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THE LEGISLATED ADJUSTMENT OF LABOR DISPUTES: AN EMPIRICAL
ANALYSIS, 1880 TO 1894

by
Joshua Abraham Gotkin

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A Dissertation Submitted to the Faculty of the
DEPARTMENT OF ECONOMICS
In Partial Fulfillment of the Requirements
for the Degree of
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THE UNIVERSITY OF ARIZONA

1995

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A handwritten signature in black ink, appearing to read "Joel A. Coll", is written over a horizontal line.

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DEDICATION

To my wife Vivienne who fills my life with love and laughter, and my father Dr. Lassar G. Gotkin, he would be very proud and pleased with how my life has turned out.

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ABSTRACT

The Federal government's involvement in railroad labor disputes was one of the earliest examples of government intervention in the economy. Initially, when the economy was crippled by railroad strikes in the late nineteenth century, the government stepped in and crushed them with troops and injunctions. The Federal government's other approach was legislative, beginning with the passage of the Arbitration Act of 1888. As the first piece of Federal arbitration legislation, it had a significant impact on the development of subsequent labor legislation, such as the Railway Labor Act of 1926 and the National Labor Relations Act in 1935. Several methods are used to assess the impact and importance of the Arbitration Act.

First, the political economy of the Arbitration Act is examined. Railroad owners opposed this legislation, fearing it would hinder their ability to hire, fire, and deal with striking workers. Organized labor favored arbitration, viewing such government intervention as providing a mandate that would compel, even force, employers to recognize unions. The ability of these constituent groups to influence their elected representatives is quantitatively tested using a simple model of legislative choice. The Arbitration Act was viewed as harmless, and even useless, by many Congressmen. Whether this legislation was effective is an important investigation.

Two approaches are used to assess the impact of the legislation. The first uses a monthly index of railroad stocks to investigate how the expected future profitability of railroad firms was affected. The price of railroad stocks fell, which implies that the legislation was expected to reduce future profits. Investors felt that this legislation did not serve the best interests of railroad capital.

The second approach examines how the passage of arbitration legislation affected strike frequency and duration. The analysis of the impact of the Arbitration Act confirms

that the mere presence of arbitration procedures can lead to an increase in strike activity. Evidently, the relative costs of railroad strikes were lowered, thus increasing strike activity. The imposition of legislated bargaining procedures can produce unexpected results, as illustrated by the Arbitration Act's effect on railroad strikes.

Chapter 1 Introduction

East and West, North and South, everywhere, there is unrest
(Carnegie, 1886).

The level of labor unrest in the 1880's and 90's was unprecedented in the history of the United States. The number of strikes and lockouts in 1880 alone was greater than the total number of recorded strikes and lockouts in the previous one hundred and forty years (United States Commissioner of Labor, 1887). The fact that change was needed, and wanted, was evident in the actions of government and public opinion during this period.

Many felt that battle lines had been drawn. Labor was attempting to seize control of rights and powers belonging exclusively to capital (Clews, 1886). Others perceived that a fundamental flaw existed at the foundation of society, robbing labor of fair and just compensation and exacting great injustice upon it (George, 1886). However, most agreed that strikes were an uncivilized method of resolving disputes (United States Strike Commission, 1895, pp. XLVI).

The government responded to this shattering of the industrial peace in several ways. First, it attempted to suppress strikes when they occurred by issuing injunctions and ordering out the troops to restore order. The nationwide railroad strike of 1877 was crushed when state and federal troops were ordered to not only suppress the riots and restore law and order, but to prevent strikers from interfering with railway service, the mails, and interstate commerce. This was a direct intervention in a conflict between labor and capital, not of an insurrection against the government (Eggert, 1967, pp. 41-53). The strike of 1877 set legal precedents for the use of force in railroad labor disputes and was,

for the next seventeen years, the predominant method of government intervention employed in the resolution of strikes in the railroad industry.

The other approach taken by government was legislative. Before 1881, only two states had legislation pertaining to the adjustment of labor disputes; however, by 1906, twenty-six states and the Federal government had passed legislation to arbitrate and mediate labor disputes. The Federal government's legislative involvement in labor relations began with the passage of the Arbitration Act of 1888, which dealt exclusively with railroad labor disputes. This legislation was a first step toward the development of modern bargaining rules, and the creation of such legislation as the Railway Labor Act of 1926 and the National Labor Relations Act in 1935.

The evolution of state and federal mediation and arbitration legislation is discussed in chapter 2, followed by an in depth analysis of the Arbitration Act of 1888 in the subsequent chapters. As the first piece of federal arbitration legislation, the Arbitration Act had a significant impact on later legislation. Exactly who supported and who opposed the passage of this legislation, and why, is central to understanding its creation.

The legislative intent of the Arbitration Act was to reduce strike activity. Groups that bore the costs of strikes should have favored this type of legislation. Clearly, the "public interest" should have played a significant role in the passage of this legislation. Railroad labor and management would also have been concerned with the passage of legislation that affected their bargaining relationship. Railroad management felt this legislation infringed on their rights to hire, fire, and deal with striking workers as they saw fit, and thus opposed the bill. Labor, especially organized labor, favored arbitration. They saw government intervention of this type as providing a mandate that would compel, even force, management to recognize unions and negotiate with them as workers' representatives (*Congressional Record*, 49-1, pp.2973).

The abilities of these constituent groups to influence their elected representatives can be captured by a simple model of legislative choice, where representatives vote in response to the desires of their constituents in an effort to increase their likelihood of reelection (Fiorina, 1974). The debates on the Arbitration bill in Congress, articles from the contemporary press, and secondary sources are used to discern the various views of legislators and interest groups. This evidence is then employed to construct hypotheses regarding these views and their effect on the passage of arbitration legislation. Roll call votes from the 49th House of Representatives are analyzed using a simple univariate probit to quantitatively test these hypotheses.

The results support the conclusion that railroad labor favored arbitration legislation, and railroad owners opposed it. Representatives whose states were affected by high levels of strike activity, and had high concentrations of manufacturing employment, were more likely to vote in favor of arbitration. In addition, party-line voting and issues raised in the debates as to the bill's constitutionality, place it in the fundamental debate regarding the power of the Federal government to regulate businesses that operated in the public interest. It is important to analyze the actual effects of the Arbitration Act after its passage.

The effects of regulation cannot be measured by only analyzing the provisions of the legislation and its passage. Stigler and Friedland (1962) claim that the economic effect of regulation is "independent of the content of the formal regulations." Two approaches are used to assess the impact of the legislation. The first approach uses monthly returns on a portfolio of railroad common stocks to investigate whether the expected future profitability of railroad firms was affected by the passage of the Arbitration Act of 1888. The effects of strikes and other events in the railroad industry are also analyzed. Returns reacted negatively to the beginning of strikes, and rebounded when strikes ended. The market viewed arbitration legislation as having a negative

impact on the expected future profits of the railroads. The second approach examines how strike frequency and duration were affected from 1881 to 1894 by the passage of state mediation and arbitration legislation, and the Arbitration Act of 1888.

The strike data employed in this part of the analysis were collected by the Commissioner of Labor of the United States and reported in the *Third, and Tenth Annual Reports of the Commissioner of Labor*, which cover the period from 1881 to 1894. These strike data are unique for two primary reasons. First, the detail of the strike information contained in these nineteenth century studies is not currently available in any other data sources covering strike activity (Card, 1990). Second, the labor market of the late nineteenth century was less constrained by laws governing the relationship between employers and employees. In particular, laws governing the adjustment of labor disputes were largely absent early in the years the studies cover, which makes this data ideal for examining the effects of the imposition of arbitration and mediation laws on strike activity. The Arbitration Act and the state legislation introduced arbitration and mediation into virgin territory.

If this legislation had had the intended effect, then the frequency and duration of strikes should have fallen. However, if arbitration lowered the relative costs of strikes, then the frequency and duration of strikes would have increased. In fact, Farber and Katz (1979) claim that the mere presence of dispute resolution procedures, like arbitration, affects the frequency, duration and outcome of disputes.

An examination of the Arbitration Act provides a natural historical experiment to test Farber and Katz's claim, since the arbitration provision of the Arbitration Act was never invoked; and to assess the impact of arbitration and mediation legislation on strike activity. The frequency and duration of railroad strikes actually increased after the passage of the Arbitration Act, which implies that the availability of arbitration lowered the relative costs of strikes.

One goal of this work is to provide a better understanding of the effects of third party intervention in labor disputes. When arbitration is available, it will change the relative costs of all possible actions. It is possible that the occurrence of strikes under systems of compulsory arbitration may be the result of the arbitration procedure itself. Any change in the bargaining environment, be it social, political, economic, or legislative, will affect the actions that employers and employees take; thus altering the frequency, duration, and outcome of labor disputes.

The other goal is to examine the development of Federal government intervention in labor disputes. The railroads were the nation's first big business, and the first industry to be regulated. The precedents set by government intervention in railroad labor disputes paved the way for subsequent government incursions into the railroad industry, and into other aspects of the economy. In the pages that follow, this study will examine the political economy and economic incidence of arbitration and mediation legislation.

Chapter 2 The Legislative Context for the Arbitration Act of 1888

2.1 Introduction

The intervention of government in labor disputes was induced by the unprecedented industrial strife in the United States in the late nineteenth century. The “labor problem,” as it was referred to in the contemporary literature, addressed the relationship between capital and labor, and how to resolve disputes between them. Henry Clews, a wealthy Wall Street financier, stated the problem in the following way:

The point to be determined is whether capital or labor shall, in the future, determine the terms upon which the invested resources of the nation are to be employed.

To the employer, it is a question whether his individual rights as to the control of his property shall be so far overborne as to not only deprive him of his freedom, but also expose him to interferences seriously impairing the value of his capital. To the employees, it is a question whether, by force of coercion, they can wrest, to their own profit, powers and control which, in every civilized community, are secured as the most sacred and inalienable rights of the employer (Clews, 1886, pp. 598).

Henry George’s view differed. In an editorial to *The Washington Post*, he approached the issue from a social perspective:

Great masses of men do not combine into widespread organization: they do not enter into contests that involve sacrifice and privation, unless impelled by strong motives, and under the spur of deep injustice. That there is at the foundation of our social structure a fundamental injustice is as apparent as the sun at noonday. And no matter what the political institutions, society can not be safely based upon injustice (*The Washington Post*, March 21, 1886).

As to the settlement of disputes between the two forces, Andrew Carnegie stressed that this should ultimately come through cooperation, and that “peaceful arbitration” should be resorted to in all disputes for which workers and business owners

are unable to reach a settlement through “friendly conference (Carnegie, 1886, pp.124).” Carnegie and many others felt that this was best accomplished not through government intervention, but voluntarily by business establishments. However, others felt that business would only adopt arbitration, or seek peaceful resolution of labor disputes, if compelled to by the government. What was needed was appropriate legislation which would “provide for a forcible but just settlement” of all labor disputes (*The Washington Post*, March 13, 1886).

The debate was fueled by the steady increase in strike activity beginning in the 1870’s (see Table 2.1). The number of strikes and lockouts in 1880 alone was greater than the total number of recorded strikes and lockouts in the previous one hundred and forty years. The level of labor unrest in the 1880’s and 90’s was unprecedented.

The labor problem quickly became a potent political and social issue, and society began to look to the government to provide the solution. The first governmental attempts at intervention in labor disputes employed court injunctions, and the Government’s police power. However, in the late 1870’s, individual states began to pass legislation to facilitate in the peaceful resolution of labor disputes through mediation and arbitration.

Table 2.1 Number of Strikes and Lockouts in the United States

<u>Year</u>	<u>Number of Strikes and Lockouts</u>
1870	24
1871	10
1872	25
1873	20
1874	28
1875	29
1876	32
1877	47
1878	40
1879	51
1880	762
1881	477
1882	476
1883	506
1884	485
1885	695
1886	1,572
1887	1,503
1888	946
1889	1,111
1890	1,897
1891	1,786
1892	1,359
1893	1,375
1894	1,404
1895	1,255
1896	1,066
1897	1,110
1898	1,098
1899	1,838
1900	1,839
1740-1869	372
1870-1879	306
1880-1889	8,533
1890-1899	14,188

Source: *Third Annual Report of the Commissioner of Labor*, pp. 1107-08.
Sixteenth Annual Report of the Commissioner of Labor, pp. 16, and 18.

2.2 State Legislation

Maryland passed legislation in 1878, and by 1886, Iowa, Massachusetts, Montana, New Jersey, New York, Ohio, and Pennsylvania all had some type of laws providing for the mediation and arbitration of labor disputes. The provisions of the statutes varied across states. Some, including Iowa, Maryland, Ohio (1885-1893), and Pennsylvania, had only private provisions for the creation of temporary boards of mediation and arbitration by the courts. The creation of these boards was generally by joint petition. These temporary boards' awards were binding by mutual agreement and enforced by the courts. The most notable exception to these provisions could be found in Pennsylvania where, on one-sided application, the non-petitioning party (defendant) was actually forced to submit to arbitration of the dispute.

Permanent boards of arbitration were set up in California, Louisiana, Massachusetts, Michigan, Montana, New Jersey, New York, and Ohio (1894). Idaho and Wyoming had constitutional provisions for the creation of a permanent board, but never established them. The awards of these boards were binding only by mutual consent, and none of the laws provided for any type of enforcement of the boards' decisions. In half of these states, arbitration could be requested on application by one side of the dispute, but still required the other side to voluntarily cooperate with the proceedings. These boards were free to offer their services to mediate and investigate disputes, except in California and Massachusetts. There, the boards could investigate disputes without application, but mediation required one-sided application before these boards could offer their services. Colorado's law only provided for the mediation of disputes by the State Commissioner of Labor; it wasn't until 1897 that they established a permanent board of mediation and arbitration .

Table 2.2 State Laws by 1900

<u>Year</u>	<u>State</u>
1878	Maryland
1880	New Jersey
1883	Pennsylvania
1885	Ohio
1886	Iowa
1886	Massachusetts
1886	New York
1887	Colorado
1887	Montana
1889	Idaho
1889	Michigan
1889	Missouri
1890	Wyoming
1891	California
1894	Louisiana
1895	Connecticut
1895	Illinois
1895	Minnesota
1895	Texas
1895	Wisconsin
1896	Utah
1899	Indiana
1899	Kansas
1900	Nebraska
1900	North Dakota

Sources: *Third Annual Report of the Commissioner of Labor*, pp. 1146-64.
Sixteenth Annual Report of the Commissioner of Labor, pp. 989-1036.
Twenty-first Annual Report of the Commissioner of Labor, pp. 919-960.
Kaltenborn (1943) pp. 171-217.
State Statutes for all States of the United States.

By 1900, twenty-five states had passed legislation providing for the peaceful resolution of labor disputes (see Table 2.2; for a detailed description of the State legislation, see Table A.1 in Appendix A). However, in most states the legislation was never used. The statutes in seventeen of the states provided that a permanent arbitration board be established, yet many never even set up their boards. Minnesota's 1895 law provided for a permanent board, but it was not established until 1917 (Ko, 1968). In the states that did establish boards, they were rarely used. The state board of arbitration in Illinois, established in 1895, was found to be unnecessary and was abolished in 1917. Of the twenty-five states with arbitration and mediation legislation, only five were actively involved in the adjustment of disputes prior to 1900 -- California, Massachusetts, New York, Ohio, and Pennsylvania.

New York and Massachusetts were the most active of these five states. The board in California heard only two cases, both in 1891, before being abolished in 1921 (Ko, 1968, pp. 16). Between 1886 and 1900 the New York Board of Mediation and Arbitration intervened in 402 disputes, but was only successful in settling 19 cases without strikes or lockouts (Kaltenborn, 1943, pp. 181; and Ko, 1968, pp. 19-20). During the same time, the Massachusetts Board of Arbitration and Conciliation intervened in 454 disputes, and was much more successful. The Massachusetts Board successfully settled 213 disputes -- 104 of which were resolved without strikes or lockouts (Ko, 1968, pp. 25).

Mediation, and not arbitration, was the most common form of adjustment on the state level by 1900 (Kaltenborn, 1943, pp. 187). However, in Massachusetts and New York, the original emphasis was on arbitration, not mediation. In fact, the New York statute provided for arbitration only, but was amended in the spring of 1887 to allow the original Board of Arbitration the power to mediate, investigate the causes of disputes, and to intervene in disputes on its own initiative. The law in Massachusetts provided for

arbitration and mediation, but the board quickly recognized that mediation was more effective than arbitration in the adjustment of labor disputes (Kaltenborn, 1943, pp. 187). The early state legislation and experience helped to shape subsequent state and federal legislation; it also affected attitudes regarding the efficacy of this type of legislation. As the United States Congress began debate on arbitration legislation, reference was made to the efforts of the States to adjust labor disputes, and the use of arbitration in England (*Congressional Record*, 49-1, pp. 2975, 3021, 3024, and 3029).

2.3 Federal Legislation

The Arbitration Act of 1888 was the first federal response, and was directed specifically toward strikes in the railroad industry¹. Railroad workers were heavily unionized -- particularly operatives (conductors, engineers, fireman, and brakemen).² By striking, the railroad unions had the potential to cripple the movement of freight, passengers, and the mails, consequently imposing great costs on railroad owners and the country.

For example, in 1877, in protest against wage reductions by several railroad companies, workers went on strike. The ensuing violence, "a veritable reign of terror in Baltimore, Philadelphia, Pittsburgh, Altoona, Harrisburg, Reading, Louisville and Chicago (Middleton, 1941, pp. 24)," resulted in destruction of property, and state troops were called in to restore order. The strike of 1877 marked the first major intervention of

¹The legislation as originally drafted was to apply to all common carriers engaged in interstate commerce (*Congressional Record*, 49-1, pp. 3037).

²At the turn of the century union membership in the labor force was around 3% and was only 18% in 1942 (Hirsch and Addison, 1986, table 3.1, pp. 46-47). The earliest figures available for railroad operatives is in 1910 -- 73.2% of engineers, 72% of conductors, and nearly all fireman were unionized, in sharp contrast to only 23.2 percent of manufacturing workers being unionized (Wolman, 1924, pp. 53-55, 90-93, and Appendix, Tables I, VI, VII).

the federal government in railroad labor disputes. It is this strike that Eggert refers to as “the first crisis (Eggert, 1967, pp. 24)”.

The Governors of Pennsylvania, Maryland, and West Virginia were unable to restore order. Therefore, they requested that President Hayes send Federal troops to quell the domestic insurrections existing in their states. In addition, as the strike halted the movement of the trains, it interrupted the interstate commerce and the mails. This was all the federal government needed to justify its intervention, and the strike was ultimately resolved using injunctions and force against the strikers. President Hayes made the following entry in his diary in the summer of 1877 after the strike: “the strikers have been put down by force; but now for the real remedy. Can’t something be done by education of the strikers, by judicious control of capitalists, by wise general policy to end or diminish the evil (Williams, 1924, pp. 440)?” The remedy was to be found in federal legislation.

The Arbitration Act of 1888 provided for the voluntary arbitration of disputes under a temporary three-person board of arbitrators: one arbitrator selected by each side of the dispute, and one mutually agreed-upon individual to act as the third. The board was created only on joint application by both parties to the dispute. No enforcement of the board’s awards was provided for; its decisions were non-binding. There was also a provision for an investigative board which could be created by the President -- at his discretion, or on application of either of the parties to the dispute, or by a state’s Governor. The investigative board was to be composed of three members: two appointed by the President, and the third was Commissioner of Labor of the United States (see Table A.2 in Appendix A, which summarizes the provisions of all the Federal Legislation). This first piece of Federal legislation was similar to State Statutes in force in 1886 in New Jersey, and Ohio.

The Pullman Strike was the first and only test of the Arbitration Act. On May 11, 1894, workers at the Pullman Car Company shops in Chicago staged a walkout over a 19% cut in wages. In support, the American Railway Union announced on June 23rd its intent to call for a nationwide boycott of Pullman cars on June 26th, if the company failed to negotiate with its striking workers.

The Pullman Car Company refused to negotiate, and the General Managers' Association of the twenty-four railroads in the Chicago area decided to resist the boycott. An attempt was made to get the Pullman Car Company to submit the dispute to arbitration under the Arbitration Act, but they refused and on June 26th the boycott went ahead as announced. Within a matter of days, rail traffic in and out of Chicago was paralyzed, tying up 29 railroads. When the workers failed to obey injunctions issued in federal court, President Cleveland ordered federal troops to the Chicago area on the third of July to protect federal property, to prevent obstruction of the mails, to prevent interference with interstate commerce, and to enforce injunctions issued by the federal courts.

Once the government stepped in, the strike/boycott did not last long. The trains were running by July 13, and on the sixteenth, the Pullman Car Company resumed normal operations. The railroad companies estimated property damage in excess of half a million dollars, and losses in revenue of almost five million dollars. The cost to employees affected by the strike was estimated at approximately 1.7 million dollars in lost wages. The industrial strife left twelve people dead, many injured, and over five hundred arrested including officers of the American Railway Union (United States Strike Commission, 1894).

The government forcefully intervened in the settlement of the Pullman Strike with the use of troops and injunctions, but did not attempt to help the two sides settle the dispute peacefully. The failure of the sides to voluntarily submit to arbitration was, in

part, due to a generally negative attitude towards arbitration. Railroad management had little confidence in the arbitration process, or the need for it, given the Federal government's accommodating strike policy of supplying injunctions and troops. Employers were the laws' strongest opponents. Organized labor favored arbitration. In the preamble to their constitution, the Knights of Labor endorsed compulsory, not voluntary, arbitration (Ko, 1968).

Although the arbitration clause of the Arbitration Act was not invoked, President Cleveland, using the investigative clause, appointed a commission on July 26, 1894 to investigate the Pullman Strike. The commission was encouraged "to find a general concurrence, even among labor leaders, in condemning strikes, boycotts, and lockouts as barbarisms unfit for the intelligence of this age, and as, economically considered, very injurious and destructive forces (United States Strike Commission, 1895, pp. XLVI)." The recommendations of this commission would significantly contribute to the next step in the legislative process (Table 2.3 lists the subsequent Federal legislation).

The Erdman Act of 1898 was the next piece of Federal legislation and reflected many of the recommendations of the United States Strike Commission's report on the Pullman strike. By 1898, the state's experiences with labor legislation had found mediation a more effective method than arbitration in the adjustment of labor disputes. The lack of a mediation provision in the Arbitration Act was considered one of its major defects; therefore, the Erdman Act provided for the settlement of railroad labor disputes with mediation. Under the Erdman Act, when a dispute threatened to interrupt railroad service, the Chairman of the Interstate Commerce Commission and the Commissioner of Labor were required to put themselves in touch with the parties of the dispute and attempt to bring about a settlement through mediation.

Arbitration was only resorted to, voluntarily, when the attempt at mediation failed. The temporary board of arbitration was to be set up as under the Arbitration Act.

Table 2.3 Federal Legislation

The Arbitration Act of 1888

The Erdman Act of 1898

The Newlands Act of 1913

The Adamson Act of 1916

Federal Control Act of 1918

Transportation Act of 1920 -- Title III (Esch-Cummins Act)

Railway Labor Act of 1926

Amendments to Railway Labor Act, 1934

Sources: Ko (1968), Kaufman (1954), Kaltenborn (1943), Fisher (1968), and the Statutes of the United States.

However, the Erdman Act differed in other significant ways besides the mediation provision. The first was that the award of the temporary board was enforceable in a court of law. The second was that employer discharge of employees, or strikes by employees, were prohibited during a pending arbitration. Also, once an award had been made, no discharge or strike was allowed for ninety days. After the expiration of this time, thirty days' notice was required for employee discharge or strike. These new provisions were an attempt to prevent strikes and the interruption of railroad service. The Erdman Act also prohibited yellow dog contracts, which barred workers from joining unions, and prevented employer discrimination against workers because of union membership. These last provisions were struck down by the Supreme Court in *Adair v. United States* in 1908.

The first time the Erdman Act was used in 1899, to mediate a wage and hours dispute, it ended in failure. The Brotherhood of Railroad Trainmen attempted to get the railroads to mediate, but they refused. The sentiments of railroad management were not much improved regarding mediation or arbitration. The latter was often considered an infringement upon the railroad's rights of determining wages and the hiring and firing of workers. Railroad management would "not in any manner relinquish to any tribunal but themselves their right of determining wages (Ko, 1968, pp. 61)." Organized labor had always favored arbitration, but while the railroad brotherhoods supported the Erdman Act, the American Federation of Labor opposed it. The Federation felt that the Erdman Act was "destructive of the best interests of labor (Ko, 1968, pp. 58)." It would be seven years before the Erdman Act was invoked again.

Once the Erdman Act was successfully applied to several cases, it was more frequently used. The effects of positive outcomes were cumulative, and employers even began requesting its use. By 1913, sixty one cases had been heard under the Erdman Act. Ko (1968) observed that, "when men thought there was hope of adjusting differences,

they would inevitably follow peaceful means rather than engage in struggles attended by suffering (pp. 59).”

The last dispute heard under the Erdman Act led to its undoing. The three member board of arbitrators placed too much responsibility on the mutually appointed third member. This defect proved fatal for the Erdman Act when, in 1913, a dispute over work rules and wages resulted in the threat of a major strike. Both workers and management were willing to arbitrate, but not under a three person board. To avert the strike, President Wilson promised new legislation. The result was the Newlands Act of 1913.

The main difference between the Erdman and Newlands Acts was the establishment of a permanent and independent mediation board, the Board of Mediation and Conciliation. This board was still used only voluntarily, but for the first time it could offer its services to parties of a dispute. Under both the Erdman and Newlands Acts, it was mediation, not arbitration, “which provided the basis for the settlement of many disputes (Kaufman, 1954, pp. 60).” Arbitration was still voluntary, but there now was a choice on the composition of the board. The temporary board of arbitration could have three or six members. In the case of a six member board, each side of the dispute was allowed two representatives, and the fifth and sixth members were to be chosen by mutual consent.

Once again the threat of a strike spurred changes in the government’s response to railroad labor disputes. The railway unions felt that they finally had the upper-hand, and a reversal in attitude toward government intervention took place. The unions, sensing their own power, were now less inclined to accept third party intervention when they might do better on their own. Railroad management now turned to the government for intervention, now favoring “more stringent controls (Kaufman, 1943, pp. 60)” to help control the unions and strike activity.

In March of 1916, the Brotherhoods -- the Brotherhood of Locomotive Engineers, the Brotherhood of Locomotive Fireman and Engineers, the Brotherhood of Railway Conductors, and the Brotherhood of Railroad Trainmen -- made demands for an eight hour day and time and a half for overtime. These demands were not open to negotiation. They refused mediation, and "stated that the issue was not arbitrable (Kaufman, 1943, pp. 61)." Labor remained obdurate, in spite of a willingness of management to negotiate. If their demands weren't met, the threatened strike would be a national one.

The ability of the railway unions to impose costs now extended to the nation itself. In the face of a certain national strike -- a national emergency -- the Adamson Act was passed in September of 1916 to avert the strike. The Adamson Act established, by law, the eight hour day for train operatives: engineers, firemen, conductors, and brakemen. The Act was unsuccessfully challenged by railroad owners in the Supreme Court case of *Wilson v. New*. An important result of the Court's ruling was legally establishing that "Congress had the power to provide for compulsory arbitration of railroad labor disputes (Ko, 1968, pp. 79)." The Federal government had, for the first time, directly intervened in a labor dispute and imposed a settlement by legislative act.

When the United States entered World War I, the uninterrupted operation of the railroads was crucial to the war effort. To guarantee that no interruptions of service occurred, the Federal government seized control of the railroads with the passage of the Federal Control Act of 1918. During the years of government control, and especially pro-labor years they were, many changes occurred. One of the first was the extension of the eight-hour day to all train employees. Union membership grew in response to freedom of membership and activity. Membership in some unions increased as much as ten-fold (Middleton, 1941, pp. 64). The wages between jobs were equalized. The unions were quite satisfied with this arrangement; management, of course, was not. The

government operated the railroads at a loss, which it subsidized. After the war, the question of whether to return the railroads to private control was debated in Congress.

The Plumb Plan, proposed by the railroad unions, would have retained government control, nationalizing the railroad industry.³ The proponents of the plan felt that “only public ownership was capable of properly recognizing human effort in the production of commodities and services (Kerr, pp. 163).” This plan was rejected by Congress and, with the passage of the Transportation Act of 1920 (Esch-Cummins Act), the railroads returned to private control. The supporters of the failed Plumb Plan viewed the Transportation Act, “as an arch conservative measure,” which was injurious to the best interests of railroad labor (Kerr, pp. 178). On the other side, railroad executives felt that the Transportation Act, while not perfect, was better than government control (Ko, 1968, pp. 82-102).

The Transportation Act provided for the creation of temporary Adjustment Boards along with the Railroad Labor Board. This permanent, nine member board was comprised of three members representing railroad management, three members representing railroad labor, and three members appointed by the President. All members of the Railroad Labor Board had to be confirmed by the Senate. Under the Transportation Act, railroad employees and employers were directed to settle disputes in mutual conference. If these negotiations failed, the dispute was then submitted to either an Adjustment Board or to the Railroad Labor Board for arbitration, depending on the cause of the dispute. Any dispute over wages, or one which an Adjustment Board could not successfully settle, was submitted to the Railroad Labor Board. The decisions of the Boards were advisory, and no enforcement mechanism was provided. The arbitration

³ The Plumb Plan was named after the union’s General Counsel, Glenn Plumb, who described it as not the “creation of any one man. It [was] rather God’s plan (Kerr, 1968, pp. 163).”

machinery could be invoked on one sided application by the parties of a dispute, or by the Board itself if it was of the opinion that the dispute could interrupt rail service and disrupt the interstate commerce.

Even though the Railroad Labor Board was fairly successful, having settled 13,690 cases, the legislation was flawed. The railway unions were not supportive of the Transportation Act on the grounds that the arbitration provision was essentially compulsory arbitration, which abrogated their right to strike and restricted their ability to collectively bargain with railroad management (Kaufman, 1943, pp. 65). The lack of union support handicapped the Board's effectiveness. In addition, arbitration, not mediation, was emphasized in the Transportation Act, because experience had shown that mediation was a more effective tool in adjusting labor disputes. These issues, combined with the inability of the Board to enforce its decisions, and administrative delays in the Board's decision-making process, led to demands by both railroad management and the railway unions for new legislation. The Railway Labor Act was the result.

The Railway Labor Act of 1926 abolished the Railroad Labor Board and, with the creation of the United States Board of Mediation, reestablished the mediation of labor disputes. The Board of Mediation was a permanent, five member board appointed by the President. Voluntary arbitration was provided by a temporary board of either three or six members. Under this Act, the President was authorized to create Emergency Boards to investigate all disputes. The Act required that the status quo be maintained during any adjustment or investigation. Neither the Board of Mediation nor the temporary arbitration boards were authorized to volunteer their services. Unlike the Transportation Act, the Railway Labor Act did not provide any direct intervention by government, except for investigation. No enforcement provision was provided and, as in the Transportation Act, all board decisions were merely advisory.

