, where positions offering similar wages are not readily available (Herrera, 2022). Put differently, a weak exogenous economic environment made these workers less willing to vote for a union.

Employees that voted against unionizing also expressed that they were satisfied with their jobs, did not want to pay high union fees, and were worried about losing time off and benefits if they were to unionize (ibid., 2021). Specifically, employees worried that union fees would outweigh added wages. “I work hard for my money,” said Melissa Charlton Myers, an employee

in Bessemer. “I don’t want any of it going to a union that *maybe* can get us more pay, or *maybe* can get us longer breaks. It’s not worth the risk” (ibid.).

Another worker that voted against unionization even had previous union membership himself, but pointed to individuality not mattering at his previous union as his reason for voting ‘no’. Seniority within his union was valued over all else, he claimed, and he did not feel as though union membership at Amazon would protect him from termination (Williams, 2021).

Amazon workers that supported unionization in Alabama called on their company to give them more control over their break time, less monitoring and less strict regulations (Herrera, 2021). Additionally, these workers wished to be treated with more dignity and respect, and requested a more manageable pace of work. This made this battle as much “a civil rights struggle as a labor one,” according to Jay Greene and Gerrit De Vynch (2021).

Other employees had their opinions swayed over the course of the union campaign. Specifically, concerns surrounding job protection were prevalent. Amazon dished out $4.3 million for anti-union consulting in 2021 alone. At BHM, Amazon held mandatory meetings, sent out anti-union text messages, and posted anti-union propaganda across warehouses (O’Brien, 2022). This messaging was strong enough to sway some employees to vote ‘no.’ For other employees, however, votes against unionization were a result of the fear factor. Because of Amazon’s disapproval, employees worried that voting for the union would make them vulnerable to termination. Ultimately, the contrasting forces of the potential benefits of unionization with Amazon’s anti-union stance made it difficult for individuals to decide how to vote.

The BHM election includes evidence that for some people, the weakness of outside minimum wages in Alabama was a reason to not vote for a union. For others, opinions on unionization came out of personal experience, general beliefs, or the fear factor. All in all, this

case study suggests that there are various factors that influence labor union elections. Some, notably minimum wages, can be explained with regressionary modeling whereas others – such as the fear factor – cannot.

JFK8: Staten Island, New York

On April 1, 2022, workers at the JFK8 Amazon facility in Staten Island voted to unionize, becoming the first Amazon labor union in the United States.[14] The vote tally was 2,654 votes for the union, and 2,131 votes against (Hsu, 2022). In true fashion, Amazon highly contested the election – hanging 'Vote No' banners in the warehouse and holding mandatory meetings for employees – before filing 25 objections upon the announcement of the election results (ibid.). Of these objections, Amazon claimed that the NLRB used an artificially reduced number of votes in calculating whether or not the Amazon Labor Union (ALU) – the name of the grassroots organization that has been campaigning for unionization at JFK8 since 2020 – had reached the 30% threshold to hold an election in the first place (O'Brien, 2022). Amazon also pointed to "chaos" and "hours-long lines" at the polls on the first day of voting, which they believe dissuaded people from voting (ibid.). Clearly, Amazon's lawyers are ready to put up a fight. Employers can, and often do, delay unionization by refusing to negotiate a contract – less than 50% of unions obtain a contract within a year of an election (Brofenbrenner, 2022). "There's every incentive for them to delay the process at every opportunity," says John Logan, director of Labor and Employment Studies at San Francisco State University (Hadero, 2022).

The ALU's efforts have been spearheaded by Christian Smalls, a former Amazon worker. Smalls was fired in March 2020 after staging a walkout over Amazon's COVID-19 policies (Hsu, 2022). Despite not having any union background, Smalls began a GoFundMe and gathered

[14] Many Amazon facilities in Europe are unionized.

signatures to meet the 30% NLRB filing requirement, thus forming the ALU. Smalls and his fellow organizers called for longer breaks, better paid leave, and a $30 hourly wage – up from the $18.25/hour wages currently offered at Amazon facilities in Staten Island. These $18.25 wages are already much higher than many other jobs in the area (ibid.; Hadero, 2022). Minimum wage increases are of peak importance. $18/hour is not a living wage in New York, Smalls argues. "We need to raise the bar higher" (Hsu, 2022).

Amazon responded to Smalls's arguments, again referencing their higher-than-average wages, healthy benefits, insurance packages, and even college tuition packages (ibid.). Similar to Alabama, employees that voted against unionization agreed with these remarks. Different from Alabama, New York is a labor-friendly town with lots of economic opportunities.[15] There is an abundance of workplaces, and the minimum wage in the boroughs of New York city is $15 – not high by Smalls's standards, but very high by federal standards. Additionally, Smalls points out that "every worker [in New York] knows someone who is in a union," and there are many unions surrounding Amazon workers in Staten Island (Betts, 2022).[16] This means that collective organizing is a near norm in New York, which helped the ALU gather more support.

Minimum wages were a key part of the ALU's campaign. The economic environment in New York is generally considered to be favorable, which likely helped these unionization efforts gather support. Still, Christian Smalls acting as the lifeblood of the ALU campaign is notable –

---

[15] Union-friendly attitudes also tend to differ across political lines, with democratic states usually being more pro-labor and pro-union than republican states. It follows that many Right to Work states are also states that hold more conservative beliefs. Though New York votes democratic in nearly every major election, Staten Island tends to be more conservative, again making ALU's victory even more surprising. Political affiliation is controlled for as part of the regressions completed in this analysis, since it may be influential in union election outcomes.

[16] While an estimated one-in-five workers in New York are unionized, most union employees in the state are part of the public sector. Private sector unionization is more difficult to achieve, which makes the ALU's efforts even more impressive (Betts, 2022).

and cannot be explained in data. The models in this analysis can only help to predict whether or not a labor union election in Staten Island would have passed absent Smalls's influence.

LDJ5: Staten Island, New York

The success of the ALU quickly made national headlines and helped to spark more unionization efforts across the country – beginning with an Amazon facility right across the street. The LDJ5 Amazon facility in Staten Island is small, with about 1,600 employees versus JFK8's 6,000, but mighty (Palmer, 2022). On April 25, 2022, workers at LDJ5 voted on whether or not they would join the ALU. Same as JFK8, these workers called for a $30 minimum wage, and Amazon's anti-union meetings and messaging remained in full force (Hsu, 2022).

Ultimately, the vote at LDJ5 failed. Less than 1,000 out of over 1,600 eligible voters filled out a ballot, with 618 of these ballots voting against unionization and 380 voting in favor of it (O'Brien, 2022). Regardless, the ALU will not stop their union drive. Sean O'Brien, President of the Teamsters Union, said in a statement: "The only thing this greedy, abusive company won today is a guarantee that Amazon works everywhere will not give up until they have a union" (ibid.).

While there are of course individual differences between workers at the JFK8 and LDJ5 facilities, the juxtaposition of these Staten Island union election outcomes pose an interesting paradox. These facilities are located down the street from one another, meaning that they exist in the same county. The workers at these facilities therefore mainly face the same exogenous conditions: the same local minimum wage, a similar number of readily available job alternatives, the same unemployment levels, the same average levels of income, and the same demographic characteristics. Why is it, therefore, that one of these union votes failed, and one did not?

One explanation is the size of the workforce at LDJ5. Amazon's anti-union campaign was more heavily felt and reached a higher percentage of employees at LDJ5 than at JFK8. Or, perhaps the pro-union argument was more present at JFK8, since that is where ALU President Christian Smalls had been persuasively campaigning for over two years. The likely answer to this question, however, is that the union election came down to individual differences in opinions between workers, which may be unexplainable in analysis.

Given that the results of the JFK8 and LDJ5 elections suggest that the effect that local minimum wages have on union elections can go either way, the analysis in this paper aims to identify which one of these effects is more prominent. The *Data* section, below, explains the data used to help identify this effect.

Data

The analysis in this paper relies on real-world data to observe the effect that minimum wages, among other factors, have on labor union votes and elections. Four datasets are used in this analysis: National Labor Relations Board data on labor unions, Michigan State data on minimum wages and state policies, IPUMS USA data on county demographics and economic conditions, and US Census Bureau data on county-level firms and employees. Each of these datasets are summarized below.

Labor Union Data – National Labor Relations Board

The NLRB has publicly available data on labor union votes dating back to 1994. To simplify the analysis, certain variables in this dataset were dropped. First, many union elections that take place have multiple unions being voted on at once. Additionally, some union elections

require a runoff in order to reach a verdict. The NLRB has data on all of these types of elections, though this analysis is simplified to single union elections that did not require a runoff. This resulted in a dataset with 22,563 observations, down from 48,687 in the original dataset.

Next, it is important to look for potential data errors. After generating variables that calculated the percentage of votes for and against a union in a given election, if the percent of votes for or against a union was greater than 100%, a data error was likely. After flagging and eventually dropping observations deemed incorrect or insufficient, 17,492 observations remained. It was also observed from looking at union votes over time that the number of recorded votes jumped dramatically in 2007. Observations preceding 2007 were therefore dropped from this analysis.

Variables of interest within this resulting dataset include, but are not limited to: the total number of votes in a union election, the votes for a union in a given election, the votes against a union in an election, votes voided in an election, the percentage of votes for a union during an election, the percentage of votes against a union in an election, and whether or not the union was given a certification title. The summary statistics of these variables are shown below.

