Causes and Consequences of Regulatory Breakdown: An Empirical Analysis

by

Wallace Patrick Mullin

Submitted to the Department of Economics
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

at the

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Stock market reactions to I.C.C. decisions are the subject of chapter three. After surveying the general behavior of the stock market during this period, I employ an event study methodology to estimate the effect on railway profitability of I.C.C. rate denials and changes in the regulatory system. Since railroad stocks were a major component of the market portfolio, the estimation procedure must take this factor into account. The estimated profit effects are substantial, with the Nationalization of the roads generating the single largest response, a gain of 3.4 %.

The final chapter addresses the political economy of regulatory breakdowns, and exploits features of this period to test a number of issues in the positive political economy of regulation. In chapter one I applied the framework advanced by McCubbins, Noll, and Weingast to explain the regulatory resistance to nominal price increases during an inflationary period. In this chapter I estimate the relationship between Congressional roll call votes and measures of various constituent interests. These results have several implications. First, they confirm the McCubbins, Noll, and Weingast hypothesis that Congress designs regulatory structure and procedures with the aim of furthering constituents' interests. Second, they indicate that railway ship-

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Acknowledgments

I owe a number of people a great deal of thanks.

First, I wish to thank Paul Joskow. During my first year at M.I.T., Paul suggested that the Progressive Era I.C.C. might merit further study. Throughout my graduate education, he has been generous with his time and advice. His insistence on careful, thorough, empirical work has substantially improved this thesis and has shaped my approach to economic research. I have also learned much from Frank Fisher. Frank contributed his valuable insights on both econometrics and industrial organization, and his sense of humor made my thesis writing experience considerably more enjoyable.

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Chapter 1

Introduction

Since the publication of Gabriel Kolko's *Railroads and Regulation* in 1965, the "revisionist" view of Interstate Commerce Commission (I.C.C.) railroad regulation has become widely accepted. According to this view, federal regulation was welcomed by the railroads as a mechanism to enforce cartel rates. A careful examination of the factual record reveals that this view is inconsistent with the effects of I.C.C. regulation on railroad profitability and behavior during the Progressive Era.

In fact, American railroads faced significant financial hardships under the I.C.C., even before the widespread appearance of competition from trucks. A large number of railroads went into receivership in 1916 and 1917, and the railroads were nationalized in December of 1917 to avoid a complete collapse of the transportation system. The I.C.C. played an important role in these developments. From 1911 to 1917, a period of inflation, the I.C.C. denied several requests for rate increases. This certainly suggests that if the Commission was a tool of the railroads, it was an ineffective one.

This thesis advances three main propositions. First, the financial position of major U.S. railroads was damaged in large part by the refusal of the I.C.C. to grant requested rate increases in the face of rising input costs. Second, this historical episode can be interpreted as an early example of a breakdown in a regulatory process caused by regulatory resistance to rapid cost and associated rate increases. Third, these developments serve as a natural experiment to test a number of related issues in the contemporary positive political economy of regulation.

In this chapter I diagnose these events as an incidence of regulatory breakdown, offer a political economy model to explain these developments, and preview the remaining three chapters of this dissertation.

1.1 Diagnosing Regulatory Failure

The events of 1911-1917 can be interpreted as more than simply a counterexample to the "cartel" view of railroad regulation. This historical episode can be considered an early example of regulatory breakdown.

This interpretation builds upon Paul Joskow's work on the operation of regulatory agencies. In the context of state regulation of public utilities, Joskow (1974) delineated two "modes" of operation for a regulatory agency.[1] In "equilibrium mode," the agency operates under well developed and stable procedures consonant with the competing pressures of the political and economic environment. A change in this environment can cause the agency to enter "innovation mode," in which the agency undertakes new initiatives in an attempt to reach a new institutional equilibrium. A dramatic change in the economic or political environment can substantially disrupt the workings of the agency, leading to a "breakdown" of the regulatory process.

Several factors could force an agency out of its "equilibrium mode," but examples suggest the importance of macroeconomic disturbances, such as inflation. Contrary to many areas of economics, here *nominal* prices play a key role. Joskow contends that price regulation does not fully constrain prices to yield competitive profit rates when costs are stable or falling. When nominal costs rise, sparking a need for rate increases, however, the regulated firm's profitability and viability may be undermined by a failure of the agency to pass these costs on in higher prices. This was the experience of public utilities in the United States following World War II. Joskow found that periods of inflation have been associated with increased requests for rate reviews by public utilities, and with lower rates of return. The inflation of the late

[1] Paul L. Joskow, "Inflation and Environmental Concern: Structural Change in the Process of Public Utility Price Regulation," *Journal of Law and Economics* 17 (1974), pp. 291-327.

