

# *Collective Action and the Origins of the American Labor Movement*

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This article examines the relationship between collective action and the size of worker and employer groups in the United States. It proposes and tests a theory of union formation and strikes. Using a new county-by-industry level dataset containing the location of unions, the location of strikes, average establishment size, and the number of establishments around the turn of the twentieth century, I find that unions were more likely to form and strikes were more likely to occur in counties with intermediate-sized worker groups and large employer groups.

There is broad consensus that the labor movement in the United States is weak compared to movements in many other countries. Among 34 Organisation for Economic Co-operation and Development (OECD) countries, the United States has the third lowest collective bargaining rate (11.9 percent) and the sixth lowest trade union density (10.8 percent).<sup>1</sup> The weakness of the American labor movement is one of the most important features distinguishing the United States from other countries. Indeed, the search for causal explanations for the weakness of American labor unions began in the late 1800s, and more than a century later, the question remains one of the most contested and salient in the social sciences. Prominent explanations include: the relative prosperity of the American worker (e.g., Sombart 1976 [1906]; Brown and Browne 1968), the racial and ethnic heterogeneity of the United States (e.g., Archer 1997; Halpern 1994; Marshall 1967; Northrup 1943), the success of employers in combating workers (e.g., Friedman 1998; Griffin, Wallace,

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<sup>1</sup> The United States labor movement also appears weak when looking at less commonly used measures of labor strength. In an index of employment protection created by Nicoletti, Scarpetta, and Boylaud (1999) the United States ranked last among 25 OECD countries and in an index of labor union rights the United States ranked fourth lowest among 34 OECD countries. See Online Appendix B for more details on these measures along with bar charts.

and Rubin 1986; Haydu 1988; Voss 1993; Willoughby 1905), and the nature of political institutions in the United States (e.g., Currie and Ferrie 2000; Oestreicher 1988; Perlman 1928; Schattschneider 1942). Despite this expansive literature, there are few theoretical or empirical treatments of the factors that contribute to and hinder the formation of unions and the decision of workers to strike.<sup>2</sup>

In this article, I propose and test a theory of union formation and strike activity that has received little attention in the extant literature. I frame the labor movement as a battle between workers and employers. Working through the logic of collective action, I suggest that both the number of workers in an establishment and the number of employers in a market explain variation in union strength and strike activity in the United States during the late-nineteenth and early-twentieth centuries. While my central hypothesis is inspired by Mancur Olson's (1965) classic work on collective action, my model is a variant of Joan Esteban and Debraj Ray's (2001) model. In the model, workers wish to form a union, which, if successful, will provide them with both public and private benefits. Employers, on the other hand, wish to prevent their workers from unionizing. The model allows for a monetary fixed cost of collective action, typical of fees and dues paid by workers or employers to obtain a union charter or join an employers' association. Under these assumptions, the model predicts that intermediate-sized worker and employer groups will be more likely to take collective action. However, if the benefit of collective action is purely private (rather than having both public and private characteristics), then small groups will be more likely to take collective action. If the benefit is purely public then large groups will be more likely to take collective action.

To test this model, I construct a dataset containing two independent outcomes that result from the battle between labor and capital. The first outcome is whether workers had successfully chartered a local branch of a national union in a county-by-industry cell by 1882, 1892, and 1902.<sup>3</sup> Specifically, I collect local branch locations for ten large, national labor unions: the Amalgamated Association of Iron and Steel Workers (AA), the Cigar Maker's International Union (CMIU), the Granite Cutters' National Union of the United States (Granite Cutters), the International

<sup>2</sup> See Friedman (2000) for an empirical treatment of the presence of union locals in 1,799 cities and Freeman (1998) for a model of union growth spurts. See Huberman and Young (1999) for a model of strike success and duration in Canada prior to WWI and Huberman and Young (2002) for a war-of-attrition model of strikes between the world wars.

<sup>3</sup> Labor union membership prior to WWI peaked during the period 1902–1904, a period that is examined in this article. See Figure 1 for a time-series of membership for four national labor unions.

Association of Machinists (IAM), the Iron Molders' Union of North America (IMU), the International Typographical Union (ITU), the National Union of United Brewery Workmen (Brewery Workmen), the United Brotherhood of Leather Workers on Horse Goods (Leather Workers), the United Garment Workers of America (UGWA), and the United Mine Workers (UMW). These ten unions accounted for more than one-third of all national labor union membership in the late nineteenth century.<sup>4</sup> The second outcome is whether a strike occurred in a county-by-industry cell during the period 1881–1894. The data on strikes were taken from Janet Currie and Joseph Ferrie's (2000) study, which were supplemented by Suresh Naidu and Noam Yuchtman (2016).

I combine these two measures of collective action with newly digitized county-by-industry level data on the number of workers and the number of establishments, taken from the 1880 Census of Manufacturing and the 1880 Census of Population. These data allow me to measure the size of both worker and employer groups by calculating the average number of workers per establishment and the number of establishments in a county-by-industry cell. I combine these data with other county-by-industry level variables that have been hypothesized to affect the strength of the labor movement: average wages, ethnic fractionalization, percentage black, strikes waves, the success of strikes, and percentage urban.

The identification of the relationship between group size and collective action relies on three components. First, the county-by-industry level observations allow me to difference out fixed, unobserved county- and industry-level characteristics that might affect unionization and strikes. Second, I measure all independent variables of interest in 1880, prior to the dramatic acceleration in the American labor movement that is shown in Figure 1. This allows me to eliminate a major source of endogeneity: establishment sizes might reflect employers' efforts to prevent unionization.<sup>5</sup> Finally, my dataset contains a rich set of control variables that have been hypothesized to effect unionization and strike activity. The three components of the identification strategy eliminate most sources of endogeneity and suggest that the estimated relationships between group size and collective action are likely reflective of the costs and benefits discussed in the model.

<sup>4</sup> Total membership for seven of the ten unions in 1899 was 194,067 (membership is available for the AA, the CMIU, the IMU, the ITU, the Brewery Workmen, the UGWA, and the UMW). Friedman (1999) estimates that there were 595,865 national union members in 1899. Thus, the lower bound of the percentage of union members that are represented by in my sample is 32.6 percent.

<sup>5</sup> It should be noted that an employer changing their establishment's size to prevent unionization only reinforces the claim that establishment size matters for collective action.

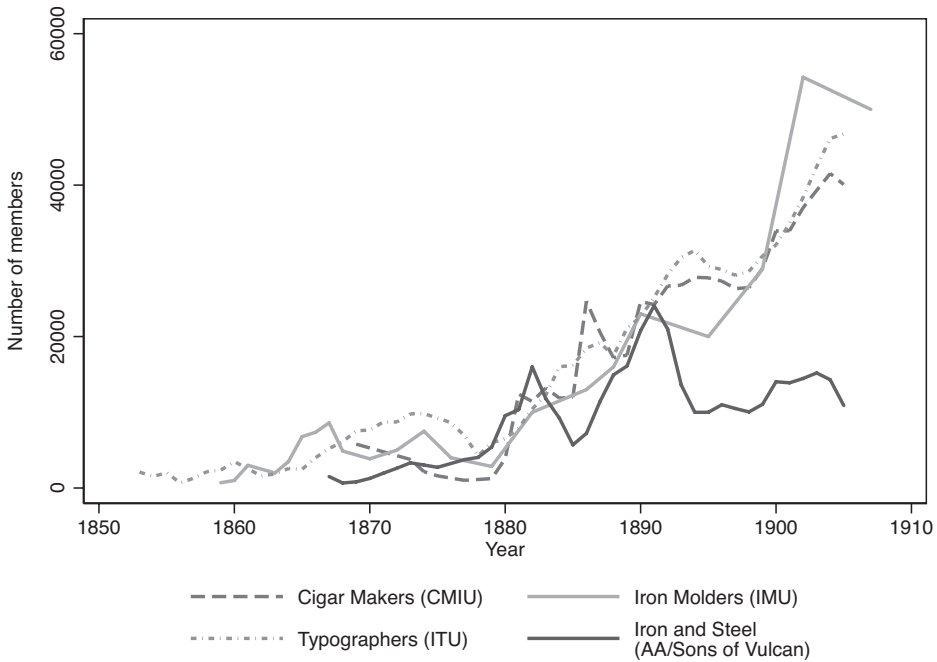


FIGURE 1  
LABOR UNION MEMBERSHIP

Sources: CMIU membership for 1869–1881 comes from *The Cigar Makers' Official Journal* 29(10), p. 9. CMIU membership for 1881–1900 comes from Wolman (1924), p. 32. CMIU membership from 1901–1905 comes from Perkins (1912), p. 11. IMU membership comes from Stockton (1922), p. 23. ITU membership comes from Barnett (1909), pp. 375–76. AA/Sons of Vulcan membership comes from Robinson (1920, pp. 20–21).

I find broad quantitative support for the theoretically predicted hump-shaped relationship between workers per establishment and collective action. Workers in county-by-industry cells with approximately 50 workers per establishment were more likely to have chartered a local union branch and more likely to have gone on strike than workers in cells with smaller or larger establishments. I also find that there was a decreasing relationship between the number of employers and the probability that they prevented unionization and strikes. There are several potential explanations for this relationship including that employers might face a free-rider problem.

To assess the magnitude of these relationships, I assign all county-by-industry cells the number of workers per establishment that maximizes the probability of a union forming or a strike occurring. I find that the number of cells with a local union would have increased from 43 to 61 percent (a 42 percent increase) and the number of cells with a

strike would have increased from 3.8 to 5 percent (a 32 percent increase). Performing the same exercise with employer group size (number of establishments), I find that the number of cells with a local union would have increased from 43 to 62 percent (a 44 percent increase) and the number of cells with a strike would have increased from 3.8 to 19 percent. I demonstrate that these effects are larger than those implied by other theories of union formation, such as racial and ethnic heterogeneity, the prosperity of workers, and the number and success of strikes. In this sense, worker and employer group size explains more variation in labor strength within the United States than many previously considered explanations.

This study contributes to the literature in several ways. First, it furthers our understanding of the factors that contributed to and hindered the emergence of the American labor movement. This is of particular interest since, as previously mentioned, the United States is often viewed as exceptional due to its lack of a robust labor movement. While the focus of this article is on the origins of the American labor movement, the results of my analysis suggest that the relative weakness of unions in the United States might partially be rooted in differences in industrial structure between the United States and Europe at the onset of the labor movement.

The second contribution of this article is to study the relationship between group size and collective action outside a laboratory setting. Gerald Friedman (1998) finds that union strikes were more successful in large American cities than in small American cities and finds the opposite relationship in France during the late nineteenth century.<sup>6</sup> Friedman also finds that union membership “declines steadily with establishment size” in the United States and notes that “unions were scarce in the giant factories of the second industrial revolution” (Friedman 1998, p. 272). In a more recent study, Tobias Karlsson and Maria Stanfors (2017) find that the likelihood of being a union member decreases with workplace size in Sweden during the late nineteenth century. I build upon these works by explicitly theorizing about and testing the relationship between worker and employer group size and collective action in county-by-industry cells. By incorporating employers into the analysis, I take seriously Friedman’s idea that “Employer resistance can vary as much as any other factor affecting unionization” (Friedman 1998, p. 302).

<sup>6</sup> Friedman attributes this to the centralization of government in the two countries: in the United States a decentralized state led local craft unions to form alliances with local politicians, whereas in France a centralized state led workers to rely on central government figures who did not intervene on the side of labor in large cities due to fears of militancy.

Finally, this article studies how labor unions developed in the era of at-will employment. Price Fishback (1998) argues that turn of the century labor markets were largely unregulated and, therefore, provide an ideal setting to test economic theories.<sup>7</sup> By focusing my attention at the onset of the American labor movement the relationship between group size and collective action should be unaffected by changes to the costs and benefits of organization that accompanied the passage of the Wagner Act (1935) and the Taft-Hartley Act (1947).