With a significantly less active role in adjusting disputes, the role of government was diminished. The main purpose of this law was to relegate the government to the position of arbitrator of last resort -- "railroads and their employees could best settle their own troubles and that government ought to intervene only when they fail (Kaufman, 1954, pp. 66-69)." Railroad management was fairly satisfied with the provisions of the Act. However, labor was not as satisfied. Although the Act prohibited the establishment of company unions, railroad management continued their sponsorship of these type of unions (Kaufman, pp. 66-69). Operationally, the inability of the Board of Mediation to intervene of its own accord reduced the Board's effectiveness in resolving disputes. To correct the deficiencies of the Act and to improve its effectiveness, and with the cooperation of both management and the unions, Congress amended the Railway Labor Act in 1934.

A new mediation board was established. The United States Board of Mediation was replaced by the National Board of Mediation, which was authorized to intervene in any dispute that threatened to interrupt the interstate commerce. The new Board of Mediation was also empowered to act as a referee to resolve deadlocks in the Adjustment Boards. It could now maintain a staff of mediators, which increased both the number of disputes heard by the Board, and the speed in which they were settled. Amendments were also made to the Act that specifically prohibited certain labor practices: it barred yellow dog contracts, outlawed discrimination against union members by management, and gave workers the right to select their own union representation.

2.4 Conclusion

The provisions of the Railway Labor Act, were the culmination of nearly fifty years of experience with the legislated adjustment of labor disputes. All of the prior legislation which had failed to incorporate mediation was ultimately not very successful. What of arbitration?

The legislation that incorporated provisions for the compulsory arbitration of disputes, like the Transportation Act, found little support. Voluntary arbitration alone was not satisfactory -- the Arbitration Act of 1888 was never used. The state legislation that only provided for arbitration either went unused, or was augmented with mediation by amendment as in New York and Massachusetts. Of the 3,910 disputes heard by the National Mediation Board between 1934 and 1952, only 150 were adjusted by arbitration (Kaufman, 1954, pp. 82).

The Arbitration Act of 1888, like many of the State Statutes, provided for the investigation of the causes of disputes. This same provision was included in the Railway Labor Act nearly a half-century later. The Railway Labor Act provides a clear role for the involvement of the Executive branch of government in maintaining the industrial peace.

The development of union power and collective bargaining can be traced in the legislative record. As early as the Erdman Act of 1898, employers were prohibited from interfering with employees' rights to organize. Employers were directed to bargain collectively, and to make and maintain written agreements with their employees, by the Railway Labor Act. Under pressure from railroad strikes, and on the threat of national railroad strikes, legislation was enacted and amended. The story of the growth and recognition of labor as a potent special interest is entwined in the history of mediation and arbitration legislation.

The intervention of government in labor disputes represents some of the earliest examples of government intervention in the economy. The economic costs of railroad strikes had reached a level at which they threatened the “general welfare” of the country. The motivations underlying the change in the Federal government’s role in the economy may have been more economic than social. Just as Henry Clews feared, the rights of the owners of capital in the railroad industry were abridged by the Federal Government. It is not that capital lost or labor won in this struggle, but that Congress found mediation and arbitration legislation to be “necessary and proper” in its Constitutional mandate to provide for the “general welfare.”

In the chapters that follow, I examine the political economy and economic incidence of the Arbitration Act of 1888. As the first piece of federal arbitration legislation, it played a significant role in the subsequent development of mediation and arbitration legislation. It also played a significant role in setting the stage for government regulation and intervention into the economy. An early version of the Arbitration Act passed both the House and Senate around the same time that the Interstate Commerce Commission was created. A thorough investigation of the Arbitration Act can help to identify some of the reasons behind the Federal government’s incursion into the economy in the 1880’s, leaving *laissez-faire* behind.

Chapter 3 The Political Economy of the Arbitration Act of 1888

Mr. REED, of Maine. Mr. Chairman, one of the greatest delusions in the world is the hope that the evils in this world are to be cured by legislation. (*Congressional Record*, 49-1, pp. 2966)

Mr. GLOVER, of Missouri. Gentlemen say, "Let [capital and labor] fight it out." But, gentlemen, while they are fighting it out the commerce of this country is injured and destroyed. How long are they to be allowed, by culpable lack of legislation, to continue a conflict that grows worse and worse as it goes on? (*Congressional Record*, 49-1, pp. 2970)

3.1 Introduction

A central question in the analysis of arbitration and mediation legislation is, who supported it? Was this legislation in the "public interest", or did it benefit a particular interest group or set of interest groups? By identifying who favored or opposed this type of labor legislation and why, a clear picture can be constructed of the reasons for its creation. The goal of this chapter is to discern which groups were involved and what their opinions were regarding the legislative adjustment of labor disputes, and how they were able to influence the formulation and passage of the legislation.

A basic model of legislative choice is applied to the voting behavior of members of the House of Representatives on an early version of the Arbitration Bill. In analyzing the voting behavior, I assume that a representative votes in response to the demands of a his or her constituents, and possibly his or her own interests (Fiorina, 1974; Peltzman, 1984; Kalt and Zupan, 1984; McGuire and Ohsfelt, 1986; Tollison, 1982; and Welch and Peters, 1983).

The stated intended effect of this type of legislation was to reduce strike activity. As such, if railroad management and labor felt that strike-imposed costs could be reduced without compromising their ability to maximize their shares of the economic rents in the

railroad industry, then both groups would have supported arbitration legislation. The other parties interested in reducing strike activity were those strongly affected by the external costs of strikes. Businesses which depended on the railroads for supplies of intermediate goods, and the shipment of final goods to market, would favor any legislation that reduced railroad strike activity. Consumers of railroad passenger service, and individuals who depended on the railroads to provide consumption goods, would also favor legislation that reduced strike activity. Farmers who relied on rail transport for delivery of crops to market would favor this type of legislation as well.

Legislative action aimed at solving the problem of railroad strikes coincided with railroad strike activity. Strikes evidently brought significant pressure to bear on Congress. Whether this pressure originated from railroad owners, railroad labor, shipper, or other interests is what this chapter seeks to determine.

3.2 Legislative Activity

The railroad strikes of 1877 awakened government and the public to the ability of labor disputes between railroad owners and labor to impose enormous costs on society. However, there was no general consensus of how to solve the railroad strike problem. Suggested remedies ranged from increasing the size of the army and passing legislation to prohibit strikes, to the use of compulsory arbitration for all labor disputes. The first concerted effort by Congress occurred during the Southwest Strikes of 1885 and 1886.

The strikes in the Southwestern United States on the lines owned by Jay Gould were the result of the railroads cutting wages in response to the business cycle downturn that began in late 1884. It was at the height of these strikes in 1886 that the Congress began to consider actual labor legislation in earnest. The first two bills introduced never made it out of committee. The Glover Bill, House Resolution 7081, and the Andersen Bill, House Resolution 7020, contained provisions for compulsory arbitration and

enforcement of the award in a court of law. The bill introduced by Representative John J. O'Neill of Missouri, House Resolution 7031, provided for voluntary arbitration with court enforcement of the arbitrated award. The bill that emerged from the House's Committee on Labor was weaker than HR7081 and HR7020, and HR7081. Table 3.1 provides a detailed description and listing of the legislative activity during this period.

House Resolution 7479 provided for the voluntary arbitration of disputes by a temporary board of three arbitrators. The award of this board was non-binding, and trusted to the "power of public opinion for the enforcement of the award (*Congressional Record*, 49-1, pp. 2959)." Representative John J. O'Neill explained that the bill was the "best we [the Committee on Labor] could do (*Congressional Record*, 49-1, pp. 2959)." He acknowledged that many members of the House would find the bill disappointing, but that the bill provided for the only method of resolving disputes that was both consistent with the Constitution and that "did not conflict with State rights or State laws (*Congressional Record*, 49-1, pp. 2959)."

The debates in Congress over House Resolution 7479 centered upon three polar positions. The first saw the Bill as absolutely ineffectual; the second was a non-interventionist position which saw no legal role for government in regulating the relationship between labor and capital; and the third view asserted that the Bill, having high moral purpose and the welfare of the nation at its heart, was necessary to ensure peaceful settlement of labor disputes. The first position was articulated by Representative William D. Kelley of Pennsylvania who contended, "I will vote for any Bill for the relief of oppressed labor; but I will not vote for this mass of words unless my vote be accompanied with this notice that the bill means nothing (*Congressional Record*, 49-1, pp. 2962)." Representative Julius Ceasar Burrows of Michigan agreed that "this seems to be an entirely harmless bill (*Congressional Record*, 49-1, pp. 2962)."

Table 3.1 Congressional Activity on Railroad Labor Legislation 1886-1888

<u>Date</u>	<u>Bill Number</u>	<u>Description</u>
03/22/1886	HR7020	Bill introduced to create U.S. Commission of Arbitration by Rep. Andersen (KS, Rep); sent to Committee on Labor; dies in committee.
03/22/1886	HR7081	Bill introduced to provide for the settlement of labor disputes by arbitration, by Reps. Glover (MO, Dem.) and Burnes (MO, Dem.); sent to Committee on Labor.
03/29/1886	HR7313	Bill introduced to create boards of arbitration for the speedy settlement of controversies and differences between common carriers and their employees, by Rep. O'Neill (MO, Dem.); sent to Committee on Labor.
03/31/1886	HR7081	Bill withdrawn by Rep Glover.
03/31/1886	HR7313	Replaced by HR7479.
03/31/1886	HR7479	Replacing HR7313; bill is favorably reported on from committee by Rep. O'Neill.
04/3/1886	HR7479	Passes House 199 to 30.
04/05/1886	HR7479	Bill referred to Senate Committee on Education and Labor, by Sen. Blair (NH, Dem.).
04/06/1886	HR7479	Bill favorably reported from committee, by Sen. Blair.
04/12/1886		Curtin Committee appointed to investigate the Southwest strike.
02/28/1887	HR7479	Passes Senate without division.
03/04/1887	HR7479	The Bill is pocket vetoed by President Cleveland.
03/16/1888	S2396	Sen. Blair reintroduces HR7479; referred to Committee on Education and Labor.
03/19/1888		Special House Committee appointed to investigate the Atchison, Topeka, and Sante Fé Railroad strikes.
03/19/1888	HR8665	Rep. O'Neill reintroduces HR7479; sent to House Committee on Labor.
04/17/1888	HR8665	Bill favorably reported by House Committee on Labor.
04/18/1888	HR8665	Bill passes House. ^a

Table 3.1 continued

04/19/1888	HR8665	Bill referred to Senate Committee on Education and Labor.
07/28/1888	HR8665	Bill reported without amendment by Senate Committee on Education and Labor, by Sen. Wilson (IA, Dem.).
09/17/1888	HR8665	Passes Senate. ^a
10/01/1888	HR8665	Signed by President Cleveland.

Source: *Congressional Record*, 49-1, and 50-1.

^a The actual vote was not recorded.

One of the strongest opponents of HR7479, Representative Martin A. Foran of Ohio, who served on the House Committee on Labor¹, was “opposed to all adjustments of labor disputes between labor and capital which is based upon legislative enactment.” He found the idea of forced conciliation amongst men as “repugnant to the human mind (*Congressional Record*, 49-1, pp. 2962).” The thought of Congress actually proposing to enact legislation to provide for the arbitration of labor disputes was “nonsense run mad (*Congressional Record*, 49-1, pp. 2963).” The opponents of the bill objected to government intervention in labor disputes on several grounds -- sovereignty of State’s rights, the rights of capital, and the constitutionality of the legislation.

Representative John J. O’Neill, who introduced the bill and also served on the House Committee on Labor, was a staunch supporter of labor and saw the bill as both necessary and effective. He felt that this type of legislation would “compel the parties on both sides to appeal to reason and to say that brute force shall not and need not be used to obtain human rights (*Congressional Record*, 49-1, pp. 2960).” Proponents of the legislation considered the labor problem, the conflict between labor and capital, as a fundamental issue in human relations that Congress, that Government, was obligated to solve (*Congressional Record*, 49-1, pp. 2963). Arbitration legislation was, if not the cure, at least a step in the direction of discovering a solution to the strike problem (*Congressional Record*, 49-1, pp. 3014). Representative Gibson of West Virginia, a proponent of the legislation, felt it was necessary for the government to “take hold of all controversies arising between capital and labor, arising in public institutions and corporations, and settle them, not purely for labor alone, not purely in the interest of capital alone, but in the interest of the public and in behalf of the country (*Congressional Record*, 49-1, pp. 3009).”

¹Rep. Foran had acted as the prosecuting attorney for the City of Cleveland against the striking railroad workers in 1877.

One side of the debate felt that labor and capital had to be compelled to resolve their differences. The other side objected to the government enacting such legislation. Both sides recognized the severe consequences of railroad strikes, but still could not agree on how to solve the problem. The bill, HR7479, finally passed both houses of Congress in late February of 1887, but was subsequently vetoed by President Cleveland.

The President claimed to favor arbitration, but felt the bill was not “sufficient (*Washington Post*, March 10, 1887).” In a meeting with Representative John J. O’Neill, the President explained that the lack of government involvement in the administration of the legislation’s provisions caused him to withhold his signature from the bill. The bill originally submitted by Representative O’Neill to the President had a provision for the awards of the temporary boards of arbitration to be reported to the Clerk of the United States Court. This gave to the award, “effect and form of a judgment (*Washington Post*, March 10, 1887).” Representative O’Neill informed the President that a bill which contained any compulsion of the award would never pass Congress, but that he would attempt to prepare a “bill for the next Congress in harmony with the President’s view (*Washington Post*, March 10, 1887).”

The next round of legislative activity did not occur until the Burlington Strike in February of 1888. By mid-March, when HR7479 was reintroduced in both the Senate and the House, strike breakers had been hired to replace striking workers on the Chicago, Burlington, and Quincy; and injunctions had been issued to block the sympathy boycott of Burlington cars. Once again, negotiations had broken down between railroad management and workers, and the nation was threatened by a strike “of gigantic proportions (McMurry, 1956, pp. 70).”

The bill re-designated as HR8665 passed the House in April with little debate, and was amended to provide for an investigative board appointed by the President. The bill was sent on to the Senate, but did not pass until September. The Arbitration Act of 1888

was signed into law on October 1 by President Cleveland, too late to be any use in the Burlington Strike.

The next step in this analysis is the specification of variables to capture constituent and legislator interests. Organized labor favored arbitration legislation and railroad owners opposed it. A great deal of evidence was entered into the record of the Congressional debates indicating that manufacturing interests also favored arbitration. By quantitatively modeling voting behavior, hypotheses can be constructed to test whether Representatives voted in line with their constituents' interests, special interests, or in the public interest.

3.3 Determinants of Voting Behavior

3.3.1 Modeling Voting Behavior

An elected representative's maximization problem is one in which the representative seeks to maximize the probability of reelection by introducing and voting for legislation which benefits their constituencies. This suggests that how a representative votes on a particular piece of legislation is a function of his constituents' interests. The probability of representative i voting in favor of bill j can be expressed in the following form

$$P_{ij} = f_i(X_i)$$

where X_i is a vector of representative i 's constituents' interests.

Kalt and Zupan (1984), and McGuire and Ohsfelt (1986) feel that this model is too simple and that a representative's personal economic interests and ideologies need to be included as determinants of voting behavior. They also argue that constituents'

interests should include both economic and ideological interests. The modified model can be expressed as

$$P_{ij} = f_i(X_i, Z_i)$$

where X_i is a vector of representative i 's constituent interests including both economic and ideological interests, and Z_i is a vector of the personal economic interests and ideology of representative i .

3.3.2 Constituent Interests

The selection of a set of variables to measure constituent interests needs to be both general and specific in order to capture the general or public interests, and special interests. Population, employment, wealth, and strike data are collected from the *Tenth Census of the United States*, *Poor's Manual of Railroads*, and the *Third Annual Report of the Commissioner of Labor of the United States*. These data are not easily disaggregated down to the district level -- a clear deficiency which cannot be easily overcome.

This does potentially introduce some aggregation bias into the results. If a State's demographics were homogenous across all districts, then the aggregation bias would be non-existent. However, for most states, especially those with urban areas, there may be significant differences across congressional districts. The aggregation bias may over- or under-emphasize the importance of an interest group in a Representative's district. To the extent that arbitration legislation applied to railroad operations across an entire state, railroad labor and owners would have attempted to influence all of a state's Representatives, minimizing the aggregation bias. In order to control for some constituent interests at the district level, an urban dummy variable and a district level party attachment variable have been used. A summary of the data, and descriptive

statistics for the data by voting behavior, are provided in Table 3.2 and Table 3.3. The Arbitration Bill was related specifically to railroad labor disputes, so the first interest group to be scrutinized will be the railroads.

The importance of railroads is likely to be highly correlated with the size of railroad operations in a member's district. The number of miles of track operated, revenues, level of investment, and profitability should be good measures of the strength of railroad interests in a Representative's district. These variables are available in *Poor's Manual of Railroads* on an annual, by state basis. The effect of railroads on a state tended to be widespread; therefore, the use of state level data should not introduce too much aggregation bias. The total wealth of railroads per capita is used as a measure of the size of railroad operations in a state². Total investment and revenues for 1885 are summed together and divided by a state's population to arrive at railroad wealth per capita.

The expected effect of railroad interests on a Representative's voting behavior on the Arbitration Bill is negative, because the railroads opposed this type of legislation (Ko, 1968, pp. 56). Jay Gould, president of the Missouri Pacific Railway Company, favored arbitration, but only between the company and individual workers (Klein, 1986, pp. 360). During the Southwest strike of 1886, the Missouri Pacific refused the Knights of Labor's request for arbitration (*Washington Post*, March, 17, and 30, 1886). Gould felt that compulsory arbitration would find few friends, and that an employer's right to dismiss and hire workers should "remain unimpaired under all circumstances (*Washington Post*, April 25, 1886)." If a Representative's state was characterized by significant railroad interests -- high railroad wealth per capita -- then a Representative would be less likely to vote in favor of arbitration legislation.

²The total wealth and miles of track operated in a state were highly correlated and collinear.

Table 3.2 Description of Data Used in the Voting Analysis

<u>Variables</u>	<u>Definition</u>
Democrat ^a	Member's political party affiliation: Democrat=1, Republican=0.
Southern Democrat	Dummy variable for Democratic Representatives from the deep South: Virginia, Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, N. Carolina, S. Carolina, and Texas.
Serving first-term	Dummy variable equal to 1 if the 49th Congress was the member's first term.
Age	Member's age.
College educated	Dummy variable for completion of college education.
Agricultural	Previous occupation agriculture/farming dummy variable.
Manufacturer	Previous occupation manufacturing dummy variable.
Trade and transportation	Previous occupation trade and transportation dummy variable.
Professional and personal services	Previous occupation professional, and personal services: lawyer, banking, journalist/publisher, doctor, college professor, public servant, engineer, soldier, and clergyman.
Urban district	Dummy variable equal to 1 if a member's district was urban. These are cities with population greater than 19,000, and identified as being one of the 100 principal cities in the U.S. as defined by the census, 1880.
Southwest Strike	Dummy variable for states affected by the Southwest strike: Arkansas, Kansas, Louisiana, Missouri, Nebraska, Tennessee, and Texas. ^b
Percent Democrat	The percent of voters in a district that voted Democratic in the House elections of 1884. ^c
Percent Black	Percent of state population Black, 1880. ^d
Percent immigrant	Percent of state population foreign born, 1880. ^d

Table 3.2 Continued

<u>Variables</u>	<u>Definition</u>
Percent employed agriculture	Percent of persons in a state employed in agriculture, 1880. ^d
Percent employed manufacturing	Percent of persons in a state employed in manufacturing, 1880. ^d
Percent employed trade and non- railroad transportation	Percent of persons in a state employed in trade and non-railroad transportation, 1880. ^d
Percent employed railroad transportation	Percent of persons in a state employed in railroad transportation, 1880. ^d
Farm wealth per capita	The amount invested in land, buildings, fences, and implements plus the value of agricultural products, divided by a state's population, 1880. ^d
Manufacturing wealth per capita	The amount invested in plant and equipment plus the value of manufactured goods, divided by a state's population, 1880. ^d
Railroad wealth per capita	The amount invested in railroads plus railroad revenues, divided by a state's population, 1885. ^{d,e}
Percent strikes union organized ^f	Number of union organized strikes, divided by the total number of strikes for 1885-1886, by state.
Percent of days lost to railroad strikes	The average length of railroad strikes multiplied by the number of employees involved in railroad strikes for 1885-1886, divided by railroad employment, multiplied by 624 days, by state.
Percent of days lost to non-railroad strikes	The average length of non-railroad strikes multiplied by the number of employees involved in non-railroad strikes for 1885-1886, divided by non-agricultural, non-railroad employment, multiplied by 624 days, by state.

Sources: ^a all characteristics of house members from ICPSR 7803.

^b *Washington Post*, *New York Times*, and *Poor's Manual of Railroads*.

^c *Guide to U. S. Elections* (1985).

^d *The Tenth Census of the United States*, v1, and v2.

^e *Poor's Manual of Railroads*, 1886.

^f all strike data from *Third Annual Report of the Commissioner of Labor*.

Labor was divided on the issue. The railroad brotherhoods and the Knights of Labor favored arbitration, as evidenced by their appeals for arbitration of disputes. The Knights of Labor's platform called for the "enactment of laws providing for the arbitration of differences between employers and employés [sic] (*Congressional Record*, 49-1, pp. 3036)." During the debates on the Arbitration Bill, letters received from labor organizations were presented as evidence in favor of the bill. In fact, many of the letters favored compulsory arbitration. A letter received from the Eureka Assembly 4180, Knights of Labor in Bonne Terre, Missouri called for legislation that would "compel the recognition of labor organizations, and compel corporations to arbitrate differences between their employés (*Congressional Record*, 49-1, pp. 2973)."

However, there is some evidence that the Arbitration Bill was not favorably viewed by certain Representatives of organized labor. The Workmen's Ethical Society of Washington opposed the Arbitration Bill (*Washington Post*, April 10, 1886). The *Post* interviewed several members of the Knights of Labor who were adamantly opposed to the Arbitration Bill. These Knights were worried that the lawyers of "rich railroad corporations" could prolong the process of arbitration "indefinitely" and turn the proceedings to the railroad's favor (*Washington Post*, March 31, 1886). For the most part, however, labor opposition to the Arbitration Bill was very limited. The majority of workers and labor organizations favored arbitration and arbitration legislation.

Overwhelmingly, organized labor wanted employers to recognize and negotiate with them as the representatives of workers. Employers were generally quite successful in ignoring the demands of workers. They employed lockouts, hired strike breakers, and used injunctions to resolve strikes, rather than enter into negotiations with striking workers (Eggert, 1967, pp. 59-69). Organized labor felt that arbitration legislation would promote or even force employers to negotiate with unions.

The data available for union membership on the state level, and even the national level for the 1880's is very poor. Garlock (1982), in a study of the Knights of Labor, can only account for membership in less than one third of the Local Assemblies of the Knights. There is no way to judge how representative the sample is for which he has membership numbers. Rather than use these membership numbers as a measure of union activity, the number of union organized strikes was divided by the total number of strikes in a state between 1885 and 1886. Given the position of organized labor, Representatives from states with heavy union activity would be more likely to vote for arbitration legislation. A positive effect is expected for the percent of strikes union organized.

In addition, the percentage of a state's labor force employed in agriculture, trade and non-railroad transportation, manufacturing, and railroad transportation, are included as a more general measure of labor's importance in a member's constituency. The evidence from the debates favors a positive effect for both manufacturing and railroad transportation employment. Given agriculture's weaker ties to railroad interests, Representatives with significant agricultural interests would be less likely to vote in favor of the arbitration legislation, unless agriculture was highly dependent on the railroads for delivery of crops.

Persons occupied in trade and non-railroad transportation should have supported arbitration legislation since they were affected by the external costs of railroad strikes. A positive effect for percent employed in trade and non-railroad transportation would be consistent with this scenario. However, it is possible that the effect could be negative. The arbitration legislation represented a form of regulation of the interstate commerce, and individuals engaged in trade and transportation, fearing government intervention and regulation, would not have favored the arbitration legislation.

The other groups that stood to benefit from a reduction in strike activity were those affected by the external costs of strikes. The fact that there were more than two

parties involved in a railway strike was clearly recognized by congressmen (*Congressional Record*, 49-1, pp. 3017). Manufacturing operations were often impaired by strikes, and Representatives who served states with large manufacturing sectors should have voted in favor of the arbitration legislation. The manufacturing/corporate lobby in congress favored the passage of the Arbitration Bill (*Congressional Record*, 49-1, pp. 3019). Representative Glover of St. Louis, Missouri, was concerned for his manufacturing constituents. He spoke out in favor of the Arbitration Bill during the debates, reporting that in March alone “260,000,000 pounds of freight, valued at \$40,000,000, would have moved had there been no strike. Ten flouring mills and scores of manufacturing establishments have been forced to shut down for want of raw materials (*Congressional Record*, 49-1, pp. 2970).”

The manufacturing wealth per capita in a state is used to ascertain the position of manufacturing interests on the bill. The only evidence entered into the House debates from manufacturing interests suggests that they supported the Arbitration Bill (*Congressional Record*, 49-1, pp. 3019, 3022-24). This is not definitive evidence of manufacturing interests' disposition towards arbitration. If manufacturing interests favored arbitration, then high manufacturing wealth per capita would have a positive effect on the probability of a Representative voting in favor of the Arbitration Bill. However, if manufacturing interests harbored similar opinions to those espoused by Jay Gould, then an inverse relationship would be expected.

No direct evidence surfaced regarding farming interests' position on the arbitration issue. The farm wealth per capita variable captures the importance of agriculture in a state. The aggregation bias is likely to be significant for this variable. For example, the Midwestern States had both high farm wealth and manufacturing wealth per capita, but this wealth was not evenly distributed across congressional districts. However, even in the aggregate, Representatives from states with high farm wealth and

dependence on railroad transportation would be more likely to vote in favor of arbitration legislation. Also, the agrarian protests of the 1880's, which were predominately aimed at the railroads and big business (Puth, 1988, pp. 303-9), would have increased the likelihood of voting for arbitration legislation. Therefore, a positive effect would be consistent for the farm wealth per capita variable.

The last few constituent variables are included to capture general state and district level characteristics. Blacks resided in predominately rural areas and were concentrated in the South. Any effect associated with the percent of the population that was Black is more likely to be a pure regional effect, than caused by the preferences of Blacks, who were becoming increasingly disenfranchised in the Southern States. The expected effect for the percentage of the population that was Black is unclear. The percent of the population that were immigrants is included to further differentiate regional differences. The expected effect for this variable is also unclear.

Urban areas were highly dependent on the railroads for the supply of consumption goods. Representative Glover feared for the well-being of his constituents, concerned that railroad strikes could potentially threaten the people of St. Louis with "famine in the midst of plenty (*Congressional Record*, 49-1, pp. 2970)." The urban district dummy variable should help diminish some of the aggregation bias. This variable is equal to 1 if a Representative's district was located in an urban area. The cities included in this variable had populations over 19,000 and were identified as being one of the 100 principal cities in the United States by the 1880 census (U.S. Bureau of the Census, 1883, v2, pp. 379-80). A list of these cities can be found in Appendix A, Table A.3. The expected effect for the urban district dummy variable is positive.

The legislative activity in early April 1886 on arbitration legislation occurred against the backdrop of the Southwest Strike. A dummy variable is constructed and set equal to 1 for states that were involved in the strike. The Missouri Pacific and Gould

System of railroads serviced Texas, Louisiana, Oklahoma, Arkansas, Tennessee, Colorado, Kansas, Missouri, and Nebraska. The cities of Ft. Worth, New Orleans, and St. Louis were particularly hard hit by the strike. The Representatives from these states were well aware of the injurious effects of strikes and should have voted in favor of arbitration. Thus, a positive effect is expected for the Southwest Strike dummy variable.

The other strike activity variables -- percent of days lost to railroad and non-railroad strikes, should have a similar effect on how a Representative voted, and thus, should also have a positive effect on the probability of voting in favor of the arbitration legislation.

The final constituent variable is included to capture constituent ideology. The percentage of Democratic votes cast for United States Representatives in a congressional district was used to identify constituent party attachment. Values in the forty-five to fifty-five percent range are indicative of districts where Representatives might be more likely to cross party lines when voting, and have weaker party attachments. The effect for this variable should parallel that of the Representative's party variable -- Democrats tended not to favor the arbitration legislation, because of beliefs about the proper role of the Federal government, and the sovereignty of States' rights. Therefore, the higher the percentage of Democrats in a Representative's district, the less likely a Representative would be to vote in favor of arbitration legislation.

3.3.3 Representative Self-Interest

Why might a legislator vote in a manner contrary to his or her constituent's interests? One reason would be because a Representative had a personal interest that might be affected by the passage of arbitration legislation. The railroads feigned being in favor of arbitration, but they clearly had little incentive to arbitrate disputes, especially with union representatives, given their success in dealing with strikes in other ways. If a

member of the House had private railroad interests it is likely, that he would have voted against the Arbitration Bill. A legislator with manufacturing interests might have voted in favor of the bill, even if railroads represented a significant proportion of their constituency. A member's last occupation before taking service in the House may reveal private economic interests.

The occupations are collapsed into four categories -- agricultural, manufacturer, trade and transportation, and professional and personal services. If private economic interests contribute to voting behavior, then the effects of these dummy variables would be statistically significant. A Representative would vote in favor of the legislation if he felt that his private economic interests would be served, and against it otherwise. The professional and personal services dummy variable includes, in descending proportions, lawyers, bankers, doctors, journalists/publishers, college professors, public servants, engineers, clergymen, and soldiers. Lawyers comprised 83 percent of the professional and personal services category, and 69 percent of overall House membership.

There was only one member in the trade and transportation category with significant ties to the railroad industry. Representative William Scott of Pennsylvania had been the "president or director of various lines, aggregating over 22,000 miles of completed road, the greatest number of miles of railroad, probably, which any one individually was ever an officer or director of (U. S. Congress, 1886, pp. 80)." If private interest had influenced Representative Scott, then he would have voted against the Arbitration Bill.

Another potential cause for voting opposite the interests of one's constituency is personal "ideology." This type of behavior can often be captured by how a member has voted on similar issues. For instance, if a legislator generally voted against big business, then it is likely they would have voted for the Arbitration Bill even when large numbers of their constituents favored the arbitration legislation. However, the problem of a

Representative's "ideology" is generally not worrisome, since a Representative's "ideology" is highly correlated with his constituent's "ideology" (Peltzman, 1984). There is a positive correlation of 0.6375 between a Representative's Democratic party affiliation, and the percentage voted Democratic in a congressional district. A Representative's party affiliation is often considered as a good proxy for a legislator's "ideology".

Even so, there is evidence that some Representatives did vote contrary to the best interests of their constituents. Martin Foran, an Ohio Democrat who represented constituents in Cleveland, felt that the government had no business regulating the relationship between labor and capital. In fact, he found the idea of forcing or compelling men to be conciliatory as "repugnant to the human mind (*Congressional Record*, 49-1, pp. 2962)." Foran represented an urban constituency with strong manufacturing interests, yet he took up a position in opposition to the bill.

A Representative may have voted in a manner contrary to his constituents based on whether or not he felt that government had a legal obligation to solve the labor problem. The constitutionality of the arbitration legislation revolved around the issues of state sovereignty and the powers of the Federal government. The Democrats tended to be strong proponents of State's rights, and thus would have been more likely to vote against the Arbitration Bill. Therefore, a negative effect is expected on the Democratic dummy variable.