1960's and early 1970's outstripped the ability of the regulatory techniques then in use, eventually leading to a new set of techniques.[2]

This parallels the railroad experience of 1911-1920. The I.C.C. proved unable or unwilling to adjust to the new, inflationary economic environment. When the I.C.C. failed to adapt to changed economic conditions, new regulatory institutions were created by nationalization and then by the Transportation Act of 1920. Viewed in this light, then, the events of this period have broader significance, for they are relevant to the important issues of regulatory lag, regulatory breakdowns, industry performance, and subsequent institutional changes.

Joskow placed his diagnosis of regulatory breakdown within a general theory of regulation. The premise of this theory is that regulators attempt to minimize conflict with the political and economic environment in which they operate. In more colloquial terms, regulators seek a "quiet life." As one consequence of this objective, regulators generally will allow regulated firms to earn high profits if there is no countervailing pressure from consumer groups.[3] In practice, this is likely to be the case in a non-inflationary environment. Inflation disrupts this "institutional and organizational equilibrium" by mobilizing consumer interests opposed to increases in regulated prices. These interests in turn enter the regulatory process, and this pressure influences the regulatory agency. This theory therefore predicts that regulatory processes will be resistant to increases in nominal prices and costs.

A weakness of this theory is that it places a central focus upon the regulatory agency, a focus that may be misplaced. This focus is based upon the view that regulatory agencies possess considerable autonomy from the elected branches of government and therefore exercise considerable discretion. Recent work in the political economy of regulation, however, has cast doubt on this view by appylying the principal-agent framework to explain the actions of regulatory agencies. In our application, the I.C.C.

[2]This process continued in the late 1970's and 1980's. See Paul L. Joskow, "Regulatory Failure, Regulatory Reform, and Structural Change in the Electrical Power Industry," *Brookings Papers on Economic Activity*, (Washington: Brookings Institution, 1989) 125-199.

[3]I employ the term "consumer" as a general one, embracing downstream firms such as the shipping interests that opposed the rail rate increases.

was subject to the wishes of several political principals, including the Congress, the President, and various interest groups. These interest groups could apply pressure to the Commission directly or through their influence on the President and Congress. The net effect of these pressures *might* give the agency considerable autonomy. A focus on the agency would then be appropriate, but the importance of the agency would be derived rather than assumed. The following framework incorporates these features into an explanation for the regulatory breakdown of the nineteen teens.

1.2 The McCubbins, Noll, and Weingast ("McNollgast") Framework

The exposition here summarizes the framework employed by McCubbins, Noll, and Weingast, aka McNollgast, (1989).

Adopting the now standard assumption of public choice, elected officials are goal-maximizing, rational actors. Whether they are Mayhew's "single-minded seekers of reelection," or they pursue a more diverse set of goals, the satisfaction of these goals depends upon pleasing political powerful groups in their constituencies.[4] Thus members of Congress "vote their district," and a President acts to please his national constituency. Since there is considerable heterogeneity in the distribution of interests geographically, politicians facing different constituencies are likely to have different (induced) preferences.

For ease of graphical exposition, assume a two-dimensional policy space represented by $\Re^2_+$. In the context of railroad regulation, the two dimensions could be the rate level (the absolute price paid by shippers generally) and the rate structure (the *relative* price paid by short haul versus long haul shippers). This space consists of policies to be chosen by elected officials and implemented by a regulatory agency. There are three political officials, the House, the Senate, and the President, each of whom is considered as a unitary actor.[5] They possess quadratic preferences over the

[4]David Mayhew, *Congress: The Electoral Connection* (New Haven: Yale University Press), 1974.