#### COLLECTIVE ACTION AND LABOR UNION FORMATION

During the late nineteenth and early twentieth centuries, both workers and employers engaged in collective action. Workers formed labor unions and employers responded with associations of their own. These labor unions and employer associations bargained over labor market rents, the eight-hour work day, workplace conditions, and actively opposed the other group's interests. Indeed, employer associations such as the National Association of Manufacturers, the National Metal Trades Association, and the Stove Founders' National Defense Association, were so successful in their fight against labor unions that they are often pointed to as a reason for the weak American labor movement. In her book on American exceptionalism, Kim Voss (1993) argues that "the Knights [of Labor] failed because their rapid growth and early successes resulted in the mobilization of employers' associations" (Voss 1993, p. 226). In the same vein, Larry Griffin, Michael Wallace, and Beth Rubin (1986) conclude that "much of the variation in unionization during this period [1902–1928] – and the relatively low level of organization during the entire pre-New Deal era – can be partially attributed to efforts of capitalists to defeat labor organization" (Griffin, Wallace, and Rubin 1986, p. 148).

If either workers or employers were to achieve benefits from collective action they had to first exert effort, pay fees and dues, and potentially endanger the relationship they had with each other. To explore the trade-off between the benefits and costs of collective action in late nineteenth century labor markets, I develop a model and examine the implications of this model as it relates to group size. The model is based on one presented in Esteban and Ray (2001), however, I modify it by

<sup>7</sup> There were, however, a series of state laws passed during the late nineteenth and early twentieth centuries that dealt with labor unions. See Holmes (2003) and Fishback, Holmes, and Allen (2009) for complete details on these state laws.

allowing for a monetary fixed cost of collective action. The formal model is located in Online Appendix A.

Suppose that there are two groups in a labor market: workers and employers. Workers wish to form a labor union, while employers wish to prevent their workers from unionizing. Only one of these outcomes will occur. If workers are successful and form a union, each worker receives a bundle of goods which could include fewer hours worked, improved workplace conditions (e.g., Shiells 1990), a higher wage, and social benefits from being a member of the organization. On the other hand, if employers are successful and prevent unionization they receive a bundle of goods which could include higher profits, an open shop, or the defeat of pro-labor legislation.

In accord with this description, I assume that the benefit to a worker or employer of achieving their preferred outcome has characteristics that are both public and private. If the benefit is public, then it is unaffected by the number of members in the group. If the benefit is private, then the *entire* benefit is (evenly) distributed among all group members. For example, assume that workers form a union and achieve improved workplace safety and capture some labor market rents in the form of a higher wage. The benefit provided to the worker by the union has characteristics that are both public and private. Workplace safety is a public benefit because all members of the union receive this regardless of the number of members. A higher wage is a private benefit because labor market rents are finite and, therefore, they must be divided among union members (see Naidu and Yuchtman 2016 for evidence of rents in late nineteenth century labor markets). Similarly, if employers prevent their workers from unionizing they might receive a benefit that is both public (e.g., an open shop in the industry) and private (e.g., increased profits). Again, an increase in profits is a private benefit because labor market rents are finite.

The benefits of engaging in collective action do not come without a cost. If successful, workers or employers must pay a monetary fixed cost to form the union or the employer's association. Fixed costs associated with forming a union include the price a national union charges workers to charter a local branch, rent for a meeting location, and other union fees and dues used for the day-to-day management of the union. Fixed costs associated with forming an employers' association include fees paid to manage the association and to aid members affected by strikes. These fees would be used to hire strike breakers and provide legal teams that could pressure public officials to intervene on behalf of the struck firms. For example, the National Metal Trades Association would "assist the

member involved to procure men to replace those striking” and undertake “such legal steps as are necessary for the protection of his [the employers’] rights” (Willoughby 1905, pp. 129–30). The National Metal Trades Association even established employment bureaus to hire non-union replacement workers (see Bonnett 1922 for case studies of the operations and handling of labor conflict by employer associations).

I assume that the fixed cost of taking collective action can be evenly divided among group members and, if the preferred outcome is achieved, the aggregate cost to the group of taking collective action will be lower than the aggregate benefit the group receives. Finally, workers and employers must exert effort to achieve their preferred outcome. All non-monetary costs of taking collective action, including the cost of conflict with the other group, are part of the effort cost. Employers and workers choose their effort to maximize their net benefit (benefit minus the monetary cost of taking collective action minus the effort cost of taking collective action).

Under this framework, one can show that the relationship between group size and collective action will be hump-shaped (inverse-U). When there are few potential members of a group, the fixed cost of forming the group will be high and, therefore, the group will be unlikely to form. As the potential membership in a group increases, the fixed cost per member will decrease, making collective action more likely. As the potential membership in a group continues to grow, the benefit per member will be reduced because the benefit exhibits some private (rival) characteristics. This, in turn, will reduce the likelihood of forming the group.

Finally, it is important to keep in mind that the benefit to workers of unionizing might exhibit a different amount of rivalry than the benefit to employers of preventing unionization. This might result in a different relationship between the probability of taking collective action and group size for workers and employers. For instance, if the benefit of taking collective action is purely private then Olson’s (1965) free-riding result, where small groups are more likely to succeed, is obtained. If, on the other hand, the benefit is purely public, then large groups will be more likely to take collective action.

#### HISTORICAL BACKGROUND

Labor historians have, of course, written much about early labor union formation in the United States (see Foner (1984) and Karabel (1979) for reviews of this literature). Often these studies draw conclusions by comparing the United States to Western Europe. As mentioned earlier,



some of the most prominent explanations for union formation (or the lack of union formation) include: the relative prosperity of the American worker, the racial and ethnic heterogeneity of the United States, the nature of political institutions in the United States, and the number and success of strikes.

The idea that worker prosperity affects labor union formation was most prominently advocated by Werner Sombart who famously concluded, “All Socialist utopias came to nothing on roast beef and apple pie” (Sombart 1976 [1906], p. 106). To back up his point that a higher standard of living translated into fewer grievances and, therefore, less reason to organize, Sombart collected data on wages and cost of living. He concluded that around the turn of the twentieth century “the American worker receives a money-wage which is twice or three times that received by his German counterpart, but the procurement of the same quantity of the necessary means of sustenance is not really any more expensive than in Germany” (Sombart 1976 [1906], p. 93). Ernest Brown and Margaret Browne (1968) have confirmed these numbers. Robin Archer (2007) questions this literature and writes, “the standard of living in other countries was not the only, or even the most important, comparative reference point against which Americans judged their economic circumstances” (Archer 2007, p. 47). Perhaps a more relevant internal reference point for workers is the standard of living of other workers in the same industry. If this line of thinking is correct, workers in locations that provide a low standard of living should be more likely to take collective action than workers in locations that provide a higher standard of living within the same industry.

Another explanation for union formation in the United States emphasizes racial and ethnic heterogeneity.<sup>8</sup> Most of these studies point to the barriers, both formal and informal, that were enacted by many labor unions to exclude blacks, Chinese, and other ethnic groups. In his history of African-American workers, Ray Marshall writes about early twentieth century labor unions and states that, “The general pattern seems to have been for local unions to exclude Negroes wherever they could” (Marshall 1967, p. 43). Booker T. Washington goes even farther and states that, “several attempts have been made by the members of labor unions...to secure the discharge of Negroes employed in their trades” (Washington 1913, p. 757). Late nineteenth and early twentieth century

<sup>8</sup> Some of the articles written on this topic include: Archer (1997, 2007), Cayton and Mitchell (1939), Jacobson (1968), Halpern (1994), Marshall (1967), Miller (1984), Northrup (1943), Reid (1930), Washington (1913), and Wolfe (1912).

mining companies even attempted to prevent unionization by staffing “their mines with ‘judicious mixtures’ of native whites, recent immigrants, and Negroes” (Northrup 1943, p. 318). Race was still a major issue facing labor unions well into the twentieth century. In 1930, there were 26 national unions that barred entry to black members; in 1943, there were still 14 national unions that barred entry to blacks (Marshall 1967). The literature is, therefore, fairly consistent in its conclusion that racial and ethnic heterogeneity impeded collective action among workers in the United States.<sup>9</sup>

The argument that America’s winner-take-all electoral system, the federal system of government, and the entrenched two-party system hindered the labor movement in the United States has been widely made.<sup>10</sup> Richard Oestreicher (1988) argues that there was class-consciousness among American workers from the 1870s until the 1930s, but they were not able to mobilize this class-consciousness due to the political power structure of America. Friedman (2000) argues that American exceptionalism was really Southern exceptionalism and he finds that much of the weakness in the Southern labor movement was the result of political variables, especially wide election margins. Through the disenfranchisement of African-Americans, Democratic candidates were able to win elections by such wide margins in the South that they did not depend on industrial workers for their votes. These Democratic officials would almost always support employers over workers in disputes. Electoral margins of victory were significantly smaller in the Northeast and Midwest, which made politicians solicit the vote of workers and even resulted in legislation favorable to labor.

Finally, it has long been observed that union growth occurs in spurts and strikes occur in waves. In his examination of union membership in 13 countries, Friedman (2008) finds that “67 percent of growth comes in only five years and over 90 percent in only ten years.” The logic of union growth spurts and strike waves is that of contagion. Workers might be more willing to organize a union or go on strike if they see that other workers are successful at organizing. Similarly, employers might be more likely to shut down a union or fight a strike if other employers are successful. Indeed, in their analysis of the determinants of strike success

<sup>9</sup> It should be noted that racial heterogeneity does not, necessarily, have to impede labor union formation. Archer (2007) argues that racial heterogeneity actually encouraged labor union formation in Australia by generating a white racial consciousness that helped to break down class barriers between skilled and unskilled workers.

<sup>10</sup> Some of the articles written on this topic include: Archer (2007), Currie and Ferrie (2000), Friedman (1998), Friedman (2000), Marks (1989), Oestreicher (1988), Perlman (1928), and Schattschneider (1942).

in Canada from 1920–1939, Michael Huberman and Denise Young (2002, p. 339) find that “Where other workers were successful, the probability of an individual win increased.”

This brief review of the labor history literature is far from comprehensive as there are many explanations for union formation. However, the explanations described here are some of the most prominent and are the ones that I directly address in the empirical analysis.

#### EMPIRICAL STRATEGY AND DATA

To test the predictions of the model, I collect county-by-industry level measures of worker and employer group size and collective action. I then adopt the following empirical specification:

$$Pr[\text{collective action} = 1]_{ict} = \alpha + f[\text{workers per establishment}]_{ic} \quad (1) \\ + f[\text{number of establishments}]_{ic} + \beta'[\text{controls}]_{ic} + \beta_i + \beta_c + \beta_t + \varepsilon_{ict}$$

In equation (1)  $i$  indexes industry,  $c$  indexes county, and  $t$  indexes year.  $Pr[\text{collective action} = 1]_{ict}$  represents the probability that workers or employers in industry  $i$  in county  $c$  had taken collective action by year  $t$ .  $f[\text{workers per establishment}]_{ic}$  is a non-linear function of the average number of workers per establishment in industry  $i$  in county  $c$  in 1880.  $f[\text{number of establishments}]_{ic}$  is a non-linear function of the number of establishments in industry  $i$  in county  $c$  in 1880. These measures capture the size of worker and employer groups.  $[\text{controls}]_{ic}$  is a vector of control variables that have been hypothesized to affect the labor movement: average wages (prosperity of workers), ethnic fractionalization, percentage black, the number of strikes, the success of strikes, and percentage urban. Finally,  $\beta_i$ ,  $\beta_c$ , and  $\beta_t$  are industry, county, and year fixed effects that control for fixed, unobserved industry, county, and year characteristics that affect the likelihood of collective action. More details on the construction of these variables follows.

#### *Dependent Variables*

I use two dependent variables to measure collective action during the late nineteenth and early twentieth centuries. Ideally, I would know which establishments had workers that were union members, and I would know which establishments were members of employer associations. However, establishment-level data on collective action is only available for a few

unions and employers. As such, my first measure of collective action, which is more widely available, is an indicator for whether the workers in a county-by-industry cell had chartered a local branch of a national labor union by 1882, 1892, and 1902. I will refer to this variable as “unionization.”