A dummy variable is also included to capture the voting behavior of Southern Democrats. They were strong proponents of States' rights and tended to consistently vote together. Therefore, they would have been more likely to have voted against the Arbitration Bill.

In addition to party affiliation and occupation, a Representative's age, level of education, and congressional service are included as general measures of a

Representative's personal characteristics. The arbitration legislation was controversial; a vote in favor of the bill represented support of a fundamental shift in the role of the Federal government in the economy. Representatives serving their first terms in the House may have been reluctant to take a stand on this heated issue, thus a negative effect is expected for the serving first term dummy variable.

The fundamental change this bill represented would be more likely embraced by younger members of the House; thus, age should have a negative effect on the probability of voting for the legislation. The level of education is also likely to have a negative effect on the probability of voting in favor of the legislation. Representatives with more education might have been more prone to challenge the legislation along constitutional grounds. The next section examines the actual voting behavior of House members with respect to the arbitration legislation.

3.4 The Voting Data

The Arbitration Act of 1888 passed the House of Representatives on April 18, 1888 (*Congressional Record*, 50-1, pp. 3109), and the Senate on September 17, 1888 (*Congressional Record*, 50-1, pp. 8609). However, no record of how individual Representatives or Senators voted was reported in the *Congressional Record*, *The New York Times*, or the *Washington Post*. This fact makes it impossible to analyze voting behavior on the passage of the final bill.

The earlier version of the Arbitration Act, passed during the previous legislative session (HR7479), which was vetoed by President Cleveland, has several recorded roll call votes related to the bill. There are three roll call votes in the House on April 1, 2, and 3 1886, for consideration of taking up debate on the bill (*Congressional Record*, 49-1, pp. 3027, 3032-33, and 3059-60). The fourth roll call is for the House's passage of the bill

Table 3.3 Description of Roll Call Votes

<u>Variables</u>	<u>Description</u>
Votes	Voting behavior: opposed to arbitration=0 in favor of arbitration=1 not voting=2
Vote1	Vote not to adjourn and take up debate on the Arbitration Bill, April 1, 1886. 193 in favor, 64 opposed, 66 not voting. ^a
Vote2	Vote to change order of business and take up debate on the Arbitration Bill, April 2, 1886. 154 in favor, 71 opposed, 98 not voting. ^b
Vote3	Vote to put aside debate on the Silver Bill and take up debate on the Arbitration Bill, April 3, 1886. 128 in favor, 87 opposed, 108 not voting. ^c
Vote4	Vote for passage of the Arbitration Bill, HR7479, April 3, 1886. 199 in favor, 30 opposed, 94 not voting. ^d

Sources: ^a *Congressional Record*, 49-1, pp. 3027.

^b *Congressional Record*, 49-1, pp. 3032-33.

^c *Congressional Record*, 49-1, pp. 3059-60.

^d *Congressional Record*, 49-1, pp. 3066.

(*Congressional Record*, 49-1, pp. 3066). A description of these roll call votes can be found in Table 3.3.

The Senate passed the bill on February 28, 1887 (*Congressional Record*, 49-2, pp. 2376). The *Congressional Record* does not report individual voting behavior or the tally of votes, but the *Washington Post* reports that the bill passed the Senate “without division (*The Washington Post*, March 1, 1887).”

The available data for roll call votes pertaining to the arbitration of labor disputes restricts the analysis of the arbitration legislation to the House activity on the earlier version of the Arbitration Bill, HR7479. The debates over the earlier bill and the final bill are very similar, as are the bills themselves. The only major difference was a provision in the final version authorizing the President to create an investigative commission to study the causes of disputes between common carriers and their employees. The next section addresses the econometric modeling of voting behavior.

3.5 Econometric Modeling of Voting and Abstention Behavior

The actual voting behavior of Representatives was restricted to three distinct choices. They could vote in favor or against a particular piece of legislation, but they could also choose not to vote. This is discrete information. A legislator cannot express his or her preferences over legislative outcomes by stating how much he or she favors a bill. This necessitates the use of discrete choice econometric models (Amemiya, 1981; Maddala, 1983).

The underlying structure of these types of discrete choice models is that the observed behavior, the dependent variable, y_i , is discrete. In the case of a binary discrete variable, the dependent variable can take on a value of zero or one. The task of these models is to predict the probability that the dependent variable will take on one of the

discrete values of the observed variable. Specifically, what is the probability that the dependent variable, y_i , will take on some value in the discrete distribution of y_i , conditional on some set of deterministic characteristics, X_i . The actual probability of observing, y_i , is unobservable and can be defined as

$$y_i^* = X_i'\beta + u_i.$$

It then follows that

$$E(y_i^*|X_i) = X_i'\beta.$$

In the binary choice case, then the

$$\begin{aligned}\Pr(y_i = 1) &= \Pr(u_i > -X_i'\beta) \\ &= 1 - F(-X_i'\beta) \\ &= F(X_i'\beta),\end{aligned}$$

where F is the cumulative distribution function of u .

The preferences for or against arbitration could be easily modeled using univariate dichotomous limited dependent variable models -- a simple probit or logit specification, where the cumulative distribution function of u would be normal or logistic. However, there are three types of voting behavior to be explained. In cases where there are more than two choices, polychotomous limited dependent variable models should be used. There are several types of these models, and the choice of which one to use is dictated by the characteristics of the actual decision process being modeled. The model selection process for voting behavior hinges on understanding the reasons why some Representatives chose to abstain from voting.

There may have been some type of strategic behavior involved in the choice of not voting. Some Representatives may have felt it was better not to vote than go on

record as either opposing or favoring the arbitration of railroad labor disputes. If enough Representatives choose not to vote, legislative action can be blocked for lack of a quorum. However, the reasons for not voting were often not strategically motivated, but simply the result of circumstance. A House member might have been detained elsewhere -- at home visiting constituents, ill, or on personal business.

There is evidence that all of the above reasons contributed to not voting. When the Arbitration Bill went to a vote on April 3, 1886 Representative Pidcock was "unavoidably absent, owing to the death of a near relative;" Representative Lehlbach was "detained in his committee-room;" and Representative Riggs was "absent on account of sickness (*Congressional Record*, 49-1, pp. 3066)." The *Washington Post* (April 4, 1886) reported that "many who would have voted and who did vote to have the bill shut out from further consideration (Vote3), did not dare go on record as voting against it when the straight question was put." Ninety-four members of the House did not vote on the arbitration question (Vote4). In addition to identifying the deterministic factors underlying particular actions, it is important to understand the relationships between the choices when specifying the proper model.

If the multiple decisions, vote yes, vote no, or do not vote, are thought to be independent and mutually exclusive, then the multinomial logit model is an appropriate choice. This implies that the decision process can be illustrated in the following fashion

Figure 3.1 Voting Decisions

If a Representative chose not to cast a vote for strategic reasons that were related to being in favor of or against the Arbitration Bill, then not voting could not have been independent of the other two choices. Given this relationship between the choices, the underlying assumption of the independence of irrelevant alternatives (Hausman and McFadden, 1984) which is required in the multinomial model specification, is violated. Therefore the use of a multinomial specification would be improper.

An ordered probit model would be appropriate if the observed discrete variable systematically corresponded to the unobservable continuous variable in the following way:

$$y_i = \begin{cases} 0 & \text{if } y_i^* \leq v, \text{ then vote against arbitration} \\ 1 & \text{if } v < y_i^* < v + \gamma, \text{ then do not vote} \\ 2 & \text{if } y_i^* \geq v + \gamma, \text{ then vote for arbitration} \end{cases} .$$

If the voting behavior followed this type of decision process, those who abstained from voting would be ordered somewhere between voting in favor of arbitration and opposing arbitration.

Figure 3.2 Ordered Voting Behavior

Representatives who abstained could be viewed as being indifferent to voting for or against the bill. The evidence presented above indicates that some Representatives who chose not to vote may have been opposed to arbitration. These Representatives would not have been indifferent to arbitration. The choices need only be differentiated

from each other. If not voting Representatives all chose not to vote because they opposed the bill, but were afraid of the repercussions, then an ordered model would be appropriate. What this implies is that the individual groups must be homogeneous in their preferences over the three actions. If they are not, then it would be difficult to order them.

The Representatives who chose not to vote were not a very homogeneous group with respect to their reasons. In fact, the mean characteristics of the group that did not vote were very similar to the mean characteristics of the group that voted (see Table 3.4). The two groups' means differ statistically significantly for only eight of the twenty-three variables. The mean characteristics of the not voting group and those of the group that voted in favor of the bill differed statistically significantly for only nine of the twenty-three variables. The not voting group was more similar to the group that voted for the legislation than it was to the group opposed to the legislation. The relationships between the three groups do not seem to meet the underlying assumptions that would be imposed by an ordered model, which suggests that this type of model is also inappropriate.

The last of the polychotomous choice models to evaluate is a sequential model. Sequential models view the decision process in stages. A legislator would first decide whether or not to cast a vote, and then in the next stage the decision to vote for or against the Arbitration Bill would be made.

Figure 3.3 Sequential Voting Behavior

The simplest version of this model is estimated under the assumption that the decisions at each stage are independent (Maddala, 1983). Under this assumption, each of the decisions is modeled as an independent binary choice model, and can be estimated with either a simple probit or logit. The probability of voting in favor of the Arbitration Bill in the simple sequential model is expressed as

$$\Pr(y_i = 1) = F(X_i'\beta_1)F(X_i'\beta_2).$$

The parameter β_1 is determined by dividing the entire sample into two groups -- voting and not voting. The probability of choosing to vote in the first stage is expressed as

$$\Pr(y_{1i} = 1) = F(X_i'\beta_1).$$

In the second stage, β_2 is determined by taking the subsample of voting House members, segregating them by whether they voted for or against the bill, and then estimating a binary probit or logit.

$$\Pr(y_{2i} = 1) = F(X_i'\beta_2).$$

There are two problems in estimating this model with the voting data. The first and already discussed, is whether the decisions to vote, and voting in favor or against the legislation are independent. The other issue is whether the explanatory variables are properly specified for the choices in each stage (Hausman and McFadden, 1984). Due to the heterogeneity in the reasons for choosing not to vote, it is likely that specifying a set of explanatory variables will be very difficult.

The estimation of the first stage of the sequential model provides evidence in support of the mis-specification hypothesis. The stage 1 estimates only correctly predict 73 percent of the vote/not vote decision, and the McFadden R-square is only 0.1208. In fact, the sequential model yields a predicted probability of voting in favor of the bill of only 0.6620, which is less than 0.8690 the actual proportion that voted in favor of the legislation. Simply predicting a vote in favor of the Arbitration Bill 86.9 percent of the time would be a better estimator of voting behavior than the sequential model. Thus, another of the polychotomous limited dependent variable models is dismissed.

Given the characteristics of the data, the use of any of the polychotomous limited dependent variable models is ruled out. The difficulty associated with clearly identifying the reasons behind the choice not to vote is common to all voting studies. The approach generally opted for is to simply ignore those Representatives that did not cast votes (Gilligan, Marshall, and Weingast, 1989; Poole and Rosenthal, 1991). Once the voting behavior has been reduced to a simple binary choice, excluding all not voting Representatives,

Figure 3.4 Simple Binary Vote

a simple probit model can be estimated. The probability of voting in favor of the arbitration legislation is expressed as

$$\Pr(y_i = 1) = F(X_i'\beta),$$

where F is the cumulative normal distribution function, and the predicted voting behavior, $\hat{y}_i$, is determined by the following method

$$\hat{y}_i = \begin{cases} 0 & \text{if } F(X_i'\hat{\beta}) < 0.5 \\ 1 & \text{if } F(X_i'\hat{\beta}) \geq 0.5 \end{cases}.$$

The results using this simple specification for Vote4 are presented in the next section.

3.6 Estimation and Results

The probit analysis of House members' voting behavior will focus on the final House vote on the Arbitration Bill HR7479 (Vote4) and be restricted to voting members only. However, an attempt was made to include the information contained in the other roll call votes. A voting index was created following Kalt and Zupan (1984). The number of votes in favor of arbitration legislation are divided by the number of times that a Representative voted. This creates a dependent variable bounded by zero and one. The voting index did not perform well even though sixty-one percent of the voting members did not alter their position on the Arbitration Bill. This is probably a result of the nature of the other roll call votes, which were not exclusive to the question of arbitration legislation. On Vote3, a vote in favor of taking up debate on the Arbitration Bill may have been a vote against the Silver Bill, rather than a vote in favor of arbitration. Probits were estimated for all of the roll call votes, but only the results for Vote4 had good predictive power.

The discussion in the previous section offered justification for ignoring the behavior of non-voting Representatives. However, the other roll call votes and information contained in the *Congressional Record* can be used to examine why some

**Table 3.4 Mean Characteristics of Members of the 49th House of Representatives
By Voting Behavior on Vote4 - HR7479 (standard deviations)**

Variable	All Members	Voted	Members Who		Not Voting
			Voted Nay	Voted Yea	
Democrat	0.5635 (0.4967)	0.5284 (0.5003)	1.0000 (0.0000)	0.4573 (0.4994)	0.6489 (0.4799)
Southern Democrat	0.2167 (0.4127)	0.1965 (0.3982)	0.7333 (0.4498)	0.1156 (0.3205)	0.2660 (0.4442)
Serving first-term	0.3746 (0.4848)	0.3668 (0.4830)	0.4333 (0.5040)	0.3568 (0.4803)	0.3936 (0.4912)
Age	49.0430 (8.5617)	48.7640 (8.7678)	50.0670 (9.2659)	48.5680 (8.6977)	49.7230 (8.0421)
College educated	0.6842 (0.4656)	0.7162 (0.4519)	0.8667 (0.3458)	0.6935 (0.4622)	0.6064 (0.4912)
Agricultural	0.0495 (0.2173)	0.0437 (0.2048)	0.0333 (0.1826)	0.0452 (0.2083)	0.0638 (0.2458)
Manufacturer	0.0526 (0.2236)	0.0262 (0.1601)	0.0000 (0.0000)	0.0302 (0.1714)	0.1170 (0.3232)
Trade and transportation	0.0619 (0.2414)	0.0699 (0.2555)	0.0000 (0.0000)	0.0804 (0.2726)	0.0426 (0.2029)
Professional and personal services	0.8359 (0.3709)	0.8603 (0.3475)	0.9667 (0.1826)	0.8442 (0.3636)	0.7766 (0.4188)
Urban district	0.3437 (0.4757)	0.3319 (0.4719)	0.2000 (0.4068)	0.3518 (0.4787)	0.3723 (0.4860)
Southwest Strike	0.1703 (0.3765)	0.1921 (0.3949)	0.2000 (0.4068)	0.1910 (0.3940)	0.1170 (0.3232)
Percent Democrat	52.3550 (15.3490)	51.1250 (14.1490)	66.1370 (14.7220)	48.8620 (12.6290)	55.3510 (17.6670)
Percent Black	12.9940 (18.2330)	12.1650 (17.5020)	35.1670 (19.9790)	8.6975 (14.2140)	15.0140 (19.8550)
Percent immigrant	13.3520 (9.6868)	13.1010 (9.3749)	3.9004 (5.4652)	14.4880 (9.0593)	13.9620 (10.4350)
Percent employed agriculture	44.8820 (21.0950)	45.6220 (20.4890)	63.6560 (15.2880)	42.9030 (19.8110)	43.0790 (22.5140)
Percent employed manufacturing	21.6520 (13.0680)	21.3630 (12.8200)	10.3260 (7.2633)	23.0270 (12.6600)	22.3550 (13.6980)
Percent employed trade & non-railroad transportation	8.8596 (4.2266)	8.5933 (3.9065)	5.2734 (3.1823)	9.0938 (3.7640)	9.5082 (4.8824)

Table 3.4 continued

<u>Variable</u>	<u>All Members</u>	<u>Voted</u>	<u>Members Who</u>		<u>Not Voting</u>
			<u>Voted Nay</u>	<u>Voted Yea</u>	
Percent employed railroad transportation	8.8596 (4.2266)	1.5001 (0.5947)	0.9442 (0.5395)	1.5839 (0.5575)	1.3309 (0.5603)
Farm wealth per capita	280.2500 (113.580)	287.9200 (114.120)	194.1300 (92.7510)	302.0700 (110.460)	261.5500 (110.650)
Manufacturing wealth per capita	165.2200 (135.920)	159.3500 (130.550)	61.2930 (64.3250)	174.1300 (131.690)	179.5300 (147.940)
Railroad wealth per capita	179.6400 (102.230)	185.0000 (104.120)	112.1300 (68.5030)	195.9900 (104.260)	166.5600 (96.7730)
Percent strikes union organized	50.6840 (20.1770)	48.8810 (18.6260)	48.8120 (27.7310)	48.8920 (16.9370)	55.0760 (23.0540)
Percent of days lost to railroad strikes	0.1376 (0.3020)	0.1483 (0.3155)	0.1570 (0.3710)	0.1470 (0.3073)	0.1117 (0.2662)
Percent days lost to non-railroad strikes	0.2535 (0.2580)	0.2447 (0.2516)	0.0623 (0.1265)	0.2722 (0.2545)	0.2750 (0.2730)
Observations	323	229	30	199	94

members chose not to vote. The *Washington Post* claimed that some Representatives chose not to vote rather than go on record as opposed to the bill (*The Washington Post*, April 4, 1886). The results of these additional investigations of voting behavior will be presented and discussed after the results for the probit analysis of Vote4.

The purpose of the probit analysis is to identify who supported and who opposed the passage of this legislation (see Table 3.5 for the probit analysis results). The first group of variables controls for a Representative's personal characteristics. A Representative's personal economic interests may impel voting behavior which is contrary to the best interests of his or her constituents. The previous occupation dummies, which were included to capture personal economic interest, are not individually or jointly statistically significant; a likelihood ratio test of their joint significance yields a chi-squared statistic of 1.896 with three degrees of freedom. In fact, none of the Representative personal characteristic variables, except for party affiliation and being a Southern Democrat, are individually or jointly statistically significant. I find no evidence that any personal economic interests drove voting behavior.

The effect of being a member of the Democratic party alone is statistically insignificant, but negative³. However, Southern Democrats were on average statistically significantly more likely to vote against the bill -- 73 percent of the Representatives who voted against the bill were Southern Democrats (see Table 3.4). The primary reason behind Democratic opposition to the bill was the belief that the bill infringed on State sovereignty, and Southern Democrats were among the most strident supporters of these rights (*Congressional Record*, 49-1, pp. 3019-21). Representative John Reagan of Texas served constituents that were affected by the Southwest Strike, but voted the party line.

³The Democratic dummy variable is insignificant even when the Southern Democrat dummy variable is dropped from the estimation.

Table 3.5 Results for Probit Estimation of Voting Behavior (standard errors)

<u>Variable</u>	<u>Vote4</u>	<u>Elasticity at Means^a</u>	<u>Weighted Aggregate Elasticity^b</u>
Democrat	-4.68370 (5.73620)	-1.13E-07	-0.40645
Southern Democrat	-2.87360* (1.66350)	-2.58E-08	-0.13993
Serving first-term	-0.36880 (0.35574)	-6.18E-09	-0.01324
Age	-0.01639 (0.01856)	-3.65E-08	-0.06932
College educated	-0.55318 (0.46697)	-1.81E-08	-0.03906
Agricultural	0.54748 (0.94463)	1.09E-09	0.00204
Manufacturer	2.97770 (26.65100)	3.56E-09	1.38E-06
Trade and transportation	3.09150 (15.66200)	9.87E-09	4.32E-06
Urban district	0.27334 (0.42217)	4.14E-09	0.00511
Southwest Strike	1.10700 (0.91499)	9.72E-09	0.02799
Percent Democrat	-0.00810 (0.01487)	-1.89E-08	-0.04434
Percent Black	-0.06264 (0.04961)	-3.48E-08	-0.14694
Percent immigrant	0.59451* (0.33057)	3.56E-07	0.31270
Percent employed agriculture	-0.13706 (0.14447)	-2.86E-07	-0.72076
Percent employed manufacturing	0.37032 (0.26789)	3.61E-07	0.39988
Percent employed trade and non-railroad transportation	-0.78221 (0.55434)	-3.07E-07	-0.42652
Percent employed railroad	2.20780 (2.28590)	1.51E-07	0.20731
Farm wealth per capita	-0.02082 (0.01411)	-2.74E-07	-0.40860

Table 3.5 continued

<u>Variable</u>	<u>Vote4</u>	<u>Elasticity at Means^a</u>	<u>Weighted Aggregate Elasticity^b</u>
Manufacturing wealth per capita	-0.07389* (0.03786)	-5.38E-07	-0.51590
Railroad wealth per capita	-0.03816* (0.02323)	-3.22E-07	-0.44070
Percent strikes union organized	-0.02206 (0.01648)	-4.93E-08	-0.08527
Percent of days lost to railroad strikes	-1.32190 (1.76510)	-8.95E-09	-0.02803
Percent of days lost to non-railroad strikes	7.37190** (3.57400)	8.24E-08	0.06380
Constant	28.84100 (19.72200)	1.32E-06	2.50330
Observations	229		
Percentage of right predictions	92.58		
Log-Likelihood	-43.088		
Log-Likelihood w/ constant term only	-88.919		

Notes: * statistically significant at better than 0.10.

** statistically significant at better than 0.05.

^a elasticity at means is calculated as $E_k = \frac{\partial \Phi(X'_i \beta)}{\partial X_{ik}} \cdot \frac{\bar{X}_k}{\Phi(\bar{X}' \beta)}$, and Φ is the cumulative Normal density function

^b the weighted aggregate elasticity is $\bar{E}_k = \frac{\sum_{i=1}^N \Phi(X'_i \beta) \cdot \frac{\partial \Phi(X'_i \beta)}{\partial X_{ik}} \cdot \frac{X_{ik}}{\Phi(X'_i \beta)}}{\sum_{i=1}^N \Phi(X'_i \beta)}$ for

the k th parameter, and Φ is the cumulative Normal density function.

Table 3.6 Prediction Success Table for Probit Analysis

		<u>Actual</u>	
		0	1
<u>Predicted</u>	0	16	3
	1	14	196

Number of right predictions 212

Percentage of right predictions 92.58

Democratic ideology did not win out entirely, since the bill would never have passed without some Democratic support, because the House was Democratically controlled. Republicans were in the majority of those who voted in favor of the Arbitration Bill, indicating a small, but statistically insignificant, difference in voting behavior based on party ideology -- the negative coefficient on party affiliation. However, it should be noted that not a single Republican voted against the Arbitration Bill, and that being Democratic reduced the overall probability of voting in favor of the bill by 41 percent on the margin (see Table 3.5, column 3).

The second group of variables represents constituent and special interests. Legislators who represented urban constituents were more likely to vote in favor of arbitration. In states affected by the Southwest Strike, Representatives were also more likely to vote in favor of the Arbitration Bill. The extent to which a district voted Democratic had a small, but statistically insignificant negative impact on the probability of voting in favor of the Arbitration Bill.

The population percentage variables yielded the expected results. The percent of the population that was Black had a negative, but statistically insignificant effect. Since Blacks were disenfranchised in the South, it is unlikely that this effect was due to the wishes of Black constituents, but is rather capturing regional effects. High concentrations of immigrants in a state's population had a positive and statistically significant effect on the probability of a Representative voting in favor of the bill. Immigrants tended to reside in urban areas and hold manufacturing jobs, which directly exposed them to the external costs of strikes. Therefore, they would have been highly likely to support the legislation.

The employment variables were supposed to help control for the influence of labor on a Representative's voting behavior. As expected, higher percentages of agricultural employment in a Representative's state had a negative impact on the

probability of voting for the arbitration legislation. Even with a one standard deviation increase in the percent employed in agriculture, the Arbitration Bill would still have passed. Table 3.7 presents the effects of a one standard deviation increase in selected variables on the passage of the Arbitration Bill.

The evidence provided during the debates in the House showed strong support for arbitration by manufacturing labor. The Representatives from states with a higher proportion of manufacturing employment were more likely to vote in favor of arbitration. A one standard deviation increase in the percentage of manufacturing employment in a Representative's state would have resulted in unanimous passage of HR7479. Railroad employment also had a positive, but statistically insignificant effect on voting in favor of arbitration legislation.

The negative effect of trade and non-railroad transportation employment supports the prediction that a more fundamental issue may have been at the core of the debate on this bill. Individuals engaged in trade and non-railroad transportation were worried about the implications of Federal regulation of the relationship between capital and labor.

The wealth variables all have a negative impact on the probability of a Representative voting in favor of the bill. Apparently, manufacturing interests concurred with the railroad interests on the issue of government regulation of the relationship between labor and capital. In fact, a one standard deviation increase in a state's manufacturing wealth per capita would have caused the defeat of HR7479. Railroad wealth per capita significantly decreased the probability of the bill's passage, but even with a one standard deviation increase in railroad wealth per capita, the bill would have still passed. Manufacturing interests were very concerned about the implications of this legislation's effects on the relationship between capital and labor.

The strike activity and union involvement in strike activity variables yielded some unexpected results. Railroad strikes had a negative, but statistically insignificant impact

Table 3.7 Effect of a One Standard Deviation Change on the Probability of Voting in Favor of Arbitration Legislation for Selected Variables

<u>Variable</u>	<u>Probability of voting for legislation ^a</u>	<u>Predicted number of votes in favor of the legislation ^b</u>
Percent employed agriculture	0.59031	132
Percent employed manufacturing	0.99998	229
Percent employed trade and non-railroad transportation	0.57924	131
Percent employed railroad	0.96432	224
Farm wealth per capita	0.61447	135
Manufacturing wealth per capita	0.22941	56
Railroad wealth per capita	0.54779	127
Percent strikes union organized	0.82165	196
Percent of days lost to railroad strikes	0.8209	196
Percent of days lost to non- railroad strikes	0.98225	229
Actual	0.8683	210

Notes: ^a The predicted probability is computed by taking the parameter vector from the probit estimation for Vote4, adding one standard deviation to the selected variable for each voting member, computing individual probabilities, and then taking the average to get the new predicted probability of voting in favor of the

$$\text{Arbitration Bill } \Pr(y = 1) = \frac{1}{N} \sum_{i=1}^N \Phi(\tilde{X}_i' \hat{\beta}).$$

^b The predicted number of votes is equal to $\sum_{i=1}^N \hat{y}_i$ where

$$\hat{y}_i = \begin{cases} 0 & \text{if } \Phi(\tilde{X}_i' \hat{\beta}) < 0.5 \\ 1 & \text{if } \Phi(\tilde{X}_i' \hat{\beta}) \geq 0.5 \end{cases}.$$

on the probability of the Arbitration Bill's passage. This implies that Representatives in states with relatively more railroad strike activity were less likely to vote in favor of the bill. The overall marginal effect is actually quite small, reducing the probability of passage by only 2.8 percent. The effect of non-railroad strikes was positive and statistically significant, which was expected. The marginal effect of non-railroad strikes is small, but a one standard deviation increase in a state's strike activity predicts unanimous passage of the legislation.

The measure of union involvement employed in the model refers to all strikes. The reason this measure was used rather than a disaggregated measure of railroad and non-railroad strikes was due to strong multicollinearity between the days lost to railroad strikes and the railroad strikes union involvement variables. The aggregated union involvement variable actually does a better job of predicting the voting behavior of the Representatives. The negative effect for this variable is unexpected. Representatives in states with heavy union involvement in strikes were more likely to vote against the legislation, but not statistically significantly.

The legislation passed by a significant majority, and would have passed even if all House members who had abstained from voting had instead voted against the bill. Nevertheless, some interesting insights may be gained by a more careful examination of the non-voting members.

3.7 Examination of the Non-Voting House Members

In the modeling section, several statistical and modeling results were offered as justification for the exclusion of non-voting Representatives from the analysis. However, a further investigation is warranted given the *Washington Post's* article of April 4, 1886, which reported that many House members abstained from voting because they opposed the bill.

Table 3.8 Cross Tabulation of Voting Behavior on Vote3 and Vote4

		<u>Vote4</u>			
	<u>Frequencies</u>	0	1	2	Total
<u>Vote3</u>	0	28	50	9	87
	1	1	123	4	128
	2	1	26	81	108
	Total	30	199	94	323

Poole and Rosenthal (1995) report that the average abstention rate in the forty-ninth session of the House of Representatives was approximately 29 percent. Ninety-four House members, 29.1 percent, abstained from voting on the HR7479. The vote on HR7479 was lopsided, passing by a margin of 37 percent (199 to 30). Poole and Rosenthal actually predict a lower turnout on lopsided issues such as the Arbitration Bill. They claim that turnout should increase with the probability of being decisive. It should also be true that abstentions are more likely on the majority side of a vote. Their results support this “silent majority” hypothesis only after the 63rd House. The behavior of non-voting members will be analyzed for conformity to Poole and Rosenthal’s findings, and to test the validity of the *Washington Post*’s claim.

The *Post*’s article attributes strategic behavior to “many” House members’ voting behavior. There were only nine House members who switched from a no vote on Vote3 to an abstention on Vote4 (see Table 3.8). Of these, only four Representatives, all Southern Democrats, had gone on the record as officially opposed to the legislation. This seems to lend little support to the *Post*’s claim that “many who would have voted and who did vote to have the bill shut out from further consideration (Vote3), did not dare go on record as voting against it when the straight question was put (*The Washington Post*, April 4, 1886).”

The mean characteristics of the non-voting Representatives are more similar to the mean characteristics of those who voted for the bill than against it. As a more rigorous test of both the strategic behavior and the “silent majority” hypotheses, the coefficients estimated in the probit analysis can be employed in computing the probabilities of voting choices, given an individual’s characteristics. These results are reported in Table 3.9. This method of analysis predicts that not voting Representatives would have voted yes with a probability of 82.5 percent. The majority of those who abstained from voting

Table 3.9 Prediction Of Voting Behavior For Members Not Voting**For All Members Not Voting**

Predicted probability of voting in favor of arbitration	0.8250
Predicted percentage voting in favor of arbitration	88.3%

For Members Voting

Predicted probability of voting in favor of arbitration	0.8683
Predicted percentage voting in favor of arbitration	90.8%
Percentage that actually voted in favor of arbitration	86.9%

Notes: The predicted probabilities are computed by taking the parameter vector from the probit estimation for Vote4 and computing individual probabilities, then the mean of these probabilities is computed to get a prediction of the overall probability of voting in favor of the Arbitration Bill for voting and non-voting House members.

$$\Pr(y = 1) = \frac{1}{N} \sum_{i=1}^N \Phi(X_i' \hat{\beta}).$$

The prediction of how a member would have voted is determined by the following rule:

$$\hat{y}_i = \begin{cases} 0 & \text{if } \Phi(X_i' \hat{\beta}) < 0.5 \\ 1 & \text{if } \Phi(X_i' \hat{\beta}) \geq 0.5 \end{cases}.$$

The percentage predicted voting in favor of the bill is simply the proportion of the sample that voted in favor of the bill.

would have voted in favor of the Arbitration Bill. These findings support the “silent majority” hypothesis, and reject the presence of any significant strategic behavior.

3.8 Conclusion

The goal of this chapter was to identify who supported and who opposed the Arbitration Bill, and which of these groups were successful in influencing the legislative outcome. A probit model was estimated with explanatory variables to capture the role of constituent interest, and legislator private interest.