[5]If we were dealing with a unidimensional policy space, we might think of the "House" and "Sen-

policy space with ideal points of H, S, and P, which I illustrate with circular indifference curves centered on a corresponding ideal point.[6] These ideal points will be a function of constituent interest, as detailed in the subsequent section. As depicted in figure 1-1, the contract curve between any two agents is the line connecting their ideal points, and the Pareto-Optimal set for the three agents consists of all policies within the triangle formed by the three ideal points, triangle HSP.[7]

In the following, I initially describe a problem which Congress recognizes and attempts to solve in designing a regulatory policy; this description is not intended as a prediction of equilibrium behavior. Consider the following timing. In the first period, elected officials choose a policy to be implemented by a regulatory agency. In the second period, the agency implements *some* policy, although not necessarily the one selected in period 1. In the third and final period, elected officials can choose whether or not to reverse the agency policy.

Figure 1-1 contains the status quo policy, SQ, and each official's indifference curve that passes through SQ. We assume for simplicity that new legislation requires the consent of the House, Senate, and President; each official has a veto. This last feature ensures that any successful legislative challenge to SQ must be located within the cigar outlined by the points $SQBDC$. By assumption, bargaining will result in a policy within the Pareto triangle, so any successful challenge to SQ is further restricted to the half-cigar outlined by the points BCD. The relative bargaining power of the three politicians will determine the precise point chosen in BCD, through some unmodeled bargaining process. Suppose point L in figure 1-1 is the policy chosen in period 1.

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ate" officials as the median voters of their respective chambers. The median voter theorem does not apply in this multi-dimensional setting, however. In fact, a substantial body of theoretical literature indicates that any outcome is feasible with pure majority rule decisions taken over a multidimensional space. That possibility need not concern us here, since Congress is not a pure majority rule institution. I assume that institutional features of the Congress (such as the Committee system and rules governing floor action) are sufficient to allow us to represent each chamber's preferences by an ideal point. See Kenneth Shepsle and Barry Weingast, "Structure-Induced Equilibrium and Legislative Choice," *Public Choice*, 37 (1981) for a discussion of the effects of these institutional features.

[6] In the section on econometric specification, I develop this spatial model of preferences in greater detail. Quadratic preferences imply elliptical indifference contours; circular indifference curves are chosen for ease of graphical exposition.

[7] Figure 1-1 is virtually identical to a diagram in McCubbins, Noll, and Weingast (1989).