To generate the unionization variable, I collected data on the location of local branches for ten of the largest national labor unions. The locations of these unions were recorded from union periodicals, which were issued on a monthly, bi-monthly, or weekly basis. Union periodicals communicated information about the national union to local members. As such, these periodicals often contained information on union finances, the state of the occupation represented by the union, names of new members, names of deceased members, and letters from union leaders. Importantly, the periodicals also provided a list of the name of each city that had chartered a local branch of the national union. Because the independent variables of interest are observed at the county-by-industry level, I geo-reference the city of each local union branch to obtain its latitude and longitude. These were then mapped to an 1880 map of the United States to obtain the county that each was located in.

In 1882, I only have branch locations for the Cigar Maker’s International Union. In 1892, I have branch locations for the CMIU and five additional labor unions: The Amalgamated Association of Iron and Steel Workers, the Iron Molders’ Union of North America, the International Typographical Union, the National Union of United Brewery Workmen, and the United Garment Workers of America. In 1902, I have branch locations for the six previously mentioned labor unions along with four additional labor unions: The Granite Cutters’ National Union of the United States, the International Association of Machinists, the United Brotherhood of Leather Workers on Horse Goods, and the United Mine Workers. More details on the exact periodicals, dates, and the data collection process are provided in Online Appendix C.

The second dependent variable is an indicator for whether the workers in a county-by-industry cell went on strike anytime during the period 1881–1894. I refer to this variable as “strikes.” The strikes variable comes from reports issued by the Commissioner of Labor that were digitized and provided by Currie and Ferrie (2000) and Naidu and Yuchtman (2016).<sup>11</sup> These data provide information on the city where the strike took

<sup>11</sup> Currie and Ferrie (2000) collected and digitized reports from six states: Connecticut, Illinois, Massachusetts, New Jersey, New York, and Pennsylvania. The strikes recorded in these six states account for 90 percent of all strikes that occurred over the period 1881 to 1894. Naidu and Yuchtman (2016) collected and digitized the remaining state reports, which filled in the final 10 percent of strikes. These remaining strikes occurred in Indiana, Maryland, Michigan, and Ohio.

place, the industry in which the strike took place, whether the strike was successful, and much more. Strikes are categorized as taking place in one of 15 different industries. I, again, geo-reference the city of each strike to obtain the county it was located in.

### *Independent Variables: Number of Establishments and Workers Per Establishment*

The independent variables of interest measure the size of the groups that are taking collective action. I measure group size for workers using the average number of workers per establishment in a county-by-industry cell and I measure group size for employers using the number of establishments in a cell.

The number of establishments are taken from Table V of the *Report on the Manufactures of the United States at the Tenth Census* (Walker and Seaton 1883).<sup>12</sup> This table reports all industries except the mining industry. Data on the number of establishments in the mining industry come from Tables 27 (anthracite coal) and 29 (bituminous coal) of the *Report on the Mining Industries of the United States* (Walker and Seaton 1886).<sup>13</sup> The industry classification scheme used in the *Report on the Manufactures* was then assigned to the industry classification scheme used by the two dependent variables. Assignments can be found in Tables 1 and 2 of Online Appendix C.

The average number of workers per establishment in a county-by-industry cell is defined as the number of workers divided by the number of establishments. When unionization is the dependent variable, I measure the number of workers from the 1880 complete count United States Census (Ruggles et al. 2015).<sup>14</sup> Online Appendix C Table 1 links workers' occupations in the 1880 census to the industry classification scheme used in the establishments data (from the *Report on the Manufactures*). For example, I consider anyone who reports his or her occupation as a "cigar

<sup>12</sup> These data were collected with much help from Rick Hornbeck.

<sup>13</sup> In addition to mining, the number of establishments in the printing industry does not include establishments for the newspaper and periodical press, and newspaper printers made up a large membership bloc in the ITU (Barnett 1909, pp. 42–43). I obtained the number of newspapers and periodicals from Appendix C of *The Newspaper and Periodical Press* (North 1884). These were added to the number of establishments from the *Report on the Manufactures*.

<sup>14</sup> I use the number of workers from the 1880 census, rather than the *Report on the Manufactures*, because most of the unions I study are organized by craft and not by industry. For example, the IAM was a union comprised primarily of machinists. There is no "machinist" industry listed in the *Report on the Manufactures*. However, a valid occupational category in the 1880 census is "machinist." When calculating the number of workers in the brewing industry I only count German brewers because the Brewery Workmen membership was almost entirely German.

maker” or a “tobacco factory operative” in the 1880 census to be a worker in a “Tobacco, cigars and cigarettes” establishment. When strikes are the dependent variable, I use the number of workers reported in the *Report on the Manufactures* since the industry categories in this report are more comparable to those used in the strikes data.

Because unionization is measured in 1882, 1892, and 1902 and the number of establishments and workers are measured in 1880, it is worth investigating whether workers per establishment in 1880 is a good predictor of workers per establishment in 1900. Friedman (1998, p. 233) notes “There was little change in the average size of establishments over all industries in this period [1880–1900]. According to the Census of Manufactures, the average American manufacturing establishment employed 10.8 workers in 1880 and only 10.4 in 1900.” While the size of the average manufacturing establishment did not change much, there might have been more dramatic changes within county-by-industry cells. To test if this is the case, I use establishment-level data from Jeremy Atack, Fred Bateman, and Thomas Weiss (2004). While these data are not available in 1900, I was able to calculate the average number of workers per establishment in a county-by-industry cell in 1860 and 1880. The correlation between the average number of workers per establishment in county-by-industry cells in these two years is 0.71. This high correlation mitigates concerns that the average number of workers per establishment in 1880 is not reflective of the reality in 1900.

### *Control Variables*

From the *Report on the Manufactures*, I construct the following variables at the county-by-industry level: average wage per worker, the profit to cost ratio (and its square), the profit to revenue ratio (and its square), and the average amount of capital owned by establishments (and its square). The average wage per worker controls for the prosperity of workers, while the profit ratios and capital per establishment control for the amount of resources employers could mobilize against labor.

From the 1880 complete count census, I construct the following variables at the county-by-industry level: percentage of workers that are black, ethnic fractionalization of workers, and the percentage of workers living in an urban designated area. Ethnic fractionalization is defined as the probability that two randomly selected workers in a county-by-industry cell are from a different ethnic group, where the ethnic groups are: native-born whites, native-born blacks, American Indians, native-born Chinese, native-born Japanese, and separate immigrant groups for each country of

birth.<sup>15</sup> The percentage of workers that are black and ethnic fractionalization measure the extent to which racial and ethnic heterogeneity affected collective action. The percentage of workers living in an urban designated area controls for the fact that urban areas were the center of union organization in the late nineteenth and early twentieth centuries.

Finally, I control for the fact that during the late nineteenth and early twentieth centuries union growth occurred in spurts and strikes occurred in waves. For a given county-by-industry cell, I compute the number of strikes and the percentage of strikes that were successful in *all other* industries in that county in the years prior to my observation of union presence. This method, which is similar to the one used by Huberman and Young (2002), eliminates the endogeneity between the number and success of strikes in a county-by-industry cell and the probability that a union is organized in that cell.

### *Estimation Strategy and Summary Statistics*

I estimate equation (1) using two different techniques. First, I use ordinary least squares (OLS) and approximate the non-linear functions with a quadratic. Second, I use Peter Robinson's (1988) semiparametric estimator. Robinson's estimator imposes a linear relationship on all of the control variables, but it allows *one* of the independent variables of interest to take any functional form. As a result, the semiparametric estimator imposes fewer restrictions than OLS on the shape of the relationship between group size and collective action. Standard errors are clustered at the county-level.<sup>16</sup>

The identification of the relationship between group size and collective action in equation (1) relies on three components. First, the nature of the data allows me to difference out fixed, unobserved county-, industry-, and year-specific characteristics that might affect collective action. This eliminates concerns that industries or counties with specific characteristics drive the results.

Second, all of the independent variables of interest are measured in 1880 before the dramatic growth in the labor movement that is shown in Figure 1. There were few unions in the United States prior to 1880, and the membership in the unions that did exist was low. At the start of the decade, local trade societies had an estimated membership of 170,000 workers. By 1890, there were an estimated 822,000 workers in

<sup>15</sup> The ethnic fractionalization of workers in industry  $i$  in county  $c$  is given by the following formula:  $Frac_{ic} = 1 - \sum_{j=1}^N s_{icj}^2$ , where  $s_{icj}$  is the share of ethnic group  $j$  in industry  $i$  in county  $c$ .

<sup>16</sup> Replication files are available from Schmick (2018).

unions (Friedman 1999). In 1886 and 1887 alone, 19 new national unions, each composed of numerous local branches, were formed (Commons et al. 1926, p. 396). By measuring establishment size in 1880 and by measuring collective action later, I am able to eliminate a chief source of endogeneity: establishment sizes might reflect employers' efforts to prevent unionization. Under this set-up, biased estimates would only occur if employers were able to anticipate the collective action of workers years in advance and, as a result, altered their establishment size by 1880.

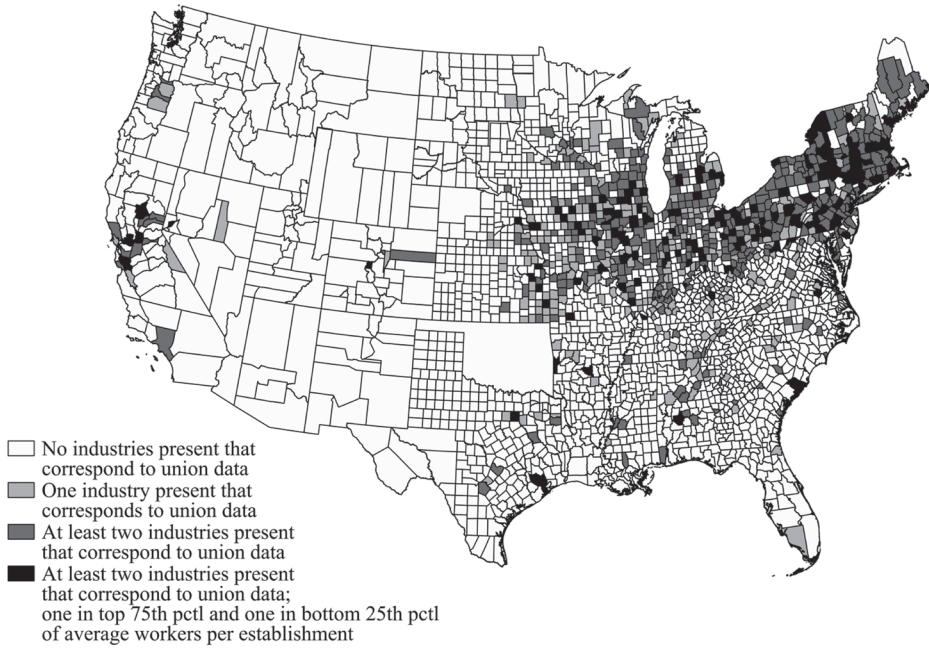
The third component of my identification strategy relies on the rich set of control variables. These allow me to control for multiple channels that have been hypothesized to effect unionization and strikes. The three components of my identification strategy eliminate most sources of endogeneity and imply that the estimated relationships between group size and collective action are likely reflective of the costs and benefits of taking collective action.

Before conducting my analysis, I make a few sample restrictions. Both the number of establishments and the average number of workers per establishment exhibit long-right tails as shown in Online Appendix B Figures 5 and 6. Since these variables have little data in their upper-ranges, the estimation of the relationship between group size and collective action becomes noisy. Accordingly, I remove the top 2.5 percent of observations for both variables. The dashed black lines on the figures show where I trim the data (the lines correspond to 130 workers and 65 establishments; when strikes are the dependent variable I trim at 117.5 workers and 102 establishments). This leaves me with a total of 4,316 unique county-by-industry cells representing 796 counties when the dependent variable is unionization. When the dependent variable is strikes, I am left with 5,873 unique county-by-industry cells representing 1,561 counties.