The role of legislator private interests was ruled out as having any significant effect on the passage of the Arbitration Bill. None of the occupation variables or personal characteristic variables were statistically significant. A Representative’s economic interests did not play a significant role in this legislation.

The results support the belief that the external cost of strikes played a significant part in the passage of the legislation. Representatives in states with urban populations and high levels of strike activity were more likely to vote in favor of the Arbitration Bill. This places an emphasis on the legislation’s potential benefits in reducing the external costs of strikes to society. How were the private or special interests served?

Organized labor supported arbitration legislation, and the effect of union involvement in strikes was predicted to be positive. However, this variable had a negative effect on the passage of the legislation. Perhaps organized labor felt that the bill did not go far enough. Some Representatives, along with the Knights of Labor, favored compulsory arbitration and felt that voluntary arbitration would not be effective (*Congressional Record*, 49-1, pp. 2970). Representative Glover of Missouri was outspoken in his support of compulsory arbitration, and he voted against the Arbitration Bill. A vote against organized labor may also have been the result of anti-union sentiments. The strike problem was often attributed to the growth of unions.

The passage of the bill implies that one group was more successful in influencing the legislative outcome. None of the employment variables were statistically significant, but the effect of manufacturing and railroad wealth was negative and statistically significant. However, the marginal effects of all these variables were small. Did some other factor influence the passage of this legislation over the protests of both railroad and manufacturing capital?

Even though party affiliation alone was not statistically significant until it was interacted with the Southern states, it did play a role in the debates and passage of the bill. The Arbitration Bill was charged with politics (*The New York Times*, May 28, 1886, 5-1), and the debates were polarized with respect to party affiliation -- not a single Republican voted against the bill. The Democrats, especially Southern Democrats, were opposed to this type of legislation.

One of the central issues of the debate on the Arbitration Bill was not whether the bill would be effective, but whether or not it was the responsibility and in the power of the Federal government to regulate businesses that operated in the public interest. The bill was attacked as being unconstitutional, because it infringed on State sovereignty. When the earlier version of the Arbitration Bill passed the House, Congress was deadlocked in its debate of bills to regulate the interstate commerce (Gilligan, Marshall, and Weingast, 1989). President Cleveland vetoed this first bill, but by the Fall of 1888 when the Arbitration Act was signed into law, the role of the Federal government in the regulation of the interstate commerce had been established.

The Federal government was developing a more acute awareness of the public welfare and its relationship to private business interests. The role of the Federal government in the regulation of the interstate commerce and big business was one of the

fundamental issues of the late nineteenth century⁴. Many in Congress believed that railroad companies had a duty to serve the public. Railroads as common carriers had an obligation to “run the trains at the hour named, to run them to the places named, to be ready to carry for all who may apply, to accept and to deliver freight in accordance with its advertised schedule. These are obligations which are imposed by the very nature of the work of a common carrier, and by the relation which this service holds to the public, for they are functions of which he can not divest himself (*Congressional Record*, 49-1, pp. 3016).”

There is no denying that the Arbitration Act was legislation passed to promote the public welfare by reducing railroad strike activity, but it was also part of the fundamental debate that revolved around the changing role of the Federal government in the late nineteenth century. Whether or not the legislation was effective in reducing strike activity is a question to be answered in a subsequent chapter.

⁴ The Supreme Court in the *Wabash v. Illinois*, 1886, and *Munn v. Illinois*, 1877 cases set the legal precedence for federal government regulation of interstate commerce. The Interstate Commerce Act of 1887, and the Sherman Antitrust Act of 1890 were major pieces of legislation.

Chapter 4 The Arbitration Act and Its Effect on Railroad Securities¹

The test of the economic effect of regulation is essentially independent of the content of the formal regulations. No degree of care in analyzing the regulations, or even their administration, will tell us whether they rubber-stamp or slightly heckle the state of affairs or substantially alter it. (Stigler and Friedland, 1962)

4.1 Introduction

The passage of the Arbitration Act of 1888 ushered in a new era in labor relations on the railroads. Railroad management was not favorably disposed to the arbitration of labor disputes. The railroad owners would have preferred legislation that outlawed strikes.

Organized labor, on the other hand, supported the Arbitration Act. This group felt that the legislation might help them in being accepted as the representatives of the workers and force railroad management to negotiate with union representatives. Many of the railroads would only negotiate with individual workers, and strongly opposed the formation of labor organizations. However, labor's support of arbitration legislation was tempered by opposition to any legislation that inhibited the use of the strike. Congress passed the legislation, but many members felt the law would not be effective in reducing strike activity.

An analysis of the passage of this legislation, and the groups that supported it, was undertaken in chapter 3. It is only by examination of what happened after the passage of the Arbitration Act that the full impact of the legislation can be assessed. Did the

¹I would thank Chris Lamoureux and Doc Ghose for their helpful comments, which contributed to the content of this chapter.

Arbitration Act rubber stamp, slightly heckle, or substantially alter the state of affairs in the railroad industry?

In the economic approach to regulation, an industry or group will seek regulation or some form of government intervention when it is profitable -- when the benefits outweigh the costs. A central thesis of Stigler (1971) is that regulation will be acquired, designed, and operated by an industry for its benefit. Posner (1971) refines the thesis by recognizing that regulation will serve "the private interests of politically effective groups (pg. 343)," and that "regulation is supplied in response to the demands of interest groups struggling among themselves to maximize the incomes of their members (pg. 336)."

The Arbitration Act was directed to regulate the relationship between capital and labor. If the legislation had reduced strike activity, then society would have benefited. Labor and capital were the primary private interests that attempted to influence the legislative outcome. It is not exactly clear who, if anyone, benefited from the passage of the Arbitration Act. One way to measure whether the Arbitration Act had an effect, how it was perceived, and how it affected railroad capital is to examine how the stock market reacted to the passage of the legislation.

The railroad strikes of the late nineteenth century were potentially devastating to railroad operations, and significantly reduced railroad profits. The Southwestern Strike of 1886 cost the railroads an estimated \$3.5 million (*The New York Times*, July, 9, 1886, 2-3), and affected the Gould System of railroads, whose reported net earnings for 1886 were \$9.0 million (Poor, 1887, pp. 770). The strike, which only lasted one month, caused a reduction in revenues of over twenty-five percent.

The Chicago, Burlington, & Quincy Railroad reported the official cost of the Burlington strike as \$2.6 million (McMurry, 1953). The United States Strike Commission (1895), in its investigation of the Pullman Strike, set the combined losses of

the railroad companies at more than \$5 million. Net earnings for the railroads in the affected region for 1894 were \$93 million (Bureau of Statistics, 1896, pp. 324).²

These strikes also imposed costs on workers in the form of foregone wages and loss of jobs. The General Executive Board of the Knights of Labor placed the loss in wages at \$1 million during the Southwest Strike of 1886 (*The New York Times*, July, 9, 1886, 2-3). The Brotherhoods of Locomotive Engineers and Firemen assisted strikers during the Burlington strike with over \$1.5 million in supplemental support, but provided no estimate of the loss in wages (McMurry, 1953). A loss in wages of \$1.7 million was attributed to workers involved in the Pullman Strike (United States Strike Commission, 1895).

The costs to the railroads and their workers only represent part of the costs of strikes; the external costs to passengers, shippers, and government were very high. The intent of the legislation was to maintain the industrial peace, which is also why troops were called out and injunctions issued. If arbitration legislation had been effective in reducing strike activity, it would have improved the stability and profitability of the railroad system while reducing the external costs of railroad labor disputes.

The market could have reacted to the passage of the legislation in three ways. First, if the market believed that the Arbitration Act could reduce strike activity without increasing the costs of railroad operations, thus benefiting railroads, then expectations of future railroad profits would have increased. An increase in expected future profits will put upward pressure on stock prices. The second reaction could have been a decrease in stock prices. This would have occurred if it was felt that the legislation was injurious to the railroad industry. If the Arbitration Act increased strike activity, or reduced railroad owners' ability to control wages, then expected future profits would have decreased. The

²This figure actually understates the effect of the strike, since many of the railroads included were not affected by the strike.

third reaction could have been no significant effect at all. If arbitration legislation was worthless and harmless, as many believed, then it would not have had a significant effect on expected future profits, and thus no significant effect on the excess returns.

Just how the market reacted is what shall be determined in this chapter. An event study technique is used to determine whether arbitration legislation had a negative or positive statistically significant effect, or no effect at all on railroad stock prices.

4.2 Event Study Methodology

Event study methodology has been extensively used to assess the effects of legislation on stock prices (Schwert, 1981; Rose, 1985; Binder, 1985; Gilligan, et al, 1990). The fundamental assumption underlying the use of this approach is the efficiency of asset markets (Fama, 1976). If asset markets are efficient, then as new information which affects the expectation of a firm's future profits arrives in the market, stock prices will adjust. The stock's price will reflect information such as legislation, strikes, or changes in regulation, which might impact the firm's expected future profits.

A common approach is to estimate a simple market model adjusted for risk (Thompson, 1985). The general form of the this model is

$$\begin{aligned}\tilde{R}_{it} &= \alpha_i + \beta_i \tilde{R}_{mt} + \varepsilon_{it} \\ \tilde{R}_{it} &= (R_{it} - R_{ft}) \\ \tilde{R}_{mt} &= (R_{mt} - R_{ft}),\end{aligned}\tag{4.2.1}$$

where $t = 1, \dots, T$ time periods, R_{it} is the return on the security of firm i at time t , R_{ft} is the risk free rate of return at time t , R_{mt} is the return on a market portfolio at time t , $\tilde{R}_{it}$ and $\tilde{R}_{mt}$ are the firm and market return adjusted by the risk free rate of return, α_i , and β_i are

the market parameters, and ε_{it} is a random error term that captures the excess or unexpected returns.

The risk adjusted excess returns for firm i at time t , $\tilde{A}_{it}$, are calculated as the estimated residuals using the parameter estimates from the simple market model.

$$\tilde{A}_{it} = \hat{\varepsilon}_{it} = \tilde{R}_{it} - \hat{\alpha}_i - \hat{\beta}_i \tilde{R}_{mt}$$

Next, the estimated residuals are analyzed to examine the excess returns associated with the event or events. A t-statistic is computed to test whether the excess return at time t differs significantly from, $\bar{\tilde{A}}_{i,\sim t}$, the mean excess return excluding the events³.

$$H_0 : \tilde{A}_{it} = \bar{\tilde{A}}_{i,\sim t}$$

$$H_1 : \tilde{A}_{it} \neq \bar{\tilde{A}}_{i,\sim t}$$

$$|t| = \left| \frac{\tilde{A}_{it} - \bar{\tilde{A}}_{i,\sim t}}{\frac{S_{\bar{\tilde{A}}_{i,\sim t}}}{\sqrt{n}}} \right| \geq t_{\alpha}$$

where $S_{\bar{\tilde{A}}_{i,\sim t}}$ is the standard deviation of the excess returns for firm i excluding event t . If

these returns differ significantly from the average excess returns over time, then the events are said to have an effect.

An extension of the model incorporates a dummy variable, D_{jt} equal to 1 if event j occurs at time t , and 0 otherwise, to capture the effect of specific events in time (Prager, 1989 and Binder, 1985).

³The mean of the expected return, by construction, is equal to zero. $E(\tilde{A}_{it}) = E(\varepsilon_{it}) = 0$. However, the mean excess return, excluding the event or events, will likely differ from zero.

$$\tilde{R}_{it} = \alpha_i + \beta_i \tilde{R}_{mt} + \sum_{j=1}^J \delta_{ij} D_{jt} + \varepsilon_{it}, \quad (4.2.2)$$

where $j = 1, \dots, J$ events, t , $\tilde{R}_{it}$, $\tilde{R}_{mt}$, α_i , β_i , and ε_{it} are defined as above. The parameter, δ_{ij} , captures the effect of the event. This extension allows the intercept to vary around the event, but in the case of regulation it might also be interesting to test for structural change in the return generating process. A dummy variable, D_{0t} , equal to 1 after the regulation takes effect and 0 otherwise, is included to allow for structural change in the intercept and the market slope parameter, β_i (Amoako-Adu, Rashid, Stebbins, 1992).

$$\tilde{R}_{it} = \alpha_{i0} + \alpha_{i1} D_{0t} + \beta_{i0} \tilde{R}_{mt} + \beta_{i1} D_{0t} \tilde{R}_{mt} + \sum_{j=1}^J \delta_{ij} D_{jt} + \varepsilon_{it}, \quad (4.2.3)$$

All of these models were developed using modern data. The available stock market data for the 1880's and 1890's have limitations that make estimating the standard event study models difficult. The limitations, difficulties, and alternative methods of estimation are discussed in the next section.

4.3 Financial Data and Alternative Estimation

There are several good sources of stock market data for the period under study. Cowles (1939) contains several monthly price indexes of common stocks. Macaulay (1938) has monthly information on railroad common stocks, and market interest rates. The third source, *The Commercial and Financial Chronicle*, was a weekly publication that reported the prices of stocks and bonds, and financial news. The variances and means of the raw returns⁴ for several of the indexes from Cowles (1939) are reported in

⁴ The returns are calculated from the price indexes including cash dividends,

$$\frac{P_t - P_{t-1}}{P_{t-1}} \cdot 100$$

Table 4.1 Descriptive Statistics for Monthly Returns, 1885-1894

<u>Type of Index</u> ^a	<u>Mean Return (%)</u>	<u>Variance Of Return</u>
All Stocks ^a	0.36	7.99
Railroad Stocks ^b	0.32	7.75
Industrial Stocks ^c	0.64	12.39
Utility Stocks ^d	0.78	11.35

Sources: ^a Cowles (1939) Table C-1, pp. 168-169.

^b Cowles (1939) Table C-3, pp. 172-173.

^c Cowles (1939) Table C-2, pp. 170-171.

^d Cowles (1939) Table C-4, pp. 174-175.

Figure 4.1 Raw Returns 1885-1889

Figure 4.2 Raw Returns 1890-1894

Table 4.1 for the period between 1885 and 1894. The time series of raw returns for the railroad index are plotted in Figures 4.1 and 4.2.

The first limitation of the data relates to the availability of an appropriate market index. The monthly common stock market (all stock) index in Cowles (1939) is composed primarily of railroad common stocks, which causes a substantial endogeneity problem. This implies that the all stock index cannot be used as a market index when railroad securities are being analyzed. The variance and the mean return of the railroad index are lower than the variance and mean return of the all stock index, but these differences are not statistically significant.

Neither of the other available industry indexes are suitable as market indexes. The mean returns of the utilities and industrial indexes are not statistically significantly different from the mean return of the all stock index, but the variances are statistically significantly higher. The market for industrial and utility securities was very thin and quite risky (Navin and Sears, 1955). The comparison of the indexes and market characteristics leads to the conclusion that there is not a good market index available during this period for analyses involving the railroad industry. This implies that an alternative method is needed to calculate the excess returns.

The simplest measure of excess returns is to compute mean adjusted returns (Brown and Warner, 1980).

$$A_{it} = R_{it} - \bar{R}_{i,\sim t}$$

where $\bar{R}_{i,\sim t}$ is the mean return for firm i excluding the return at time t

$$\bar{R}_{i,\sim t} = \frac{1}{T-1} \left[\sum_{t=1}^{\sim t-1} R_{it} + \sum_{t=\sim t+1}^T R_{it} \right].$$

The test procedure is identical to the one described in the previous section. The only difference is in the computation of the excess returns. A t-statistic is calculated to see if the difference between A_{it} , the excess return for firm i at time t , and $\bar{A}_{i,\sim t}$, the mean of the excess returns for firm i excluding the event at time t is significant.

$$|t| = \left| \frac{A_{it} - \bar{A}_{i,\sim t}}{S_{\bar{A}_{i,\sim t}} / \sqrt{n}} \right| \geq t_{\alpha}$$

where $S_{\bar{A}_{i,\sim t}}$ is the standard deviation of the mean adjusted returns for firm i excluding event t .

Some modifications of the test procedure discussed above were made. First, since the Arbitration Act was federal legislation and affected all railroads, the railroad stock price index from Cowles (1939) was used to generate monthly returns on the market portfolio of all railroad common stocks, rather than individual firm level returns. A complete list of the railroad companies included in the index can be found in Table 4.2. There are multiple events to be analyzed, some of which are related. In order to adjust for this, not wanting to condition $\bar{R}_{i,\sim t}$, or $\bar{A}_{i,\sim t}$ on any of the events, all events were dropped from the sample for calculation of the mean returns and the mean excess return.

The exclusion of all the events reduced the number of observations in the 60 month window around each event to as few as 44 observations. Rather than use this limited number of observations, the window was expanded to include the years 1885 to 1894. This is the ten year period in which all the events occurred.

The monthly mean return for the portfolio of railroad common stocks was calculated over the entire ten year period excluding all twenty-six of the events to be analyzed.

Table 4.2 Railroads Included in the Cowles Index

Atchison, Topeka & Santa Fe	Nashville, Chattanooga & St. Louis
Baltimore & Ohio	New York Central & Hudson River
Boston & Albany	New York, Chicago & St. Louis
Boston & Maine	New York, Lake Erie & Western
Burlington, Cedar Rapids, & Northern	New York, New Haven & Hartford
Canadian Pacific	New York, Ontario & Western
Canada Southern	New York, Susquehanna & Western
Central Railroad of New Jersey	Norfolk & Western
Chesapeake & Ohio	Northern Central
Chicago & Alton	Northern Pacific
Chicago, Burlington & Quincy	Ohio & Mississippi
Chicago, Milwaukee & St. Paul	Ohio Southern
Chicago & Northwestern	Old Colony
Chicago, Rock Island & Pacific	Oregon Short Line
Chicago, St. Louis & Pittsburgh	Oregon Shortline & Utah Northern
Chicago, St. Paul, Minneapolis, & Omaha	Pennsylvania
Cleveland, Cincinnati, Chicago, & St. Louis	Peoria, Decatur, & Evansville
Cleveland, Columbus, Cincinnati, & Indianapolis.	Philadelphia & Reading
Cleveland & Pittsburgh	Pittsburgh, Cincinnati, Chicago & St. Louis
Columbus, Hocking Valley & Toledo	St. Louis, Alton & Terra Haute
Delaware & Hudson	St. Louis & San Francisco
Delaware, Lackawanna & Western	St. Louis, Southwestern
Denver & Rio Grande	St. Paul & Duluth
Eastern	St. Paul, Minneapolis & Manitoba
Flint & Pere Marquette	South Carolina RR
Great Northern	Southern Pacific
Illinois Central	Texas & New Orleans
Iowa Central	Texas & Pacific
Lake Shore & Michigan Central	Texas & St. Louis in Texas
Lehigh Valley	Union Pacific
Long Island	United Cons of NJ
Louisville & Nashville	Virginia Midland
Michigan Central	Wabash (receipts)
Milwaukee & St. Paul	Wabash Railroad Co.
Minneapolis & St. Louis	Wabash, St. Louis, & Pacific
Missouri, Kansas & Texas	Wheeling & Lake Erie
Missouri Pacific	Wisconsin Central
Mobile & Ohio	

Source: Cowles, 1939, pp. 456-57.

$$\bar{R}_{RR} = \frac{1}{94} \sum_{j=1}^{94} R_{RRj},$$

where R_{RRj} are the raw returns in months that events did not occur. The mean and variance of the raw returns excluding all the events are 0.26 and 7.95. The mean adjusted excess returns, A_{RRt} are calculated as

$$A_{RRt} = R_{RRt} - \bar{R}_{RR}$$

for $t=1$ to 120 months.

Does this simpler method reduce the ability to test for the effects of events on the prices of railroad securities? Brown and Warner (1980) found no evidence that the more complicated methods of generating excess returns were any better than this simpler method. They felt that a researcher's time might be better spent "reading old issues of the *Wall Street Journal* to more accurately determine event dates (pp. 249)." In the following sections, a set of events is laid out and the test procedure described above is performed.

4.4 Further Discussion of Alternative Methodology

Prior to discussing the results, some further methodological issues require examination. When the t-test method described in the previous section was executed, all but one event had a statistically significant effect on railroad stock returns. However, many of these excess returns were less than one standard deviation from the mean. It is possible that the time series of excess returns does not follow a standard t-distribution. In fact, the dispersion of the data around the mean excess return suggests that returns may come from a distribution with much fatter tails.

As a quick check, a random sample of 94 observations was drawn from a t-distribution with three degrees of freedom. The mean and variance of this random sample was 0.0691 and 2.0212. The mean of the actual mean adjusted excess returns is effectively zero,⁵ but is not statistically significantly different from the mean of the random sample drawn from the t-distribution. However, the variance of the excess returns is 7.9496, which is statistically significantly greater than the variance of the random sample⁶. These distributional differences imply that a type I error is much more likely to occur if the standard t-test procedure is used. Therefore, an alternative distribution free method of examining the excess returns is more appropriate in this case.

The method used incorporates a bootstrapping technique that only uses the empirical distribution of excess returns.⁷ The excess return associated with a particular event is compared against 10,000 random draws with replacement from the time series of excess returns excluding the events. Then, a probability is calculated by dividing k , the number of draws for which the excess return was greater than the random draw, by the total number of draws.

$$\Pr(|A_{RRt}| > |\text{random draw from time series of returns}|) = \frac{k}{10000}$$

The probabilities from this procedure are reported in Tables 4.3, 4.4, and 4.5.

The task of the analysis was to assess whether any of the events had an effect on the market. Was a particular excess return associated with an event different from the excess returns associated with non-event months? What would be a statistically

⁵The actual mean is -0.4×10^{-15} .

⁶ $F_{93,93} = \frac{s_1^2}{s_2^2} = \frac{7.9496}{2.0212} = 3.93 > 1.53 = F_{93,93,\alpha=0.01}$, reject the variances are the same.

⁷This procedure was suggested by Chris Lamoureux.

significant number of success -- how big does k have to be for the event to have a statistically significant effect? If a non-parametric sign test is applied to the frequency of successes, then a z -value can be computed for each k as follows (Freund and Walpole, 1987)

Let

x = the number of successes, k

n = the number of trials = 10,000

$\theta = 0.5$

$$z = \frac{(x - 0.5) - n\theta}{\sqrt{n\theta(1 - \theta)}}$$

$$z = \frac{(x - 0.5) - (10,000)(0.5)}{\sqrt{(10,000)(0.5)(1 - 0.5)}} \quad (4.4.1).$$

$$z = \frac{x - 5000.5}{50}$$

for $x > n\theta$

If a value for z is chosen such that

$$z = z_{\alpha=.01} = 2.58,$$

then solving equation 4.4.1 for x

$$x = 2.58(50) + 5000.5$$

$$x = 5129.5$$

which implies that

$$k_{.01} = 5130.$$

If the

$$\Pr(|A_{RRt}| > |\text{random draw from time series of returns}|) = \frac{k}{10000} > 0.5130,$$

then the event has an effect.

4.5 Events and Results

A record of events relating to railroads was compiled through a careful search, employing both primary (*The New York Times*, 1885-1894; *The Washington Post*, 1885-1894; *The Commercial and Financial Chronicle*, 1885-1894; the *Congressional Record*, 49-1,2 and 50-1; and United States Strike Commission, 1894) and secondary sources (Eggert, 1967; Filippelli, 1990; Kaltenborn, 1943; Ko, 1968; McMurry, 1953; Gilligan, et al, 1990; and Prager, 1989). The excess returns will be tested for sensitivity to the beginning and ending of strikes, the passage of the Interstate Commerce Act, and the passage of the Arbitration Act. These events and their associated monthly excess returns are reported in Tables 4.3, 4.4, and 4.5.

4.5.1 The Impact of Strikes on Stock Returns

The market should have reacted negatively to the start of a strike, and positively to its end. The *Washington Post's* Finance and Commerce column of March 11, 1886 blames Wall Street's not "very roseate view of the general" condition of the market on the continuing labor troubles on the "Southwestern system of roads." As further evidence of the market's sensitivity to strike activity, *The Post* reports the strong opening of the market on March 27, 1886 as being the result of a "more favorable outlook for an early settlement of the strike in the Southwest." However, later in the day the announcement that "the negotiations looking to a settlement of Transcontinental troubles had been broken off had a depressing effect upon the roads (*The Washington Post*, March 27, 1886)."

Table 4.3 Events and Excess Returns for Strikes

month	event ^a	expected effect	excess return ^b	bootstrapping probability ^c
May-85	• Southwest Strike of 1885 begins.	–	-1.29	0.314
Oct-85	• Southwest Strike of 1885 ends.	+	5.64	0.938*
Mar-86	• Southwest Strike of 1886 begins.	–	-1.70	0.401
Apr-86	• Southwest Strike of 1886 ends.	+	-1.24	0.289
	• Arbitration Bill, HR7479, passes House.	–		
May-86	• National strike for the 8-hour day	–	-1.80	0.427
	• Haymarket Massacre	–		
	• Chicago Freight Handlers Strike.	–		
	• Cullom Bill to regulate interstate commerce passes Senate.	–		
Jun-86	• Recovery from labor troubles.	+	4.70	0.923*
Feb-88	• Burlington Strike begins.	–	-0.76	0.144
Mar-88	• Burlington Strike escalates.	–	-3.77	0.807*
	• Chicago Switchmen's Strike begins.	–		
Apr-88 ^d	• C. B. & Q. railroad returns to normal operations.	+	0.36	0.195
	• Chicago Switchmen's Strike ends.	+		
	• Arbitration Bill, HR8665, passes House.	–		
Jun-88	• C. B. & Q. trains are dynamited.	–	-3.82*	0.822*
Jul-88	• Dynamiters arrested.	+	3.11*	0.805*
Jan-89	• Official end of the Burlington Strike.	+	1.58*	0.551*
May-94	• Pullman Strike begins.	–	-3.93*	0.852*

Table 4.3: continued.

month	event ^a	expected effect	excess return ^b	bootstrapping probability ^c
Jun-94	• Pullman Strike escalates.	–	-1.71	0.376
Jul-94	• Troops sent to Chicago.	–	-1.43	0.351
Aug-94	• Pullman Strike ends.	+	3.75	0.840*

Sources and notes: ^a events compiled from *The New York Times*, 1885-1894; *The Washington Post*, 1885-1894; *The Commercial and Financial Chronicle*, 1885-1894; the *Congressional Record*, 49-1,2 and 50-1; United States Strike Commission, 1894; Eggert, 1967; Filippelli, 1990; Kaltenborn, 1943; Ko, 1968; McMurry, 1953; Gilligan, et al, 1990; and Prager, 1989.

^b The mean adjusted excess returns are calculated as raw return minus overall mean of 0.26.

^c $\Pr(|A_{RRt}| > |\text{random draw from time series of returns}|)$,

^d This is the only excess return that was not statistically significant using the standard *t*-test procedure. The *t*-tests are computed with mean of excess returns equal 0, and standard deviation of 2.82, *n*=94.

* statistically significant at 0.01. $\frac{k}{10000} > 0.5130 = \frac{k_{.01}}{10000}$,

The excess return for May 1885 at the beginning of the Southwest Strike of 1885 was negative. When the strike ended in the fall of 1885, the excess return for October 1885 was positive and statistically significant. A negative return was also associated with the start of the Southwest Strike of 1886 in March. When it ended in April, a significant positive effect would be expected, but the excess return for the month is negative and statistically insignificant. This is not surprising, since there were fears of further unrest. In late April, there were rumors of a general strike on May 1, 1886 in support of the universal eight-hour day movement (*The Washington Post*, April 22, 1886). The passage of the earlier version of the Arbitration Bill, HR7479, may also have had a confounding impact on the market, since its expected effect is negative.

The fears of further unrest were justified. On Monday May 3, 1886 a general strike did, in fact, begin in which an estimated 350,000 workers nationwide went on strike (Filippelli, 1990, pp. 164-9). The following day a mass meeting in Chicago's Haymarket Square turned violent, resulting in seven policemen dead and sixty injured. Eight civilians died in the ensuing riot and as many as forty were injured (*The New York Times*, May 9, 1886, 2-5). The remainder of May was little improved, with the Freight Handlers Strike paralyzing railroads in the Chicago area, and continuing uncertainty in the stock market (*The New York Times*, May 9, 1886, 2-2, 9-5; May 24, 1886, 5-1). The insignificance of May's negative excess return is consistent with the market's expectations -- the troubles of May had been anticipated.

The stock market's recovery in June 1886 from the labor troubles of April and May was positive and statistically significant. The Knights of Labor held a conference in Cleveland beginning on May 25, 1886, extensively covered by the press, in which they condemned strikes and announced their favorable disposition towards arbitration (*The New York Times*, May 27, 1886, 4-3).

It was nearly two years before the railroad industry was embroiled in another strike. The Burlington Strike began in the closing days of February 1888, and then escalated in March when freight handlers in Chicago joined the strike. There was a great fear that the strikers on the Chicago, Burlington, & Quincy Railroad, and their sympathizers, would tie up rail traffic in the Chicago area (*New York Times*, March 5, 1888, 1-6; March 6, 1888, 1-4, 4-5). The Chicago, Burlington, & Quincy strikers had promised not to obstruct the operation of the railroad; by March 5th, the company had been so successful at attracting and hiring replacements that if the strikers kept their promise, traffic would have been little disturbed. In fact, while the company was meeting with strikers on March 5th, it was busy restoring its operations to normal (*New York Times*, March 5, 1-5; March 6, 1888, 1-4). The excess returns in both February and March are negative, but only statistically significant for March.

April brought with it an end to the Chicago Switchmen's Strike and the successful lock-out and replacement of workers on the Chicago, Burlington, & Quincy. A positive return is associated with the end of the strike, but it is not statistically significant. The passage of the Arbitration Bill, HR8665, may have confounded the positive effect of the strike's end.

The calm only lasted about a month as the frustrations of the blacklisted Burlington engineers and firemen led to violence. In June of 1888, several attacks were made against the trains of the Chicago, Burlington, & Quincy. The perpetrators were arrested in July and no further outbreaks of violence occurred. The market reacted predictably with negative and statistically significant excess returns in June, and positive and statistically significant excess returns in July of 1888 when the dynamiters were arrested.

Even though the Chicago, Burlington, & Quincy had returned to normal operations in April 1888, the strike did not officially end until January 1889, when

representatives of the Brotherhood of Locomotive Engineers finally reached a settlement for the reinstatement of the blacklisted Burlington engineers and firemen (*The New York Times*, January, 5 1889, 1-5). The stock market reacted positively and statistically significantly to this news.

The next significant strike to hit the railroads was the boycott of Pullman cars in June of 1894 by the Brotherhood of Locomotive Engineers, in support of striking workers in the Pullman car shops. This strike paralyzed all rail traffic moving through the Chicago area. The strike had the expected negative impact on the portfolio of railroad securities. When the strike ended in August 1894, after troops had been sent in to restore order and train service, the market responded positively.

Negative returns were clearly associated with the start of strikes. On the other hand, the cessation of the Southwest Strike in October 1885 and of other strike activity in June 1886, January 1889, and August 1894, all had a positive impact on returns. Before continuing on to a discussion of the arbitration legislation, a brief analysis of the passage of the Interstate Commerce Act is important because some of the events associated with both pieces of legislation occurred in the same month.