Figure 1.1: Congressional and Presidential Preferences

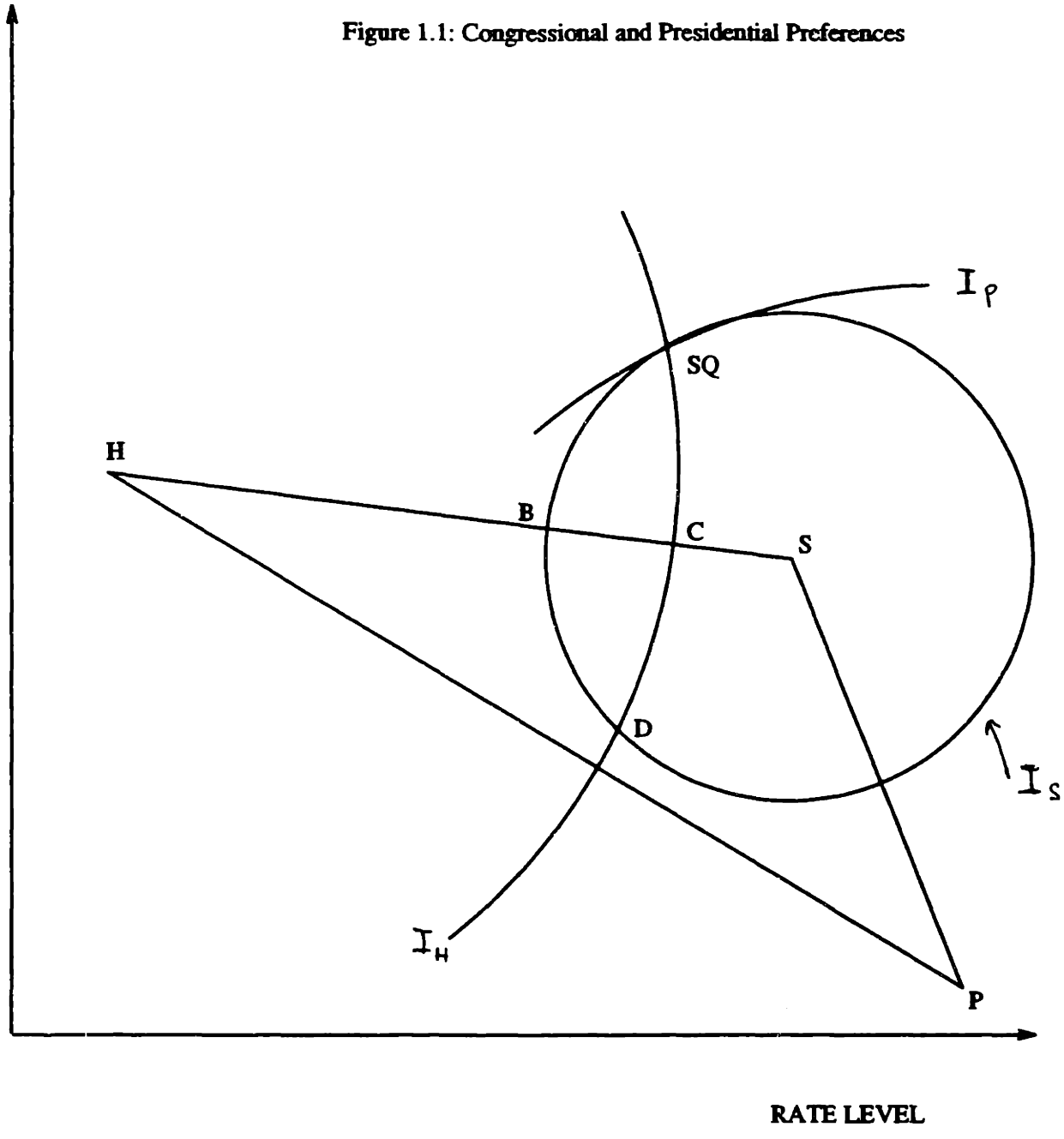
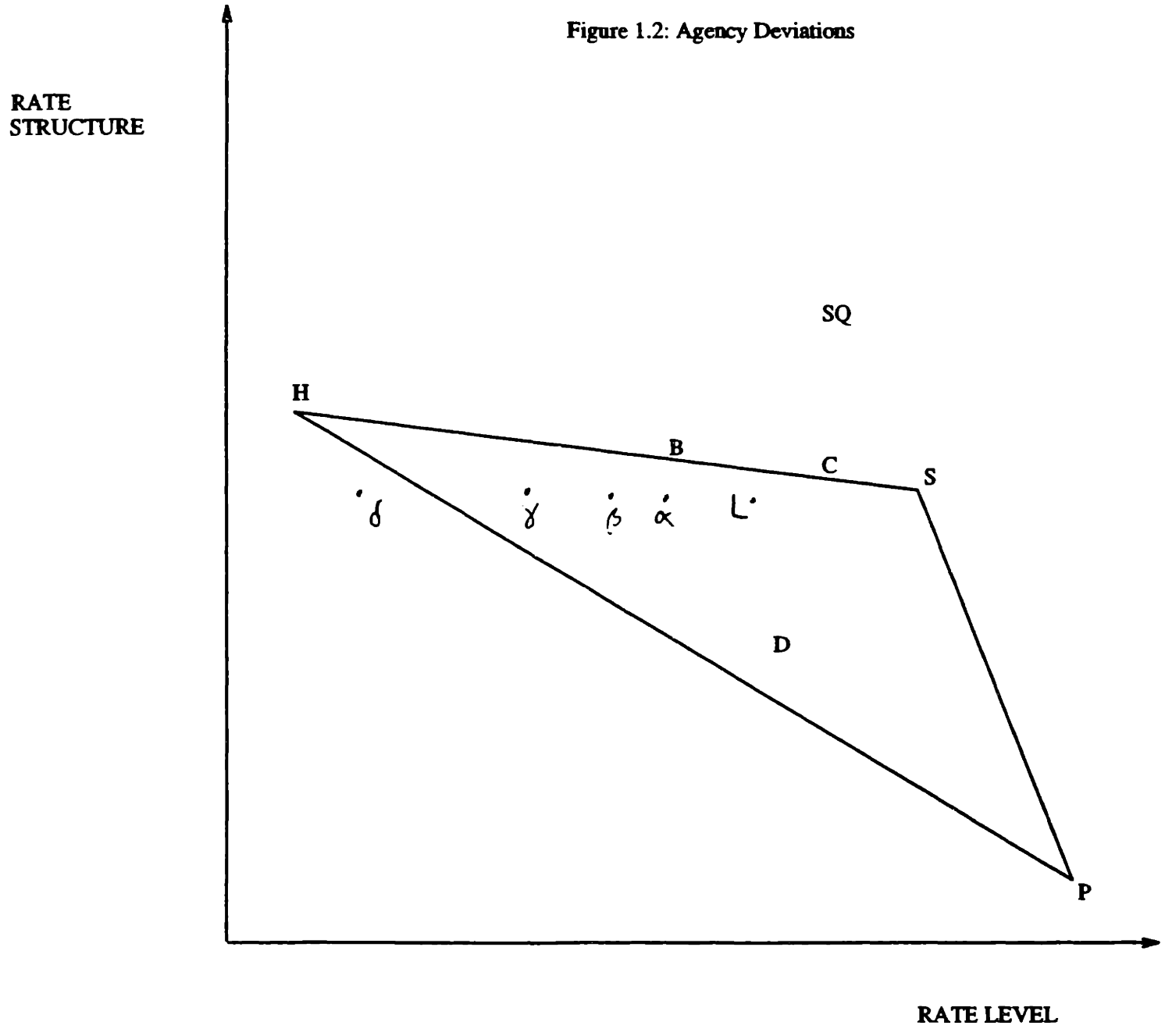