Figure 2 Panel A identifies the 796 counties in my sample and provides a graphical depiction of the within county variation in the average number of workers per establishment in these counties. Counties in light gray contain one industry in which workers could be represented by one of the ten unions in my sample. Counties in the medium shade of gray contain two or more industries in which workers could be represented by one of the unions in my sample. Finally, counties in black have at least two industries *and* have large within county variation in the number of average workers per establishment. Specifically, these counties have one industry that is in the top 75th percentile and another industry that is in the bottom 25th percentile of workers per establishment within that industry. Figure 2 Panel B is set-up analogously to Panel A, but shows



Panel A: Counties in sample and within-county variation in average workers per establishment



Panel B: Counties in sample and within-county variation in the number of establishments

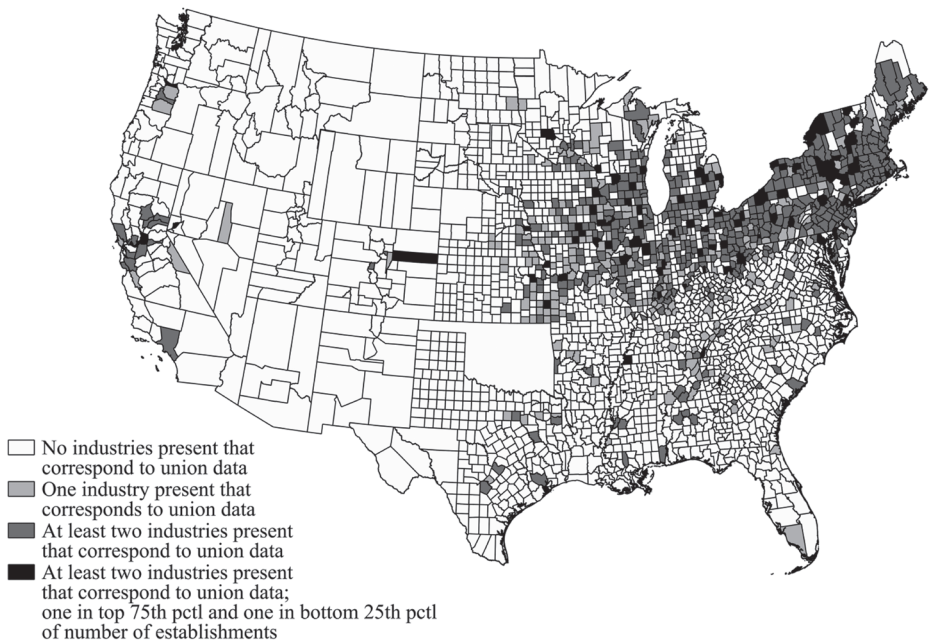


FIGURE 2  
COUNTIES IN SAMPLE

Sources: The data used generate the above figures come from Table V of Walker and Seaton (1883).

within county variation in the number of establishments. See Online Appendix B for maps of control variables that are analogous to Figure 2.

Table 1 displays the sample means of independent variables of interest, broken down by industries for which I have unionization data. The iron and steel industry had the largest number of average workers per establishment (43 workers), whereas the brewing industry had the smallest (4 workers). Printing had the highest average number of establishments (18 establishments), whereas iron and steel had the lowest (5 establishments). Mining and iron and steel were the most racially diverse and had some of the lowest wages per worker. The most ethnically diverse industries were granite cutting and textiles. Granite cutters experienced the highest number of strikes occurring in other industries within their county. Finally, the industry with the highest profit to cost ratio was mining. The last column of Table 1 reports summary statistics when the dependent variable is strikes. Note that strikes are rare events compared to the chartering of a local union. Local unions were chartered in 43 percent of county-by-industry cells, whereas strikes took place in only 4 percent of county-by-industry cells.

## RESULTS

### *Unionization, Worker Group Size, and Employer Group Size*

Table 2 presents the estimates of equation (1) when the dependent variable is unionization. In columns (1)–(4) I approximate the functions between group size and unionization using a quadratic in the average number of workers per establishment and the number of establishments. In column (5), I estimate the function between worker group size and unionization semiparametrically, using Robinson's (1988) double residual estimator. Finally, in column (6) I estimate the function between employer group size and unionization semiparametrically.

Column (1) tests the main hypothesis that both worker and employer group size matters for unionization. Both the linear and quadratic terms in average workers per establishment are in the expected direction and statistically significant. As shown near the bottom of the table, the average workers per establishment that maximizes the probability of unionization is about 59. The linear and quadratic terms in the number of establishments are also significant and indicate that the probability of unionization is maximized around 34 establishments. Finally, the percentage of workers living in an urban designated area is positive and significant.

TABLE 1  
SUMMARY STATISTICS

Dataset:	Unions										Strikes	
	Brewing	Cigar-Making	Coal Mining	Granite Cutting	Iron and Steel	Iron Molding	Machine Products	Printing	Saddlery and Harness	Textile	All	All
Workers per establishment	3.92 (3.62)	8.76 (11.33)	25.68 (29.01)	12.21 (13.94)	43.25 (36.72)	10.31 (14.36)	18.48 (14.79)	5.38 (3.95)	4.35 (2.52)	18.1 (18.33)	13.17 (19.08)	12.31 (16.69)
Number of establishments	5.29 (5.78)	13.08 (13.28)	10.8 (12.64)	8.43 (8.15)	4.85 (4.94)	7.47 (8.25)	7.37 (8.23)	18.04 (11.14)	10.91 (8.24)	8.74 (9.02)	9.59 (10.13)	15.17 (16.55)
Number of workers	24.7 (58)	115.5 (234.7)	268.4 (507)	107.6 (162.1)	210.6 (288.1)	95.8 (259.6)	140.7 (215.5)	109.2 (138.9)	45.2 (51.1)	167.3 (349.9)	118.3 (259.2)	175 (428.3)
Percent black	0 (0)	0.018 (0.08)	0.054 (0.123)	0.013 (0.053)	0.067 (0.168)	0.016 (0.073)	0.008 (0.032)	0.009 (0.023)	0.006 (0.032)	0.005 (0.038)	0.016 (0.073)	0.058 (0.141)
Ethnic fractionalization	0 (0)	0.4 (0.18)	0.515 (0.218)	0.579 (0.164)	0.46 (0.21)	0.398 (0.2)	0.385 (0.188)	0.209 (0.132)	0.346 (0.198)	0.545 (0.197)	0.367 (0.24)	0.374 (0.199)
Percent urban	0.671 (0.374)	0.765 (0.297)	0.094 (0.217)	0.666 (0.3)	0.408 (0.382)	0.616 (0.374)	0.6 (0.349)	0.793 (0.249)	0.414 (0.308)	0.614 (0.319)	0.598 (0.368)	0.316 (0.341)
Wage per worker	430 (83.7)	410 (144)	289 (255)	444 (107)	360 (149)	474 (447)	474 (444)	528 (399)	407 (277)	355 (160)	423 (301)	353 (585)
Number of strikes in other industries	17.23 (79.03)	5.35 (21.82)	0.42 (2.93)	27.1 (99.13)	6.53 (26.14)	5.53 (26.67)	5.71 (24.30)	8.6 (27.88)	5.47 (26.78)	4.63 (15.32)	7.55 (39.29)	NA

Percent of strikes that are successful given a strike occurs	0.489 (0.19)	0.515 (0.294)	0.382 (0.085)	0.497 (0.237)	0.448 (0.216)	0.497 (0.264)	0.492 (0.264)	0.488 (0.243)	0.495 (0.247)	0.505 (0.234)	0.495 (0.247)	NA
Profit to cost ratio	0.452 (0.198)	0.468 (1.04)	0.857 (2.54)	0.477 (0.315)	0.574 (1.85)	0.38 (0.326)	0.381 (0.326)	0.329 (0.841)	0.396 (0.265)	0.302 (0.318)	0.43 (0.937)	0.338 (0.688)
Capital per establishment	37,510 (64,845)	3,802 (8,007)	32,154 (86,030)	5,949 (6,859)	183,992 (117,509)	26,858 (29,563)	26,136 (28,006)	5,007 (4,577)	2,589 (3,142)	5,284 (6,400)	27,015 (62,370)	15,532 (30,962)
Chartered union/ went on strike	183	398	164	43	74	334	209	315	62	63	1,845	225
Did not charter union/ did not strike	299	217	80	114	206	404	165	97	360	529	2,471	5,648
Total observations	482	615	244	157	280	738	374	412	422	592	4,316	5,873
Percentage unionized/ experienced strike	38%	65%	67%	27%	26%	45%	56%	76%	15%	11%	43%	4%

Notes: This table displays summary statistics for two datasets: (1) when unions are the dependent variable (all columns except the last) and (2) when strikes are the dependent variable (last column). For the unions dataset, the variables of interest are broken down by industry. Standard deviations are reported in parentheses.

Sources: The data on county-by-industry cells that chartered unions come from union periodicals. The data on cells that experienced at least one strike during the period 1881–1894 come from reports issued by the Commissioner of Labor that were digitized by Currie and Ferrie (2000) and Naidu and Yuchtman (2016). Other variables come from the 1880 Census of Manufacturing and the 1880 Census of Population. More details are provided in the “Data” section of the text and Online Appendix C.

TABLE 2  
UNIONIZATION, WORKER GROUP SIZE, AND EMPLOYER GROUP SIZE

Model:	Pr(union in county-industry cell = 1)					
	OLS (1)	OLS (2)	OLS (3)	OLS (4)	Semiparametric (5)	Semiparametric (6)
Average workers per establishment	1.131*** (0.171)	1.130*** (0.171)	1.144*** (0.172)	0.997*** (0.183)	†	1.131*** (0.173)
Average workers per establishment square	-0.00965*** (0.00172)	-0.00965*** (0.00172)	-0.00968*** (0.00171)	-0.00936*** (0.00175)	†	-0.0102*** (0.00168)
Number of establishments	1.987*** (0.316)	1.998*** (0.317)	2.048*** (0.316)	1.841*** (0.349)	2.033*** (0.338)	‡
Number of establishments square	-0.0289*** (0.00543)	-0.0291*** (0.00544)	-0.0298*** (0.00542)	-0.0269*** (0.00544)	-0.0297*** (0.00538)	‡
Percent urban	0.259*** (0.0589)	0.258*** (0.0589)	0.244*** (0.0596)	0.231*** (0.0589)	0.223*** (0.0590)	0.235*** (0.0584)
Average wage per worker		0.0227 (0.0322)	0.0200 (0.0298)	0.0161 (0.0269)	0.00826 (0.0268)	0.0211 (0.0281)
Percent black			-0.384* (0.187)	-0.376* (0.183)	-0.316 (0.180)	-0.385* (0.188)
Ethnic fractionalization			0.114 (0.0686)	0.103 (0.0682)	0.0712 (0.0682)	0.110 (0.0686)
Number of strikes				0.00109 (0.000940)	0.00112 (0.000908)	0.00121 (0.000907)

Percent of strikes successful				-0.248*	-0.234*	-0.249*
				(0.121)	(0.118)	(0.122)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
County-by-industry controls	No	No	No	Yes	Yes	Yes
Observations	4,316	4,316	4,316	4,316	4,316	4,316
Countries	796	796	796	796	796	796
Workers per establishment at maximum probability of unionization	58.61***	58.59***	59.08***	53.23***	70.22	55.69***
	(3.476)	(3.476)	(3.520)	(4.064)		(4.047)
Number of establishments at maximum probability of unionization	34.37***	34.36***	34.42***	34.26***	34.25***	65
	(3.192)	(3.178)	(3.100)	(3.794)	(3.354)	

\* = Significant at the 5 percent level.

\*\* = Significant at the 1 percent level.

\*\*\* = Significant at the .05 percent level.

†: The estimated relationship between average workers per establishment and unionization is shown in Figure 3.

‡: The estimated relationship between the number of establishments and unionization is shown in Figure 4.