4.5.2 The Impact of the Interstate Commerce Act on Stock Returns

Traditionally, the Interstate Commerce Act was viewed as legislation created in the public interest to control railroad freight and passenger rates. The legislation would have reduced the railroads' expected future profits, thus producing negative excess returns (Gilligan, et al, 1990). However, in the more recent revisionist literature which views the Interstate Commerce Act as special interest legislation that actually benefited the railroads, the passage of the Interstate Commerce Act would have increased expected future profits and been associated with positive excess returns. Gilligan, Marshall and Weingast (1990) found that, on average, railroads benefited from the passage of the

Table 4.4 Events and Excess Returns for the Interstate Commerce Act.

month	event ^a	expected effect	excess return ^b	bootstrapping probability ^c
May-86	• Cullom Bill to regulate interstate commerce passes Senate.	–	-1.80	0.427
	• National strike for the 8-hour day	–		
	• Haymarket Massacre	–		
	• Chicago Freight Handlers Strike.	–		
Oct-86	• <i>Wabash v. Illinois</i> Supreme Court decision.	+	2.86	0.802*
Nov-86	• <i>Wabash v. Illinois</i> Supreme Court decision.	+	2.15	0.672*
Jan-87	• Cullom Bill passes House, ICA signed into law by President Cleveland.	–	-1.07	0.248
Apr-87	• Interstate Commerce Commission holds hearings to interpret the short haul shipping constraint.	+	2.75	0.777*
May-87	• Interstate Commerce Commission hearings continue.	+	1.70	0.582*
Jun-87	• ICC reports its official interpretation of the short haul shipping constraint.	–	-2.37	0.627*

Sources and notes: ^a events compiled from *The New York Times*, 1885-1894; *The Washington Post*, 1885-1894; *The Commercial and Financial Chronicle*, 1885-1894; the *Congressional Record*, 49-1,2 and 50-1; United States Strike Commission, 1894; Eggert, 1967; Filippelli, 1990; Kaltenborn, 1943; Ko, 1968; McMurry, 1953; Gilligan, et al, 1990; and Prager, 1989.

^b The mean adjusted excess returns are calculated as raw return minus overall mean of 0.26.

^c $\Pr(|A_{RRt}| > |\text{random draw from time series of returns}|)$,

* statistically significant at 0.01. $\frac{k}{10000} > 0.5130 = \frac{k_{01}}{10000}$,

Interstate Commerce Act. Prager (1989) also found a statistically significant and positive effect on expected future profits.

The primary events associated with the passage of the Interstate Commerce Act and their excess returns are presented in Table 4.4. The positive effect for the Supreme Court's decision in *Wabash v. Illinois* and the Interstate Commerce Commission hearings is consistent with the findings in Gilligan, et al, (1990). The state's attempts at railroad shipping rate regulation came to an end with the Supreme Court's decision in *Wabash v. Illinois*. The power to regulate the railroads was prohibited to the states and placed in the hands of Congress. Railroad owners were very pleased with this decision. Apparently, they felt that the benefits of being free from state regulation outweighed any worries over the implications of *Wabash v. Illinois* for regulation of the railroads by the Federal government.

However, railroad owners were wary of Federal regulation, as evidenced by the negative impact of the Senate's passage in May 1886; and the House's passage and President Cleveland's signing of the Cullom Bill in January 1887 creating the Interstate Commerce Commission. There was a great deal of uncertainty with regard to the actual impact of this legislation on the railroads, so a negative impact was expected.

It was not until the Interstate Commerce Commission held hearings in April and May of 1887 that the railroads were given a better idea how the legislation would function and how the Commission was going to interpret the short haul shipping constraint. Gilligan, et al (1990) found that the effects of the short haul shipping constraint differed across railroads -- some benefited and others did not. The excess returns were positive and statistically significant for both April and May, but the market had a negative and statistically significant reaction to the Interstate Commerce

Commission's final report. The Commission's interpretation of the short haul shipping constraint had a net positive effect on returns of 2.08 percent.⁸

The overall net effect of the passage of the Interstate Commerce Act was positive, and increased returns by 4.22 percent.⁹ This result supports the revisionist hypothesis that the railroad industry actually benefited from the passage of the Interstate Commerce Act.

4.5.3 The Impact of Arbitration Legislation on Stock Returns

The expected effect for arbitration legislation is negative. Railroad owners were opposed to arbitration legislation, objecting to any intervention which might tie their hands in treating striking workers as they saw fit. They felt that this type of legislation would increase labor costs, thus reducing future expected profits.

The intended effect of arbitration legislation was to reduce strike activity. A positive effect would have been associated with the legislation if stock market participants felt that the legislation could reduce strike activity without imposing additional costs on the railroads. This would have increased expected future profits, and thus increased returns. However, there were strong sentiments expressed regarding the efficacy of arbitration legislation.

A day after the House passed HR7479, *The New York Times* stated that members of the House felt that, though the legislation "might be a defective measure, it would be regarded as an attempt to settle labor difficulties and a vote against it might be subject to misconstruction." The article further stated that it was "generally thought in the House that the bill did not amount to much, and would do little good (April 4, 1886, 8-2)." A

⁸This is the sum of the excess returns for April, May, and June 1887.

⁹This is the sum of the excess returns for May, October, and November 1886; and January, April, May, and June 1887.

Table 4.5: Events and Excess Returns for Arbitration Legislation.

month	event ^a	expected effect	excess return ^b	bootstrapping probability ^c
Apr-86	• Arbitration Bill, HR7479, passes House.	–	-1.24*	0.289
	• Southwest Strike of 1886 ends.	+		
Feb-87	• Arbitration Bill, HR7479, passes Senate.	–	-0.79*	0.180
Mar-87	• Arbitration Bill, HR7479, pocket vetoed by President Cleveland.	+	2.27*	0.690
Apr-88 ^d	• Arbitration Bill, HR8665, passes House.	–	0.36	0.195
	• C. B. & Q. railroad returns to normal operations.	+		
	• Chicago Switchmen's Strike ends.	+		
Sep-88	• Arbitration Bill, HR8665, passes Senate.	–	2.74*	0.777
Oct-88	• HR8665 is signed into law by President Cleveland - Arbitration Act of 1888.	–	-1.04*	0.230

Sources and notes: ^a events compiled from *The New York Times*, 1885-1894; *The Washington Post*, 1885-1894; *The Commercial and Financial Chronicle*, 1885-1894; the *Congressional Record*, 49-1,2 and 50-1; United States Strike Commission, 1894; Eggert, 1967; Filippelli, 1990; Kaltenborn, 1943; Ko, 1968; and McMurry, 1953.

^b The mean adjusted excess returns are calculated as raw return minus overall mean of 0.26.

^c $\Pr(|A_{RRt}| > |\text{random draw from time series of returns}|)$,

^d This is the only excess return that was not statistically significant using the standard *t*-test procedure. The *t*-tests are computed with mean of excess returns equal 0, and standard deviation of 2.82, *n*=94.

* statistically significant at 0.01. $\frac{k}{10000} > 0.5130 = \frac{k_{01}}{10000}$,

later article in *The New York Times* on April 14 remarked that the Arbitration Bill recently passed in the House of Representatives was not “worth the paper it is printed on (April 14, 1886, 4-3).” If the Arbitration Bill was worthless, then it would not have had a significant effect on expected future profits, and thus no significant effect on the excess returns. The pattern of returns should help to sort out the market’s perception of this legislation.

The passage of the Arbitration Bill HR7479 by the House in April 1886 had a negative, but statistically insignificant effect on returns. April’s excess return is confounded by the end of the Southwest Strike of 1886. The *Washington Post* reported that by April 24, business had fully resumed on the roads involved in the Southwest Strike (*The Washington Post*, April, 24, 1886). When more than one event occurs in a month, it is impossible to sort out the actual effects of each individual event.

However, it is reasonable to infer which effect may have been stronger, especially if expected effects for the individual events oppose each other. A positive effect was expected for the end of the Southwest Strike. The negative return for April implies that the legislation must have been expected to have a negative impact on the railroads, and that its negative effect outweighed the positive effect of the strikes end, thus yielding an overall negative excess return for the month. In order for this to occur, the legislation must have had a relatively large expected negative effect.

The Senate did not pass the Arbitration Bill, HR7479, until February 28, 1887. Given the timing of its passage, the negative response in stock prices for February was probably not caused by the Arbitration Bill. The subsequent veto of HR7479 by President Cleveland in March caused an increase in stock prices. This positive and statistically significant effect implies that the market was pleased with the President’s veto of the Arbitration Bill. Given the negative effect of the House’s passage of the

Arbitration Bill and the positive effect of the Bill's failure to become law, it is apparent that the market felt arbitration legislation would have a significant negative effect on the railroad industry.

The debates in the House over the final version of the Arbitration Bill, HR8665, expressed similar views to the debates on HR7475 in 1886 and 1887. The Bill's effectiveness was again challenged. Representative Foran felt that "the enactment of this bill would simply place on the statute-books of the United States a legislative eunuch (*Congressional Record*, 50-1, April 18, 1888, pp3105)."

The House's passage of the Arbitration Bill in April 1888 went completely unnoticed in *The New York Times*, and received only brief mention with no comment in *The Washington Post* (April 19, 1888) on an inside page. The return for April 1888 is positive and statistically insignificant. However, two large strikes came to a close during this month, which should have caused a large positive effect. Similar to the events of April 1886, the rebound in stock values was confounded by the House's passage of an Arbitration Bill. The news of the cessation of the Burlington labor troubles should have been accompanied by a much larger positive effect than 0.36 percent. The legislation must have, once again, had a relatively large offsetting negative effect.

The Senate passed the Arbitration Bill on September 17, 1888 with no debate. Neither *The New York Times* nor *The Washington Post* made any reference to the Arbitration Bill. The excess return in September was positive and relatively large, which is not consistent with the previous effects associated with arbitration legislation. The lack of any mention of the passage of the Arbitration Bill does not necessarily prove that it had no effect on the market, nor that it was still viewed as a negative piece of legislation.

Several other newsworthy and influential events did occur in September that should have had significant positive effects on the market. Legislation had been introduced to outlaw Trusts, but was successfully blocked from going to a vote. The

Treasury increased disbursements of money into the economy, and it was reported that prosperous economic times lay ahead (*The Washington Post*, September 6, 16, and 30, 1888).

The Arbitration Act of 1888 was signed into law with very little fanfare on October 1, 1888. In fact, *The New York Times* ignored the event entirely, and less than one column-inch of space was allotted to the announcement in *The Washington Post* (October, 2, 1888). The economic outlook was good -- the future promising "a decided improvement in the market (*The Washington Post*, October, 7, 1888)." All economic indicators favored positive excess returns, yet October was marked by a statistically insignificant negative excess return of 1.04 percent. Once again it appears that arbitration legislation was not expected to have a positive affect on the future profits of the railroads, and had a negative offsetting effect on the market.

4.5.4 Regression Analysis of the Events and Excess Returns

In several cases, confounding events pose problems with the interpretation of particular excess returns and events. Of the three months in which multiple events of different types occur simultaneously, the effects are impossible to separate. To summarize and examine the net effects of strikes, the Interstate Commerce Act, and arbitration legislation, a simple regression is estimated on the monthly excess returns with a set of dummy variables (see Tables 4.6 and 4.7). A dummy variable is created for each type of event. The expected effect for the *Strike Begins* dummy variable is negative, and positive for the *Strike Ends* dummy variable. Arbitration legislation should have a net negative effect on excess returns. The Interstate Commerce Act is expected to have a positive effect.

Table 4.6 Definitions of Dummy Variables

<u>Variable</u>	<u>Definition</u>
<i>Strike Begins</i>	Dummy variable equal to 1 for each month a strike began.
<i>Strike Ends</i>	Dummy variable equal to 1 for each month a strike ended.
<i>Arbitration Legislation</i>	Dummy variable equal to 1 for passage of arbitration legislation, and -1 for veto of HR7479 in March 1887.
<i>Interstate Commerce Act</i>	Dummy variable equal to 1 for Interstate Commerce Act events.
<i>January</i>	Monthly dummy variables, for 1885-1894.
<i>February</i>	
<i>March</i>	
<i>April</i>	
<i>May</i>	
<i>June</i>	
<i>July</i>	
<i>August</i>	
<i>September</i>	
<i>October</i>	
<i>November</i>	
<i>December</i>	

Sources: Events taken from Tables 4.3, 4.4, and 4.5.

Table 4.7 Regression Results for Excess Returns

Variable	Coefficient (Standard Error)	Elasticity at Means
<i>Strike Begins</i>	-2.0671* (1.057)	-1.5629
<i>Strike Ends</i>	2.9167** (1.079)	1.7152
<i>Arbitration Legislation</i>	-2.0016* (1.156)	-0.6726
<i>Interstate Commerce Act</i>	1.1698 (1.233)	0.5996
<i>January</i>	0.3922 (0.8777)	0.3295
<i>February</i>	0.67436 (0.8779)	0.5665
<i>March</i>	-0.6031 (0.8968)	-0.5066
<i>April</i>	0.5932 (0.9190)	0.4983
<i>May</i>	-0.0037 (0.9444)	-0.0312
<i>June</i>	-0.9576 (0.9013)	-0.8045
<i>July</i>	-0.7674 (0.8798)	-0.6447
<i>August</i>	0.9617 (0.8707)	0.8079
<i>September</i>	1.9999** (0.8717)	1.6800
<i>October</i>	-0.2870 (0.8856)	-0.2411
<i>November</i>	-0.1190 (0.8723)	-0.1000
<i>December</i>	-0.8478 (0.8607)	-0.7122
R-Square	0.2698	
Observations	120	

Notes: Dependent variable is the mean adjusted excess return.

Estimated for AR(1) error term structure by Cochrane-Orcutt Procedure.

* statistically significant at 10%

** statistically significant at better than 5%

The strike effects are confirmed by the regression. The average effect of the start of strikes on the margin decreased returns by 1.56 percent. The marginal effect of the *Strike Ends* dummy variable increased returns by 1.72 percent.

The regression results found a much smaller net effect for the Interstate Commerce Act. The excess returns only increased by 1.08 percent with respect to the passage and interpretation of the Interstate Commerce Act. However, the effect is statistically insignificant.

The *Arbitration Legislation* dummy variable had a negative and statistically significant effect on excess returns. On average, arbitration legislation reduced returns by 2 percent over the ten year period. The regression results compliment and confirm the negative effect of arbitration legislation on railroad securities¹⁰.

4.6 Conclusion

The results of this analysis support the hypothesis that this legislation was not in the best interests of the railroad industry. The negative returns associated with the passage of arbitration legislation, and the market's positive reaction to the failure of government to enact arbitration legislation, clearly support this belief. In addition, the regression analysis found a negative and statistically significant effect on excess returns for arbitration legislation. The market expected this legislation to have a negative impact on future profits in the railroad industry.

The beginning of a strike also had a negative impact on stock returns; when a strike ended, the returns responded positively. Strike effects were positive on net, which

¹⁰The regression also helps explain the contrary positive effect in September 1888. The statistically significant *September* dummy variable indicates a "September effect". When the "September effect" is decomposed on an annual basis there is evidence of cyclical behavior. This effect may be linked to information arriving in the market regarding the quality of the harvest. Perhaps this positive effect was the result of unexpected good news about the Fall 1888 harvest.

might indicate that the losses associated with a strike were smaller than the costs of resolving labor disputes by a method other than strikes. The market reacted positively on net to the passage of the Interstate Commerce Act and its associated events.

Organized labor had argued for arbitration legislation as a means of compelling employers to negotiate with unions. Clearly, railroad owners and the market were worried, not about the effects of the legislation on strike activity, but about the implications of arbitration legislation. If arbitration legislation were to shift the balance of power in the bargaining relationship between capital and labor, giving labor the upper-hand, then the owners of capital would have found it more difficult to set wages and collect monopsony rents.

Arbitration legislation did alter the state of affairs in the railroad industry. This analysis of the events provides further insight into how this type of legislation was perceived. However, these results do not offer any insights or evidence that indicate whether the legislation was effective. Did the Arbitration Act function as intended? Did it reduce strike activity? The degree to which this legislation altered the state of affairs in the railroad industry can also be measured by examining how the legislation affected strike activity.

Chapter 5 The Arbitration Act and Its Effect on Strike Activity

A strike or lockout is, in itself, a ridiculous affair. Whether a failure or a success, it gives no direct proof of its justice or injustice. In this it resembles war between two nations. It is simply a question of strength and endurance between the contestants. The gage of battle or the duel is not more senseless as a means of establishing what is just and fair than an industrial strike or lockout(Carnegie, 1886).

5.1 Introduction

The Federal government began its legislative involvement in labor relations with the passage of the Arbitration Act of 1888. This legislation was the first step toward the creation of the Railway Labor Act of 1926, the National Labor Relations Act in 1935, and the development of collective bargaining rules. What makes the study of this piece of legislation interesting is that prior to the law's introduction, the only dispute resolution procedures employed by the Federal government were the use of the injunction, and troops to stop strike activity. The Arbitration Act introduced arbitration into virgin territory.

The legislative intent of the Arbitration Act was to reduce the number of railroad strikes and to assist in their settlement when they did occur. If this legislation had had the intended effect, then the frequency and duration of strikes should have fallen. The arbitration provisions of the Arbitration Act were never invoked. Does this mean the legislation was ineffective?

Not necessarily. The availability of arbitration may reduce disputes even when it is not used. In theory, arbitration is supposed to deter disputes in much the same way that the threat of a strike does, by imposing costs on employers and employees (Stevens, 1966). Therefore, if disputes were to be resolved by arbitration and the costs of arbitration were high, then the presence of arbitration would decrease the number of disputes. However, if arbitration lowered the costs of strikes, then the number of disputes would increase.

How could the mere availability of arbitration affect strike activity? Farber and Katz (1979) claim that the very presence of dispute resolution procedures, like arbitration, will affect the frequency, duration, and outcome of disputes. When arbitration was introduced into the bargaining environment by the Arbitration Act, it gave railroad management and workers a third alternative. Instead of only being able to negotiate or strike, they could now choose to reach a settlement by arbitration. Farber and Katz's (1979) work implies that if the introduction of arbitration had decreased (increased) the relative costs of strike activity, then the frequency and duration of railroad strikes would have increased (decreased).

Strike data for the period 1881 to 1894 are employed to test for the structural effect of the introduction of arbitration into the bargaining environment. These data were collected by the Commissioner of Labor of the United States and reported in the *Third, and Tenth Annual Reports of the Commissioner of Labor*, which cover the period from 1881 to 1894.

These strike data are unique for two reasons. First, the detail of the strike information contained in these nineteenth century studies is not currently available in any other data sources covering strike activity (Card, 1992). Second, the labor market of the late nineteenth century was less constrained by laws governing the relationship between employers and employees. In particular, laws governing the adjustment of labor disputes

were largely absent in the early years of these studies, which makes these data ideal for examining the effects of the introduction of arbitration laws on strike activity.

In addition to evaluating the effectiveness of the Arbitration Act, this chapter seeks to contribute to our understanding of the effects of third party intervention in labor disputes. Since its legislative inception, arbitration has become an integral component of the bargaining environment. A clear understanding of how third party intervention in labor disputes affects the behavior of employers and employees is critical to the formulation of policy, and the further development of dispute resolution procedures. Before examining the effects of the Arbitration Act, Sections 2 and 3 provide a basic discussion of the literature, and present some simple modeling of the bargaining environment.

5.2 Dispute Resolution Procedures

A dispute resolution procedure is a method by which disputes are settled. Strikes are, in fact, a type of dispute resolution procedure. Arbitration and mediation are the two other most common dispute resolution procedures. How do the outcomes differ between these procedures? The best outcomes of disputes would be those which minimize the internal and external costs of disputes. Generally, strikes are a costly way to settle disputes, imposing losses on employers and employees (internal costs), and society (external costs). What kind of dispute resolution procedures can promote less costly resolutions of labor disputes? This question, which is of contemporary concern, was also raised in the late nineteenth century in the United States. The “labor problem” was identified as the need to preserve the “industrial peace”, to avert the injurious effects of strikes (Rieve, 1886).

The modern labor relations literature establishes two criteria that an effective dispute resolution procedure should satisfy. First, it should provide adequate incentives for negotiation to take place. The procedure should function in the same way as the threat of a strike does, by providing incentives for employees and employers to negotiate a settlement, thus avoiding the costs of a strike. In this sense, a good dispute resolution procedure is one that is rarely used. Second, outcomes determined by the procedure should not distort what might occur in the procedure’s absence; that is, the procedure should maintain neutrality. This second criteria implies that a procedure’s presence should not bias the outcomes in favor of any one of the parties.

If the issues being disputed cannot be settled by simple negotiation between parties, a third party can be introduced into the negotiation process as either a mediator or an arbitrator. A mediator serves as an intermediary and attempts to assist the parties in re-negotiating their differences. The mediator offers suggestions and facilitates

communication between the parties. An arbitrator issues formal rulings which, by previous agreement between the parties of a dispute, or by law, can be binding. If the rulings are binding, the parties must abide by the decision of the arbitrator. These dispute resolution procedures can be forced on the parties, as in compulsory arbitration or mediation, or may be entered into voluntarily. When functioning properly, these procedures should encourage disputants to reach negotiated settlements.

Two common systems of arbitration are employed. In conventional arbitration, the arbitrator is free to choose any settlement he or she prefers. Under the second system, final-offer arbitration, the arbitrator must choose one of the disputing party's final offers as the settlement. A few examples should help to clarify the dispute resolution procedure.

A simple example:

Two siblings splitting a candy bar.

Procedure 1: One cuts, the other chooses.

Procedure 2: Parental intervention -- the division of the candy bar is performed by a third party.

A more complex example:

Employees and employer determining a new wage.

Procedure 1: Negotiation -- they determine the new wage by making offers and counter offers.

Procedure 2: Strike -- the employees are not satisfied and they threaten to strike. The potential costs of a strike provide an incentive for workers and management to reach a negotiated settlement.

Procedure 3: Third party intervention. Conventional arbitration can be used to settle the dispute once negotiations fail. The arbitrator is free to impose the settlement he prefers.

5.3 Theory and Empirical Literature Review

There are two branches of the strike literature. The first examines the determinants of strikes, while the other is concerned with the effects of bargaining procedures. These two approaches are not substantially different when dispute resolution procedures are simply modeled as one of the many determinants of strikes.

The general determinants of strike behavior -- the level of unemployment, firm profits, inventory levels, the availability of substitute inputs, and a union's strike fund balances, are discussed in the first branch of the literature. This branch of the literature predicts that the frequency and duration of strikes are procyclical. Strikes will be more likely to occur when the economy is doing well -- low unemployment, and high profits (Ashenfelter and Johnson, 1969; Reder and Neumann, 1980). Another finding is that the costs of a strike are inversely related to strike frequency and duration. The higher the relative costs of a strike, the lower the probability of one occurring and the shorter its duration (Reder and Neumann, 1980). A deficiency in this branch of the literature is that the type of bargaining procedures employed are not explicitly incorporated in the models. The importance of developing procedures to aid in the resolution of labor disputes, and the study of why negotiations fail, has spurred research into the modeling of arbitration systems.

An early example of such an endeavor is a paper by Farber and Katz (1979). They developed a theoretical model which captured the role of uncertainty and risk preferences when arbitration was available. The arbitration modeled is compulsory conventional arbitration. A dispute occurs when parties fail to reach a negotiated settlement and must submit to arbitration. There are only two actions that can be taken -- negotiate or arbitrate. If an arbitration procedure works, it must induce the parties to negotiate. The intent is to avoid disputes by providing an incentive for parties to reach a negotiated settlement. Arbitration, like a strike, will impose costs on the parties, making

a dispute more costly than reaching a negotiated settlement, and thus providing an incentive for the parties to negotiate (Stevens, 1966).

There are no direct costs of negotiation or arbitration in Farber and Katz's model. The cost of arbitration is generated by the uncertainty of the arbitrator's behavior. Following is a simplified version of Farber and Katz's model, which quantitatively explains the conditions under which parties will reach a negotiated settlement or resort to arbitration. The rents being split by the parties are normalized to 1.

Let s_{iA} represent party i 's expectation of the arbitrator's award. These expectations are private information.

Let s_{1N} represent party 1's offer to party 2, and s_{2N} represent party 2's offer to party 1 when negotiating a settlement.

If $s_{1A} + s_{2A} \geq 1$ then the parties will resort to arbitration.

If $s_{1A} + s_{2A} < 1$ then the parties are more likely to reach a negotiated settlement.

A negotiated settlement will occur when

$s_{1N} > s_{2A}$ or $s_{2N} > s_{1A}$, and

$1 - s_{iN} > s_{iA}$ for each i .

When the indirect costs of arbitration are high, the parties will have pessimistic expectations of the expected arbitration award, and a negotiated settlement will be more likely; therefore, the sum of s_{1A} and s_{2A} would be less than one. The difference between s_{1A} and s_{2A} represents a range of values over which a negotiated settlement might occur. This range of possible negotiated settlements, the contract zone, is illustrated in Figure 5.1. The shaded region in the graph is the contract zone. If party 2 made the offer, s_{2N} , party 1 would be better off accepting this offer than submitting the dispute to arbitration, given their expectation of the arbitrated award, s_{1A} . The offer of s_{2N} gives party 2 a share of the normalized rents of $1 - s_{2N}$, which is greater than their expected share from

Figure 5.1 Pessimistic Expectations of the Arbitrated Award

an arbitrated settlement. Therefore, this offer would be an acceptable outcome for both parties.

However, if the parties have optimistic expectations of the arbitrator's award, a dispute is more likely to occur -- the sum of s_{1A} and s_{2A} is greater than one. In this case, the contract zone disappears and the parties will resort to arbitration (see Figure 5.2). Party 2 would no longer be willing to offer the settlement of s_{2N} to party 1; it would not be rational, since party 2 thinks it could do better by submitting to arbitration. The only negotiated settlements that party 2 is willing to offer have to yield a share greater than what they expect to receive from an arbitrated outcome,

$$1 - s_{2N} > s_{2A}.$$

An offer of s'_{2N} would be such an offer, but party 1 will only accept offers from party 2 that are greater than what they expect to receive from an arbitrated settlement,

$$s_{2N} > s_{1A}.$$

The decision of whether to arbitrate or negotiate is driven by the parties' expectations of the arbitrator's award.

The major contribution of Farber and Katz's work was in showing that dispute resolution procedures are an important determinant of dispute incidence, duration and outcome. Farber and Katz's model has provided a theoretical framework for the further study of the effects of dispute resolution procedures; it is their assertion that the mere presence of dispute resolution procedures alters the bargaining environment. Any analysis of strike activity must address both the general determinants of strike activity, and the specific dispute resolution procedures that are available.

An empirical study of Canadian public sector contract negotiations under different bargaining procedures by Currie and McConnell (1991), found that dispute rates were higher, but dispute costs were lower under compulsory arbitration than under the right to strike. Their analysis also discovered that wages determined under compulsory

Figure 5.2 Optimistic Expectations of the Arbitrated Award

arbitration tended to be higher than wages determined under the right to strike. The first finding of higher dispute rates under arbitration is consistent with the findings of others (Currie, 1989; Ashenfelter and Bloom, 1984; Ashenfelter, Currie, Farber, and Spiegel, 1990).

The increase in dispute rates under arbitration is referred to as the “chilling effect,” whereby the incentive to negotiate is “chilled” because of the lowered dispute costs associated with the use of arbitration. Most studies, using either field data (Ashenfelter and Bloom, 1984; Currie, 1989; Card, 1990) or experimental data (Ashenfelter, Currie, Farber, and Spiegel, 1990), find strong evidence in support of this effect.

The “narcotic effect” is a bargaining phenomenon also associated with the use of arbitration, which occurs when parties grow dependent upon arbitral intervention. They no longer attempt to negotiate, but instead, rely on the arbitration procedure to reach an agreement for them. Currie and Farber (1992) used an experimental regime to collect data to test for this effect, but found no evidence in support of it. Currie (1989) does, however, find evidence of the effect in field data from British Columbia teachers’ contract negotiations. Neither of these effects can be tested here, since the arbitration provisions of the Arbitration Act and all of the state legislation’s arbitration provisions prior to 1894, were never used. The mediation provisions in several of the state statutes were invoked, but usage was very low relative to the number of strikes and mediation was seldom successfully applied (Ko, 1968).

Farber and Katz’s model restricts behavior to only two actions -- negotiate or arbitrate. Once the Arbitration Act was passed, labor and management had three choices -- negotiate, arbitrate (voluntarily), or strike. In states that provided legislation for the mediation and arbitration of disputes, employers and employees had four choices --

negotiate, mediate, arbitrate, or strike. An extension of the simple model is developed below, which incorporates the additional actions.

There were potentially three types of dispute resolution procedures available once legislation had been passed. A dispute results when negotiation breaks down and a strike, or third party intervention in the form of mediation or arbitration occurs. Prior to 1894, all of the mediation and arbitration legislation only provided for voluntary mediation and arbitration.

Let s_{ij} represent party i 's expected normalized share received from choosing dispute resolution procedure j . A negotiated settlement can only occur when a contract zone exists.

Existence of the contract zone:

If $\sum_{i=1}^2 s_{ij} < 1$ for all j , then a contract zone will exist.

The existence of a contract zone is a bit more complicated here than in the simpler form of the model. For example, if the parties have pessimistic expectations over an arbitrator's award, a contract zone will exist, as illustrated in Figure 5.1, and a negotiated settlement will be more likely to occur. However, if the parties have optimistic expectations over s_{iS} , (their expected normalized shares from entering into a strike,) this would imply that

$$\sum_{i=1}^2 s_{iA} < 1 \leq \sum_{i=1}^2 s_{iS}.$$

This particular scenario is illustrated in Figure 5.3. The contract zone, defined by the difference between the parties' expectations of the arbitrator's award, is eliminated due to the higher shares each party expects to gain from resorting to a strike. Party 2's offer of s_{2N} makes party 2 better off than under arbitration or a strike, but party 1 will

Figure 5.3 Pessimistic Expectations Of Arbitrator's Award With Optimistic Expectations Of Strike Outcome

only accept offers greater than s_{1S} . Party 1 could do better by striking than by accepting any offer that party 2 would be willing to offer, or by submitting to arbitration. Given the parties' expectations, a negotiated settlement will not be reached.

The new model can be formalized as follows

Let s_{ij} represent party i 's normalized expected share received from resorting to dispute resolution procedure j , where j = mediation, arbitration, or strike.

Let s_{1N} represent party 1's offer to party 2, and

s_{2N} represent party 2's offer to party 1 when negotiating a settlement.

If $\sum_{i=1}^2 s_{ij} < 1$ for all j , then a stable contract zone will exist, and the parties will reach a negotiated settlement.

However,

if $\sum_{i=1}^2 s_{ij} \geq 1$ for at least one j , then a stable contract zone will not exist, and the parties will resort to dispute resolution procedure j under the following conditions :

Mediation will be resorted to when

$s_{iM} > s_{iA}$ and $s_{iM} > s_{iS}$ for all i .

Arbitration will be resorted to when

$s_{iA} > s_{iM}$ and $s_{iA} > s_{iS}$ for all i .

A strike will be resorted to when

$s_{iS} > s_{iM}$ and $s_{iS} > s_{iA}$ for at least one i .

The conditions under which a settlement will occur can be summarized as follows. A negotiated settlement, s_N , will be reached if and only if a stable contract zone exists, and when

$s_N > s_{ij}$ for all i and j .