Figure 1.2: Agency Deviations



We now consider the consequences if Congress chose that policy naively, having ignored the possibility that the agency might implement some different policy in period 2. Turn your attention to figure 1-2, which reproduces the pareto triangle and the key specified policies. As indicated, the elected officials select the policy, here L, but the regulatory agency is left with the task of implementation in period 2.[8] Suppose the agency "deviates," by implementing some other policy, such as α depicted in figure 1-2.[9] A key insight of McCubbins, Noll, and Weingast is that as long as the agency deviates to a policy within the pareto triangle *HSP*, no ex-post "legislative correction or punishment is possible." That is because any such deviation must be preferred by one official to the enacted policy L, and so any legislative initiative to rebuke the agency and return regulatory policy to L in period 3 will be vetoed by that official. In this case, for example, policy α is preferred over L by the House, since it lies closer to its ideal point, H. A second insight is that any deviation to a point outside the pareto triangle will be overturned by legislative action in period 3, but that action may not be able to restore L, since the agency deviation creates a "new status quo" that redefines the bargaining positions of the three officials (just as the point SQ in figure 1-1 defined the bargaining positions and dictated that only policies within the half-cigar *BCD* could be enacted).

This illustrates a pervasive feature of the American political system, the "privileged position of the status quo," and a related concept, the importance of veto power. In this example, the regulatory agency is able to implement a policy different from the one enacted because, once implemented, that policy becomes the status quo, and formal legislative action to change the status quo faces substantial hurdles. These hurdles are "veto points" at various steps in the legislative process. In this particular example, the veto points are stark and simple: each of three equals has a veto. A

[8]The elected officials are assumed to be unable, because of informational requirements, to implement the policy directly. The need for industry-specific expertise creates the need to delegate policy implementation.

[9]The motivation for this deviation is not explored. Several reasons are possible. The agency could collude with one or more of the constituent interests (such as the railroads), or with one or more of the elected officials. As the text discusses, the occurrence of unforeseen contingencies could lead to the implementation of a policy different from the one specified by the original enacting coalition.

richer, more descriptive model would contain even more veto points, with vetoes often wielded by small minorities. For instance, Congressional committees possess ex-ante "gatekeeping" veto power over legislation within their jurisdiction; a majority of a committee, constituting a tiny minority of the entire chamber, can prevent changes to the status quo by refusing to report such bills to the floor.

These issues are directly relevant to an explanation of railroad regulatory policy in the nineteen teens. Consider the "policy drift" depicted in figure 1-2. Policy L is enacted, but the implemented policy changes to α, then β, then γ. Any attempt to legislate a return to L would be vetoed by the House, which has benefitted from this policy drift. The gradual shift from L to γ largely preserves the rate structure, but significantly reduces the rate level. This is the precisely the pattern of *real* rate changes that would occur if a policy of no *nominal* rate increases persisted during a period of inflation. *Inflation changes the status quo point.* In this illustration, the House, as a minority, cannot directly enact policy γ, nor can it persuade the Senate and President to do so. In the presence of inflation, however, the House can exercise its veto to defend γ, and thereby obtain low real rates. More generally, inflation gives a minority with veto power over nominal rate increases the power to obtain real rate reductions.