Notes: The table reports OLS and semiparametric estimates from equation (1) in the text. The unit of observation is a county-by-industry cell. Standard errors, reported in parentheses, are clustered at the county level. The semiparametric estimation is performed using Robinson's (1988) double residual estimator with local second-degree polynomial smoothing based on an Epanechnikov kernel function. County-by-industry controls include: average profit to revenue ratio and its square, average profit to cost ratio and its square, average capital per establishment and its square, and the total number of workers in county-by-industry cell.

Sources: The dependent variable comes from union periodicals and the independent variables come from a variety of sources. See the text and Online Appendix C for more details.

Column (2) adds a control for the average wage of workers, which is not statistically significant.<sup>17</sup> Column (3) adds racial and ethnic heterogeneity controls. The percentage of workers that are black has a negative and significant association with the probability of workers forming a union, with a 1 percentage point increase in black workers decreasing the likelihood of unionization by 0.38 percentage points. The ethnic fractionalization of workers has a positive association with unionization, but it is not statistically significant. Even after adding the racial and ethnic heterogeneity controls, the group size variables remain highly significant. Finally, column (4) includes all other county-level controls, including the number of strikes in other industries and the percentage of these strikes that were successful. The greater the number of strikes in other industries the more likely a union is to form (p-value = 0.25). However, the probability of forming a union actually decreases with the percent of strikes that are successful. A potential explanation for this result is that workers' success in other industries might make employers more inclined to cooperate with workers even without a union.

The specification in column (4) is the preferred OLS specification since it absorbs all fixed, unobserved county-, industry-, and year-specific characteristics that might be associated with unionization and includes the full set of control variables. The estimated average establishment size that maximizes the probability of unionization varies from 53 workers in column (4) to 59 workers in column (3). Note that modeling group sizes with a quadratic provides a better fit for the data than a linear specification.<sup>18</sup>

To assess the magnitude of the coefficients I assign all county-by-industry cells the number of workers per establishment at the maximum probability of unionization (53 workers), holding all other variables constant. Doing this increases predicted unionization in the cells from 43 to 61 percent (a 42 percent increase). Performing the same exercise for the number of establishments, I find that predicted unionization increases from 43 to 62 percent (a 44 percent increase). These group size effects are much larger than the effects from other variables. For instance, wages have a positive effect on unionization in column (4). Therefore, if I assign all cells the average wage of the highest paying industry, which is \$528 a year for printers (see Table 1), unionization increases by less than 1 percentage point (from 42.7 to 42.9 percent). Similarly, assigning

<sup>17</sup> The average wage of workers is divided by 1,000.

<sup>18</sup> The Akaike information criterion for the linear model is 2,952 and it is 2,846 for the quadratic model.

all cells 0 percent black workers increases unionization by less than 1 percentage point (from 42.7 to 43.3 percent). A similar exercise can be performed by setting fractionalization equal to 1 and the number of strikes equal to 27.1 (the highest number in Table 1). In both cases unionization never increases above 50 percent. To summarize, the size of worker and employer groups dwarves the effects from other variables.

Online Appendix B Table 1 reports the corresponding estimates for columns (1)–(4) when a logistic regression model is used, as opposed to the linear probability model. The significant, hump-shaped relationships are still present when using the logistic model. Online Appendix B Table 3 reports the corresponding estimates for columns (1)–(4) when union membership is the dependent variable. Union membership data are only available for three unions, all in the year 1892.

I now turn to the semiparametric estimation. Column (5) of Table 2 shows the estimated coefficients on the control variables when the relationship between average workers per establishment and unionization is estimated semiparametrically. Figure 3 graphs the estimated relationship. The hump-shape is prominent, with the probability of unionizing increasing steeply from 0 to about 25 workers per establishment. The relationship flattens out and remains fairly constant from 25 workers to 70 workers. The probability of unionizing then decreases when average establishment size exceeds 70 workers.

Column (6) of Table 2 shows the estimated coefficients on the control variables when the relationship between the number of establishments and unionization is estimated semiparametrically. Figure 4 graphs the estimated semiparametric relationship. The probability of unionizing increases from 0 to 15 establishments. It then flattens out, but continues to increase slightly. Around 35 establishments the relationship decreases a bit, before increasing again. Therefore, the relationship between the number of establishments and unionization is increasing over almost the entire range.

This relationship could exist for a number of reasons. First, if the ideas in the model are taken seriously, then perhaps the benefit to employers of preventing unionization is primarily private (e.g., an increase in profits). This private benefit would create a free-rider problem for employers and result in a decreasing relationship between the number of employers and the probability that they are successful in preventing unionization. Indeed, Friedman (1998) notes that single firm corporations were more effective at fighting labor than multi-firm employer associations. He writes that “Giant corporations were able to drive unions out of many American industries, including steel, petroleum refining, and meatpacking. These



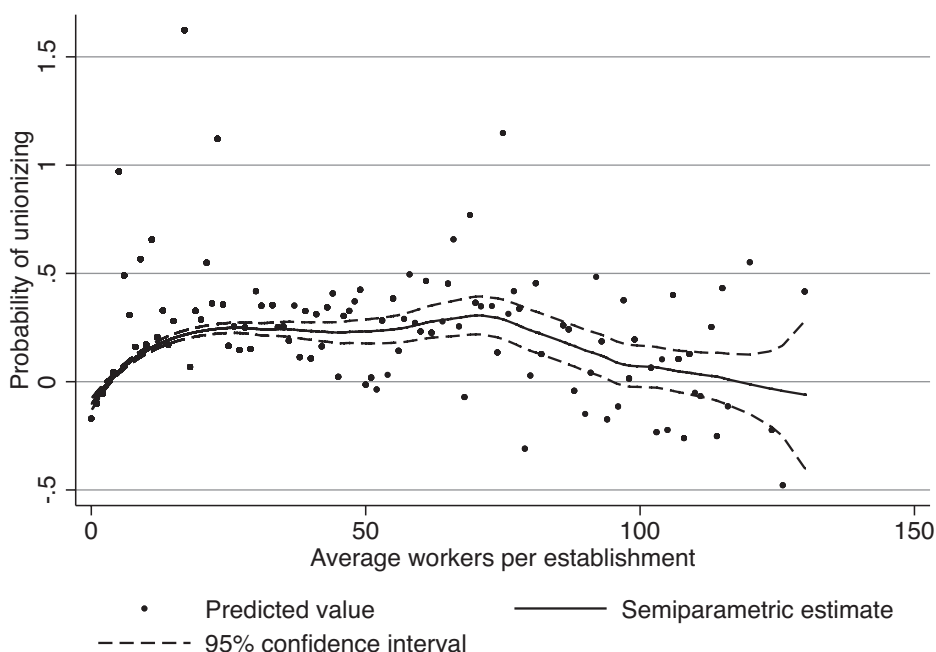


FIGURE 3

## RELATIONSHIP BETWEEN WORKERS PER ESTABLISHMENT AND UNIONIZATION

*Notes:* Figure 3 depicts the semiparametric estimate of the relationship between unionization and average workers per establishment from Table 2, column (5). The function is estimated using Robinson's double residual estimator, local second-degree polynomial smoothing based on an Epanechnikov kernel function, and a rule-of-thumb kernel bandwidth that minimizes the conditional weighted mean integrated squared error. The dashed lines are 95 percent confidence intervals for the semiparametric regression line. The predicted values used to estimate the semiparametric function are represented with dots, which are bin scattered because the actual number of observation is too large to create a useful scatter plot. The dots are generated by first rounding each value of average workers per establishment to the nearest integer (e.g., 21.4 would be rounded to 21) and then taking the average predicted value for each integer. Note that the scale of the vertical axis is relative to the omitted county, industry, and year dummies.

*Sources:* See Table 2.

enterprises avoid the employers' version of the 'free rider' problem because anti-union activities could be executed at the command of a single authority who also received the benefits of employer action" (Friedman 1998, pp. 163–64). Dorothee Schneider (1994) notes that consolidations into large corporations in the brewing industry led to employers successfully fighting labor and Richard Edwards (1979) finds that large, consolidated corporations such as McCormick, Carnegie, Pullman, General Electric, U.S. Steel, and International Harvester were "more broadly organized than the workers, and the workers lost" (Edwards 1979, p. 50). A second reason for the increasing relationship could simply be that more establishments mean more locations where a union could form.

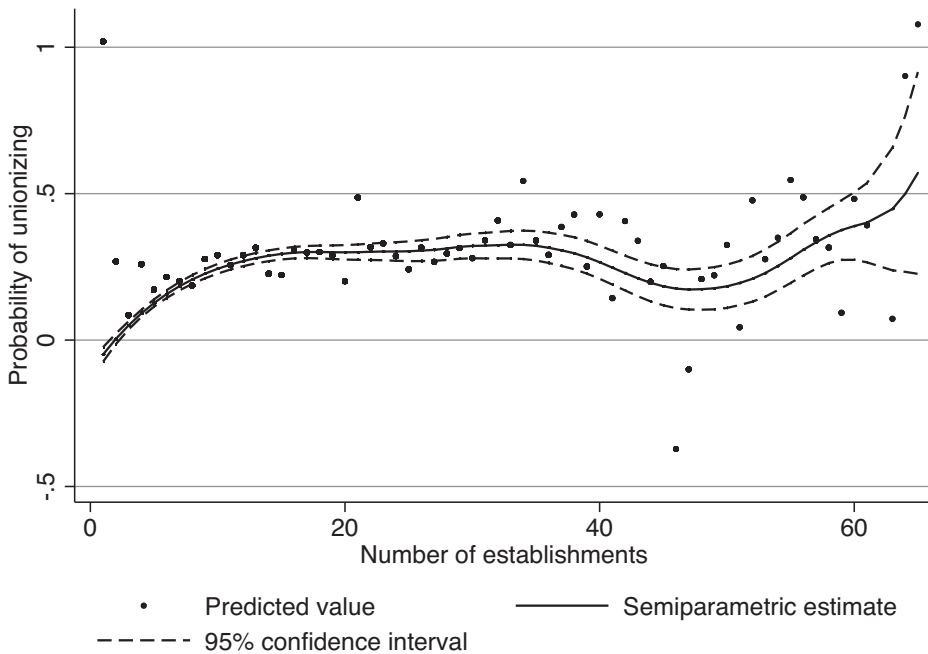


FIGURE 4  
RELATIONSHIP BETWEEN THE NUMBER OF ESTABLISHMENTS AND  
UNIONIZATION

Notes: Figure 4 depicts the semiparametric estimate of the relationship between unionization and the number of establishments from Table 2, column (6). See notes to Figure 3.

Sources: See Table 2.

Finally, while the focus of this article is the origins of the labor movement in the United States, the results described earlier imply that differences in worker and employer group sizes across countries might partially explain differences in the strength of labor movements. I collected establishment size data that shows that the average establishment size might have been smaller in the United States than in some Western European countries. Specifically, average establishment size in the United States around the turn of the twentieth century was approximately 13 workers, while it was 15 workers in Denmark, 24 workers in Norway, and 28 workers in Sweden.<sup>19</sup>

<sup>19</sup> The Denmark data come from *Danmarks Statistik Statistisk Aarboeg* (1898) and the industries used are: book printing, brewing, cement, distilling, matches, paper, shipbuilding, and tobacco. The Norway data come from *Statistisk Aarboeg for Kongeriget Norge* (1890) and the industries used are: brewing, brick making, distilling, leather tanning, matches, shipbuilding, and tobacco. The Sweden data come from *Sveriges Officiella Statistik* (1903) and the industries used are: baking, bookbinding, book printing, brewing, brick making, carriage making, cement, cooperage, distilling, matches, paper, shipbuilding, and tobacco.

*Robustness Checks*

Table 3 presents several robustness checks of the main empirical results. All robustness checks are variations of the OLS specification presented in column (4) of Table 2. For brevity, I only report the coefficients for the average number of workers per establishment and its square. The coefficients for the number of establishments and its square are similar to those displayed in Table 2 and are available upon request.