This condition states that in order for a negotiated settlement to occur, party i would never accept a settlement that they could improve upon by taking a different course of action; that is, by resorting to one of the j dispute resolution procedures.

$$s_{1N} > s_{2j} \text{ or } s_{2N} > s_{1j} \text{ for all } j, \text{ and} \\ 1 - s_{iN} > s_{ij} \text{ for each } i, \text{ and all } j.$$

The general conditions under which a mediated settlement, s_M , would occur are when

$$s_M > s_{ij} \text{ for all } i \text{ and } j.$$

Recall that once we reach this stage of the bargaining process there is no longer a stable contract zone -- negotiation has failed. Therefore, the only condition that must be met is that the mediated outcome cannot be improved upon by either party resorting to another dispute resolution procedure.

When an arbitrated outcome is reached, s_A , the arbitrator's award cannot be improved upon by either party taking a different course of action. The condition is

$$s_A > s_{ij} \text{ for all } i \text{ and } j.$$

Likewise, when a strike occurs, the strike outcome must be the best outcome that the parties can attain. The strike settlement, s_S , would have to meet the criteria

$$s_S > s_{ij} \text{ for all } i \text{ and } j.$$

Under this condition, a strike would make each of the parties better off than any other course of action. It should be clear that the payoffs from the alternative actions will influence the choices that the parties will make. Another possible scenario is that the parties might have pessimistic expectations over both the arbitrator's award and the outcome from a strike. A stable contract zone will exist in this case. If arbitration yields a lower cost outcome than a strike, then the expected shares from an arbitrated and strike settlement would have the relationship

Figure 5.4 Pessimistic Expectations Of Arbitrator's Award and Strike Outcome

$$\sum_{i=1}^2 s_{iS} < \sum_{i=1}^2 s_{iA} < 1.$$

This scenario is one possible example of the relationship between strikes and arbitration after the passage of the Arbitration Act, which is illustrated in Figure 5.4. The contract zone prior to the introduction of arbitration, Contract Zone 1, would be defined by the difference between s_{1S} and s_{2S} . Before arbitration was available, an offer of s_{2N} by party 2 would have been acceptable to both parties.

However, after arbitration is introduced, the contract zone shrinks. The new contract zone, Contract Zone 2, would be defined by range of outcomes bounded by s_{1A} and s_{2A} . The offer s_{2N} would no longer be in the contract zone. The smaller contract zone would decrease the range of possible negotiated settlements, which would increase the likelihood of negotiations failing and a strike occurring. In fact, any change in the bargaining environment that lowered the relative costs of strikes would decrease the size of the contract zone and increase the likelihood of a dispute occurring; thus, increasing the likelihood of a strike.

The examples so far have assumed that both parties had similar expectations over the various outcomes. However, what if the parties had divergent expectations? Railroad management did not favor arbitration, but railroad labor did, and management had generally fared better than labor when strikes occurred. This implies that railroad management would have had pessimistic expectations of the arbitrator's award, and relatively more optimistic expectations of the strike outcome than did workers. The owners would have refused arbitration, or any offer made by workers that was less than their expected share from a strike.

Given labor's favorable disposition toward arbitration, they would have had optimistic expectations of the arbitrated outcome. An arbitrated outcome would have

Figure 5.5 Workers Have Optimistic Expectations of the Arbitrator's Award; and Management Has Pessimistic Expectations of the Arbitrator's Award, But Relatively More Optimistic Expectations of the Strike Outcome

made workers better off than either any offer management was willing to extend, or a settlement resulting from a strike. This scenario is illustrated in Figure 5.5 and implies the following relationships between the expected normalized shares,

$$\sum_{i=1}^2 s_{is} > 1, \text{ no contract zone exists, and}$$

$$s_{1A} > s_{1S} \text{ and } s_{2S} > s_{2A}.$$

A strike is unavoidable, given railroad management and workers' expectations.

This last illustration exemplifies how a change in the bargaining environment and an individual's expectations can affect the outcomes and occurrence of disputes. Even though arbitration was voluntary under the provisions of the Arbitration Act, its mere presence would have altered the relative costs of the other actions and thus the outcomes of disputes. If the availability of arbitration decreased the relative costs of strikes for even one of the parties, then changes in the frequency and duration of disputes would be associated with the passage of the legislation. By gathering strike data on either side of the Arbitration Act's creation, and examining whether the presence of arbitration increased or decreased strike activity, the legislation's effect on the bargaining environment can be tested.

5.4 The Data

The data used to analyze the effect of the state and federal mediation and arbitration legislation were compiled from several sources. State level and railroad data were culled from the *Tenth, Eleventh, and Twelfth Census of the United States*; and various years of *Poor's Manuals of Railroads*. The state of the national economy -- real gross domestic product -- was taken from Balke and Gordon (1989). Strike information was collected by the Commissioner of Labor of the United States and reported in the *Third, and Tenth Annual Reports of the Commissioner of Labor*, which cover the period

from 1881 to 1894.¹ The strike data include information on the number of strikes, the duration in days for each firm involved in a strike, the causes of disputes, dispute success rates, the number of employees prior to the strike, the number of strikers, the number of employees thrown out of work by the strike, union involvement, wages, employer losses, occupations, and industries.

The richness and quality of the strike data has not gone unnoticed. David Card and Craig Olson (1992) used the data to isolate the effect of union bargaining power on strike outcomes. As mentioned previously, the data are ideal for the study of legislative change, and were utilized by Janet Currie and Joseph Ferrie (1994) to study the effects of a wide range of state legislation on strike activity.

The cost of strikes is generally measured as a combination of their frequency and duration. The number of strikes (*STRIKES*) in a given state, in a given year, is used to capture the frequency of both railroad and non-railroad strike activity. The Commissioner of Labor's reports were organized with "establishments" as the unit of observation in the *Third Annual Report*, and "the strike" as the unit of observation in the *Tenth Annual Report*. Establishments affected by strikes of like causes, location, and dates have been combined as a single strike so that the number of strikes is consistent across the two reports.

The duration of a strike was determined in the *Tenth Annual Report* by the following method. First, since the reports do not convey detailed information on strikes which lasted less than a day, all enumerated strikes lasted a minimum of one day. Also, a strike often included more than one establishment. When this was the case, the starting date of the strike was recorded as the date the first establishment was struck, and the ending date was determined by the date the last establishment involved returned to

¹Some recent work by Card and Olson (1992) and Bailey (1991) shed some doubt on the reliability of these reports. The number of strikes may be slightly understated.

normal operation. No like measure of strike duration is available in the *Third Annual Report*, which measures duration as the sum of days each establishment was involved in a strike. Since this measure of duration is also available in the *Tenth Annual Report*, the duration of strikes used in the analysis (*DURATION*) is the average number of days that establishments were involved in strikes in a given state, in a particular year.

The measure of duration used in the analysis was computed by dividing the sum of days each establishment was involved in a strike by the total number of establishments involved in strikes in a given state, in a particular year. The variables *STRIKES* (railroads, and non-railroad strikes) and *DURATION* are used as the dependent variables in the analysis. A summary and definitions of all the variables can be found in Table 5.1. The next stage of the analysis is to determine the explanatory variables.

The theory and empirical work relating to the determinants of strike activity dictate the inclusion of variables which capture the costs of a unit of strike activity to employers and employees. The level of unemployment, firm profits, inventories, availability of substitute inputs, a union's strike fund balances (Ashenfelter and Johnson, 1969; Reder and Neumann, 1980; McConnell, 1989; and Hayes, 1984), and the availability of dispute resolution procedures (Farber and Katz, 1979; Ashenfelter and Bloom, 1984; Currie and McConnell, 1991; Card, 1990) are all generally cited as determinants of dispute costs. The task is to select proxies for these costs.

Strike activity has been shown to demonstrate procyclical tendencies (Ashenfelter and Johnson, 1969; Reder and Neumann, 1980). Therefore, the inclusion of the percentage change in real gross domestic product (*PCHRGDP*) should capture changes in labor and product market conditions. A positive relationship between *PCHRGDP* and strike incidence and duration would be consistent with strike frequency and duration being procyclical. A negative relationship would indicate that strike frequency and

Table 5.1 Strike Analysis Variables

<i>VARIABLE</i>	<i>DESCRIPTION</i>
<i>STRIKES</i>	Number of strikes by state by year. ^a
<i>DURATION</i>	Average duration in days per firms involved in strikes by state by year.
<i>RGDP</i>	Real Gross Domestic Product by year for the United States.
<i>PCHRGDP</i>	The percent change in real GDP by year for the United States.
<i>REALREV</i>	Real railroad revenues by year for the United States.
<i>PCHRREV</i>	The percent change in real railroad revenues by year for the United States.
<i>RVA</i>	Real value added in manufacturing by state by year.
<i>LAGRVA</i>	<i>RVA</i> lagged one year
<i>UNIONR</i>	The ratio of the number of strikes in which a union was involved to the total number of strikes by state by year.
<i>RRMILES</i>	Railroad track miles by state by year, in thousands.
<i>ICA</i>	Dummy variable for the Interstate Commerce Act equal to 1 stating in 1887.
<i>ARBACT</i>	Dummy variable for Arbitration Act of 1888 equal to 1 starting in 1889.
<i>MP</i>	Dummy variable equal to 1 if a state had legislation for the mediation of labor disputes by a permanent board.
<i>MAP</i>	Dummy variable equal to 1 if a state had legislation for the mediation and arbitration of labor disputes by a permanent board.
<i>AT</i>	Dummy variable equal to 1 if a state had legislation for the arbitration of labor disputes by a temporary board.
<i>MAT</i>	Dummy variable equal to 1 if a state had legislation for the mediation and arbitration of labor disputes by a temporary board.
<i>STATE</i>	Dummy variables for states

Sources: ^a the Dakota Territory, North Dakota, South Dakota, Oklahoma Territory, and Oklahoma were dropped due to missing data.

duration are countercyclical, which would imply that strike activity tends to rise when the economy is declining. There is some evidence that railroad strike activity was countercyclical. The railroad strike waves of the late 1870's, and early 1880's and 1890's, were in response to railroad owners' attempts to cut wages during lean economic times.

The one-year lag of real value added in manufacturing (*LAGRVA*) by state is included in the analysis of non-railroad strikes as a proxy for the profits of non-railroad firms. The percentage change in real value added in manufacturing would be the desired form for this variable. However, this information is only available on a decennial basis. The years between 1880 and 1890, and 1890 and 1900 were extrapolated by a simple linear trend being fitted to the years between decades, making the changes from year to year fixed. The lag is used instead of the current level of real value added to capture the effects of changing economic conditions on expectations. This variable is the best proxy available for non-railroad firm profits at the state level. Higher profits will induce workers to demand higher wages, thus increasing the likelihood of a strike. A positive relationship is expected between strike activity and the lag of real value added in manufacturing.

The profits of railroads are proxied by railroad revenues, which are adjusted by the GDP deflator (Balke and Gordon, 1989) to express them in real terms. The percentage change in real railroad revenue (*PCHRREV*), rather than the level, is used to capture the changes in railroad revenues over time. Higher railroad profits will induce workers to demand higher wages, thus increasing the likelihood of a strike. A positive relationship between strike activity and railroad revenue is expected.

The level of union activity should be a determinant of strike activity, given the fact that organized labor can generally impose much greater costs on employers than can individual workers (Hicks, 1948; Ashenfelter and Johnson, 1969). Union involvement

is proxied by dividing the number of strikes in which unions were involved by the total number of strikes in a given year in a particular state. This computation yields a union involvement rate (*UNIONR*). When a union is present, the effect of increased bargaining power, greater worker solidarity, and union militancy suggests increased frequency and duration of strikes. Thus, a positive effect is expected for union involvement.

The most important variables in this analysis are the dummy variables that proxy the structural changes in the bargaining environment after the passage of the federal and state legislation. This legislation fundamentally altered the bargaining environment. The passage of the state legislation and the Arbitration Act gave employers and employees additional choices to consider. Prior to the legislation there were only two choices -- negotiate or strike.

If the availability of arbitration or mediation changed the relative costs of taking a course of action, then the legislation would have had an effect on the frequency and duration of strikes. Arbitration was not popular with railroad management, and it had not been used very often even at the state level (Ko, 1968; Kaltenborn, 1943; Kaufman, 1954). There would have been a high degree of uncertainty associated with the process of arbitration, which would have made the costs of arbitration high relative to negotiation, mediation, and strikes. Thus, it is no surprise that railroads never utilized the arbitration provisions of the Arbitration Act in the face of a potential dispute, or as a method of adjustment during a strike. The experience of the states possessing laws with arbitration provisions was identical to the experience under the Arbitration Act (Ko, 1968; Kaltenborn, 1943). However, if labor or management perceived arbitration as a safety net then, at least implicitly, the costs of a unit of strike activity would have been lowered. This reduction in relative costs would have increased the likelihood of a strike.

Mediation was slightly more effective, but only to a very limited degree. Prior to 1894, only four of the eleven states that had legislation with mediation provisions had

been active in the adjustment of labor disputes using mediation (Ko, 1968; Kaltenborn, 1943). Mediation was perceived as an effective tool to help reduce strike activity. If, however, the availability of mediation lowered the costs of strike activity, then an increase in strike activity would be expected.

The intent of both the federal and state legislation was to reduce the number of strikes and to assist in the settlement of strikes when they did occur. If this legislation had had the intended effect, then the frequency and duration of strikes should have fallen. The coefficients on the legislative dummy variables would be negative in this case. However, if arbitration and mediation lowered the relative costs of strikes, then the frequency and duration of strikes would have increased, and the legislative dummy variables would have a positive coefficient. A positive coefficient suggests that a “chilling” of negotiation occurred and, in the case of the federal legislation, that the mere presence of arbitration increased strike activity.

The Arbitration Act was passed late in 1888, so the dummy variable for the Act (*ARBACT*) is set equal to 1 for each state starting in 1889. This dummy variable varies over time but is fixed across all states. A positive coefficient on this variable would indicate an increase in railroad strike activity being associated with the passage of the legislation.

The adoption of state legislation varies over the entire period studied. The statutes of each state were searched, from the time of statehood through 1894, for legislative acts relating to the adjustment of labor disputes. Four dummy variables (*MP*, *MAP*, *AT*, and *MAT*) were created to capture the effects of state legislation based on the type of legislative provisions a state had in effect at a specific point in time (see Tables 5.1, and 5.2). The state legislation generally applied to all firms operating within that state, so the dummies are included in the analysis of both railroad and non-railroad strikes. If any of this legislation had the intended effect, then the coefficients on these

Table 5.2 Legislative Dummy Variables

<u>MP</u>		<u>MAP</u>		<u>AT</u>		<u>MAT</u>	
YEAR	STATE	YEAR	STATE	YEAR	STATE	YEAR	STATE
1887	COLORADO	1891	CALIFORNIA	1886	IOWA	1878	MARYLAND
		1894	LOUISIANA			1889	MISSOURI
		1886	MASSACHUSETTS			1880	NEW JERSEY
		1887	MONTANA			1885	OHIO
		1889	MICHIGAN			1883	PENNSYLVANIA
		1892	NEW JERSEY				
		1886	NEW YORK				

dummy variables will be negative. A complete list of these states, with dates of adoption and a description of the legislative provisions, can be found in Appendix A, Table A.1.

A dummy variable for the passage of the Interstate Commerce Act is also included in the analysis. The analysis of the previous chapter indicated that the Interstate Commerce Act had a positive affect on railroad profits. However, any change in railroad revenues would be captured by the railroad revenue variable (*PCHRREV*). Did the Interstate Commerce Act have a non-revenue related effect on the railroad industry and strike activity?

The Interstate Commerce Act represented a significant change in the role of the government in railroad affairs. There was now a stronger mandate for government to see that no interruption of the interstate commerce occurred. The Federal government's intervention with injunctions and troops in both the Burlington Strike of 1888, and the Pullman Strike of 1894 greatly reduced the duration of these strikes. The Act may have deterred strike activity and shortened the duration of railroad disputes.

State characteristics are a critical factor to control for in this analysis. The number of railroad track miles (*RRMILES*) by state by year, and a set of state dummy variables have been included to control for any variations in strike activity across states not explained by the other explanatory variables.

A few general characteristics are obvious on examination of means from the sample. Descriptive statistics are computed over several subsets of observations: states, time, pre- and post- Arbitration Act, by states with legislation versus states without legislation, and by both railroad and non-railroad strikes (see Tables 5.3, 5.4, and 5.5). The mean duration and number of railroad strikes for the whole country rose significantly after the passage of the Arbitration Act, which indicates that the legislation may not have functioned as intended.

Table 5.3 Mean Characteristics by Years and Legislation Across All States

	<u>STRIKES</u>		<u>DURATION</u>		<u>UNIONR</u>		<u>RRMILES</u>	<u>RAILREV</u>	<u>RGDP</u>
	<u>RAILROAD</u>	<u>NON-RR</u>	<u>RAILROAD</u>	<u>NON-RR</u>	<u>RAILROAD</u>	<u>NON-RR</u>			
<u>ALL YEARS (n=630):</u>	0.6492	22.7860	2.2771	23.1340	10.12	47.60	3179	148.12	204.9
<u>YEARS (n=45):</u>									
1881	0.3333	9.9778	1.3735	18.6810	0.89	29.77	2251	104.74	169.0
1882	0.2000	9.6889	2.2272	19.2540	0.74	25.74	2500	105.51	179.7
1883	0.2000	10.1110	0.6437	22.6230	6.67	38.52	2632	122.29	184.2
1884	0.1111	9.7333	0.1667	29.2560	1.11	38.47	2717	121.16	187.5
1885	0.3333	13.8440	1.7296	29.8970	4.44	46.88	2794	123.44	188.9
1886	1.1556	30.4670	2.9804	26.4980	4.16	42.35	2968	132.61	194.6
1887	0.5778	31.3110	1.3407	11.9230	7.56	49.59	3223	150.22	203.4
1888	0.8889	19.1330	1.2041	17.3220	18.63	54.82	3348	140.00	202.4
1889	0.5778	23.2670	1.3704	19.7880	5.56	56.69	3459	153.15	215.0
1890	1.3111	39.3330	2.2652	18.0690	10.00	60.29	3571	172.44	218.1
1891	0.8444	37.1780	2.3481	25.8430	20.85	62.25	3657	179.80	225.1
1892	0.8444	27.8670	4.8178	32.1720	20.59	61.88	3751	183.18	235.7
1893	1.2222	27.7110	5.4757	21.2990	19.57	48.90	3795	200.12	235.6
1894	0.4889	29.3780	3.9363	31.2520	20.93	50.20	3835	185.06	228.8
								(millions)	(billions)
<u>NATIONAL LEGISLATION:</u>									
PRE (n=360)	0.4750	--	1.4582	--	5.52	--	2804	125.00	
POST (n=270)	0.8815	--	3.3689	--	16.25	--	3678	178.96	
<u>STATE LEGISLATION:</u>								<u>RVA</u>	
WITHOUT (n=520)	0.5539	10.4920	1.6566	22.0630	8.29	44.41	2804	311.88	
WITH (n=110)	1.1000	80.9000	5.2103	28.1980	18.78	62.66	4952	1502.30	
								(millions)	

Table 5.4 Mean Characteristics by States for 14 Years, 1881-1894

<u>STATES (n=14):</u>	<u>STRIKES</u>		<u>DURATION</u>		<u>UNIONR</u>		<u>RRMILES</u>	<u>RVA</u>
	<u>RAILROAD</u>	<u>NON-RAILROAD</u>	<u>RAILROAD</u>	<u>NON-RAILROAD</u>	<u>RAILROAD</u>	<u>NON-RR</u>		
ALABAMA	0.0714	4.4286	0.7143	46.4760	0.00	62.91	2794	108.25
ARIZONA	0.0714	0.1429	0.2143	0.6429	7.14	14.29	1001	14.50
ARKANSAS	0.5000	1.2143	1.8810	24.7970	9.52	48.81	2004	56.17
CALIFORNIA	0.9286	14.0000	2.6667	14.4320	9.52	66.82	3699	501.01
COLORADO	0.7143	5.7857	4.2738	41.6380	42.86	62.22	3614	114.20
CONNECTICUT	1.0740	35.0000	5.1310	19.6080	2.38	35.47	990	621.32
DELAWARE	0.0000	2.1429	0.0000	32.2940	0.00	37.02	307	69.33
FLORIDA	0.0000	7.2857	0.0000	15.1290	0.00	23.78	1996	46.62
GEORGIA	1.0000	7.2143	2.0857	13.0630	15.00	58.01	3870	185.35
IDAHO	0.0000	0.2857	0.0000	8.2500	0.00	21.43	840	6.15
ILLINOIS	6.2857	88.2140	9.8803	22.5830	41.23	64.29	9608	2442.20
INDIANA	2.0714	20.3570	4.5393	32.3060	16.16	63.16	5818	589.17
IOWA	0.1429	11.3570	1.0714	34.0250	14.29	54.17	7912	252.14
KANSAS	0.1429	3.7143	1.5000	32.5900	14.29	62.44	6877	177.50
KENTUCKY	1.2143	9.6429	3.3810	49.7710	15.71	65.50	2417	438.73
LOUISIANA	0.1429	2.4286	1.2857	19.0830	7.14	50.20	1533	139.69
MAINE	0.0000	8.3571	0.0000	23.3000	0.00	47.19	1268	224.43
MARYLAND	0.1429	11.5000	2.0714	31.6690	0.00	68.47	1216	467.03
MASSACHUSETTS	0.4286	94.6430	1.1190	25.2430	7.14	52.90	2100	2163.80
MICHIGAN	0.3571	17.3570	2.9286	25.7560	7.14	59.72	6189	660.38
MINNESOTA	1.2143	18.9290	6.8237	12.6850	28.57	55.23	4952	388.92
MISSISSIPPI	0.2143	0.4286	0.1191	14.2140	0.00	28.57	2076	47.63
MISSOURI	1.0000	19.4290	3.7202	27.5690	22.14	77.74	5518	847.59
MONTANA	0.2143	1.5000	6.9643	19.8930	0.00	36.91	1678	28.98

Table 5.4 Mean Characteristics by States, continued

	<u>STRIKES</u>		<u>DURATION</u>		<u>UNIONR</u>		<u>RRMILES</u>	<u>RVA</u>
	<u>RAILROAD</u>	<u>NON-RAILROAD</u>	<u>RAILROAD</u>	<u>NON-RAILROAD</u>	<u>RAILROAD</u>	<u>NON-RR</u>		
NEBRASKA	0.1429	2.8571	0.8571	32.3100	7.14	65.51	4236	150.23
NEVADA	0.0000	0.0000	0.0000	0.0000	0.00	0.00	934	4.94
NEW HAMPSHIRE	0.0714	6.1429	0.0714	22.2330	0.00	48.50	1092	184.31
NEW JERSEY	0.1429	33.4290	5.1429	21.6750	0.00	65.32	2002	873.13
NEW MEXICO	0.3571	0.5000	1.2857	18.0480	28.57	17.86	1283	4.68
NEW YORK	1.9286	339.7900	8.4373	14.4930	22.62	80.32	7544	4630.90
NO. CAROLINA	0.0714	0.2143	0.2143	0.6429	0.00	14.29	2530	126.40
OHIO	3.5714	63.3570	4.7390	35.4910	12.59	56.10	7645	1738.20
OREGON	0.2857	1.1429	0.6071	13.2890	7.14	39.29	1245	85.44
PENNSYLVANIA	1.4286	126.4300	4.6274	39.0680	15.95	49.34	8133	3052.30
RHODE ISLAND	0.0714	7.4286	0.0714	39.1430	0.00	20.69	216	364.07
SO. CAROLINA	0.0714	0.6429	0.5000	1.0595	7.14	17.86	2018	80.37
TENNESSEE	0.9286	9.7857	3.7058	34.6400	27.38	52.47	2500	185.15
TEXAS	0.5000	3.2143	5.7500	25.6780	32.14	68.93	7628	183.19
UTAH	0.1429	1.2143	0.2857	22.9000	0.00	46.43	1190	24.65
VERMONT	0.0714	1.1429	0.2143	23.3550	0.00	50.00	959	109.36
VIRGINIA	0.0000	6.3571	0.0000	29.1150	0.00	60.02	2996	236.68
WASHINGTON	0.1429	4.3571	0.5714	13.8820	0.00	48.52	1447	95.34
WEST VIRGINIA	0.0000	6.2857	0.0000	35.0050	0.00	50.87	1299	89.54
WISCONSIN	1.1429	25.2140	2.3036	26.3830	20.24	53.23	5006	572.93
WYOMING	0.2143	0.5000	0.7143	5.8810	14.29	19.05	861	4.82

Table 5.5 Mean Strike Characteristics

	<u>TOTAL STRIKES</u>		<u>DURATION</u>		<u>UNIONR</u>	
	<u>RAILROAD</u>	<u>NON-RAILROAD</u>	<u>RAILROAD</u>	<u>NON-RAILROAD</u>	<u>RAILROAD</u>	<u>NON-RAILROAD</u>
<u>ALL STRIKES:</u>	409	14355	8.1976	29.1490	36.44	59.97
<u>YEARS:</u>						
1881	15	449	7.7261	28.0220	5.00	44.65
1882	9	436	25.0560	30.9430	8.33	41.37
1883	9	455	5.7933	31.8140	60.00	54.16
1884	5	438	2.5000	36.5700	16.67	48.09
1885	15	623	7.7833	36.3610	20.00	57.01
1886	52	1371	7.4509	32.2270	10.39	51.51
1887	26	1409	6.0333	14.9040	34.00	61.99
1888	40	861	3.6123	22.2710	55.90	70.48
1889	26	1047	4.1111	24.7350	16.67	70.87
1890	59	1770	5.6631	20.3280	25.00	67.83
1891	38	1673	5.8039	29.8190	52.13	71.82
1892	38	1254	12.0440	37.1220	51.48	71.40
1893	55	1247	13.6890	26.6240	48.93	61.13
1894	22	1322	11.8090	36.0600	62.78	57.92
<u>NATIONAL LEGISLATION:</u>						
PRE	171	--	7.1913	--	27.25	--
POST	238	--	8.9177	--	43.01	--
<u>STATE LEGISLATION:</u>						
WITHOUT	288	5456	7.1787	29.2670	35.92	58.91
WITH	121	8899	10.4210	28.7210	37.57	63.82

Average union activity across all states appeared to have been on the rise throughout the entire period under study -- unions were involved in 27 percent of railroad strikes prior to the Arbitration Act, and in 43 percent of railroad strikes after 1889. Union involvement in non-railroad strikes varied from a low of 41 percent in 1882 to a high of 71 percent in 1889. A particularly interesting feature of the data is that strikes involving railroad workers, who were more heavily unionized than workers in other industries, had on average lower rates of union involvement in strike activity. In fact, union involvement in non-railroad strikes is statistically significantly greater than union involvement in railroad strikes in all but four years -- 1883, 1888, 1893, and 1894.

The number of track miles rose, but these were on the rise all through the late nineteenth century. States with more rail miles tended to have higher mean annual frequency and duration of strikes. Railroad revenues (*REALREV*) fluctuated during the period, with the low point in 1881 and reaching a high of \$200.12 million (in 1987 dollars).

States that adopted legislation had statistically significant higher mean annual frequency of strikes, strike duration, and union involvement than did states which had not adopted legislation. However, on examination of mean strike characteristics between strikes that occurred in states with and without legislation, only union involvement in non-railroad strikes is statistically significantly greater in states with legislation. In addition, states adopting legislation had statistically significant higher mean value added in manufacturing, and miles of railroad track; with higher overall strike costs, the benefits of reducing strike activity in these states would have been greater relative to the other states. The modeling and results are discussed in the next section.

5.5 Modeling and Empirical Results

To carry out a test of the effectiveness of the legislation, the following models are estimated on the data for railroad and non-railroad strikes:

$$\begin{aligned} STRIKES_{RRit} = & \beta_1(PCHRGDP_t) + \beta_2(PCHRREV_t) + \beta_3(UNIONR_{it}) \\ & + \beta_4(RRMILES_{it}) + \beta_5(ARBACT_t) + \gamma_1(MP_{it}) + \gamma_2(MAP_{it}) \\ & + \gamma_3(AT_{it}) + \gamma_4(MAT_{it}) + \sum_{i=1}^{45} \delta_i STATE_i + \varepsilon_{it} \end{aligned}$$

$$\begin{aligned} DURATION_{RRit} = & \beta_1(PCHRGDP_t) + \beta_2(PCHRREV_t) + \beta_3(UNIONR_{it}) \\ & + \beta_4(RRMILES_{it}) + \beta_5(ARBACT_t) + \gamma_1(MP_{it}) + \gamma_2(MAP_{it}) \\ & + \gamma_3(AT_{it}) + \gamma_4(MAT_{it}) + \sum_{i=1}^{45} \delta_i STATE_i + \varepsilon_{it} \end{aligned}$$

and

$$\begin{aligned} STRIKES_{NRit} = & \beta_1(PCHRGDP_t) + \beta_2(LAGRVA_{it}) + \beta_3(UNIONR_{it}) \\ & + \beta_4(RRMILES_{it}) + \gamma_1(MP_{it}) + \gamma_2(MAP_{it}) \\ & + \gamma_3(AT_{it}) + \gamma_4(MAT_{it}) + \sum_{i=1}^{45} \delta_i STATE_i + \varepsilon_{it} \end{aligned}$$

$$\begin{aligned} DURATION_{NRit} = & \beta_1(PCHRGDP_t) + \beta_2(LAGRVA_{it}) + \beta_3(UNIONR_{it}) \\ & + \beta_4(RRMILES_{it}) + \gamma_1(MP_{it}) + \gamma_2(MAP_{it}) \\ & + \gamma_3(AT_{it}) + \gamma_4(MAT_{it}) + \sum_{i=1}^{45} \delta_i STATE_i + \varepsilon_{it} \end{aligned}$$

where

$i = 1, \dots, 45$ states

$t = 1, \dots, 14$ years

These models are estimated separately for railroad and non-railroad strike activity² by generalized least squares allowing for cross-sectional heteroskedasticity, within cross-section serial correlation, and separate intercepts are included for each state³. The results for railroad and non-railroad strike activity for this first set of models are presented in columns (1) of Tables 5.6 and 5.7.

The estimated coefficients on *PCHRGDP* for railroad strike frequency and non-railroad strike frequency are statistically insignificant, but have different signs. The positive relationship between *PCHRGDP* and non-railroad strike frequency is consistent with empirical findings of cyclicalities in current strike data. However, the negative coefficient on *PCHRGDP* for railroad strike frequency would be unexpected in current data, but is actually consistent with much of the observed railroad strike behavior of the late nineteenth century.

The negative relationship between *PCHRGDP* and duration for both railroad and non-railroad strike activity indicates that the duration of strikes was counter-cyclical. The joint costs of strikes to both employers and employees would have fallen when the economy was not performing well, thus increasing the average duration of strikes for firms. Unemployment tends to rise during a recession, which would make strike breakers more readily available. The cost savings associated with cutting wages were greater than the costs associated with weathering a strike. The relative costs to workers of accepting a lower wage were relatively larger than the costs of going out on strike. These factors would clearly have increased strike duration under poor economic conditions.

²A pooling test was performed to see if railroad and other strike activity could be combined. The restriction that the coefficients for railroad and other strike activity were identical was rejected.