Table 1: *Labor Union Data, Summary Statistics*

Variable	Mean	Std.dev	Min	Max
Total Votes	59.91	108.29	2	2225
Votes For	32.6	62.77	1	1602
Votes Against	26.99	54.86	1	1258
Votes Voided	2.67%	6.63	1	162
Percent For	55.50%	0.23	1.49%	100%
Percent Against	43.84%	0.23	0.40%	100%
Certified	59.38%	0.49	0	1

Source: National Labor Relations Board

The Total Votes variable is continuous and represents the total number of votes recorded in a given union election. Votes For, Votes Against and Votes Voided represent the count of union votes that fit within each of these categories respectively. The percentage of votes for a union (Percent For, or Pfor) in a given election and the percentage of votes against a union (Percent Against) were also calculated, and exist between the bounds of 0% and 100%. Pfor is used as the dependent variable in the ordinary least squares regression in this analysis.

Certified is a binary variable equal to 1 if a union was certified following an election and equal to 0 otherwise. The NLRB dataset had a variable titled 'Union to Certify,' and observations under this variable were either blank or included a union name. The existence of a name acts as an indicator that a labor union was certified following a union election. Observations where Certified is equal to 1 also have a name listed under the 'Union to Certify' variable, therefore. The Certified variable is used as the dependent variable in the logistic regression in this analysis.

Minimum Wage and Policy Data – Michigan State

The second dataset necessary for this analysis comes from Michigan State. This dataset has information on state-level and city-level minimum wages among many other policies, though only a few variables within this dataset – notably the Right to Work law, minimum wage, year, state, and city – are important to this analysis. Observations that could not be merged from the Michigan State dataset were due to certain states and years not being contained in that dataset. These observations were dropped.[17]

[17] The Michigan State dataset was merged in STATA on a many-to-one level with the NLRB dataset as the master dataset and the Michigan State dataset as the using dataset. 16,062 observations out of 17,492 were matched, indicating that this merge was largely successful. Observations that were not merged, and were therefore dropped in this analysis, had to do with the variables year and state. The Michigan State dataset has data on Guam, the Virgin Islands, and Puerto Rico, whereas the NLRB dataset is limited to the 50 US states plus Washington D.C. The merged dataset was limited to the NLRB geographies, therefore. Finally, there were a small number of duplicates found following the merge, which were dropped.

Notably, the Michigan State dataset expires in 2019, eliminating 2020 and 2021 observations. Limiting the dataset through the year 2019 almost entirely eliminates the effects of COVID, as well.[18] Summary statistics from the Michigan State dataset are shown in Table 2.

Table 2: *Minimum Wage data, Summary Statistics*

Variable	Mean	Std.dev	Min	Max
State Minimum Wage	$8.10	1.22	$5.15	$13.50
Difference from Federal	$0.97	1.15	-$1.40	$6.25
Diff. from Fed (squared)	$2.28	4.64	$0	$39.06
Right To Work	12.60%	33.19%	0	1

Source: Michigan State

In Table 2, the State Minimum Wage variable records minimum wages at the state-level or city-level in a given year. Certain states – Georgia, and certain parts of Montana and Oklahoma – have state minimum wages lower than the federal minimum wage, making these states' minimum wages effectively $7.25 in the modern day. The Michigan State dataset did not recognize this, however, and instead records minimum wages according to state law. To account for this, certain minimum wage variables were manually fixed in STATA to ensure that areas with minimum wages lower than the federal minimum wage anytime from 2007 - 2019 reflected the federal minimum wage of that year.

The Difference from Federal variable (MinDiff) takes the difference of the state minimum wage value and the federal minimum wage value of that year. The Difference from Federal, squared, variable (MinDiff_sq) squares the MinDiff value. These variables are the main independent variables of interest in this analysis. Taken together, they explain the effect that outside minimum wages have on the likelihood of union certification, holding other variables

[18] Eliminating observations from 'COVID' years, 2020 and 2021, is helpful in analysis because these years likely experienced unique trends, not in line with 'normal' times.

constant. One of these control variables is the presence of the Right to Work law. The Right to Work variable is coded as binary, equal to 1 if RTW exists in a state and equal to 0 otherwise.

County-Level Controls – IPUMS USA

The regressions in this analysis utilize various county-level controls, found publicly online at IPUMS USA. To obtain county-level data, it was first necessary to use a county crosswalk dataset from IPUMS USA that contained county FIPS codes, state FIPS codes, and data on county names, sizes, and locations. Only counties where a union vote occurred from 2007 - 2019 were included in this data. South Dakota, Vermont, West Virginia, Wyoming did not have any counties that fit this criteria, eliminating these states from the analysis completely. After completing the county crosswalk merge, the resulting dataset had 14,738 observations.

The next step completed in STATA involved adding county-level control variables. IPUMS USA has data on employment status, citizenship status and many other demographics, as well as county FIPS codes, state FIPS codes, and year. After downloading data from IPUMS and collapsing the dataset at the year and county level to find the mean level of unemployment, citizenship status, poverty status, education level, the average gender breakdown and racial demographics, as well as the median income and age for each county in each year, this dataset was ready to be merged onto the existing master dataset using the variables county FIP, state FIP and year. Summary statistics from the IPUMS dataset are shown in Table 3.

Table 3: *County-Level Control Data, Summary Statistics*

Variable	Mean	Std.dev	Min	Max
Year	2012.82	3.68	2007	2019
Female	51.35%	0.02	33.12%	63.32%
Black	12.22%	0.11	0%	69.82%
Hispanic	16.41%	0.15	0%	96.43%
Asian & Pacific Islander	8.71%	0.08	0%	55.17%
Other	2.42%	0.02	0%	51.28%
Democrat	66.02%	0.47	0%	100%
Age	43.45	1.91	36	50
Age (squared)	1891.27	163.99	1296	2500
College Educated	38.08%	0.12	10.52%	71.06%
Citizenship Status	77.20%	0.14	38.92%	99.46%
Income	42,753.83	9,169.79	21,200	87,000
Poverty Level	12.19%	0.05	1.99%	47%
Unemployment Level	4.98%	1.97%	0.46%	12.47%

Source: IPUMS USA

The years of interest in this analysis are 2007 through 2019, since data did not start being collected in full by the NLRB until 2007 and the Michigan State minimum wage and policy data expire in 2019 as previously mentioned. Variables Female, Black, Hispanic, Asian & Pacific Islander, and Other represent the average proportion of each of these demographics in a given county in a given year.[19] Including these control variables help to explain whether personal identities are important to union votes.

Democrat is coded as binary dependent upon states' 2012 election results. The variable equals 1 if a state voted for Barack Obama in 2012, and equal to 0 otherwise, which in this case indicates a state voted for Mitt Romney. Since the democratic party has historically been more

[19] Other is defined as individuals that do not identify as White, Black, Hispanic, or Asian or Pacific Islander

pro-union than the republican party, including this as a control variable answers the question of whether or not living in a majority democratic state makes union certification more likely.

The age of individuals in this analysis is limited to 36 - 50, as this represents the prime working-age population and thus the individuals most likely to vote in a union election. The Age (squared) variable squares the average age in a county in a given year. Including Age as a control variable helps to understand if certain age groups are more likely to vote for a union over others.

The education variable was coded as binary within the IPUMS USA dataset, equal to 1 if someone has at least four years of college and 0 otherwise, before being collapsed at the county level. The resulting College Educated variable shown in Table 3 represents the percentage of individuals that have at least four years of a college education in a given county in a given year. Recent union elections have had a higher percentage of college educated workers involved, hence the motivation for including this variable.

The same process used for the College Educated variable was used for the Citizenship Status variable, the Poverty Level variable, and the County Unemployment variable. The county-level unemployment variable is important to this analysis because it proxies labor market tightness. Labor market shortages have been found to increase union activity, which would suggest that low levels of unemployment would increase the likelihood of union certification. Finally, Income is a continuous variable measured as the median income in a county in a given year, coded as missing, as opposed to 0, if an individual does not have an income.

Firm Data – US Census Bureau

Another control variable included within this analysis looks at the number of establishments per county. As aforementioned, controlling for the filtering effect created by the

NLRB requirement that a petition with 30% support must be filed before a union election can take place is difficult in practice. This effect can be estimated vis-a-vis proxies. The US Census Bureau has publicly available data on county business patterns, which include the number of existing establishments in a county, and the number of employees in a county. After merging on the US Census data, a new variable titled Elections per Firm Density was generated. This variable, shown in Table 4, measures the number of union elections that take place as a percentage of the number of establishments in a given county in a given year. Including this variable within regressions provides insight as to how difficult it is to get a union election to occur in the first place. Summary statistics from the US Census Bureau dataset are shown below.

Table 4: *Firm Data, Summary Statistics*

Variable	Mean	Std.dev	Min	Max
Elections per Firm Density	3.43%	2.52%	0.01%	23.79%
Establishments	43,726.57	59,360.79	1,585	265,112
Employees	730,557.60	947988.6	23,393	4,007,163

Source: US Census Bureau

The Elections per Firm Density variable (election_density) exists as a percentage between 0% and 100%, though the actual maximum value is nearly 24% as shown in Table 4. Though not included in regressionary analysis, the establishments and employees variables are continuous and represent the count of firms and individuals working in a county.[20] Following the

[20] Additional variables that calculated the number of individual union votes that took place as a percent of the number of county establishments, and the number of individual union votes per the number of employees in a county, were also generated in this dataset, though were eventually dropped from the analysis because they did not have significant explanatory power in regressionary models.

merge of the US Census Bureau dataset with the master dataset – the joint NLRB, Michigan State, and IPUMS USA data – 10,297 observations remained.[21]

Methodological Approach

Two regressions are completed as part of this analysis: a logistic model, and an ordinary least squares model. Each of these models predict the effect that local-level minimum wages have on the likelihood of union certification, holding control variables aforementioned constant.