Robustness check (1) adds state-by-industry level controls for the average value added per worker and the average wage inequality in establishments, estimated from the Attack and Bateman (2004) samples.<sup>20</sup> High value added per worker and high wage inequality might entice workers to unionize. Since the Attack and Bateman (2004) data are samples, I was not able to estimate these two variables for all state-by-industry cells, which explains the smaller sample size in column (1) of Table 3. However, the relationship between average workers per establishment and unionization remains intact when including these control variables. The average number of workers per establishment at the maximum probability of unionization is around 50.

Robustness check (2) replicates robustness check (1), but uses two-stage least squares (2SLS) and instruments for average workers per establishment (and its square). The instrument for average workers per establishment in a county-by-industry cell is the average number of workers per establishment in *all other* cells within that industry. The logic behind this instrument is that the average establishment size in *all other* cells should only affect the probability of unionization in the cell under consideration through its ability to predict average establishment size. When using this instrument, the hump-shaped relationship remains significant and the average number of workers per establishment at the maximum probability of unionization barely changes. The first-stage F-statistic on the linear term is 31, and it is 27 on the quadratic term. Furthermore, the Cragg-Donald statistic is 93, indicating that the instruments are strong predictors of the average number of workers per establishment and its square.

Robustness check (3) estimates the relationship between average establishment size and unionization using only data from the year 1892.

<sup>20</sup> Value added per worker is estimated from the difference between the value of outputs and inputs in an establishment, divided by the number of workers in that establishment. This is averaged over all establishments in a state-by-industry cell. Wage inequality is estimated as the ratio of unskilled to skilled workers' wages in an establishment. This is, again, averaged over all establishments in a state-by-industry cell.

TABLE 3  
ROBUSTNESS CHECKS OF RELATIONSHIP BETWEEN WORKER GROUP SIZE AND UNIONIZATION

		Pr(union in county-industry cell = 1)						
Robustness Check:	State-by-Industry Level Controls	2SLS	1892	1902	Brewing	Cigar-Making	Coal Mining	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Average workers per establishment	1.085*** (0.215)	2.241*** (0.654)	0.966** (0.347)	0.867*** (0.215)	3.113 (1.615)	0.937 (0.620)	1.389*** (0.314)	
Average workers per establishment square	-0.0108*** (0.00191)	-0.0200*** (0.00553)	-0.00942*** (0.00301)	-0.00809*** (0.00198)	-0.00570 (0.0884)	-0.00194 (0.00794)	-0.00832*** (0.00308)	
Workers per establishment at maximum probability of unionization	50.13*** (4.108)	56.13*** (4.243)	51.26*** (8.042)	53.57*** (5.649)	273.2 (4114.5)	241.0 (869.3)	83.45*** (15.82)	
Observations	3,367	3,367	1,457	2,654	482	615	244	
Counties	604	604	582	796	241	205	244	
				Machine Products	Printing	Saddlery and Harness	Textile	
Robustness Check:	Granite Cutting	Iron and Steel	Iron Molding	(11)	(12)	(13)	(14)	
	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
Average workers per establishment	2.056*** (0.692)	0.146 (0.355)	1.660*** (0.389)	1.201* (0.515)	6.181** (2.363)	5.019** (1.843)	0.540* (0.257)	
Average workers per establishment square	-0.0197*** (0.00533)	-0.00149 (0.00309)	-0.0160*** (0.00444)	-0.0113 (0.00702)	-0.0417 (0.0366)	-0.204*** (0.0565)	-0.00350 (0.00249)	

TABLE 3 (CONTINUED)  
 ROBUSTNESS CHECKS OF RELATIONSHIP BETWEEN WORKER GROUP SIZE AND UNIONIZATION

Robustness Check:	Pr(union in county-industry cell = 1)						
	State-by-Industry Level Controls (1)	2SLS (2)	1892 (3)	1902 (4)	Brewing (5)	Cigar-Making (6)	Coal Mining (7)
Workers per establishment at maximum probability of unionization	52.17*** (5.981)	48.99 (62.42)	51.89*** (7.279)	52.94*** (16.74)	74.17 (39.08)	12.28*** (1.950)	77.30*** (25.54)
Observations	157	280	738	374	412	422	592
Counties	157	140	369	374	206	422	296

\* = Significant at the 5 percent level.

\*\* = Significant at the 1 percent level.

\*\*\* = Significant at the .05 percent level.

Notes: The table reports OLS and 2SLS from equation (1) in the text. The unit of observation is a county-by-industry cell. Standard errors, reported in parentheses, are clustered at the county level. The instrument for average workers per establishment (and its square) is the average establishment size in industry  $i$  in all counties except county  $c$  (and its square). All columns control for county fixed effects, industry fixed effects, year fixed effects, percent urban, the number of establishments and its square, the number of strikes that were successful, average wage per worker and its square, percent black, ethnic fractionalization, average profit to revenue ratio and its square, average profit to cost ratio and its square, average capital per establishment and its square, and the total number of workers in county-by-industry cell.

Sources: The dependent variable comes from union periodicals and the independent variables come from a variety of sources. See the text and Online Appendix C for more details.

Similarly, robustness check (4) estimates the relationship using only data from the year 1902. In both cases the hump-shaped relationship is present. Finally, robustness checks (5)–(14) separately estimate the relationship for each of the 10 industries in my sample. All of the industries display some sort of hump-shaped relationship, with the linear and quadratic terms being statistically significant in five of the industries (the quadratic term for machine products in robustness check (11) has a p-value of 0.11).

### *Strikes and Establishment Size*

Table 4 presents estimates of equation (1) when the dependent variable is strikes. It is organized analogously to Table 2. Year fixed effects are not included in these specifications because the strikes variable takes a value of one if a county-by-industry cell experienced a strike any time during the period 1881–1894 (in other words, the variable does not have a time dimension). Furthermore, since few counties ever experienced a strike, I use state fixed effects instead of county fixed effects in Table 4.<sup>20</sup> The number and success of strikes in other county-by-industry cells is not included because of endogeneity concerns. To understand this, consider the example where the dependent variable takes a value of one because a strike occurred in a county-by-industry cell in 1882. If this strike initiated a wave of strikes in other industries it would be inappropriate to use the number and success of these other strikes as an explanatory variable.

Columns (1)–(4) display the significant hump-shaped relationships between group size and strikes. The estimated establishment size at the maximum probability of striking varies from 37 in column (4) to 58 in columns (1) and (2). The number of establishments that maximize the probability of striking is quite large in all specifications and ranges from 159 in column (4) to 188 in column (1). Online Appendix B Table 2 reports the corresponding estimates of Table 5 when a logistic regression model is used. The significant, hump-shaped relationship is still present when using this model.

Semiparametric estimates are reported in columns (5) and (6) of Table 4, and Figures 5 and 6 display the relationships of main interest. In Figure 5, the hump-shaped relationship between average workers per establishments and strikes is, again, noticeable with the probability of striking increasing steeply from 0 to 30 workers per establishments. The relationship then decreases with some undulation. In Figure 6, the relationship

<sup>20</sup> Only 45 of the 1,561 counties in the sample experienced a strike.

TABLE 4  
STRIKES, WORKER GROUP SIZE, AND EMPLOYER GROUP SIZE

Model:	Pr(strike in county-industry cell = 1)					
	OLS (1)	OLS (2)	OLS (3)	OLS (4)	Semiparametric (5)	Semiparametric (6)
Average workers per establishment	0.249*** (0.0589)	0.254*** (0.0591)	0.215*** (0.0552)	0.0996 (0.0612)	†	0.0861 (0.0808)
Average workers per establishment square	-0.00214*** (0.000658)	-0.00219*** (0.000659)	-0.00186*** (0.000632)	-0.00135* (0.000641)	†	-0.00125 (0.000859)
Number of establishments	0.362*** (0.0728)	0.370*** (0.0728)	0.362*** (0.0717)	0.275*** (0.0703)	0.275*** (0.0924)	‡
Number of establishments square	-0.000963 (0.000785)	-0.00105 (0.000783)	-0.000971 (0.000780)	-0.000869 (0.000774)	-0.000880 (0.000821)	‡
Percent urban	0.0809*** (0.0139)	0.0786*** (0.0138)	0.0578*** (0.0125)	0.0575*** (0.0125)	0.0577** (0.0199)	0.0567** (0.0200)
Average wage per worker		0.0162*** (0.00413)	0.0155*** (0.00449)	0.0148*** (0.00467)	0.0148*** (0.00452)	0.0148*** (0.00438)
Percent black			-0.0218 (0.0156)	-0.0209 (0.0160)	-0.0200 (0.0190)	-0.0213 (0.0193)

Ethnic fractionalization			0.104*** (0.0269)	Yes	Yes	0.0980*** (0.0265)	0.0976*** (0.0311)	0.0970*** (0.0313)
State fixed effects	Yes	Yes		Yes	Yes		Yes	Yes
Industry fixed effects	Yes	Yes		Yes	Yes		Yes	Yes
County-by-industry controls	No	No		No	Yes		Yes	Yes
Observations	5,873	5,873		5,873	5,873		5,873	5,873
Counties	1,561	1,561		1,561	1,561		1,561	1,561
Workers per establishment at maximum probability of striking	58.16*** (7.454)	58.18*** (7.291)		57.80*** (8.472)	36.97*** (11.06)		30.22	34.37* (14.87)
Number of establishments at maximum probability of striking	187.8 (126.9)	176.9 (108.4)		186.2 (123.6)	158.5 (111.1)		156.0 (101.7)	102

\* = Significant at the 5 percent level.

\*\* = Significant at the 1 percent level.

\*\*\* = Significant at the .05 percent level.

†: The estimated relationship between average workers per establishment and strikes is shown in Figure 5.

‡: The estimated relationship between the number of establishments and strikes is shown in Figure 6.

Notes: The table reports OLS and semiparametric estimates from equation (1) in the text. See notes to Table 2. Standard errors for the semiparametric estimates are clustered at the state level.

Sources: The dependent variable comes from Currie and Ferrie (2000) and Naidu and Yuchtman (2016) and the independent variables come from a variety of sources. See the text and Online Appendix C for more details.



TABLE 5  
UNIONIZATION AND AVERAGE ESTABLISHMENT SIZE BY FIXED COSTS

Model:	Pr(union in county-industry cell = 1)			
	Low Fixed Cost Unions		High Fixed Cost Unions	
	OLS (1)	Semiparametric (2)	OLS (3)	Semiparametric (4)
Average workers per establishment	0.459 (0.316)	†	0.666 (0.486)	‡
Average workers per establishment square	-0.00571 (0.00330)	†	-0.00683 (0.00406)	‡
Percent urban	0.219 (0.131)	0.242 (0.130)	0.239 (0.128)	0.232 (0.122)
Average wage per worker	0.00334 (0.0245)	-0.00198 (0.0238)	0.384 (0.224)	0.378 (0.222)
Percent black	-0.471 (0.307)	-0.446 (0.235)	0.0664 (0.517)	0.0966 (0.516)
Ethnic fractionalization	0.0230 (0.123)	-0.0431 (0.122)	0.228 (0.208)	0.213 (0.207)
Number of strikes	0.000759 (0.00109)	0.000723 (0.00106)	0.000546 (0.00109)	0.000363 (0.00108)
Percent of strikes successful	-0.284* (0.117)	-0.273* (0.115)	-0.250 (1.009)	-0.136 (1.024)
County fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
County-by-industry controls	Yes	Yes	Yes	Yes
Observations	2,357	2,357	1,428	1,428
Counties	492	492	691	691
Workers per establishment at maximum probability of unionization	40.19*** (10.39)	37.5	48.69*** (14.21)	44

\* = Significant at the 5 percent level.

\*\* = Significant at the 1 percent level.

\*\*\* = Significant at the .05 percent level.

†: The estimated relationship between average workers per establishment and unionization for low fixed cost unions is shown in Figure 7.

‡: The estimated relationship between average workers per establishment and unionization for high fixed cost unions is shown in Figure 7.