³A test for homogeneity of the intercept term was done, and for both models the homogeneity restriction was rejected at a confidence level of better than 99%. See Hsiao (1986) for a discussion of panel data models and the test procedure.

Table 5.6 Estimation for Railroad Strike Activity

VARIABLE	RAILROAD STRIKE ACTIVITY					
	STRIKE FREQUENCY			DURATION		
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
<i>PCHRGDP</i>	-0.00112 (0.00392)	0.00028 (0.00461)	-0.00142 (0.00409)	-0.00107 (0.00806)	-0.00732 (0.00936)	-0.00632 (0.0163)
<i>PCHRREV</i>	0.00156 (0.00131)	0.00101 (0.00148)	0.00157 (0.00134)	0.00188 (0.00244)	0.00089 (0.00265)	0.00462 (0.00492)
<i>UNIONR</i>	0.01061** (0.00048)	--	0.01065** (0.00048)	0.06750** (0.00182)	--	0.06239** (0.00298)
<i>RRMILES</i>	0.00002 (0.00003)	0.00007 (0.00004)	0.00001 (0.00003)	0.00018 (0.00014)	0.00054** (0.00018)	0.00039** (0.00019)
<i>ARBACT</i>	0.034209* (0.02112)	0.06940** (0.02769)	0.04269 (0.03086)	0.08637 (0.06383)	0.19859** (0.10280)	0.34123** (0.1523)
<i>ICA</i>	--	--	0.00678 (0.03284)	--	--	-0.47836** (0.1506)
<i>MP</i>	0.43926** (0.23150)	1.11940** (0.25370)	0.43867** (0.2165)	2.08530 (2.04500)	6.30950** (1.96700)	2.4137 (1.967)
<i>MAP</i>	0.19805 (0.13330)	0.21570 (0.15530)	0.21533* (0.1289)	3.01740** (0.86890)	2.68200** (0.94050)	2.878** (0.8617)
<i>AT</i>	-0.05959 (0.07206)	0.10597 (0.16900)	-0.06507 (0.0608)	-0.12245 (0.61470)	0.95297 (1.15000)	-0.00642 (0.5282)
<i>MAT</i>	0.46997** (0.23870)	0.53168** (0.25310)	0.49776** (0.2382)	3.34370** (0.67180)	2.85230** (1.17800)	3.295** (0.7404)
WALD CHI-SQUARE ON STATE DUMMIES	209.28269	--	--	84.46108	--	--
R-SQUARE	0.6194	0.3840	0.6311	0.7620	0.3557	0.6242
NOBS	630	630	630	630	630	630

Table 5.7 Estimation for Non-Railroad Strike Activity

<u>NON-RAILROAD STRIKE ACTIVITY</u>						
VARIABLE	<u>STRIKE FREQUENCY</u>			<u>DURATION</u>		
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
<i>PCHRGDP</i>	0.05100 (0.04010)	0.03440 (0.03980)	0.04670 (0.03970)	-0.15326 (0.13330)	-0.07900 (0.09390)	-0.16520 (0.14270)
<i>LAGRVA</i>	4.30E-05** (3.74E-06)	4.19E-05** (3.84E-06)	4.32E-05** (3.83E-06)	2.43E-06* (1.50E-06)	2.34E-06 (1.66E-06)	2.50E-06 (1.60E-06)
<i>UNIONR</i>	0.01540** (0.00273)	--	0.01520** (0.00275)	0.22968** (0.01940)	--	0.22915** (0.01920)
<i>RRMILES</i>	-0.00232** (0.00048)	-0.00177** (0.00048)	-0.00233** (0.00051)	-0.00212** (0.00105)	0.00045 (0.00057)	-0.00210* (0.00113)
<i>ARBACT</i>	--	--	-0.02650 (0.25340)	--	--	-0.11266 (0.89700)
<i>MP</i>	0.30010 (2.32500)	-0.43577 (2.20600)	0.31789 (2.36700)	22.87000 (19.36000)	19.50000 (18.09000)	22.91600 (19.25000)
<i>MAP</i>	30.93900** (3.98000)	30.07500** (4.12600)	30.84600** (3.97800)	-0.41245 (2.66100)	-1.10500 (2.68700)	-0.46541 (2.73700)
<i>AT</i>	-12.76100** (2.50400)	-12.80000** (2.51700)	-12.85900** (2.47600)	4.78050 (6.21800)	10.02300 (7.36400)	4.82750 (6.22600)
<i>MAT</i>	2.47940 (5.95600)	2.58850 (6.12200)	2.30760 (5.92400)	-2.55840 (5.18200)	-3.28450 (4.18600)	-2.49760 (5.18900)
WALD CHI-SQUARE ON STATE DUMMIES	336.8574	--	--	207.4505	--	--
R-SQUARE	0.8206	0.8065	0.8210	0.6873	0.6684	0.6855
NOBS	630	630	630	630	630	630

* statistically significant at better than 10%

** statistically significant at better than 5%

The positive coefficient on the rail revenue variable, *PCHRREV*, is consistent with workers demanding higher wages when revenues are rising. None of the economic indicator variables had a significant impact on strike activity, except for the *LAGRVA* in the non-railroad strike activity equations. This effect was positive and statistically significant. Strike activity was higher in states with larger manufacturing sectors.

Overall, the largest contributor to strike activity was union involvement. A 1 percent increase in union activity at the margin would increase railroad strike frequency by 16.6 percent, and railroad strike duration by 30 percent. The effect of union involvement on non-railroad strike frequency is only 3.2 percent, and is 47.3 percent for duration of non-railroad strikes. This result reinforces the critical and important role increased unionization played in late nineteenth century labor markets. In fact, its effect on strike duration and frequency greatly increased the costs of strikes to society.

The construction of the *UNIONR* variable, and the relatively large size of the t-statistics on this union involvement variable in the railroad strike frequency and duration equations, raises some question regarding the specification of these equations. This question essentially revolves around whether there is a simultaneity problem between the *UNIONR* variable and the dependent variables *DURATION* and *STRIKES*. Of course, it could be that the union involvement variable is just a very important determinant of railroad strike activity. The specification of railroad equations would be of far greater concern if similar results had been obtained in the non-railroad equations. In fact, the exclusion of the *UNIONR* variable from the non-railroad equations is not even a significant restriction. The non-railroad results are not sensitive to the exclusion of *UNIONR* (columns 2a and 2b, Table 5.7).

The only statistical test for this type of specification error in a single equation uses an instrumental variable specification, which is not possible for lack of a good

Table 5.8 Elasticities

VARIABLE	ELASTICITY AT MEANS			
	RAILROAD		NON-RAILROAD	
	<i>STRIKES</i>	<i>DURATION</i>	<i>STRIKES</i>	<i>DURATION</i>
	(1)	(1)	(1)	(1)
<i>PCHRGDP</i>	-0.0043	-0.0012	0.0055	-0.0164
<i>PCHRREV</i>	0.0133	0.0046	--	--
<i>LAGRVA</i>	--	--	0.9126	0.0507
<i>UNIONR</i>	0.1655	0.3000	0.0322	0.4725
<i>RRMILES</i>	0.0878	0.2514	-0.3233	-0.2919
<i>ARBACT</i>	0.0226	0.0163	--	--
<i>MP</i>	0.0086	0.0116	0.0002	0.0126
<i>MAP</i>	0.0199	0.0862	0.0884	-0.0012
<i>AT</i>	-0.0013	-0.0008	-0.0080	0.0030
<i>MAT</i>	0.0598	0.1212	0.0090	-0.0091

instrument. Union membership would be a good instrument, and might in fact be a better measure of union power if reliable annual data were available on union membership. However, it is not clear that high rates of union membership is, in itself, a measure of union power. The strength of a union is truly felt through its ability to impose costs on employers. A union might have a relatively large number of members, yet have only limited ability to impose costs on an employer. The number of strikes actually ordered by a union may be more representative of a union's true power. These arguments do not alone settle the question. Given the data limitations, the only approach is to check the sensitivity of the specification of the equations to the exclusion of the *UNIONR* variable.

The estimation was redone, dropping the *UNIONR* variable to examine the sensitivity of the earlier results (columns 1a and 1b, Tables 5.6 and 5.7) to the union involvement variable. The results of this estimation are presented in columns 2a and 2b of Tables 5.6 and 5.7. The exclusion of union activity lowers the explanatory power of the models for railroad strike activity, and a likelihood ratio test rejects that the specifications are the same. There is some alteration in the size of coefficients, but no sign changes on any of the significant variables. This type of behavior in the estimated coefficients would also be consistent with multi-collinearity problems, but principal component analysis yields a condition number of only 2.8, which rules out any multicollinearity problems.⁴ There seems to be little evidence to support any specification problems with respect to the union involvement variable.

If effective, the federal legislation should have reduced the frequency and duration of railroad strikes. However, the passage of the Arbitration Act caused an increase in both the frequency and duration of strikes. The frequency of railroad strikes rose significantly with the introduction of the federal arbitration legislation. The marginal

⁴A condition number of 20 or larger is usually assumed as an indicator of a severe multicollinearity problem.

effect is only 2.3 percent, but this is larger than the combined effects of *PCHRGDP* and *PCHRREV*. Strike duration was also increased by the passage of the federal legislation; however, its effect, although not statistically significant, is also larger than the combined effects of *PCHRGDP* and *PCHRREV* on the margin. The model predicts that the Arbitration Act caused an additional 9 railroad strikes between 1881 and 1894. However small this increase may seem, it is statistically significant. Furthermore, given the potential for any railroad strike to paralyze railway service, even one additional strike could have had serious ramifications.

The increase in railroad strike activity after 1888 could have been the result of a pure time effect that occurred across all industries. The mean number of strikes for both railroads and non-railroads increased after the passage of the Arbitration Act (see Table 5.5). The Arbitration Act applied to the railroads, and should not have affected strike activity in other industries. As a test of the possible spuriousness in the relationship between the Arbitration Act and the increase in strikes, the dummy variable for the Arbitration Act, *ARBACT*, was included in the non-railroad strike activity equations. The results of this estimation are presented in columns 3a and 3b of Table 5.7. The coefficients on *ARBACT* are not statistically significantly different from zero in either of the non-railroad equations. These results suggest that the increase in railroad strikes associated with the Arbitration Act was not a spurious effect.

The state legislation generally applied to all firms over a certain size doing business in a state. Therefore, it is possible that the state legislation would have had an effect on railroad strike activity. The introduction of state legislation with mediation provisions in Colorado, Maryland, Missouri, New Jersey, Ohio, and Pennsylvania significantly increased the frequency of railroad strikes (*MP*, *MAT*). The duration of railroad strikes in California, Louisiana, Massachusetts, Montana, Maryland, Missouri,

New Jersey, Ohio, and Pennsylvania also increased after the introduction of mediation legislation which included arbitration provisions (*MAP*, *MAT*), see columns 1a and 1b, Table 5.6. The introduction of Iowa's arbitration legislation by a temporary board (*AT*) had a negative impact on railroad strike activity, but the effect was not statistically significant. In most of these states the legislation was seldom if ever used, except in Massachusetts and New York. It appears that the availability of mediation and arbitration at the state level increased railroad strike activity.

The effect of mediation legislation on non-railroad strike frequency is positive, but only statistically significant for those states which adopted legislation providing for mediation and arbitration by a permanent board -- California, Louisiana, Massachusetts, Montana, New Jersey, and New York (columns 1a and 1b, Table 5.7). Iowa's arbitration provision had a significant negative effect on non-railroad strike frequency. This is especially interesting, because Iowa's statute was one of the few that provided for the enforcement of arbitration awards in the courts. The use and availability of mediation increased non-railroad strike frequency.

The results for the effect of state legislation on non-railroad strike duration, while not significant, are very interesting. It appears that states in which the legislation provided for voluntary arbitration upon the failure of mediation, the duration of non-railroad strikes was reduced. The threat of arbitration must have provided an incentive to settle strikes quickly. This result is actually consistent with empirical findings in current data -- increased frequency of disputes (the "chilling effect"), but a reduction in dispute duration, which leads to an overall reduction in strike costs to society (Card, 1990; Currie and McConnell, 1991).

The *ICA* dummy variable is added to the railroad regressions to see if the Interstate Commerce Act had any influence on railroad strike activity. The results for this regression are presented in columns 3a and 3b of Table 5.6. In the railroad strike

frequency equation (column 3a), the inclusion of the dummy variable, *ICA*, slightly reduces the statistical significance of the Arbitration Act dummy variable, but is itself statistically insignificant. The Interstate Commerce Act did not have a statistically significant effect on the frequency of strikes.

The result for railroad strike duration is more interesting. The Arbitration Act still has a positive effect on the duration of strikes, but is now statistically significant. The negative and statistically significant coefficient for the Interstate Commerce Act dummy variable supports the hypothesis that the government's increased involvement in the regulation of the interstate commerce reduced the duration of railroad strikes.

The individual state dummy variables are not reported, but were jointly significant in all of the specifications. These variables helped to control for the variation in strike activity across states. Without these, the results of the state legislation dummy variables, in particular, would have been less convincing.

5.6 Conclusion

The primary goal of this chapter was to examine the effect of state and federal mediation and arbitration legislation on the frequency and duration of railroad and non-railroad strike activity. The strike data did not entirely conform to many of the stylized facts for modern data. Railroad strike frequency and duration may have been countercyclical rather than procyclical, which is inconsistent with modern strike behavior but consistent with the historical evidence. As expected, both the frequency and duration of railroad and non-railroad strikes increased when firm revenues rose.

The most significant determinant of strike activity was the degree of union involvement. The positive and statistically significant effect of union involvement on railroad strike activity was expected, given the power of the railroad unions. However,

given the relatively weaker unionization in other industries, the importance of union involvement in non-railroad strike activity was somewhat unexpected. The militancy of labor unionism at this time in United States history should not be underestimated.

The increase in the frequency of strikes after the passage of the Arbitration Act challenges the general belief that this legislation was ineffectual. In fact, it was worse than ineffectual. The Arbitration Act increased, rather than decreased, railroad strike activity. The presence of an additional alternative lowered the relative costs of strike activity. Farber and Katz (1979) claimed that the mere presence of dispute resolution procedures alter the bargaining environment. The results obtained here give empirical support to their conjecture.

The results for state legislation also indicate increases in strike frequency, but possibly a reduction in strike duration in states that were actively involved in the resolution of labor disputes. The threat of arbitration when mediation failed may have provided an incentive to settle disputes quickly. State legislation also seems to have altered the bargaining environment.

The unprecedented industrial strife of the late nineteenth century led to the first legislative action intended for the peaceful resolution and avoidance of strikes. As arbitration has become an integral feature in labor disputes, the need to better understand the consequences and effects of this type of intervention becomes ever more important.

The results of this analysis contribute significantly toward such an understanding. When available, mediation and arbitration change the relative costs of all alternative actions. The occurrence of strikes under systems of compulsory arbitration may be the result of the arbitration procedure itself. Any change in the bargaining environment, be it social, political, economic, or legislative, will affect the actions that employers and employees take; thus, altering the frequency, duration, and outcome of labor disputes.

Chapter 6 Conclusion

The unprecedented labor unrest of the late nineteenth century foisted upon government a new and expanded role in the economic life of the country. Labor and Capital were at war and it seemed that, unchecked, the conflict would continue to worsen. The responsibility fell to government to resolve this strife, and nowhere was the need more acute than in the railroad industry. The clash between railroad labor and management had the potential to halt the movement of freight, passengers, and the mails. Railroad strikes posed a threat to the welfare of the country. In fact, it was this ability to impose enormous costs on society that provided the basis for Federal government intervention in railroad labor disputes. The Federal government's involvement in railroad labor disputes was one of the earliest examples of government intervention in the economy.

Initially, when the industrial peace was shattered by railroad strikes, the government stepped in and restored order by force. Troops and injunctions were employed as dispute resolution procedures in the nationwide railway strikes of 1877, the Southwestern Strikes of 1885 and 1886, the Burlington Strike of 1888, and in the Pullman Strike of 1894. Even though arbitration was available once the Arbitration Act of 1888 was passed, its provisions for voluntary arbitration were never used. Federal legislation was not successfully applied to settle a railroad labor dispute until 1906.

This first success came under the Erdman Act of 1898. However, it was not the arbitration provisions, but the mediation provisions that were used. The experience at the State level had clearly demonstrated the efficacy of mediation, not arbitration. All subsequent legislation that failed to emphasize the mediation of disputes was ultimately unsuccessful. The provisions of the Railway Labor Act of 1926, as amended in 1934, were not a lone legislative effort, but the culmination of nearly fifty years of experience with the legislated adjustment of labor disputes. This legislative legacy contributed to the

development of union power and collective bargaining in not just the railroad industry, but in other industries as well. The National Labor Relations Act of 1935 was an obvious descendent of the earlier railroad legislation.

One of the primary reasons organized labor supported arbitration and mediation legislation was as a means to increase their bargaining power with employers. As early as the Erdman Act of 1898, employers were prohibited from interfering with employees' rights to organize. The Railway Labor Act of 1926 directed employers to bargain collectively and to make and maintain written agreements with their employees. The story of the growth and recognition of labor as a potent special interest group is entwined in the history of mediation and arbitration legislation.

As the first piece of federal arbitration legislation, the Arbitration Act of 1888 played a significant role in the development of mediation and arbitration legislation, and serves as the central focus of this study. The first step in the analysis of the Arbitration Act is to identify who supported and who opposed arbitration, and which of these groups were successful in influencing the legislative outcome. A probit model is estimated with explanatory variables to capture the role of constituent interest, and legislator self-interest. The only insight from the Representatives' occupation variables was that lawyers were more likely to have voted against the arbitration bill. A Representative's economic interests did not play a significant role in this legislation.

Even though party affiliation alone was not statistically significant until it was interacted with the Southern States, it did play a role in the debates and passage of Arbitration Bill HR7479. The debates were polarized with respect to party affiliation -- not a single Republican voted against Arbitration Bill HR7479. Labor favored arbitration legislation, and a vote against it was considered as a vote against labor. The analysis shows that both railroad owners and manufacturing interests were opposed to the arbitration of labor disputes.

The Arbitration Act was touted by some members of Congress as being in the best interests of labor, and as a positive step toward finding a solution to the labor problem. Certain members of Congress found the Arbitration Act to be harmless and/or useless legislation, while still other Representatives and Senators objected to arbitration legislation on constitutional grounds. This last position was integral in a more fundamental debate over the proper role of government.

The central issue in this debate was not whether the Arbitration Act would be effective, but whether or not it was the responsibility and in the power of the Federal government to regulate businesses that operated in the public interest. Although government intervention in the economy is commonplace today, in the 1880's laissez-faire was the status quo. This piece of legislation, and the forceful intervention of the government in railroad labor disputes, was seen as "necessary and proper" in fulfilling the Constitutional mandate of the Federal government to provide for the "general welfare." The Arbitration Act was part of the fundamental debate that revolved around the changing role of the Federal government in the late nineteenth century.

The analysis of the provisions and the political economy of the Arbitration Act does not tell us if the legislation was effective, ineffective, or how it may have altered the railroad industry. The actual effect of the legislation must be examined. The first approach in the analysis of the Arbitration Act's effects examines monthly returns on a portfolio of railroad common stocks to determine how arbitration legislation, and other pertinent events, affected the expected future profits of railroad firms.

Strikes had a statistically significant impact on railroad stock prices. When strikes began they had a negative effect on returns; when they ended, a positive effect. The impact of the Interstate Commerce Act was also examined, and its effect was positive, indicating that the railroad industry expected to benefit from its passage. This result is

consistent with the findings of Gilligan, et al (1990) and Prager (1989), both of whom used more complex methods of generating the excess returns.

This event analysis was often confounded by events other than those being studied. However, the results do lend support to the hypothesis that arbitration legislation was not in the best interests of railroad owners. The market expected the Arbitration Act to have a negative effect on the expected future profits in the railroad industry. Results of the analysis of monthly stock returns provide further insight regarding how arbitration legislation was perceived. However, it does not offer any evidence as to whether the legislation was effective.

If the Arbitration Act had been effective it would have reduced railroad strike activity. Farber and Katz (1979) claimed that the mere presence of dispute resolution procedures can alter the frequency, duration, and outcome of disputes. In fact, in some settings the mere presence of arbitration procedures could lead to an increase in strike activity. The analysis of the impact of the Arbitration Act confirms Farber and Katz's conjecture. Evidently, the relative costs of railroad strikes were lowered by the introduction of arbitration by the Arbitration Act, thus increasing strike activity.

This study of the legislated adjustment of railroad labor disputes significantly increases our understanding of the effects of third party intervention in labor disputes. Any change in the bargaining environment, be it social, political, economic, or legislative, will affect the actions that employers and employees take; thus, altering the frequency, duration, and outcome of labor disputes. The occurrence of disputes may often be the result of the dispute resolution procedure itself. Therefore, if policy makers fail to carefully examine how bargaining procedures alter the incentives to negotiate or strike, then the imposition of legislated bargaining procedures can produce unexpected results, as illustrated by the Arbitration Act's effect on railroad strike activity.

APPENDIX A:
STATE AND FEDERAL MEDIATION AND ARBITRATION LEGISLATION

Table A.1 State Legislation By 1906

<u>STATE</u>	<u>DATE</u>	<u>CITATION</u>	<u>DESCRIPTION</u>
CALIFORNIA	3/10/1891	<i>The Statutes of California and Amendments to the Codes, Passed at the Twenty-ninth Session of the Legislature, 1891.</i> Sacramento: A. J. Johnston, 1891. Ch. 51, sec. 1-8, pp. 49-50.	permanent state board of mediation and arbitration, special boards, investigation without application, status quo, one sided application for mediation, joint application for arbitration,
COLORADO	3/24/1887	<i>Laws Passed at the Sixth Session of the General Assembly of the State of Colorado.</i> Denver: Collier and Cleaveland Lithography Co., 1887. Sec. 9, pg. 65.	mediation by state commissioner of labor, 25 or more employees, one sided application
	3/31/1897	<i>Laws Passed at the Eleventh Session of the General Assembly of the State of Colorado.</i> Denver, 1887. Ch. 2, sec. 1-15, pg. 22-27.	permanent state board of mediation and arbitration, local boards, status quo, joint application for arbitration, binding 1yr-court enforced, mediation and investigation by Board (supersedes investigation by commissioner of labor) could be initiated by any interested party.
CONNECTICUT	6/28/1895	<i>Public Acts Passed by the General Assembly of the State of Connecticut in the Year 1895.</i> Hartford: Case, Lockwood, and Brainerd Co., 1895. Ch. 239, sec. 1-8, pp. 584-585.	permanent state board, status quo, joint application for arbitration, non-binding, mediation could be offered by the board
IDAHO	11/1889	<i>Constitution of the State of Idaho, Article 13, sec. 7, in Idaho Code, Containing the General Laws of Idaho, Annotated, v1.</i> New York: The Bobbs-Merrill Co., Inc., 1947, pg. 307.	constitutional provision for the legislature to create a board of arbitration.

IDAHO, continued	2/18/1899	<i>General Laws of the State of Idaho, Passed at the Fifth Session of the State Legislature.</i> Boise: Geo. J. Lewis, 1899. Sec. 1-11, pp. 319-322.	permanent state board, local boards, mediation could be offered by labor commissioner, status quo, joint application for arbitration, court enforced
ILLINOIS	8/2/1895	<i>Laws of the State of Illinois, Enacted by the Thirty-ninth General Assembly.</i> Springfield: Edward F. Hartman, 1895. Sec. 1-9, pp. 1-7.	permanent. state board, mediation could be offered by the board, joint agreement to arbitrate, decision binding 6mos
	4/12/1899	<i>Laws of the State of Illinois, Enacted by the Forty-first General Assembly, At the Regular Biennial Session.</i> Springfield: Phillips Brothers, 1899, pp. 1-7.	<u>amendment:</u> public and union officials duty to report strikes, status quo, one sided application for arbitration, decision binding and enforceable in a court of law with mutual agreement.
	5/11/1901	<i>Laws of the State of Illinois, Enacted by the Forty-second General Assembly, At the Regular Biennial Session.</i> Springfield: The H.W. Roker Co., 1901, sec. 1, pp. 90-91.	<u>amendment:</u> investigation without application
	5/13/1903	<i>Laws of the State of Illinois, Enacted by the Forty-third General Assembly, At the Regular Biennial Session.</i> Springfield: Phillips Bros., 1903, sec. 1, pp. 84-85.	<u>amendment:</u> state senate confirmation of board members.
INDIANA	2/28/1899	<i>Laws of the State of Indiana Passed at the Sixty-first Regular Session of the General Assembly.</i> Indianapolis: Wm. B. Burford, 1889, Ch. 128, sec. 1-19, pp. 202-209.	permanent state board (Labor Commission), local board for arbitration, court enforced, joint application for arbitration, mediation and investigation without application

IOWA	3/6/1886	<i>Acts and Resolutions Passed at the Regular Session of the Twenty-first General Assembly of the State of Iowa.</i> Des Moines: Geo. E. Roberts, 1886, Ch. 20, sec. 1-13, pp. 21-25.	joint petition to court to set up temporary tribunals of voluntary arbitration for disputes in mechanical, manufacturing, mining, or business, decisions of tribunals enforceable in a court of law.
KANSAS	3/15/1899	<i>State of Kansas, Laws of the Special Session, 1898, Passed at the Special Session Beginning December 21, 1898 and Concluding January 9, 1899.</i> Topeka: J. S. Parks, 1899, Ch. 28, sec. 42, pp. 89-91.	permanent court of visitation, empowered to settle rate, safety, labor disputes for railroads incorporated or operating in the state, investigation without petition, investigation and arbitration by petition of <i>any</i> interested party, on petition the court of visitation could force a railroad to arbitrate the dispute, decisions of court of visitation final and enforceable in court of law, if employers failed to abide by the decision of the court the court could seize ownership to keep trains running.
LOUISIANA	7/12/1894	<i>Acts Passed by the General Assembly of the State of Louisiana at the Regular Session, Begun and Held in the City of Baton Rouge, on the Fourteenth Day of May, 1894.</i> Baton Rouge, 1894, No. 139, sec. 1-14, pp. 174-176.	permanent state board, one sided application, status quo, mediation and investigation without application, notification by public officials, no enforcement
MARYLAND	4/1/1878	<i>Laws of the State of Maryland Made and Passed at a Session of the General Assembly Begun and Held at the City of Annapolis on the Seventy Day of January, 1878 and Ended on the First Day of April, 1878.</i> Annapolis: George Colton, 1878, Ch. 379, sec. 1-6, pp. 584-587.	temporary boards, mediation by judge or justice of the peace on one sided application., one sided application to arbitrate if mediation fails, decision binding by mutual agreement and enforced in court of law, applied to corporations incorporated in the state.

MARYLAND,
continued

4/12/1904 *Laws of the State of Maryland Made and Passed at a Session of the General Assembly Begun and Held at the City of Annapolis on the Sixth Day of January, 1904 and Ended on the Fourth Day of April, 1904.* Baltimore: Wm. J. C. Dulany Co., 1904, Ch. 671, sec. 1-10, pp. 1187-1189.

replaces act of 1878, investigation and mediation by the Chief of the Bureau of Labor Statistics upon application or notification by any reliable source. if mediation fails the Chief is to try to get parties to agree to arbitration by a temporary board, decision of board binding by mutual agreement.

MASSACHUSETTS 6/21/1886 *Acts and Resolves Passed by the General Court of Massachusetts in the Year, 1886.* Boston: Wright and Potter Printing Co., 1886, Ch. 263, sec. 1-9, pp. 204-206.

permanent board of arbitration and conciliation, one sided application for arbitration, decision binding for 6 months by mutual agreement of both parties, 60 days written notice required for intent to not abide by decision, no enforcement.

5/14/1887 *Acts and Resolves Passed by the General Court of Massachusetts in the Year, 1887.* Boston: Wright and Potter Printing Co., 1887, Ch. 269, sec. 1-6, pp. 895-897.

amended: local boards, investigation without application, notification by public officials.

6/4/1890 *Acts and Resolves Passed by the General Court of Massachusetts in the Year, 1890.* Boston: Wright and Potter Printing Co., 1890, Ch. 385, sec. 1-2, pp. 3344-346.

amended: appoint of expert assistants by involved parties to investigate disputes and gather information for the board.

6/5/1902 *Acts and Resolves Passed by the General Court of Massachusetts in the Year, 1902.* Boston: Wright and Potter Printing Co., 1902, Ch. 446, sec. 1, pp. 359-360.

amended: investigation and mediation by the board without application.,

0/0/1903 *Acts and Resolves Passed by the General Court of Massachusetts in the Year, 1904.* Boston: Wright and Potter Printing Co., 1904, Ch. 313, sec. 1-4, pp. 263-266.

amended: Governor given authority to request board take action in a dispute.

MICHIGAN	7/3/1889	<i>Public Acts and Joint and Concurrent Resolutions of the Legislature of the State of Michigan, Passed at the Regular Session of 1889.</i> Lansing: Darius P. Thorp, 1889, No. 238, sec. 1-9, pp. 359-361.	permanent. state board, investigation and mediation by board without application, joint application to arbitrate, no enforcement,
MINNESOTA	4/25/1895	<i>General Laws of the State of Minnesota Passed During the Twenty-ninth Session of the State Legislature, Commencing January Eighth, One Thousand Eight Hundred and Ninety-Five.</i> St. Paul: Brown, Treacy and Co., 1895, Ch. 170, sec. 1-14, pp. 382-386.	permanent. state board, local boards, investigation and mediation without application to board, board persuade arbitration if mediation failed, joint application to arbitrate, when mutually agreed the decision of the board was binding for 6 months , sixty days written notice required for intent to not abide by decision, notification by public officials.
MISSOURI	4/11/1889	<i>Laws of Missouri, Passed at the Thirty-fifth General Assembly, Begun and Held at the City of Jefferson, Wednesday, January 2, 1889, Regular Session.</i> Jefferson City: Tribune Printing Co., 1889, sec. 1-5, pp. 138.	temporary. boards of arbitration to be created under authority of Commissioner of Labor if mediation failed, investigation and mediation by Commissioner of Labor on application by any reliable source, arbitration non-binding, no enforcement, if a strike or lockout in effect boards could not be formed.
	3/7/1901	<i>Laws of Missouri, Passed at the Forty-first General Assembly, Begun and Held at the City of Jefferson, Wednesday, January 2, 1901, Regular Session.</i> Jefferson City: Tribune Printing Co., 1901, sec. 1-11, pp. 195-197.	<u>amended:</u> created permanent board, investigation and mediation by the board without application., board could arbitrate if mediation failed with one sided or joint application, decisions binding only upon mutual agreement, decisions enforced in a court of law, the Act states that is the duty of employers and employees to submit disputes to investigation by the board.

MISSOURI,
continued

3/23/1903 *Laws of Missouri, Passed at the Forty-second General Assembly, Begun and Held at the City of Jefferson, Wednesday, January 7, 1903, Regular Session.* Jefferson City: Tribune Printing Co., 1903, sec. 1, pp. 218-219.

amended: gave board right to subpoena witness and compel testimony, penalty for failing to appear before the board

MONTANA

00/00/1887 (cite: need regular session for 1887, not available. 1891 appropriation for services of the board in 1890)

permanent state board, local boards, investigation and mediation by board without application, commissioner. of labor can offer to mediate, one sided application to arbitrate, decision binding only when mutually agreed for 6mos or 60 days notice, duty of public officials to notify the board of labor disputes.