Hypotheses

There are two main hypotheses that exist in regards to how minimum wages influence labor union elections.

> *H1: The higher an area's minimum wage is relative to the federal minimum wage, the more likely union certification will be in that area.*

H1 follows literature that suggests that strong exogenous economic environments make workers more likely to vote for a union, or, weak exogenous environments make workers less likely to vote for a union. This suggests that there is less risk involved in voting for a union in an area that already offers high wages because these wages help act as a cushioned fallback plan, whereas there is more risk in voting for a union in an area where jobs with higher-wages are not as readily available. Workers residing in areas with high minimum wages may also feel less threatened by employers' anti-union messaging. It could also be true that areas with high local minimum wages coincide with labor-friendly areas, making union membership generally more popular and acceptable. H1 is consistent with the election results of the Amazon facility JFK8 in

[21] The 'master dataset' is defined as the resulting dataset following merges. The final master dataset includes NLRB, Michigan State, IPUMS USA, and US Census Bureau data. References to the 'master dataset' beyond this point in the paper refer to this final master dataset.

Staten Island, which faced an outside minimum wage of $15, over $7 higher than the federal minimum, and occurred in what is generally considered to be a union-friendly area (Betts, 2022).

The second hypothesis suggests the opposite of this effect.

> *H2: The closer an area's minimum wage is to the federal minimum wage, the more likely union certification will be.*

The negative correlation suggested by H2 would occur if individuals deemed unionization unnecessary against a backdrop of already sufficient wages, benefits, and working conditions. Unions often exist to enhance the quantity and quality of these benefits, so if an area already is above-average relative to federal standards, individuals may not feel called to unionize. H2 is consistent with the results of the Amazon LDJ5 election in Staten Island.

While H1 and H2 are mutually exclusive, it is possible that at some point the relationship flips – that is, for relatively low minimum wages an increase in the wage strengthens votes for, but at the very high levels this effect erodes. For example, union certification may be more likely in an area with a $10 minimum wage than in areas that abide by the federal $7.25 minimum wage (H1), but less likely at a $15 minimum wage than at the $10 or even $7.25 level (H2). In a regression model, the existence of this effect – referred to as a turnaround point – is depicted by having opposite signs on the coefficients of MinDiff and MinDiff_sq.

Finally, aside from H1 and H2, it could also be true that individuals hold pro-union or anti-union opinions for reasons that have nothing to do with their local minimum wage. Instead, these votes could be informed by social identities, personal preferences, or other circumstances and beliefs. In a regression, this would make the minimum wage variable insignificant.

Logistic Regression

The logistic regression model, or 'logit' model, in this analysis uses the binary variable Certified as the dependent variable. The first independent variable of interest in this regression is MinDiff. As a reminder, MinDiff is the difference between the state-level or city-level minimum wage and the federal minimum wage during a given year. For example, MinDiff is equal to $1.75 in Massachusetts (MA) in 2015, as the minimum wage was $9.00 in MA and the federal minimum wage was $7.25. In 2019, this value is equal to $4.75 in MA, since the state minimum wage rose to $12.00/hour and the federal minimum wage stayed the same as in 2015.

The second independent variable of interest in this regression is the MinDiff value squared, denoted MinDiff_sq. Including MinDiff_sq within the regression details whether or not there is a notable turnaround point. The other control variables included within the logistic regression are as previously mentioned: race, age, gender, education level, political affiliation, income, citizenship status, poverty rates, unemployment rates, the Right to Work law, and the number of elections per county establishments. The logit model formula is as follows:

$$P(Certified) = 1 / (1+e^{-z})$$

$$z = B_0 + B_1(MinDiff) + B_2(MinDiff\_sq) + B_3(age) + B_4(age\_sq) + B_5(\%female) + B_6(\%black) + B_7(\%hispanic) + B_8(\%asian\_pi) + B_9(\%other) + B_{10}(\%college\ educated) + B_{11}(democrat) + B_{12}(\%citizen\_status) + B_{13}(median\_income) + B_{14}(\%poverty) + B_{15}(right\text{-}to\text{-}work) + B_{16}(elections\_density) + B_{17}(unemployed\_county) + \varepsilon$$

After running this logit model in STATA, the 'margeff' command is used to determine the average marginal effects and standard errors that each variable has on the likelihood of union certification and approval. Utilizing this command generates coefficients that allow for easier interpretation of regressionary results – a one unit increase of a control variable will change the

probability of union certification by an average of that variable's coefficient, holding all other variables constant.

Ordinary Least Squares Regression

The ordinary least squares (OLS) regression model follows a similar approach to the logit model. The dependent variable in this regression is the continuous variable percentage of votes for a union, denoted 'Pfor.' Pfor exists on the interval 0 to 1, with .5 representing a 50% approval rate, for example. The independent variables MinDiff and MinDiff_sq used in this regression are consistent with the logit model, as well as the county and state-level controls.

The OLS formula, equivalent to 'z' in the logit model above, is as follows[22]:

$$\hat{P}for = B_0 + B_1(MinDiff) + B_2(MinDiff\_sq) + B_3(age) + B_4(age\_sq) + B_5(\%female) + B_6(\%black) + B_7(\%hispanic) + B_8(\%asian\_pi) + B_9(\%other) + B_{10}(\%college\ educated) + B_{11}(democrat) + B_{12}(\%citizen\_status) + B_{13}(median\_income) + B_{14}(\%poverty) + B_{15}(right\text{-}to\text{-}work) + B_{16}(elections\_density) + B_{17}(unemployed\_county) + \varepsilon$$

The OLS model is interpreted as a one unit increase in an independent variable 'x' leads to a B_x unit increase in Pfor on average, ceteris paribus.

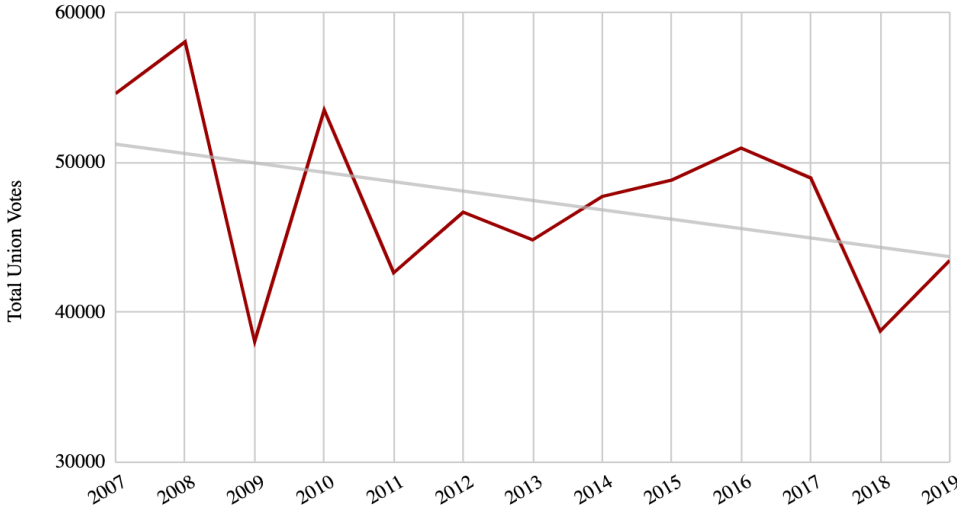
Empirical Results

Preliminary Observations

Before analyzing regressions, it is important to observe the master dataset from a higher level to contextualize further discussion and inferences. The first result important to this discussion looks at the total number of individual union votes, both for and against, over time.

[22] The 'hat' on $\hat{P}$for represents an estimated dependent value.

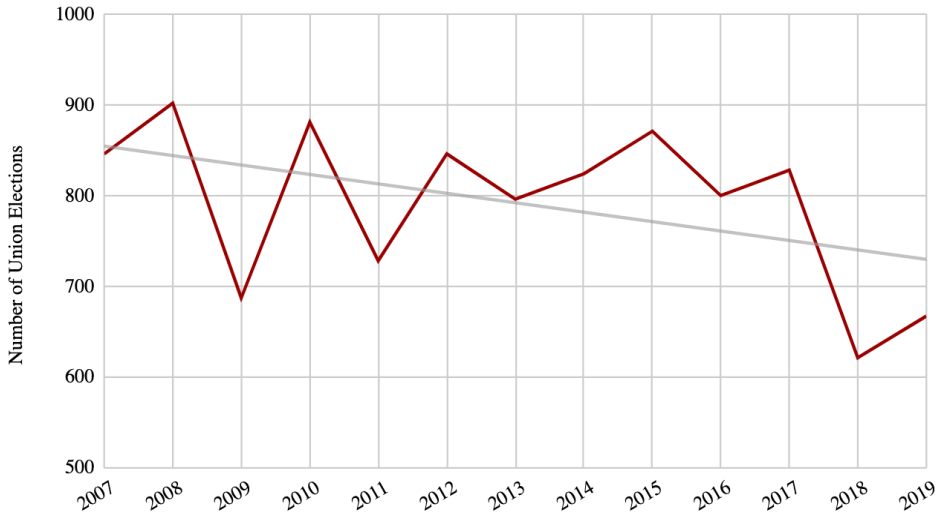
Figure 2: *Total Number of Individual Union Votes Over Time*



Source: Author's Calculations, from NLRB, Michigan State, IPUMS USA, US Census

As detailed in Figure 2, there is a downward trend in individual labor union votes from 2007 - 2019.[23] It follows, therefore, that there would be an expected decrease in the number of labor union elections occurring over this same time frame. Figure 3 details the number of union elections that took place from 2007 - 2019, and shows similar results to Figure 2.