This raises the question of why politicians, at least in the ex-ante stage, thought in terms of *nominal* and not real rates. I return to this issue shortly.

This description suggests one explanation for Congress' failure during the nineteen teens to reverse the I.C.C.'s rate denial policy; such a reversal was thwarted by a minority with veto power. This descriptions does not explain, however, why the I.C.C. chose a rate denial policy. One possibility is related to the "McNollgast solution" to the "McNollgast problem."

The "McNollgast problem," outlined above, is the inability of ex-post legislative actions to sanction and reverse, and thus presumably deter, regulatory agency deviations from enacted policies. If legislators are risk-averse, each will have an incentive to prevent such deviations, even if each has no reason to believe such deviations are

likely to be biased away from his ideal point.[10] The "McNollgast solution" is administrative structure and procedures, which are determined *ex-ante* to constrain and channel agency policy *ex-post.* Given the need to delegate policy implementation to an agency and the desire that the implemented policy serve constituent interests, a (second-best) solution is to "enfranchise the constituents of each political actor" in the decisionmaking process of the regulatory agency. For example, giving a particular constituency standing to challenge agency decisions in court helps enfranchise that constituency. In the phrasing of McCubbins, Noll, and Weingast, regulatory structure *mirrors* the politics of the enacting coalition; interests involved in the congressional debate are represented in agency proceedings. Moreover, this structure should *stack the deck* in favor of those interest groups that were important to legislators in the enacting coalition.

If administrative procedures and structure achieve these goals, then the situation depicted in figure 1-2 should be replicated at the level of the I.C.C.. Thus the shipping groups supporting the House position, who prefer low rates, should have influence on the I.C.C.. If the politics of agency decisionmaking exactly mirrors the politics of the enacting coalition, then the shipping groups most preferring low rates should lack the power to force nominal rate reductions but possess the power to veto nominal rate increases.

Some qualitative evidence supports this interpretation. First, the enacting coalition of the Mann-Elkins Act of 1910, through a provision in the Act, encouraged the Commission to resist nominal rate increases. This provision directed that "whenever there shall be filed ...a new ...rate ...the burden of proof to show that the ...proposed increased rate is just and reasonable shall be upon the common carrier."[11] As interpreted by the I.C.C., this required a railroad seeking an advanced rate "to

[10]Of course, if a legislator believes that a post-enactment deviation is likely to move the policy further from his ideal point, his incentive to prevent such deviation is strengthened. For example, a member of the House of Representatives might fear that after enactment, the Senate and the President could collude and move the implemented policy toward their ideal points by means of agency appointments.

[11]quoted by Albro Martin, *Enterprise Denied* (New York: Columbia University Press, 1971), p. 173.

prove the new rate as a whole was reasonable, not merely that the increase in the rate was reasonable."[12] In practice, this burden of proof was difficult for the railroads to satisfy; the "deck had been stacked" against the railroads.

Second, the Mann-Elkins act enfranchised shipping interests by providing for investigatory hearings to ascertain the merits of proposed rate increases. Requests for general rate advances in the nineteen teens mobilized interests opposed to the railroads, and these interests employed the regulatory process to lobby against the increases. The hearings, in addition to their "fact-finding" role, provided a forum for agricultural and mercantile shipping interests opposed to rate increases. The most noteworthy exploitation of this forum occurred in the 1910 case, *Advances in Rates, Eastern Case.* Several Eastern organizations, including the New York Chamber of Commerce, hired as their representative the attorney Louis D. Brandeis.[13] His dramatic claims of the high degree of waste and inefficiency in the railroads' business practices were widely quoted in the newspapers, and finally in the I.C.C.'s report denying the roads' request. Shipping interests presented organized rebuttals to the railroads' claims in the 1914 and 1915 hearings, but offered little organized opposition in the 1917 *Fifteen Per Cent Case.*

To return to an earlier point, why did politicians in 1910 enact a policy concerning *nominal* rates? It is possible that the enacting coalition of the Mann-Elkins Act sought real rate reductions, and employed these features of the Act and inflation to achieve them. I doubt that was the case, however. The levels of inflation during the Progressive Era should be considered an unforeseen contingency. Prices had steadily *declined* since the end of the Civil War until 1900, and then stabilized. It is therefore likely that Congress, in establishing the provisions of the Mann-Elkins Act, sought to prevent real freight rate increases, but did not intend to force real rate reductions. It turned out that those administrative procedures, coupled with inflation, generated real rate reductions. The policy drift that occurred could not be remedied by legislative action because a sufficiently large number of Congressmen

[12]20 *I.C.C. Reports* (1911) 307.