3/15/1895 *Codes and Statutes of Montana in Force July First 1895, v1, annotated by Edwin S. Booth.* Butte: Inter Mountain Publishing Co., 1895, Ch. 19, sec. 3330-3338, pp. 428-432.

permanent state board, local boards, investigation and mediation by board without application, commissioner. of labor can offer to mediate, one sided application to arbitrate, decision binding only when mutually agreed for 6mos or 60 days notice, duty of public officials to notify the board of labor disputes.

NEBRASKA

Kaltenborn (1948) states that the state had a law by 1900, I couldn't find any other reference, except for general arbitration statute which seemed to apply to contracts. Constitutional amendment in 1920 to create an Industrial Commission to settle labor disputes.

NEW JERSEY

3/10/1880 *Act of the One-hundredth and fourth Legislature of the State of New Jersey, and the Thirty-sixth Under the New Constitution.* Morristown: Vance and Stiles, 1880, Ch. 138, sec. 1-5, pp. 178-179.

temporary three member boards for voluntary arbitration, joint application for arbitration, no enforcement.

NEW JERSEY,
continued

4/28/1886 *Act of the One-hundredth and tenth Legislature of the State of New Jersey, and the Forty-second Under the New Constitution.* Trenton: MacCrellish and Quigley, 1886, Ch. 211, sec. 1-10, pp. 315-317.

temporary five member boards for voluntary arbitration, joint application for arbitration, no enforcement.

3/24/1892 *Act of the One-hundredth and sixteenth Legislature of the State of New Jersey, and the Forty-eighth Under the New Constitution.* Trenton: MacCrellish and Quigley, 1892, Ch. 137, sec. 1-15, pp. 238-244.

permanent state board, local boards, investigation and mediation by board without application, joint application to arbitrate, decision of board final and binding by mutual agreement, no enforcement

NEW YORK

5/18/1886 *Laws of the State of New York Passed at the One-hundredth and ninth Session of the Legislature, Begun January 5 and Ended May 20, 1886 in the City of Albany.* Albany: Banks and Brothers, 1886, Ch 410, sec. 1-12, pp. 630-632.

permanent state board, local boards formed by petition to court, joint application for arbitration, no enforcement

3/10/1887 *Laws of the State of New York Passed at the One-hundredth and tenth Session of the Legislature, Begun January 4 and Ended May 26, 1887 in the City of Albany.* Albany: Banks and Brothers, 1887, Ch 63, sec. 1-14, pp. 71-74.

amendment: the rulings of the local boards could be appealed to the permanent state board.

5/13/1897 *Laws of the State of New York Passed at the One-hundredth and twentieth Session of the Legislature, Begun January 6 and Ended April 24, 1897 in the City of Albany, v1.* Albany: Banks and Brothers, 1897, Ch 415, art. 10, sec. 140-149, pp. 490-493.

amendment: mediation and investigation without application, status quo

NO. DAKOTA

Kaltenborn (1943) says had law by 1900, couldn't find any other reference, except for arbitration of contracts and private property disputes.

OHIO

2/10/1885 *The State of Ohio, General and Local Acts Passed and Joint Resolutions Adopted by the Sixty-sixth General Assembly at its Adjourned Session, Begun and Held in the City of Columbus, January 6, 1885.* Columbus: Myers Brothers, 1885, pp. 45-48

tribunals for voluntary arbitration (local boards) to be created on joint petition to court, no enforcement

5/18/1894 *The State of Ohio, General and Local Acts Passed and Joint Resolutions Adopted by the Seventy-first General Assembly at its Regular Session, Begun and Held in the City of Columbus, January 1, 1894.* Norwalk: The Lansing Printing Co., 1894, pp. 373-374.

amendment: permanent state board, local boards (as in act of '85), one sided application for arbitration, binding only by joint agreement, investigation without application, notification by public officials.

4/27/1896 *The State of Ohio, General and Local Acts Passed and Joint Resolutions Adopted by the Seventy-second General Assembly at its Regular Session, Begun and Held in the City of Columbus, January 6, 1896.* Columbus: J. L. Tranger, 1896, pp. 324-326.

amendment: mediation and investigation by the board without application.

PENNSYLVANIA

4/26/1883 *Laws of the General Assembly of the Commonwealth of Pennsylvania, Passed at the Session of 1883, in the One-hundredth and seventh Year of Independence.* Harrisburg: Lane S. Hart, 1883, No. 16, pp. 15-21.

Voluntary Trade Tribunal Act of 1883: temporary boards of arbitration created by joint petition to court, decisions binding by mutual agreement, decisions enforced by courts, act applied to iron, steel, glass, textiles, and coal.

PENNSYLVANIA, continued	5/18/1893	<i>Laws of the General Assembly of the Commonwealth of Pennsylvania, Passed at the Session of 1893, in the One-hundredth and seventeenth Year of Independence.</i> Harrisburg: Edwin K. Myers, 1893, No. 55, pp. 102-105.	temporary boards as in 1883, except joint (employees as plaintiff) or single petition for arbitration, with single petitioner (plaintiff) act is actually involuntary for non-petitioning party (defendant), court could appoint arbitrators if non-applicant didn't select their own, decisions enforced by courts, applied to mining, manufacturing and transportation
TEXAS	4/24/1895	<i>General Laws of the State of Texas Passed at the Regular Session of the Twenty-fourth Legislature Convened at the City of Austin, January 8, 1895, and Adjourned April 30, 1895.</i> Austin: Ben C. Jones and Co., 1895, Ch. 61, sec. 1-11, pp. 85-88.	temporary boards of arbitration to be created by joint petition to court, status quo, decision enforced by courts, binding for 1yr,
UTAH	3/24/1896	<i>Laws of the State of Utah, Passed at the Special and First Regular Session of the Legislature of the State of Utah, Held at Salt Lake City, the State Capital, in January, February, March, and April 1896.</i> Salt Lake City: Desert News Publishing Co., 1896, Ch. 62, sec. 1-12, pp. 174-177.	permanent board, mediation and investigation by the board without application, single or joint application for arbitration, decisions of board binding by mutual agreement, 90 days notice to vacate decision, no enforcement.
	3/14/1901	<i>Laws of the State of Utah, Passed at Regular Session of the Legislature of the State of Utah, Held at Salt Lake City, the State Capital, in January, February, and March 1901.</i> Salt Lake City: Desert News Publishing Co., 1901, Ch. 68, sec. 1-12, pp. 68-70.	<u>amendment:</u> notification by public officials, senate confirmation of board members

WASHINGTON	3/9/1903	<i>Session Laws of the State of Washington, Eighth Session, 1903.</i> Tacoma: Allen and Lamborn Printing Co., Ch. 58, sec. 1-7, pp. 71-72	investigation and mediation by Commissioner of Labor on one sided application, if mediation failed temporary boards of arbitration formed at the request of the Commissioner of Labor, no enforcement
WISCONSIN	4/19/1895	<i>The Laws of Wisconsin Passed at the Biennial Session of the Legislature of 1895, With Index of Session Laws Since 1878.</i> Madison: Democrat Printing Co., 1895, Ch. 364, sec. 1-12, pp. 737-742.	permanent board, local boards, notification by public officials, mediation and investigation by the board on one sided application or notice from public officials, single or joint agreement to arbitrate, decision binding by mutual agreement for 6 months or 60 days notice to vacate, no enforcement
WYOMING	11/1890	<i>Session Laws of the State of Wyoming Enacted by the First State Legislature Convened at Cheyenne on the Twelfth Day of November 1890, Also Act of Congress Admitting the State of Wyoming, State Constitution, and Rules of the Supreme Court.</i> Cheyenne: The Daily Sun Publishing House, 1891, Art. 19, sec. 1, pp. 67-68.	state constitution article 19 sec 1: the legislature shall establish courts of voluntary arbitration, as of 1906 never established by legislature.

Sources: as cited above for the various State statutes; *Third, Sixteenth, and Twenty-First Annual Reports of the Commissioner of Labor*; and Kaltenborn (1943).

Table A.2 -- Federal Mediation and Arbitration Legislation:

The Arbitration Act of 1888

- Provided for the voluntary arbitration of disputes by a temporary three person board of arbitrators with one member from each side of the dispute, and a mutually agreed upon third person to act as the chairman of the board. Arbitration could be provided only if both parties agreed to it. No enforcement of the Board's decisions was provided for; its decisions were not binding.
- Provided for a three member investigative commission created by the President; or applied for by either of the parties or by the governor of a state. Two members appointed by the President and the third being the Commissioner of Labor. The board reported to the President and Congress.
- The arbitration provision was never used. An investigative Commission was created only once to investigate the Pullman Strike of 1894.

The Erdman Act of 1898

- Provided for the voluntary mediation and conciliation of disputes by the Commissioner of Labor and the chairman of the Interstate Commerce Commission, when requested by either party of the dispute.
- Provided for the voluntary arbitration of disputes by a temporary three person board of arbitrators with one member from each side of the dispute, and a mutually agreed upon third person to act as the chairman of the board. Arbitration could be provided if mediation failed and only if both parties agreed to it. The Act required parties to refrain from strikes and lockouts pending the outcome of arbitration. Once the board had made its decision, strikes and lockouts were prohibited for at least three months, and then not without thirty days prior notice. The award of the board was to remain in force for one year, during which time the dispute could not be submitted again to arbitration.
- Under the Act, the award of the board was binding under liability for damages in a court of law.
- The Act prohibited yellow dog contracts, but this provision was declared unconstitutional in *Adair v. United States*, 1908.
- The Act only applied to railroads engaged in interstate commerce, and did not include an investigative commission provision as in the Arbitration Act of 1888.
- Unsuccessfully applied for the first time in 1899, and then not invoked again for eight years. The Act was successfully applied sixty one times from 1906 to 1913: twenty nine disputes settled by mediation, twenty six disputes settled by mediation and arbitration, and six disputes settled by arbitration alone.

The Newlands Act of 1913

- Provided for voluntary mediation and conciliation by an independent permanent board. The Board of Mediation and Conciliation could offer its services to the parties of a dispute. This three member board was appointed by the President with each appointment requiring Senate approval.
- Provided for voluntary arbitration of disputes as in the Erdman Act, except the board of arbitrators would now have six members -- two members from each side of the dispute and two members mutually selected by the four.
- the Act disposed of 148 disputes between 1913 and 1919. Of those, 70 were settled by mediation alone, 21 by mediation and arbitration, and one by congressional action (the Adamson Act).

The Adamson Act of 1916

- Established 8 hour day for railroad workers by law.
- Created a commission to observe the operation of the law.

World War I, 1917-1920

- Federal operation of the railroads under the Federal Control Act of 1918. The railroads were operated by the Board of Railroad Wage and Working Conditions, and the Boards of Adjustment Nos. 1, 2, and 3.
- The three Boards of Adjustment settled 3,100 disputes between 1918 and 1920.

Transportation Act of 1920 -- Title III (Esch-Cummins Act)

- Returned the railroads to private ownership.
- Created the Railroad Labor Board. This was a permanent nine member board composed of three members representing employers, three members representing employees, and three members representing the public's interest, appointed by the President and confirmed by the Senate. Members of the Labor Board were prohibited from having any pecuniary interests in railroads. The members of the board received an annual salary of \$10,000.
- The Act directed management and labor to first attempt the settlement of disputes in mutual conference before appealing to the Board.
- Provided for the creation of temporary Adjustment Boards to arbitrate disputes. These Boards could be created on one-sided application of either party of the dispute, or under direction of the Railroad Labor Board.
- Provided for compulsory arbitration by the Railroad Labor Board of all disputes over wages, or disputes which the temporary Adjustment Boards were unable to resolve.

Transportation Act of 1920 -- continued

- The Board was given the power to intervene in any dispute that it felt threatened to interrupt rail service.
- The decisions of the Board were advisory and no enforcement mechanism was provided.
- The Railroad Labor Board disposed of 13,690 cases. However, one significant strike did occur -- the Shopmen's Strike of 1922.

Railway Labor Act of 1926

- Repealed Title III of the Transportation Act of 1920, abolishing the Railroad Labor Board.
- Created the United States Board of Mediation. This was a permanent five member non-partisan board appointed by the President. Members were to serve five year terms, and be paid an annual salary of \$12,000.
- Provided for the creation of Boards of Adjustment. The Act stipulated that the parties of a dispute "shall" create Boards of Adjustment when they were unable to settle disputes in mutual conference.
- Provided for the mediation of disputes unsettled by mutual conference or adjustment, by the Board of Mediation. The services of the Board could be invoked by the disputants on agreement, or on one-sided application. The Board could not directly intervene in a dispute of its own accord. If the Board was unable to mediate a dispute, it was instructed to urge the parties to *voluntarily* submit to arbitration.
- Provided for voluntary arbitration by a temporary board of arbitrators of either three or six members created by agreement of the parties to the dispute. The temporary boards awards were only advisory. If the parties refused arbitration, and the dispute threatened to disrupt the interstate commerce, the Board of Mediation was required to notify the President.
- Provided for the creation of Emergency Boards by the President to investigate all disputes.
- Required that during any proceedings under the act, the status quo was to be maintained during the process, and for thirty days after the proceedings conclusion.
- Prohibited the establishment of company unions.
- The United States Board of Mediation disposed of 2,365 cases between 1926 and 1934. Only two minor strikes occurred during this period, and no significant interruption of interstate commerce.

Amendments to Railway Labor Act, 1934

- Abolished the United States Board of Mediation.
- Created the National Board of Mediation. This is a permanent three member non-partisan board appointed by the President. Members serve staggered three year terms, one member being appointed each year. The board is authorized to maintain a staff of mediators hired through civil service examinations.
- Created the National Railroad Adjustment Board to arbitrate disputes. This is a thirty six member bi-partisan board -- eighteen members are selected by carriers and eighteen are selected by labor. Salaries of members are paid by the parties they represent. The board is broken up into four separate independent divisions.
- Provides for the mediation of disputes by the National Board of Mediation. The board has the power to intervene in any dispute with the potential of a labor emergency, or on one-sided application. If the Board is unable to mediate a dispute, it is instructed to urge arbitration.
- Provides for arbitration of disputes on one-sided application of either party in a dispute, by the National Railroad Adjustment Board. Referees are employed to settle disputes when the Boards are deadlocked. The Board's decisions are final and binding, and enforceable in a court of law. If the parties refuse arbitration, and the dispute threatens to disrupt the interstate commerce, the Board of Mediation is required to notify the President.
- Prohibits non-interference of carriers in workers' rights to organize.
- Prohibits "yellow dog" contracts.
- Directs carriers to bargain collectively with their employees, and to make and maintain written contracts.
- The Railway Labor Act is still in operation today. Its provisions have been extended to the airlines.

Sources: Fisher (1968), Ko (1968), Kaltenborn (1943), and Kaufman (1954).

References

- Amemiya, Takeshi. "Qualitative Response Models: A Survey." *Journal of Economic Literature*, v19, December 1981, pp. 1483-1536.
- Amoako-Adu, Rashid, and Stebbins. "Capital Gains Tax and Equity Values: An Empirical Test of Stock Price Reaction of The Introduction and Reduction of Capital Gains Tax Exemption." *Journal of Business and Finance*, v16, n2, April 1992, pp. 275-288.
- Anderson, John C. "The Impact of Arbitration: A Methodological Assessment." *Industrial Relations*, v20, n2, Spring 1981, pp. 129-148.
- Ashenfelter, Orley and Currie, Janet. "Negotiator Behavior and the Occurrence of Disputes." *American Economic Review*, v80, n2, pp. 416-420.
- Ashenfelter, Orley and Johnson, George. "Bargaining Theory, Trade Unions, and Industrial Strike Activity." *American Economic Review*, v59, pp. 35-49, March 1969.
- Ashenfelter, Orley, and Bloom, David. "Models of Arbitrator Behavior: Theory and Evidence." *American Economic Review*, v74, n1, March 1984, pp. 111-124.
- Ashenfelter, Orley, Currie, Janet, Farber, Henry and Spiegel, Matthew. "An Experimental Comparison of Dispute Rates in Alternative Arbitration Systems." Princeton University Working Paper, no. 267, July 1990.
- Bailey, Gary L. "The Commissioner of Labor's Strikes and Lockouts: A Cautionary Note." *Labor History*, v32, Summer 1991, pp. 432-440.
- Balke, Nathan, and Gordon, Robert. "The Estimation of Prewar GNP: Methodology and New Results." *Journal of Political Economy*, v97, n2, February 1989, pp. 38-92.
- Binder, J. J. "Measuring the Effects of Regulation with Stock Price Data." *RAND Journal of Economics*, v16, n2, Summer 1985, pp. 167-183.
- Brams, Steven J. *Negotiation Games: Applying Game Theory to Bargaining and Arbitration*. New York: Routledge, 1990.
- Brotherhood of Railroad Trainmen *Main Street -- Not Wall Street: A reply to the railroad's demands for a wage reduction*, 1938.
- Brown, Stephen J. and Warner, Jerold B. "Measuring Security Price Performance." *Journal of Financial Economics*, v8, n3, Sept. 1980, pp. 205-258.
- Brown, Stephen J. and Warner, Jerold B. "Using Daily Stock Returns: The Case of Event Studies." *Journal of Financial Economics*, v14, n1, 1985, pp. 3-31.

- Bureau of Statistics. *Statistical Abstract of the United States, 1888, No.11*. Washington D. C.: Government Printing Office, 1889.
- Card, David and Olson, Craig. "Bargaining Power, Strike Durations, and Wage Outcomes: An Analysis of Strikes in the 1880's." Working paper #294, Industrial Relation Section, Princeton University, Jan1992.
- Card, David. "Strikes and Bargaining: A Survey of Recent Empirical Literature." *American Economic Review*, v80, May 1990, pp. 410-415.
- Chandler, Alfred D. Jr., ed. *The Railroads: The Nation's First Big Business*.
- Clewes, Henry. "The Labor Crisis." *North American Review*, v142, June 1886, pp. 598-607.
- The Commercial and Financial Chronicle*. various issues 1881-1898
- Congressional Record*, Sessions 44-50. Washington D. C.: Government Printing Office.
- Cowles, Alfred, and Associates. *Common-Stock Indexes*. Bloomington, Indiana: Principia Press, Inc., 1939.
- Cunningham, W. J. and Fagan, J. O. "Two Views of the Railroad Question: I) Brotherhoods and Efficiency, II) Authority and Efficiency." *Atlantic Monthly*, Sept. 1909.
- Currie, Janet and Farber, Henry, "Is Arbitration Addictive? Evidence from the Laboratory and the Field." Princeton University Working Paper, Jan1992.
- Currie, Janet, and McConnell, Sheena. "Collective Bargaining in the Public Sector: The Effect of Legal Structure on Dispute Costs and Wages." *American Economic Review*, v81, n4, September 1991, pp. 693-718.
- Currie, Janet. "Who Uses Interest Arbitration? The Case of British Columbia's Teachers, 1947-1981." *Industrial and Labor Relations Review*, v42, n3, April 1989, pp. 363-379.
- Edwards, P. K. *Strikes in the United States, 1881-1974*. Oxford: Basil Blackwell Publisher, 1981.
- Eggert, Gerald G. *Railroad Labor Disputes -- the Beginnings of Federal Strike Policy*. Ann Arbor: The University of Michigan Press, 1967.
- Ehrenberg, Ronald G. and Smith, Robert S. *Modern Labor Economics, 3rd ed.* Scott, Foresman and Co., 1988.
- Fagan, J. O. *Confessions of a Railroad Signalman*.

- Fagan, J. O. *Labor and the Railroads*. Boston: Houghton and Mifflin Co., 1909.
- Fama, E. *Foundations of Finance*. New York: Basic Books, 1976.
- Fama, Eugene F., Fisher, Lawrence, Jensen, Michael C., and Roll, Richard. "The Adjustment of Stock Prices to New Information." *International Economic Review*. v 10, n1, Feb. 1969, pp. 1-21.
- Farber, Henry and Bazerman, Max. "Divergent Expectations as a Cause of Disagreement in Bargaining: Evidence from a Comparison of Arbitration Schemes." *Quarterly Journal of Economics*, v104, n1, February 1989, pp. 99-120.
- Farber, Henry and Katz, Harry. "Interest Arbitration, Outcomes, and the Incentive to Bargain." *Industrial and Labor Relation Review*, v33, Oct. 1979, pp. 55-63.
- Farber, Henry. "An Analysis of Final-Offer Arbitration." *Journal of Conflict Resolution* v24, n4, December 1980, pp. 683-705.
- Farber, Henry. "Bargaining Theory, Wage Outcomes, and the Analysis of Strikes: An Econometric Analysis." *American Economic Review*, v68, n3, June 1978, pp. 262-271.
- Feuille, Peter. "Final Offer Arbitration and the Chilling Effect." *Industrial Relations*, v14, n3, October 1975, pp. 302-310.
- Filippelli, Ronald L. *Labor Conflict in the United States: An Encyclopedia*. New York: Garland Publishing, Inc., 1990.
- Fisher, Thomas R. *Industrial Disputes and Federal Legislation* New York: AMS Press, 1968.
- Fogel, Robert. *Railroads and American Economic Growth*. 1964.
- Freeman, Richard and Medoff, James. *What Do Unions Do?*. New York: Basic Books, 1984.
- Freund, John E., and Walpole, Ronald E. *Mathematical Statistics*. Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1987.
- Gilligan, Marshall, and Weingast. "Regulation and the Theory of Legislative Choice: The Interstate Commerce Act of 1887." *Journal of Law and Economics*, v32, pp. 35-61.
- Gilligan, Thomas T., Marshall, and Weingast. "The Economic Incidence of the Interstate Commerce Act of 1887." *RAND Journal of Economics*, v21, n2, Summer 1990, pp. 189-210.
- Griffen, John *Strikes: A Study in Quantitative Economics*. New York: Columbia University Press, 1939

- Haines, Henry Stevens. *Railway Corporations as Public Servants*. New York: The Macmillan Co., 1907.
- Haney, Lewis. *A Congressional History of the Railroads, 1850-1887*. Madison, Wisconsin: 1910.
- Hausman, Jerry and McFadden, Daniel. "Specification Tests for the Multinomial Logit Model." *Econometrica*, v52, n5, September 1984, pp. 1219-1240.
- Hayes, Beth. "Unions and Strikes with Asymmetric Information." *Journal of Labor Economics*, v2, Jan1984, pp. 57-63.
- Hicks, J. R. *The Theory of Wages*. New York: Peter Smith, 1948.
- Hirsch, Barry and Addison, John T. *The Economic Analysis of Unions*. Boston: Allen and Unwin, 1986.
- Hoffman and Libecap, "Institutional Choice and the Development of U.S. Agricultural Policies in the 1920's." forthcoming.
- Hollander, H. H. and Barnett, G. E. *Studies in American Trade Unionism*. New York: Henry Holt and Co., 1906.
- Homer, Sidney and Sylla, Richard. *A History of Interest Rates*. New Brunswick: Rutgers University Press, 1991.
- Hsiao, Cheng. *Analysis of Panel Data*. New York: Cambridge University Press, 1986.
- Hunt, Robert. *Law and Economics*. Madison, Wisconsin: 1958.
- Kaltenborn, Howard S. *Governmental Adjustment of Labor Disputes*. Chicago: The Foundation Press, 1943.
- Karson, Marc. *American Labor Unions and Politics*. Carbondale: Southern Illinois University Press, 1958.
- Kaufman, Jacob J. *Collective Bargaining in the Railroad Industry*. New York: King's Crown Press, 1954.
- Kennan, John and Wilson, Robert. "Strikes, Bargaining, and Arbitration: New Developments." *American Economic Review*, v80, n2, pp. 405-409.
- Kerr, K. Austin *American Railroad Politics, 1914-1920*. University of Pittsburgh Press, 1968.
- Kim, Seung-Wook and Fishback, Price V "Wages and Accident Risk Under Different Labor Market Institutions: Railroads, 1892-1945. Feb. 1992

- Ko, Ting Tsz. *Governmental Methods of Adjusting Labor Disputes*. New York: AMS Press, 1926
- Licht, Walter. *Working For The Railroad: The Organization of Work in the Nineteenth Century*. Princeton, New Jersey: Princeton University Press, 1983, pages xx, 328.
- Macaulay, Frederick R. *The Movements of Interest Rates, Bond Yields, and Stock Prices in the United States Since 1856*. New York: National Bureau of Economic Research, 1938.
- Maddala, G. S. *Limited Dependent and Qualitative Variables in Econometrics*. Cambridge University Press, 1983.
- Manly, Basil M. "Labor's Share of the Social Product." *American Academy of Political and Social Science*, v69, Jan 1917, pp. 128-132.
- Martin, Albro. *Enterprise Denied: Origins of the Decline of American Railroads, 1897-1917*. New York: Columbia University Press, 1971.
- McCaleb, Walter F. *Brotherhood of Railroad Trainmen* New York: Albert and Charles Boni, 1936.
- McConnell, Sheena. "Strikes, Wages, and Private Information." *American Economic Review*, v79, Sept. 1989, pp. 801-15.
- McKibbin, Carroll, and The Inter-University Consortium for Political and Social Research. *Roster of United States Congressional Officeholders and Biographical Characteristics of Members of the United States Congress, 1789-1985 Merged Data*. ICPSR Study 7803, 1985.
- McMurry, Donald L. *The Great Burlington Strike of 1888: A Case History in Labor Relations*. Cambridge: Harvard University Press, 1956.
- Middleton, Harvey P. *Railways and Organized Labor*. Chicago: Railway Business Association, 1941.
- Navin, Thomas and Sears, Marian. "The Rise of a Market for Industrial Securities, 1887-1902." *Business History Review*, v24, n2, June 1955, pp. 105-138.
- The New York Times*. various issues 1885-1894.
- Painter, Leonard. *Brotherhood Railway Carmen of America*. Kansas City, Missouri: 1941.
- Peltzman, Sam. "Toward a More General Theory of Regulation." *Journal of Law and Economics*, v19, 1976.
- Perlman, Selig. *The Theory of the Labor Movement*. New York: The Macmillan Co., 1928.

- Poole, Keith T., Rosenthal, Howard. "Patterns of Congressional Voting." *American Journal of Political Science*, v35, n1, pp. 228-78.
- Poole, Keith T., and Rosenthal, Howard. *Congress: A Political-Economic History of Roll Call Voting*. Chapter 10: *Abstention from Roll Call Voting*. draft March 1995.
- Poor, Henry V. *Poor's Manual of the Railroads of the United States*. various years 1879-1895.
- Posner, Richard. "Theories of Economic Regulation." *The Bell Journal of Economics and Management Science*, v2, 1971, pp. 344.
- Prager, Robin "The Effects of Horizontal Mergers on Competition: The Case of the Northern Securities Company." *RAND Journal of Economics*, v23, n1, Spring 1992, pp. 123-133.
- Prager, Robin. "Using Stock Price Data to Measure the Effects of Regulation: The Interstate Commerce Act and the Railroad Industry." *RAND Journal of Economics*, v20, n2, Summer 1989, pp. 280-290.
- Reder, Melvin and Neumann, George. "Conflict and Contract: The Case of Strikes." *Journal of Political Economy*, v88, Oct. 1980, pp. 8647-86.
- Rieve, Emil. "What Labor Demands of Government." *The Annals, American Academy of Political and Social Science*, v178, n4, pp. 123-128.
- Rose, Nancy L. "The Incidence of Regulatory Rents in the Motor Carrier Industry." *RAND Journal of Economics*, v16, n3, Autumn 1985, pp. 299-318.
- Roster of United States Congressional Officeholders and Biographical Characteristics of Members of the U. S. Congress, 1789-1985*. ICPSR study 7803.
- Schwert, G. W. "Using Financial Data to Measure the Effects of Regulation." *The Journal of Law and Economics*, v24, n1, 1981, pp. 121-158.
- Snowden, Kenneth. "Historical Returns and Security Market Development, 1872-1925." *Explorations in Economic History*, v27, n4, Oct. 1990, pp. 381-420.
- Sobel, Joel and Takahashi, Ichiro. "A Multistage Model of Bargaining." *Review of Economics and Statistics*, v50, July 1983, pp. 411-426. (1983)
- Statutes of the United States*. various years. Washington: GPO
- Stevens, Carl M. "Is Compulsory Arbitration Compatible with Bargaining." *Industrial Relations*, v5, n2, February 1966, pp. 38-52.
- Stigler, G. S., and Friedland, Claire. "What Can Regulators Regulate? The Case of Electricity." *Journal of Law and Economics*, v5, October 1962, pp. 1-16.

Stigler, George. "The Theory of Economic Regulation." *The Bell Journal of Economics and Management Science*, v2, n1, Spring, 1971, pp. 3-21.

Stonex, W.L. "The Case for Government Operation and Ownership," *American Academy of Political and Social Science*, 86, 67-76, Nov1919.

Taft, Phillip. *Organized Labor in American History*. New York: Harper and Row Publishers, 1964, pp. xxi, 818.

The New York Times. various issues March 7, 1886–July 9, 1889.

Theil, Henri. *Principles of Econometrics*. New York: John Wiley and Sons, 1971.

Thompson, Rex. "Conditioning the Return-Generating Process on Firm-Specific Events: A Discussion of Event Study Methods." *Journal of Financial and Quantitative Analysis*, v20, n2, June, 1985, pp. 151-168.

Tibal, A. "Railroad Efficiency and the Labor Unions." *Iron Age*, Feb. 23, 1911.

Troesken, Werner. "On the Endogeniety of Legal Change: The Chicago Gas Industry, 1887-1913." Dept. of History, University of Pittsburgh.

United States Bureau of Statistics. *Statistical Abstract of the United States*. Washington D. C.: U. S. Government Printing Office. for years 1886-1895, Numbers 9-18.

United States Census Bureau. *Tenth Census of the United States, 1880, v1*. Washington D. C.: U. S. Government Printing Office, 1883.

United States Census Bureau. *Tenth Census of the United States, 1880, v2*. Washington D. C.: U. S. Government Printing Office, 1883.

United States Commissioner of Labor. *Tenth Annual Report of the Commissioner of Labor, Strikes and Lockouts, 1895*. Washington D.C.: Government Printing Office, 1897.

United States Commissioner of Labor. *Third Annual Report of the Commissioner of Labor, Strikes and Lockouts, 1887*. Washington D.C.: Government Printing Office, 1889.

United States Congress. *Biographical Directory of the American Congress, 1774-1971*, Senate Document No. 92-8. Washington D. C.: U. S. Government Printing Office, 1971.

United States Congress. *Congressional Directory, 49-1*. Washington D. C.: U. S. Government Printing Office, 1886.

United States Strike Commission. *Report on the Chicago Strike, June-July, 1894*. Washington, D. C.: Government Printing Office, 1895.

The Washington Post. various issues 1885-1894.

Williams, Charles Richard, ed. *Dairy and Letters of Rutherford B. Hayes, vol. 3.* Columbus, Ohio: 1924.

Wolman, Leo. *Growth of American Trade Unions, 1880-1923.* New York: National Bureau of Economic Research, Inc., 1924.

Wood, Louis Aubrey. *Union-Management Cooperation on the Railroads.* New Haven: Yale University Press, 1931.