Figure 3: *Total Union Elections Over Time*



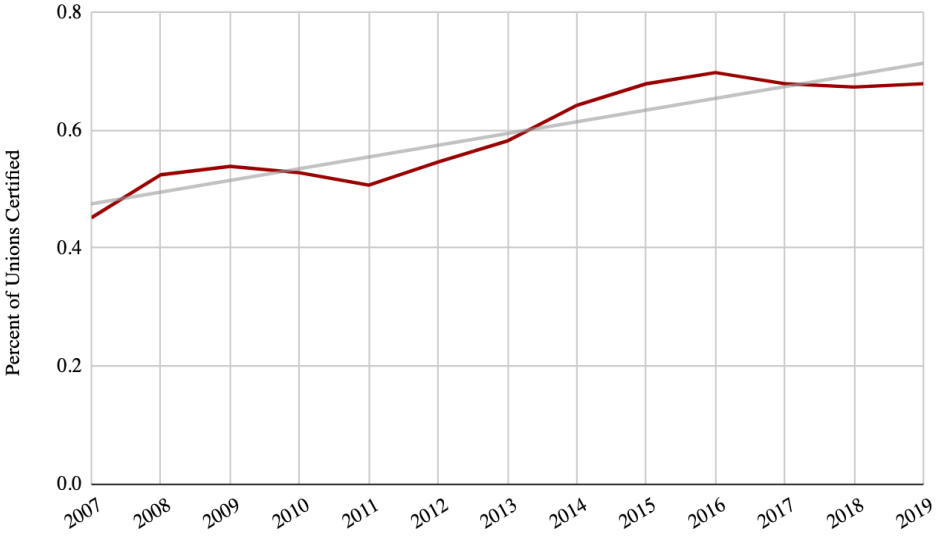
Source: Author's Calculations, from NLRB, Michigan State, IPUMS USA, US Census

[23] The dip and subsequent rise from 2008 - 2009 in Figure 2 is consistent with existing literature on the Great Recession and labor unions, presented in the background section of this paper.

Figure 3 shows a decline in the number of union elections occurring over time. Both Figure 2 and Figure 3 are consistent with existing literature. Fewer union votes is likely a result of fewer union elections, and fewer union elections taking place results in fewer union members.

Aside from the number of union elections and votes taking place, it is important to consider the percentage of unions being certified over time. Within the master dataset, variables were generated to indicate whether or not a union passed – Certified and Pfor, as described. Figure 4 examines the binary Certified variable and observes an upward trend over time.

Figure 4: *Share of Unions Certified Over Time*



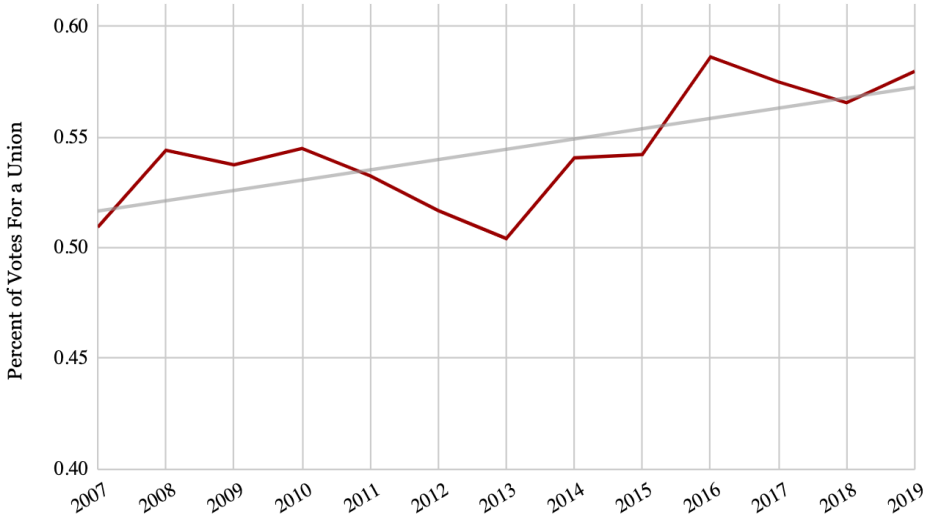
Source: Author's Calculations, from NLRB, Michigan State, IPUMS USA, US Census

At a glance, this result seems counterintuitive to existing literature. Considering Figure 4 in the context of Figure 2 and Figure 3, however, tells a more ambiguous story. Even though there may be a higher percentage of unions certified in recent years, the count of unions being certified may still be declining. For example, as estimated by Figures 3 and 4, if there were 900

union elections in 2008 and 50% were certified, and 620 union elections in 2018 and 65% were certified, there would be fewer unions certified in 2018 than 2008.

Another variable generated for this analysis, Pfor, calculates the percentage of votes for a union in a given election. The Pfor variable is depicted over time in Figure 5.

Figure 5: *Percentage of Votes for a Union Over Time*



Source: Author's Calculations, from NLRB, Michigan State, IPUMS USA, US Census

Figure 5 shows an upward trend in the percent of votes for a union. This is in line with the results and interpretations of Figure 4. The most important takeaway from Figure 5, however, lies within the margins of the result. With the trendline hovering around 50% - 55%, it is clear that the margins of union elections are critical. Most elections over this time period are not landslide victories or losses. Instead, it is likely a matter of a handful of votes that determine whether or not a union will pass. If 50% plus one ballot is needed for a union to pass, one person may be the difference maker in whether or not a union forms. Looking at individual-level union votes and decision making models becomes increasingly important in this case.

Logistic Regression Model Results

The logit model predicts that a $1 increase in MinDiff (the difference between the local minimum wage and the federal minimum wage) increases the likelihood of union certification until the local minimum wage rises to $4.18 above the federal minimum wage. Past this point, a $1 incremental increase in MinDiff begins to decrease the likelihood of union certification. The results of the logit model are shown below in Table 5.

Table 5: *Logistic Regression Results* [24]

Certified					
	Logit	**Marginal Effects**		**Logit**	**Marginal Effects**
Minimum Wages			**Exogenous Conditions**		
MinDiff	0.410*** (0.051)	0.096*** (0.012)	college educated	0.863** (0.409)	0.202** (0.096)
MinDiff_sq	-0.049*** (0.012)	-0.012*** (0.003)	democrat	-0.319*** (0.063)	-0.074*** (0.015)
Personal Identities			citizen_status	-0.488 (0.421)	-0.114 (0.099)
age	0.069 (0.383)	0.016 (0.090)	median_income	0.00001* (5.38e-06)	2.36e-06* (1.26e-06)
age_sq	-0.001 (0.004)	-0.0001 (0.001)	poverty_level	2.794*** (0.790)	0.655*** (0.185)
female	-4.826*** (1.843)	-1.131*** (0.432)	right-to-work	0.294*** (0.073)	0.067*** (0.016)
black	0.516* (0.306)	0.122* (0.072)	elections_density	2.868*** (0.931)	0.673*** (0.218)
hispanic	0.229 (0.308)	0.054 (0.072)	unemployed_county	-2.735** (1.368)	-0.641** (0.321)
asian_pi	-0.638 (0.564)	-0.150 (0.132)	_cons	-0.091 (8.418)	
other	4.870*** (1.434)	1.142*** (0.336)			

Source: Author's Calculations, from NLRB, Michigan State, IPUMS USA, US Census

The positive correlation between MinDiff and Certified supports hypothesis 1; the further away a state or city's minimum wage is relative to the federal minimum wage, the more likely

[24] The Pseudo R^2 of the logistic model is 0.0210. In Table 5, *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level. Variables without any denotation were not significant in this regression.

union certification will be. Specifically, for the first $1 past the federal minimum wage, certification is 7.4% more likely, ceteris paribus.[25] The negative correlation between MinDiff_sq and Certified indicates that this positive effect wears off past a certain point, however. This turnaround point is identified through the following formula:

$$-1*(B_1[MinDiff]/2*B_2[MinDiff\_sq]))$$
$$-1*(0.096/[2*(-0.012)]) = \$4.18$$
$$\$7.25 \text{ federal minimum} + \$4.18 = \$11.43/\text{hour}$$ [26]

Past a wage of $11.43, the positive relationship between MinDiff and Certified begins to erode. In other words, $1 incremental increases in MinDiff past this turnaround point make union certification less and less likely.

This model also suggests that a 1 year increase in the average age in a county increases the likelihood of union certification up until the age of 80, though this finding was insignificant.[27] Being female is of significant importance to this analysis. The logit model estimates that an increase in the mean-level of females in a county decreases the likelihood of union certification. Historically, many manufacturing jobs have been male dominated, meaning that many union votes have come from male workers. This inequality may show up in data in a way that suggests that men support certifying unions more than women.

Other identities in this regression look at race. Taken separately, a 1% increase in the

[25] 7.4% is calculated by 0.096(1) - 0.012(1*1) = 0.074

[26] This value is equal to $10.73 in 2008 when the federal minimum wage was $6.55, $10.03 in 2007 when the federal minimum was $5.85, and so on.

[27] This finding also does not hold in practice, given that most workers retire around the age of 65, and few if any counties will have an average age of 80.

number of Black, Hispanic, Asian or Pacific Islander, or 'other'[28] people in a county increases the likelihood of union certification by an average of 12.2%, 5.4%, -15%, and 114.2%, respectively, ceteris paribus. Only the variables black and other are statistically significant.

The percent of citizens in a county was not statistically significant in this analysis. The median income variable was significant at the 10% level, though its effect is small – a $1,000 increase in the median income in a county increases the likelihood of certification by 0.2%.