Notes: The table reports OLS and semiparametric estimates from equation (1) in the text. See notes to Table 2. Low fixed cost unions are the CMIU, IMU, ITU, and UGWA, which each had a chartering fee of \$5. High fixed cost unions are the AA (\$25), Brewery Workers (\$10), Leather Workers (\$12), and UMW (\$15).

Sources: The dependent variable comes from union periodicals and the independent variables come from a variety of sources. See the text and Online Appendix C for more details.

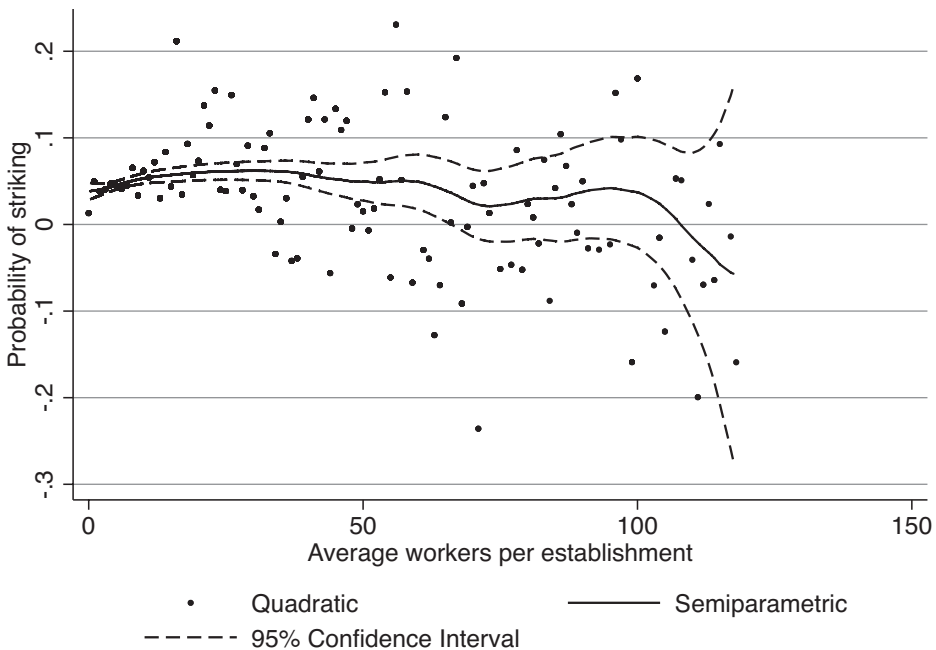


FIGURE 5  
RELATIONSHIP BETWEEN WORKERS PER ESTABLISHMENT AND STRIKES

*Notes:* Figure 5 depicts the semiparametric estimate of the relationship between strikes and average workers per establishment from Table 4, column (5). See notes to Figure 3.  
*Sources:* See Table 4.

between the number of establishments and strikes actually appears to be increasing linearly until around 70 establishments. The relationship then decreases a bit, before increasing again. Therefore, the relationship between the number of establishments and strikes is increasing over almost the entire range of establishments. Again, this relationship could exist because of the free-rider problem or because more establishments mean more locations where a strike could occur.

Finally, I use the coefficients in column (4) of Table 4 to assess the magnitude of the effects. If all county-by-industry cells are assigned the number of workers per establishment at the maximum probability of striking (37 workers) predicted strikes increase from 3.8 to 5 percent (a 32 percent increase). Performing the same exercise for the number of establishments and assigning all cells the maximum number in my sample (102) I find that predicted strikes would have increased from 3.8 to 19 percent. Again, it can be shown that these group size effects are much larger than the effects associated with other variables.

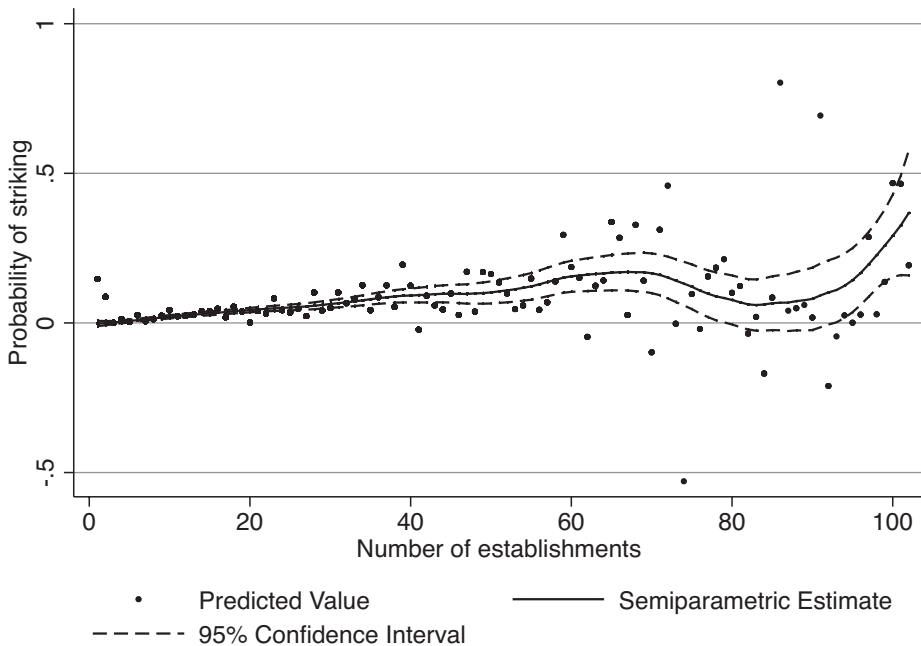


FIGURE 6

## RELATIONSHIP BETWEEN THE NUMBER OF ESTABLISHMENTS AND STRIKES

Notes: Figure 6 depicts the semiparametric estimate of the relationship between strikes and the number of establishments from Table 4, column (6). See notes to Figure 3.

Sources: See Table 4.

### Chartering Fee Results

According to the model, the fixed costs of forming a union play a key role in whether workers decide to take collective action. It is an immediate implication of the model that the number of workers per establishment that maximizes the probability of union formation will increase as fixed costs increases. In this section, I exploit variation in the fixed costs of chartering a union to test whether this was the case.

In the late nineteenth and early twentieth centuries, unions were federated organizations consisting of local branches, with some autonomy, and a national headquarters. To form a local branch of a national union, a group of workers had to submit a monetary “chartering” fee to the national headquarters. After receiving this fee, the headquarters provided the workers with a charter for the branch and the workers received all the benefits of being a member of a nation-wide union. Using the *Reports of the Industrial Commission on Labor Organizations* (1901), I obtained information on the chartering fees in 1901 for eight of the

ten unions that I study. I break these unions into two groups, low chartering fees and high chartering fees, and estimate equation (1) separately for each group. Low fixed cost unions are the CMIU, IMU, ITU, and UGWA, each having a chartering fee of \$5. High fixed cost unions are the AA (\$25), Brewery Workers (\$10), Leather Workers (\$12), and UMW (\$15).

While these chartering fees are small by today's standards, they appear substantial when inflated by wages. For example, a \$5 chartering fee in 1900 is about \$700 in today's wages and a chartering fee of \$25 would be about \$3,500 (the wage index comes from Officer and Williamson 2017). Even a \$5 chartering fee could have been substantial in per capita terms. For example, the national headquarters of the CMIU charged \$5 for a charter. In my data, the median size of a cigar-making establishment was six workers. If all workers split the chartering fee evenly then each worker would pay \$0.83, or approximately \$113 in today's wages. It is also important to keep in mind that the chartering fee was just one of many fees that union members paid.

The results from estimating equation (1) for low and high fixed cost unions are displayed in Table 5. I do not include the number of establishments in these regressions since the fixed costs of forming a union should only affect the relationship between worker group size and collective action. Columns (1) and (3) repeat the specification from column (4) of Table 2 for the high and low fixed cost industries. Both the linear and quadratic terms for average workers per establishment are not statistically significant, likely due to the reduction in sample size. Most importantly, the number of workers per establishment at the maximum probability of forming a union is 40 for the low fixed cost unions, while it is 49 for the high fixed cost unions (these maximums are not statistically different from each other). Columns (2) and (4) of Table 5 report the semiparametric estimates, and Figure 7 displays the relationship of main interest. Again, the number of workers per establishment at the maximum probability of forming a union is 38 for the low fixed cost unions, while it is 44 for the high fixed cost unions. Both the low fixed cost and the high fixed cost unions display a notable hump-shaped relationship, despite the OLS coefficients not being significant. The most important thing to note in Figure 7 is that fewer workers are needed to overcome the costs in the low fixed cost unions. The results in Table 5 and Figure 7 are in alignment with the prediction of the model that more workers are needed to take collective action when fixed costs increase.

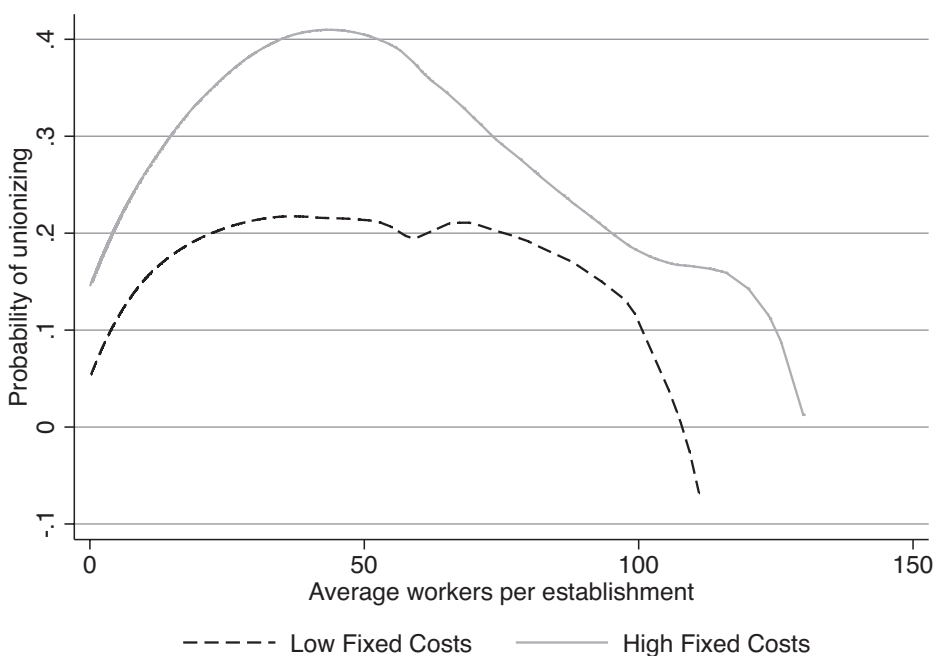


FIGURE 7  
RELATIONSHIP BETWEEN WORKERS PER ESTABLISHMENT AND UNIONIZATION  
BY FIXED COSTS

*Notes:* The dashed line in Figure 7 depicts the semiparametric estimate of the relationship between unionization and average workers per establishment from Table 5, column (2). The solid line in Figure 7 depicts the semiparametric estimate from Table 5, column (4). See notes to Figure 3. The semiparametric regression line is estimated using local second-degree polynomial smoothing based on an Epanechnikov kernel function and a kernel bandwidth of 25. Low fixed cost unions are the CMIU, IMU, ITU, and UGWA, which each had a chartering fee of \$5. High fixed cost unions are the AA (\$25), Brewery Workers (\$10), Leather Workers (\$12), and UMW (\$15).

*Sources:* See Table 5.

## CONCLUSION

The nineteenth century labor movement is often imagined as a large, nationwide movement in which workers gained class-consciousness and employers fought against the formation of unions. In reality, of course, the labor movement was made up of individual workers who decided how much of their own effort to commit to improving workers' prospects in their communities. Employers, likewise, decided how many resources should be mobilized to prevent their workers from unionizing and striking. In this article, I argue that when making these decisions, workers and employers weighed the costs and benefits of their effort. Theory suggests that there is a hump-shaped relationship between the probability of collective action and group size as long as there is a fixed

cost to taking collective action and the benefit has characteristics of both public and private goods.