The positive correlation between college educated and Certified is significant, predicting a 20.2% increase in the likelihood of union certification when the percentage of people in a county that have completed at least four years of a college increases by 1. This is consistent with findings from recent union elections that have a high number of college graduates engaged.

The democrat variable is significant, but counters evidence presented in the literature review section of this paper. According to the logit model, residing in a state that voted for Obama in the 2012 election makes union certification 7.4% less likely on average, holding all else constant. Existing literature suggests that democratic states tend to be more pro-labor, easing union election and campaign processes. This regression suggests the opposite. Still, the democrat variable is far from perfect; it does not capture county-level political leanings, and does not extend beyond political attitudes of 2012.

The Right to Work law was also significant, and also counterintuitive. The logit model suggests that RTW states are 6.7% more likely to see union certification as compared to states where RTW does not exist. Given that RTW laws tend to make union activity more difficult, this result is puzzling. It is possible that workers do not mind voting for a union to form in RTW states, because they do not have to join. Or, the selection effect could be occurring; that is, if

[28] 'Other' is defined as a race aside from White, Black, Hispanic, or Asian or Pacific Islander. The 'other' variable was significant at the 1% level in this analysis, likely because there are very few people that identify as this race, making a 1% increase in this population at the county-level very large in practice.

RTW exists and a union vote is brought anyway, perhaps it is more likely to be successful.

Higher poverty levels are also found to lead to higher chances of union certification. Specifically, a 1% increase in a county-level poverty rate increases the odds of certification by about 65.5%, ceteris paribus. Although it is unlikely that many individuals experiencing poverty are voting in union elections, this regression result is consistent with trends from the 1930s and 2008. During these times of recession, poverty levels were higher, and union activity increased.

The election density variable, used as a proxy for the NLRB filing requirement, is also statistically significant. On average, a 1% increase in election density increases the likelihood of union certification by 67.3%, ceteris paribus. Many election-dense areas coincide with union-friendly areas, which is consistent with literature that suggests that union-friendly environments are beneficial for union campaigns. What is important to take away from this result, however, is that areas where union elections are more densely occurring are likely the same areas where the NLRB requirement for having a union election is more likely to pass.

Finally, the county unemployment rate is statistically significant. The unemployment rate acts as a proxy for labor market tightness. Consistent with Baumann's research, this model suggests that when people do not feel shielded from job and income loss, which tends to happen when unemployment levels are high, they are less likely to vote for a union. Specifically, this model predicts that a 1% increase in the unemployment rate decreases the likelihood of union certification by 64.1%, holding other controls constant.

Overall, the logit model suggests that the increased strength and presence of exogenous economic factors makes union certification more likely.[29] Specifically, certification is most likely when the minimum wage is $4.18 above the federal minimum, and unemployment is low.

[29] The strength of exogenous options is best proxied by the MinDiff variable in this analysis, and the presence of exogenous options is best proxied by the unemployment variable.

Ordinary Least Squares Regression Model Results

The OLS regression uses the same independent variables as the logit regression, but uses the dependent variable Pfor. Since most unions that receive majority support will be certified, the OLS model and the logit model should suggest similar results. This was indeed found to be the case: a $1 increase in MinDiff increases the percent of votes for a union up until MinDiff reaches a value of $5.13, at which point the percent of votes for a union begins to fall. The results of the OLS regression are shown in Table 6.

Table 6: *OLS Regression Results* [30]

Pfor			
	OLS		**OLS**
Minimum Wages		**Exogenous Conditions**	
MinDiff	0.025*** (0.005)	college educated	0.085* (0.044)
MinDiff_sq	-0.002** (0.001)	democrat	0.004 (0.007)
Personal Identities		citizen_status	0.033 (0.045)
age	-0.011 (0.041)	median_income	1.32e-06** (5.77e-07)
age_sq	0.0001 (0.0004)	poverty_level	0.124 (0.085)
female	0.133 (0.190)	right-to-work	0.036*** (0.008)
black	0.021 (0.033)	elections_density	0.379*** (0.100)
hispanic	0.090*** (0.034)	unemployed_county	0.202 (0.151)
asian_pi	0.005 (0.059)	_cons	0.575 (0.894)
other	0.431*** (0.141)		

Source: Author's Calculations, from NLRB, Michigan State, IPUMS USA, US Census

[30] The R^2 of the OLS model is 0.0217. The Adjusted R^2 of the OLS model is 0.0201. In Table 6, *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level. Variables without any denotation were not significant in this regression.

As in the logit model, the results of the OLS model are in line with hypothesis 1 (counties with minimum wages further away from the federal minimum wage are more likely to vote for a union) up until a turnaround point. This occurs at $5.13 in the OLS model, a slightly higher value than in the logit model. This value is calculated below, and depicted in Figure 5.

$$-1*(B_1[MinDiff]/2*B_2[MinDiff\_sq]))$$
$$-1*(0.025/[2*(-0.0092)]) = \$5.13$$
$$\$7.25 \text{ federal minimum} + \$5.13 = \$12.38/\text{hour}$$

Figure 5: *Marginal Effect of Dollars Above the Federal Minimum Wage on Election Outcomes*

Source: Author's Calculations, from NLRB, Michigan State, IPUMS USA, US Census

As seen in Figure 5, the likelihood of union certification in the OLS model peaks at a value of $5.18. At this point, holding all else constant, the vote share is predicted to increase by over 6% as compared to areas where the state minimum wage equals the federal minimum wage. Another important takeaway from Figure 5 is that the percent increase in votes for a union is positive at least up until $10 above the federal minimum wage. No state currently has a minimum wage higher than $9 above the federal minimum, however, suggesting that union vote

shares will be higher in any state that has a minimum wage above than the federal minimum wage.

Same as the logit regression, the age and age_sq variables remain positively correlated with Pfor, but are insignificant. The direction of the correlation between female and Pfor switched from the logit model, now suggesting that having more females in a county increases union support, though female is insignificant in the OLS model. Identifying as any non-white race also increases vote shares for unions in the OLS model, with variables hispanic and other proving significant. Specifically, a 1% increase in the percentage of hispanic people in a county increases the vote share for unions by about 9%, and a 1% increase in the percentage of people identifying as 'other' increases the vote share for unions by 43.1%. This is a change from the logit model, where black was significant but not hispanic, and asian_pi was insignificant and decreased the likelihood of union certification. In the OLS model, asian_pi is still insignificant, but is now positively correlated with Pfor.

The directional effect of democrat also switched from the logit to the OLS model, going from negative to positive. This positive effect is what was expected originally, in line with existing research that suggests that democratic states are more union-friendly. Unfortunately in the OLS model, however, democrat is no longer significant. Similarly, the correlation between Pfor and the percentage of citizens in a county switched from negative to positive, though this correlation was not significant in either regression. The correlation between Pfor and poverty remained positive, but the poverty variable is not significant in the OLS model.

College education is still significant in the OLS model and works in the same direction as in the logit model. A 1% increase in the percentage of people with at least four years of a college education increases votes for a union by 8.5% on average, holding other variables constant. This

is consistent with existing research. The median income variable became more significant, but the effect on union activity is still small. A $1,000 increase in the median income in a county increases votes for a union by an estimated 0.1%.

For states with the RTW law, the OLS model predicts that living in a RTW state increases votes for a union by 3.6%, ceteris paribus. As in the logit model, this result is significant and surprising. The election density variable is significant in OLS as well, though its effect is not as large as in the logit model. A 1% increase in election density increases votes for a union by a predicted 37.9%.

The county unemployment rate variable in the OLS model provides perhaps the most surprising results. The correlation between unemployment and union success switched from negative to positive, but unemployment is no longer a significant indicator of union support.

The OLS model suggests that on average, union certification is less likely in states where the minimum wage is closer to the federal minimum of $7.25, and more likely in states where the minimum wage is relatively high.[31] This relationship persists until the local minimum wage reaches $12.38, holding all else constant. Past this point, the percentage of votes for a union is expected to decrease slightly.

Discussion

Why do these results matter? At a high level, these results matter because they suggest that local minimum wages are a significant exogenous factor that influence labor union election outcomes. This effect is more pronounced in some US states than others. Specifically, a $1

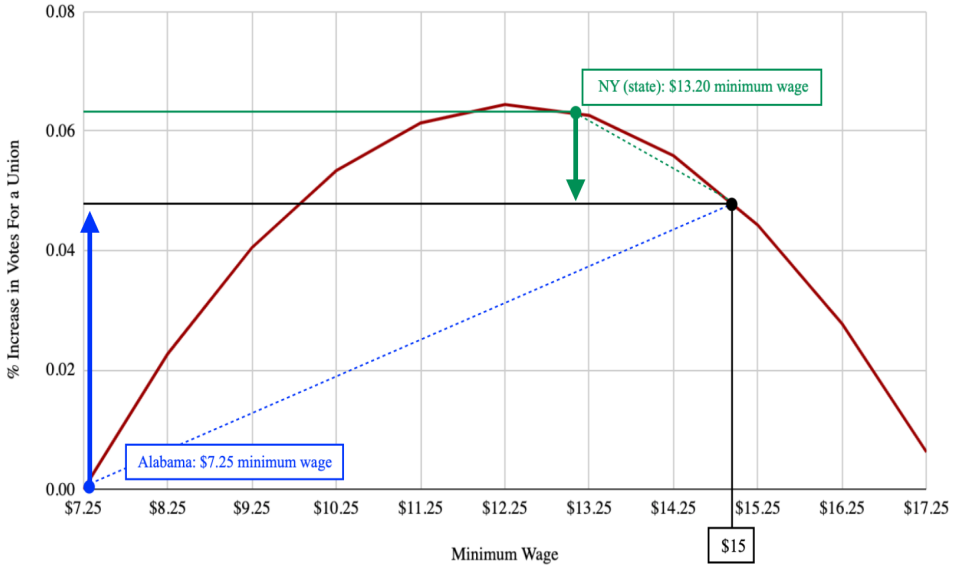
[31] Areas with relatively high minimum wages also coincide with areas that have lower levels of unemployment, higher levels of median income, democratic states, and a higher proportion of people with a college education. These correlations are presented in Appendix D.

increase in the minimum wage in a state that has a relatively low minimum wage will matter more for union support than a $1 increase in the minimum wage in an area that already has a high minimum wage; i.e., going from a $7.25 wage to an $8.25 wage increases union support by 2.3%, whereas going from $10.25 to $11.25 increases union support by less than 1%.

Policy Implications: Raise the Wage Act

The marginal benefit of minimum wage increases on union certification likelihood carries significant policy implications, specifically surrounding debates on whether or not to raise the federal minimum wage. The *Raise the Wage Act* is perhaps the most pertinent minimum wage policy being debated today. This bill suggests increasing the federal minimum wage incrementally until it reaches $15 per hour by June 2025. According to this analysis, a $15 federal minimum wage is beneficial for union support in some states, but not in others. Figure 6 approximates the effect that raising the minimum wage to $15 would have in Alabama – a state with a $7.25 minimum wage – and New York – a state with a $13.20 minimum wage.

Figure 6: *Marginal Effect of Minimum Wages on Union Election Outcomes*



Source: Author's Calculations, from NLRB, Michigan State, IPUMS USA, US Census

Figure 6 predicts that raising the minimum wage from $7.25 to $15 will increase the percent of votes for a union by about 5%. This would be the case in states such as Alabama, Georgia, Louisiana, and more (refer to Appendix A). For states with higher minimum wages, raising the minimum wage to $15 may decrease union certification likelihood. In the case of New York state, the percent of votes for a union is expected to drop by over 1% as a result of this policy. The minimum wage 'sweet spot' for union supporters occurs at the turnaround point – $11.43 in the logit model, and $12.38 in OLS. In Alabama, raising the minimum wage from $7.25 to this sweet spot would increase union support by an estimated 6.5%, greater than the potential increase in union votes brought on by the *Raise the Wage Act*.

Whether or not these percent changes in union support, onset by changes in the minimum wage, change the final outcome of a union election will depend upon other exogenous factors within a county. The logit and OLS regression equations act as predictive models to approximate these outcomes. To begin, these models can approximate union elections that have already occurred.

Predictions for Amazon Labor Union Elections

As explored within the *Case Studies: Amazon Labor Union Elections* section of this paper, the three labor union elections that recently took place at Amazon facilities in Alabama and New York offer helpful insights as to what may be influencing labor union votes.

According to the OLS model in this analysis, the Amazon labor union election in Alabama (BHM) would have passed. Specifically, the model predicts that the election would receive 53.55% support.[32] This calculation is as follows:

[32] The inputs used in this model come from 2017, the latest year with available and accurate data on a union election in Jefferson County, Alabama (where Amazon warehouse BHM resides).

OLS Model	OLS Model: Prediction for Bessemer, Alabama (BHM)
$\hat{P}for = 0.575 + 0.025(MinDiff) - 0.002(MinDiff\_sq) - 0.011(age) + 0.0001(age\_sq) + 0.133(\%female) + 0.021(\%black) + 0.090(\%hispanic) + 0.005(\%asian\_pi) + 0.431(\%other) + 0.085(\%college\ educated) + 0.004(democrat) + 0.033(\%citizen\_status) + 0.000001(median\_income) + 0.124(\%poverty) + 0.036(right\text{-}to\text{-}work) + 0.379(elections\_density) + 0.202(unemployed\_county)$	$\mathbf{0.5355} = 0.575 + 0.025(0)* - 0.002(0) - 0.011(44) + 0.0001(1936) + 0.133(0.530) + 0.021(0.368) + 0.090(0.029) + 0.005(0.019) + 0.431(0.010) + 0.085(0.372) + 0.004(0)** + 0.033(0.93) + 0.000001(40000) + 0.124(0.158) + 0.036(1)*** + 0.379(0.006) + 0.202(0.036)$ *MinDiff = 0 ($7.25 - $7.25) **democrat = 0; AL voted Romney in 2012 ***right-to-work = 1; AL is a RTW state

The actual result of the union election at the BHM facility in Alabama remains too close to call. As of April 2022, the vote had 46.84% support, yet, the over 400 ballots challenged have the potential to sway the results. Specifically, if around 65% of the challenged ballots count for the union, the election would presumably pass with over 50% support. If 83.65% of the challenged ballots go to the pro-union side, the election would receive 53.55% support, in line with the OLS model.[33] In essence, the OLS model prediction could easily be within a few percentage points away from the actual result once the challenged ballots are decided upon.

The results of the Amazon union elections in Staten Island are more complicated. The JFK8 and LDJ5 facilities are only half a mile away from one another. It follows, therefore, that these facilities are in the same county and face the same outside minimum wage on top of other

[33] The BHM re-vote in April 2022 counted 875 votes for, 993 votes against, and 416 votes challenged. To solve for the values above, the following equations were used:
1. (x + 875) / (416 + 875 + 993) = .501, representing enough votes for the union to receive majority support and presumably pass. In this case, x = 269.28, or 270 votes.
2. (y + 875) / (416 + 875 + 993) = .5355, the OLS model prediction. Here, y = 348.08, or 349 votes.

exogenous circumstances. According to the OLS model, a labor union in Staten Island would pass with 58.86% support.[34]

OLS Model: Prediction for Staten Island, New York (JFK8 & LDJ5)
0.5886 *= 0.575 + 0.025(15 - 7.25)* - 0.002(7.75x7.75) - 0.011(45) + 0.0001(2025) + 0.133(.507) + 0.021(.081) + 0.090(.147) + 0.005(.133) + 0.431(.019) + 0.085(.414) + 0.004(1) + 0.033(.681) + 0.000001(57000) + 0.124(.067) + 0.036(0) + 0.379(.022) + 0.202(.029)* **MinDiff = $15 - $7.25 = $7.75; NYC min.wage of $15*

The actual results of the JFK8 election are not far off from this prediction – that vote passed with 55.46% support, only 3 percentage points off from the OLS model. The OLS model does not come close to predicting the actual outcome from the LDJ5 election, however. That vote failed decisively, with only 38% of votes in support of unionization.

All in all, while the model does predict that union votes in New York will be higher than votes in Alabama on average, it is clear that there are various differences between the LDJ5 facility and the JFK8 facility that this model is not capturing.

Why is this the case? Put simply, the models in this analysis are not perfect. They help to predict a certain relationship between minimum wages and union certification odds, but cannot predict election outcomes with complete accuracy. This is evidenced by the logit Pseudo R^2 value of 0.0217, and the OLS R^2 value of 0.0210, values which suggest that there are many things about votes not being observed in the model that certainly affect outcomes. These R^2 values help provide a measure of how important things such as the fear factor and leadership are.

[34] The inputs used in this model come from 2019, the latest year with available and accurate data on a union election in Richmond County, New York (where Amazon warehouses JFK8 and LDJ5 reside).

Drawbacks to the Models

The logit and OLS models consider the effects that outside minimum wages, personal identities, and county-level and state-level conditions and demographics have on union election outcomes. With R^2 values around 2%, there are clearly many factors not in this analysis that can, and do, influence election outcomes. The history of pro-union attitudes is one potential contributing factor to union election outcomes that was not controlled for in this analysis. In future research and analysis, this effect could be proxied by the percentage of successful union elections out of the total number of union elections that occurred in a county in a given year. Or, this effect could be estimated by looking at US Senators and House members that voted for generally considered 'pro-labor' laws, such as the Protecting the Right to Organize Act.[35]

Additionally, and as mentioned, the NLRB filing requirement is hard to control for in analysis. In these models, the election_density variable provides insight as to how likely it is that this requirement would pass. This is not perfect, however. This makes the logit and OLS models helpful indicators of votes that occur, yet, does not make the models perfect indicators of vote preferences.

Finally, there are other aspects that are nearly impossible to control for in regressionary analysis. As an example, these regressions are incapable of controlling for the leadership influence of people like Christian Smalls. Smalls, the President of the ALU, was an incredibly powerful force in getting people on the pro-union side over the course of the two years leading up to the JFK8 election in April 2022. His persuasiveness is difficult to capture in data. Similarly,

[35] The Protecting the Right to Organize (PRO) Act is a proposed United States law that would expand labor protections related to employee's rights to collective organization. Specifically, the PRO Act prevents employers from holding mandatory anti-union meetings, gives protection to union strikes, and weakens RTW laws. The NLRB could fine employers that violated this law. The PRO Act passed in the US House of Representatives in 2021, and is currently awaiting a vote in the Senate (Protecting the Right to Organize Act of 2021)

the persuasiveness of anti-union employer campaigns are not easy to quantify. Seeing that some people admit to not voting their true conscience out of fear of job termination, it is clear that employer intimidation matters in election outcomes. This result again suggests that the economic models in this analysis may do a good job of capturing votes in a union election, but they are not always perfectly capturing preferences.

Conclusion

Not every employee will be in a labor union, or even have the opportunity to vote on one. Regardless, the impact that unions have on the labor force are vast. There are clear and measurable benefits to unionization that extend beyond just union workers themselves.
In short, labor unions are important – yet, they are waning in abundance. Increasing minimum wages through policy is one way to help enhance labor union activity. Evidence in this analysis and beyond suggests that stronger exogenous economic environments, including relatively high minimum wages, increase the likelihood of union certification and support. Specifically, this analysis suggests that areas with minimum wages around $12 and with lower levels of unemployment will be most conducive to successful labor union organization.