I explore whether this hump-shaped relationship existed in the United States by compiling a new county-by-industry level dataset containing information on local union locations, strike locations, and accurate measures of group size for the largest industries in the late nineteenth and early twentieth centuries. The empirical analysis confirms the intuition of the theoretical predictions; there was, indeed, a hump-shaped relationship between the average number of workers in an establishment and the likelihood that they formed a union or went on strike. This result holds across two independent measures of collective action (unionization and strikes), two different estimation techniques (quadratic and semiparametric), and is robust to many potential confounding influences. I also find some evidence that the relationship between the number of establishments and the probability of workers unionizing was increasing. I present a number of explanations for this finding including that employers face a free-rider problem and, therefore, a smaller number of employers may have an easier time mobilizing.

The findings of this article imply that variation in the size of worker and employer groups helped to shape the labor movement in the United States. Workers were more likely to form a union and more likely to strike in locations and industries with approximately 50 workers, which is in the middle of the range of average establishment sizes. Similarly, unions were more likely to form and strikes were more likely to occur in locations and industries with a large number of employers. The conclusion of this article is that much of the variation in labor strength within the United States can be explained by the size of worker and employer groups. Accordingly, differences in group sizes across countries might partially explain the exceptional weakness of the American labor movement.

Finally, this article does not rule out alternative theories of collective action in the United States. In fact, my empirical analysis finds some support for these alternative hypotheses, such as racial heterogeneity making it difficult for workers to organize. Rather, this article is designed to call attention to a theory that has received little consideration, and even fewer empirical tests, in the literature on the origins of the American labor movement.

#### REFERENCES

- Archer, Robin. "Why Is There No Labor Party? Class and Race in the United States and Australia." In *American Exceptionalism?*, edited by R. Halpern and J. Morris, 56–75. London: Palgrave Macmillan, 1997.

- . *Why Is There No Labor Party in the United States?* Princeton: Princeton University Press, 2007.
- Atack, Jeremy, and Fred Bateman. *State Samples from the 1880 Census of Manufacturing*. Ann Arbor, MI: Inter-university Consortium for Political and Social Research, 2004.
- Atack, Jeremy, Fred Bateman, and Thomas J. Weiss. *State Samples from the Census of Manufacturing: 1850, 1860, and 1870*. Ann Arbor, MI: Inter-university Consortium for Political and Social Research, 2004.
- Barnett, George E. "The Printers: A Study in American Trade Unionism." *American Economic Association Quarterly* 10, no. 3 (1909): 3–379.
- Bonnett, Clarence E. *Employers' Associations in the United States: A Study of Typical Associations*. New York: Macmillan, 1922.
- Brown, Ernest Henry Phelps, and Margaret H. Browne. *A Century of Pay: The Course of Pay and Production in France, Germany, Sweden, the United Kingdom, and the United States of America, 1860-1960*. London: Macmillan, 1968.
- Cayton, Horace R., and George S. Mitchell. *Black Workers and the New Unions*. Chapel Hill: UNC Press, 1939.
- Commons, John Rogers, David Joseph Saposs, Helen Laura Sumner, et al. *History of Labour in the United States*. New York: The Macmillan Company, 1926.
- Currie, Janet, and Joseph Ferrie. "The Law and Labor Strife in the United States, 1881–1894." *Journal of Economic History* 60, no. 1 (2000): 42–66.
- Danmarks Statistik Statistisk Aarbog*. Copenhagen: Thieles Bogtrykkeri, 1898.
- Edwards, Richard. *Contested Terrain: The Transformation of the Workplace in the Twentieth Century*. New York: Basic Books Inc., 1979.
- Esteban, Joan, and Debraj Ray. "Collective Action and the Group Size Paradox." *American Political Science Review* 95, no. 3 (2001): 663–72.
- Fishback, Price V. "Operations of 'Unfettered' Labor Markets." *Journal of Economic Literature* 36, no. 2 (1998): 722–65.
- Fishback, Price V., Rebecca Holmes, and Samuel Allen. "Lifting the Curse of Dimensionality: Measures of the States' Labor Legislation Climate in the United States During the Progressive Era." *Labor History* 50, no. 3 (2009): 313–46.
- Foner, Eric. "Why Is There No Socialism in the United States?" *History Workshop* 17 (Spring 1984): 57–80.
- Freeman, Richard B. "Spurts in Union Growth: Defining Moments and Social Processes." In *The Defining Moment: The Great Depression and the American Economy in the Twentieth Century*, edited by Michael D. Bordo, Claudia Goldin, and Eugene White, 265–96. Chicago: University of Chicago Press, 1998.
- Friedman, Gerald. *State-Making and Labor Movements: France and the United States, 1876–1914*. Ithaca, NY: Cornell University Press, 1998.
- . "US Historical Statistics: New Estimates of Union Membership the United States, 1880–1914." *Historical Methods: A Journal of Quantitative and Interdisciplinary History* 32, no. 2 (1999): 75–86.
- . "The Political Economy of Early Southern Unionism: Race, Politics, and Labor in the South, 1880–1953." *Journal of Economic History* 60, no. 2 (2000): 384–413.
- . "Labor Unions in the United States." In *EH.Net Encyclopedia*, edited by R. Whaples. Economic History Association, La Crosse, WI, 2008.
- Griffin, Larry J., Michael E. Wallace, and Beth A. Rubin. "Capitalist Resistance to the Organization of Labor Before the New Deal: Why? How? Success?" *American Sociological Review* 51 (April 1986): 147–67.

- Halpern, Rick. "Organized Labor, Black Workers, and the Twentieth Century South: The Emerging Revolution." In *Race and Class in the American South since 1890*, edited by Melvyn Stokes and Rick Halpern, 43–76. Providence: Berg Publishers, 1994.
- Haydu, Jeffrey. "Employers, Unions, and American Exceptionalism: Pre-World War I Open Shops in the Machine Trades in Comparative Perspective." *International Review of Social History* 33 (1988): 25–41.
- Holmes, Rebecca. "The Impact of State Labor Regulations on Manufacturing Input Demand During the Progressive Era." Ph.D. diss., University of Arizona, 2003.
- Huberman, Michael, and Denise Young. "Cross-Border Unions: Internationals in Canada, 1901–1914." *Explorations in Economic History* 36 (1999): 204–231.
- . "Hope against Hope: Strike Activity in Canada, 1920–1939." *Explorations in Economic History* 39 (2002): 315–54.
- Jacobson, Julius. *The Negro and the American Labor Movement*. Garden City: Anchor Books, 1968.
- Karabel, Jerome. "The Failure of American Socialism Reconsidered." *Socialist Register* 16, no. 16 (1979): 204–27.
- Karlsson, Tobias, and Maria Stanfors. "Rish Preferences and Gender Differences in Union Membership in Late Nineteenth-Century Swedish Manufacturing." *Feminist Economics* 24, no. 1 (2017): 1–28.
- Marks, Gary Wolfe. *Unions in Politics: Britain, Germany, and the United States in the Nineteenth and Early Twentieth Centuries*. Princeton: Princeton University Press, 1989.
- Marshall, Ray. *The Negro Worker*. New York: Random House, 1967.
- Miller, Sally. "Socialism and Race." In *Failure of a Dream?: Essays in the History of American Socialism*, edited by John H. M. Laslett and Sally M. Lipset, 218–43. Berkeley: University of California Press, 1984.
- Naidu, Suresh, and Noam Yuchtman. "Labor Market Institutions in the Gilded Age of American Economic History." In *Oxford Handbook of American Economic History*, edited by L. S. Cain, Price V. Fishback, and Paul Rhode. Oxford: Oxford University Press, 2016.
- Nicoletti, Giuseppe, Stefano Scarpetta, and Oliver Boylaud. "Summary Indicators of Product Market Regulation with an Extension to Employment Protection Legislation." OECD Working Paper #226, Paris, France, 1999.
- North, S.N.D. *The Newspaper and Periodical Press*. Washington, DC: GPO, 1884.
- Northrup, Herbert R. "The Negro and the United Mine Workers of America." *Southern Economic Journal* 9, no. 4 (1943): 313–26.
- Oestreicher, Richard. "Urban Working-Class Political Behavior and Theories of American Electoral Politics, 1870–1940." *Journal of American History* 74, no. 4 (1988): 1257–86.
- Officer, Lawrence H., and Samuel H. Williamson. *Annual Wages in the United States, 1774–Present*. MeasuringWorth, 2017, <https://www.measuringworth.com/datasets/uswage/>.
- Olson, Mancur. *The Logic of Collective Action*. Cambridge: Harvard University Press, 1965.
- Perkins, G. W., ed. "President Perkins Report to the Twenty-Second Convention International Cigarmakers Union." *Cigar Makers' Official Journal* 36, no. 9 (1912): 8–38.



- . “Stability, Membership Benefits.” *Cigar Makers’ Official Journal* 29, no. 10 (1905): 9.
- Perlman, Selig. *A Theory of the Labor Movement*. New York: The Macmillan Company, 1928.
- Reid, Ira De A. *Negro Membership in American Labor Unions*. New York: Alexander Press (National Urban League), 1930.
- Reports of the Industrial Commission on Labor Organizations, Labor Disputes, and Arbitration, and on Railway Labor*. Washington, DC: GPO, 1901.
- Robinson, Jesse Squibb. *The Amalgamated Association of Iron, Steel and Tin Workers*. Baltimore: Johns Hopkins Press, 1920.
- Robinson, Peter M. “Root-N-Consistent Semiparametric Regression.” *Econometrica: Journal of the Econometric Society* 56, no. 4 (1988): 931–54.
- Ruggles, Steven, Katie Genadek, Ronald Goeken, et al. *Integrated Public Use Microdata Series: Version 6.0 [Dataset]*. Minneapolis: University of Minnesota, 2015.
- Schattschneider, Elmer Eric. *Party Government*. New York: Holt, Rinehart and Winston, 1942.
- Schmick, Ethan. “Collective Action and the Origins of the American Labor Movement.” Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2018–05–01. <https://doi.org/10.3886/E102902V1>.
- Schneider, Dorothee. *Trade Unions and Community: The German Working Class in New York City*. Urbana: University of Illinois Press, 1994.
- Shiells, Martha Ellen. “Collective Choice of Working Conditions: Hours in British and US Iron and Steel, 1890–1923.” *Journal of Economic History* 50, no. 2 (1990): 379–92.
- Sombart, Werner. *Why Is There No Socialism in the United States?* White Plains: International Arts and Sciences Press, Inc., 1976 [1906].
- Statistisk Aarvog for Kongeriget Norge*. Kristiania: I Kommission Hos H. Aschehoug & Co., 1890.
- Stockton, Frank Tenney. *The International Molders Union of North America*. Baltimore: Johns Hopkins Press, 1922.
- Sveriges Officiella Statistik*. Stockholm: P.A. Norstedt & Söners Förlag, 1903.
- Voss, Kim. *The Making of American Exceptionalism: The Knights of Labor and Class Formation in the Nineteenth Century*. Ithaca: Cornell University Press, 1993.
- Walker, Francis A., and Charles W. Seaton. *Report on the Manufactures of the United States at the Tenth Census*. Washington, DC, Department of the Interior, Census Office: GPO, 1883.
- . *Report on the Mining Industries of the United States with Special Investigations into the Iron Resources of the Republic and into the Cretaceous Coals of the Northwest*. Washington, DC, Department of the Interior, Census Office: GPO, 1886.
- Washington, Booker T. *The Negro and the Labor Unions*. New York: Atlantic Monthly Press, 1913.
- Willoughby, William Franklin. “Employers’ Associations for Dealing with Labor in the United States.” *Quarterly Journal of Economics* 20, no. 1 (1905): 110–50.
- Wolfe, French Eugene. *Admission to American Trade Unions*. Baltimore: Johns Hopkins Press, 1912.
- Wolman, Leo. *The Growth of American Trade Unions, 1880–1923*. Cambridge: NBER, 1924.