The margins to these votes matter. The average vote share in most labor union elections lies around 50%. Triggering an uptick in union activity even by a few percentage points would benefit millions of workers directly, and even more workers indirectly. The inequality and wealth gap would be expected to narrow, in part because of the threat of unionization effect (employers raising wages to disincentive further unionization), and in part because employees successfully bargaining for increased wages and benefits (Tavernise & Schieber, 2022).

With this being said, it will take more than just minimum wage increases for union activity to take off. There are various factors that workers weigh before voting in a union election, both quantifiable and not. Perhaps most notably, research suggests that employer intimidation remains in full force and continues to discourage many workers from voting for a union. Hopefully, policies such as the Protecting the Right to Organize Act, currently awaiting a Senate vote, can aid in workers' abilities to engage in union activity.

Until then, the world turns to workers like Christian Smalls. Once described by Amazon lawyers as "not smart, or articulate," Smalls did not let Amazon's threats get in the way of his charge towards unionization. "When I read that memo, [it] motivated me to start an organization" said Smalls, and thus was born the Amazon Labor Union (Hsu & Selyukh, 2022). Divided, Smalls and his coworkers at Amazon used to beg for higher wages, better working conditions, and bigger benefit packages. Together, these workers have bargained, and won; the first domino to fall in a ripple effect that's full power remains to be seen.

References

Baumann, Robert, Bryan Engelhardt, David L. Fuller & M. Ryan Haley. "Estimating the Relationship Between Labour Market Tightness, Unemployment Insurance Benefits and Union Election Activity." Applied Economics Letters, 25:5, 354-358, DOI: 10.1080/13504851.2017.1321834. May 2, 2017. https://www.tandfonline.com/doi/pdf/10.1080/13504851.2017.1321834?casa_token=hLDVstXJT6kAAAAA:0tPg-jT4vHNTl4x56q5EmFr5hP-AYHiXKwukgTk5T1ujwKn8AFlhMbHGCiwmN5Y9QOmtyKYo8FaQ

Bergman, Ben. "Unions Have Pushed the $15 Minimum Wage, but Few Members Will Benefit." NPR, February 10, 2015. https://www.npr.org/2015/02/10/384980527/unions-have-pushed-the-15-minimum-wage-but-few-members-will-benefit.

Betts, Anna. "How New York's Most Republican Borough Unionized Amazon." Observer, April 12, 2022. https://observer.com/2022/04/the-amazon-labor-unions-victory-was-a-product-of-staten-islands-deep-union-roots/.

Bivens, Josh, Lora Engdahl, Elise Gould, & Teresa Kroeger, et al. "How Today's Unions Help Working People: Giving Workers the Power to Improve Their Jobs and Unrig the Economy." Economic Policy Institute, August 24, 2017. https://www.epi.org/publication/how-todays-unions-help-working-people-giving-workers-the-power-to-improve-their-jobs-and-unrig-the-economy/.

Blader, Steven L. "What Leads Organizational Members to Collectivize? Injustice and Identification as Precursors of Union Certification." *Organization Science* 18, no. 1 (2007): 108–26. https://doi.org/10.1287/orsc.1060.0217.

Bronfenbrenner, Kate. "No Holds Barred: The Intensification of Employer Opposition to Organizing." Economic Policy Institute and American Rights at Work Education Fund, May 20, 2009. https://files.epi.org/page/-/pdf/bp235.pdf

"CPI Inflation Calculator." U.S. Bureau of Labor Statistics. U.S. Bureau of Labor Statistics. https://www.bls.gov/data/inflation_calculator.htm.

Deshpande, Satish P. "Factors Influencing Employee Association Members' Votes for Unionization." *The Journal of Psychology* 129, no. 6 (February 6, 1995): 621–28. https://doi.org/10.1080/00223980.1995.9914933.

Deshpande, Satish P., and Jack Fiorito. “Specific and General Beliefs in Union Voting Models.” *Academy of Management Journal* 32, no. 4 (1989): 883–97. https://doi.org/10.5465/256573.

Greene, Jay, and Gerrit De Vynch. “Workers at Amazon Warehouse in Alabama Reject Unionization, a Major Win for the e-Commerce Giant.” The Washington Post. WP Company, April 9, 2021. https://www.washingtonpost.com/technology/2021/04/09/amazon-union-vote-bessemer/.

Hadero, Haleluya. “Staten Island Amazon Union Could Face a Tough Road Ahead after Victory.” ABC7 New York. WABC-TV, April 24, 2022. https://abc7ny.com/amazon-labor-union-workers-staten-island/11785701/.

Herrera, Sebastian. “Amazon Union Tallies near Finish, with Close Votes in New York, Alabama.” The Wall Street Journal. Dow Jones & Company, April 1, 2022. https://www.wsj.com/articles/amazon-union-re-vote-in-alabama-too-close-to-call-11648761115.

Herrera, Sebastian. “Why Amazon Workers in Alabama Voted Against Union.” The Wall Street Journal. Dow Jones & Company, April 10, 2021. https://www.wsj.com/articles/why-amazon-workers-in-alabama-voted-against-union-11618066800.

Hess, Abigail J. “Union Enrollment Has Declined for Decades, but Union Workers Still Earn 19% More.” CNBC. CNBC, February 5, 2021. https://www.cnbc.com/2021/02/05/union-enrollment-declined-for-decades-but-union-workers-still-earn-more.html

Hsu, Andrea, and Alina Selyukh. “He Was Fired by Amazon 2 Years Ago. Now He's the Force Behind the Company's 1st Union.” NPR. NPR, April 2, 2022. https://www.npr.org/2022/04/02/1090353185/amazon-union-chris-smalls-organizer-staten-island.

Kiersz, Andy. “The Minimum Wage Is Set to Increase in 21 States and DC in 2019 - Here's What It Will Be in Every State.” Business Insider. Business Insider, January 2, 2019. https://www.businessinsider.com/minimum-wage-2019-state-map-2018-12.

Krueger, A.B. Reflections on dwindling working bargaining power and monetary policy. In

Luncheon address at the Jackson hole economic symposium (Vol.24), August 24, 2018. https://docs.google.com/document/d/15L6VzpllNxD8p_uwBlhAJzVTtbBXiZbWPar4nfBCQCY/edit?usp=sharing.

Lafer, Gordon, and Lola Loustaunua. "Fear at Work: An Inside Account of How Employers Threaten, Intimidate, and Harass Workers to Stop Them from Exercising Their Right to Collective Bargaining." Economic Policy Institute, July 23, 2020. https://www.epi.org/publication/fear-at-work-how-employers-scare-workers-out-of-unionizing/.

Milkman, Ruth and Stephanie Luce. "Labor Unions and the Great Recession." *RSF: The Russell Sage Foundation Journal of the Social Sciences* 3, no. 3 (2017): 145-165. muse.jhu.edu/article/659928.

O'Brien, Sara Ashley. "Amazon Files Its Appeal of Historic Union Vote at New York City Warehouse." CNN. Cable News Network, April 8, 2022. https://www.cnn.com/2022/04/08/tech/amazon-union-elections-objections/index.html.

O'Brien, Sara Ashley. "Amazon Workers Vote against New York Union Drive." CNN. Cable News Network, May 2, 2022. https://www.cnn.com/2022/05/02/tech/amazon-labor-union-election-staten-island-ldj5/index.html.

Palmer, Annie. "Amazon Illegally Interfered in Alabama Warehouse Vote, Union Alleges." CNBC. CNBC, April 8, 2022. https://www.cnbc.com/2022/04/07/amazon-illegally-interfered-in-alabama-warehouse-vote-union-alleges.html.

Protecting the Right to Organize Act of 2021. Bill, The United States Congress § (2021). https://www.congress.gov/bill/117th-congress/house-bill/842.

Rosenfeld, Jake, Patrick Denise, and Jennifer Laird. "Union Decline Lowers Wages of Nonunion Workers: The Overlooked Reason Why Wages Are Stuck and Inequality Is Growing." Economic Policy Institution, August 30, 2016. https://www.epi.org/publication/union-decline-lowers-wages-of-nonunion-workers-the-overlooked-reason-why-wages-are-stuck-and-inequality-is-growing/.

Schmitt, John. "Biggest Gains in Union Membership in 2017 Were for Younger Workers."

Economic Policy Institute, January 25, 2018. https://www.epi.org/publication/biggest-gains-in-union-membership-in-2017-were-for-younger-workers/.

Schmitt, John and Ben Zipperer. "Dropping the Ax: Illegal Firings during Union Election Campaigns, 1951-2007." Center for Economic and Policy Research, March 2009. https://cepr.net/documents/publications/dropping-the-ax-update-2009-03.pdf?phpMyAdmin=330ac50250f0at3851ad76r2963

Selyukh, Alina. "Amazon Warehouse Workers Get to Re-Do Their Union Vote in Alabama." NPR, NPR, November 29, 2021. https://www.npr.org/2021/11/29/1022384731/amazon-warehouse-workers-get-to-re-do-their-union-vote-in-alabama.

Shelkova, Natalya Y., Low-Wage Labor Markets and the Power of Suggestion, June 3, 2014. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2478219

Shermer, Elizabeth Tandy. "Perspective | the Right to Work Really Means the Right to Work for Less." The Washington Post. WP Company, October 28, 2021. https://www.washingtonpost.com/news/made-by-history/wp/2018/04/24/the-right-to-work-really-means-the-right-to-work-for-less/.

Solman, Paul. "Labor Unions Weakened by Recession." PBS LearningMedia. PBS NewsHour, February 24, 2021. https://mass.pbslearningmedia.org/resource/7d3943cb-122a-4af1-b51a-ae0a1b2d17aa/7d3943cb-122a-4af1-b51a-ae0a1b2d17aa/.

Summers, Timothy P,. John H. Betton, and Thomas A Decotiis. "Voting For and Against Unions: A Decision Model." *The Academy of Management Review* 11, no. 3 (1986): 643–55. https://doi.org/10.2307/258316.

Tavernise, Sabrina, and Noam Schieber. "Are Unions Making a Comeback?" *Spotify.* The New York Times, The Daily Podcast. May 2, 2022. https://www.nytimes.com/2022/05/02/podcasts/the-daily/unions-amazon-starbucks.html?rref=vanity.

Valenti, Denise. "Princeton Economists Find That Unions Had Historical Role in Helping Address Income InequalityD." Princeton University. The Trustees of Princeton University, June 21, 2018.

https://www.princeton.edu/news/2018/06/21/princeton-economists-find-unions-had-historical-role-helping-address-income.

VanHeuvelen, Tom. 2019. "The Right to Work, Power Resources, and Economic Inequality." SocArXiv. May 14, 2019. https://osf.io/preprints/socarxiv/7qb56/

Wallender, Andrew. "Unions Shed Some Members in 2019 but Numbers Remain Steady (1)." Bloomberg Law, January 22, 2020. https://news.bloomberglaw.com/daily-labor-report/unions-shed-some-members-in-2019-but-numbers-remain-steady.

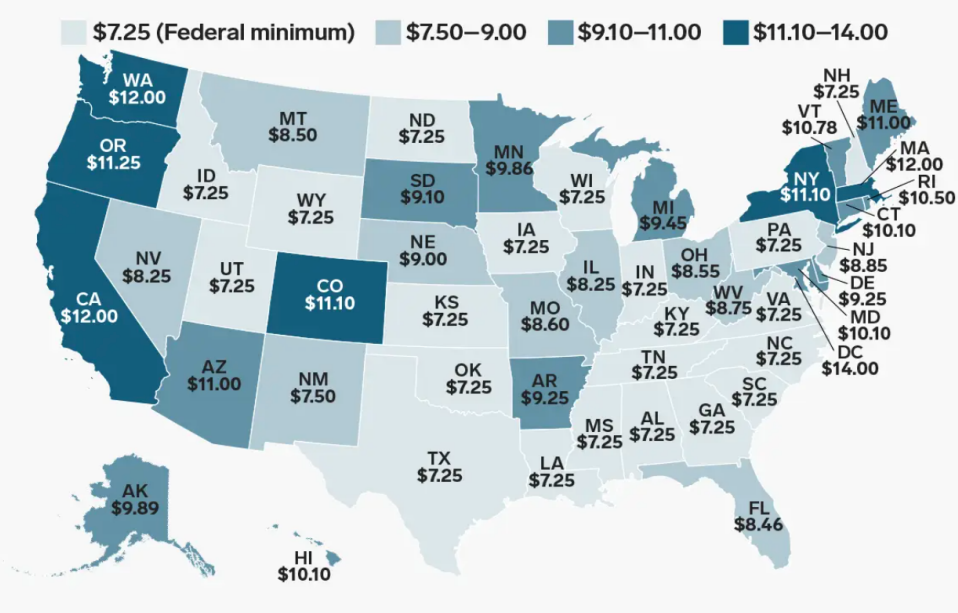
Walters, Matthew, and Lawrence Mishel . "How Unions Help All Workers." Economic Policy Institute, August 26, 2003. https://www.epi.org/publication/briefingpapers_bp143/#:~:text=Unionized%20workers%20receive%20better%20pension,leave%20(vacations%20and%20holidays).

Williams, Annabelle. "The Amazon Union Vote Failed. 2 Workers Explain Why They Voted Against Unionizing." Business Insider. Business Insider, April 9, 2021. https://www.businessinsider.com/amazon-union-vote-why-some-workers-voted-against-unionizing-alabama-2021-3.

Zipperer, Ben. "Union Membership Byte 2009." Center for Economic and Policy Research, January 29, 2020. https://cepr.net/jump-in-public-sector-unionization-raises-overall-rate-again-in-2008/.

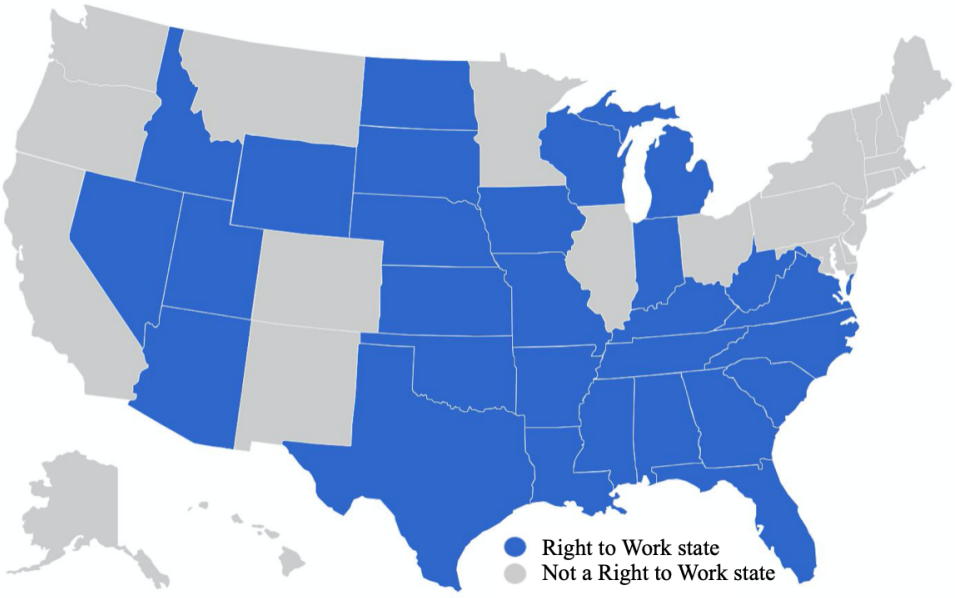
Appendices

Appendix A: *2019 State Minimum Wages by US State*



Source: Economic Policy Institute, data from EPI and Wolters Kluwer (2019)

Appendix B: *Right to Work States, 2022*



Source: National Right to Work Foundation (2022)

Appendix C: *Union Avoidance Tactics*

Tactics that turn support for unions at the outset of a unionizing campaign into a 'no' vote	Legal under current law
Forcing employees to attend daily anti-union meetings where pro-union workers have no right to present alternative views and can be fired on the spot if they ask a question.	√
Plastering the workplace with anti-union posters, banners, and looping video ads—and denying pro-union employees access to any of these media.	√
Instructing managers to tell employees that there's a good chance they will lose their jobs if they vote to unionize.	√
Having supervisors hold multiple one-on-one talks with each of their employees, stressing why it would be bad for them to vote in a union.	√
Having managers tell employees that pro-union workers are "the enemy within."	√
Telling supervisors to grill subordinates about their views on unionization, effectively destroying the principle of a secret ballot.	√

Source: Lafer & Loustaunua (2020) from The Economic Policy Institute

Appendix D: *Correlation Matrix*

	certified	MinDiff_sq	age	female	black	hispanic	asian_pi	other	college educated	democrat	citizen status	median income	poverty level	right to work	elections density	unemployed county
certified	1.000															
MinDiff_sq	0.097	1.000														
age	-0.050	-0.228	1.000													
female	-0.050	-0.184	-0.002	1.000												
black	-0.005	-0.169	-0.231	0.493	1.000											
hispanic	0.034	0.154	-0.347	-0.016	-0.131	1.000										
asian_pi	0.035	0.222	-0.336	-0.106	-0.159	0.221	1.000									
other	0.055	0.183	-0.120	-0.206	-0.176	0.013	0.503	1.000								
college_educated	0.026	0.150	-0.282	0.103	-0.018	-0.254	0.347	-0.052	1.000							
democrat	0.005	0.289	-0.198	-0.052	-0.166	0.285	0.433	0.197	0.198	1.000						
citizen_status	-0.028	-0.177	0.492	-0.097	-0.011	-0.700	-0.677	-0.105	-0.183	-0.520	1.000					
median_income	0.044	0.337	-0.121	-0.048	-0.140	-0.219	0.378	-0.005	0.836	0.317	-0.173	1.000				
poverty_level	0.040	-0.058	-0.330	0.006	0.403	0.398	-0.165	0.053	-0.477	-0.103	-0.117	-0.547	1.000			
right-to-work	0.018	-0.162	-0.042	0.051	0.083	0.126	-0.183	-0.051	-0.182	-0.389	0.069	-0.278	0.111	1.000		
elections_density	0.008	-0.090	0.137	-0.040	0.072	-0.128	-0.220	0.000	-0.309	-0.048	0.263	-0.221	0.192	-0.114	1.000	
unemployed_county	-0.061	-0.312	-0.016	0.210	0.321	0.174	-0.057	-0.090	-0.305	0.059	-0.163	-0.384	0.442	-0.005	0.092	1.000

Key
1.000
0.3 - 0.999
0.1 - 0.299
0.001 - 0.099
0.000
(0.001) - (0.099)
(0.1) - (0.299)
(0.3) - (1.0)

Source: Author's Calculations, from NLRB, Michigan State, IPUMS USA, US Census