[13]Albro Martin, *Enterprise Denied* (New York: Columbia University Press, 1971), p. 196.

preferred that decline in rates.

1.3 Thesis Overview

The remaining three chapters address issues related to the causes and effects of the regulatory breakdown of the Progressive Era. Chapters two and three describe the background of the regulatory regime and establish the deleterious effects of the rate denials.

In chapter two, I document the inflationary environment of the nineteen teens, and the I.C.C.'s refusal to pass along increased costs into freight rates. I then offer qualitative and accounting evidence to support the contention that these I.C.C. actions seriously undermined railroad profitability. The Presidential and Congressional responses, embodied in Nationalization and the Transportation Act of 1920, are detailed.

Stock market reactions to I.C.C. decisions are the subject of chapter three. After surveying the general behavior of the stock market during this period, I employ an event study methodology to estimate the effect on railway profitability of I.C.C. rate denials and changes in the regulatory system. Since railroad stocks were a major component of the market portfolio, the estimation procedure must take this factor into account. The estimated profit effects are substantial, with the Nationalization of the roads generating the single largest response, a gain of 3.4%.

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exercised considerable political power, and that this power was channelled through the Congress. Coupled with other quantitative evidence, this supports the view that Congress dominates the decisionmaking of regulatory agencies, and thereby refutes the agency autonomy view underlying the quiet-life hypothesis. These contentions are supported by both logit estimates and semiparametric average derivative estimates, although the semiparametric results suggest a different pattern of relative influence by the various constituency groups.

Chapter 2

Regulatory Responses to Inflationary Pressures and Contemporary Views On Effects

This chapter details the railroad regulatory response to the inflationary pressures of the nineteen teens, and presents some initial evidence of the effects of this response upon railroad performance. The plan of this chapter is as follows. The first section documents the inflation of the era and its effects on railroad costs. In the second section I describe the important statutory changes of 1900-1910, which created the legal environment and reflected the political environment in which the Commission operated. I then document the interaction of these economic and political developments; the third section reports the railroads requests for rate increases and the refusal of the I.C.C. to grant these requests. Section four examines contemporary views of the effects of this rate regime on the railroads, and also surveys some supporting quantitative evidence. The modifications to this rate regime are considered in section five. These changes were imposed by President Wilson's decision to nationalize the railroads in December 1917, and then by the Transportation Act of 1920. Finally I offer some concluding remarks.

2.1 The Economic Environment: Inflation and Railroad Costs

The inflation of the early twentieth century is documented and placed within its historical context by figure 2-1, which displays the David-Solar United States consumer price index for 1860-1926.[1] Consumer prices declined steadily after the Civil War, stabilized briefly before 1900, and then began to increase. The moderate inflation of 1900-1910 was followed by more severe inflation, especially after 1914, reflecting the onset of the war in Europe.

I have already alluded to the rising costs of providing railroad service. Table 2.1 contains concrete evidence of the upward trend in the prices of key railroad inputs. Although the inflation of the nineteen teens constitutes my primary focus, I have included data for 1900-1926 to provide a basis for comparison. (I follow this practice throughout this chapter whenever data permit.) As with consumer prices, the increase in costs was particularly pronounced after 1914. Of these costs, wages were the most important; a contemporary source estimated that payments to labor accounted for 70% of an average railroad's operating costs.[2] Later accounts indicate that wages made up 55 to 60 percent of railway operating expenses.[3] Even if the first number is discounted as too high, labor was undeniably a major component of railroad cost. An issue we will encounter is the extent to which the railroads held down their labor costs. Some contemporary sources suggested that any increase in freight rates would have been absorbed by the powerful railroad unions. If true, this would substantially undermine my criticism of the I.C.C., and I address this argument later.

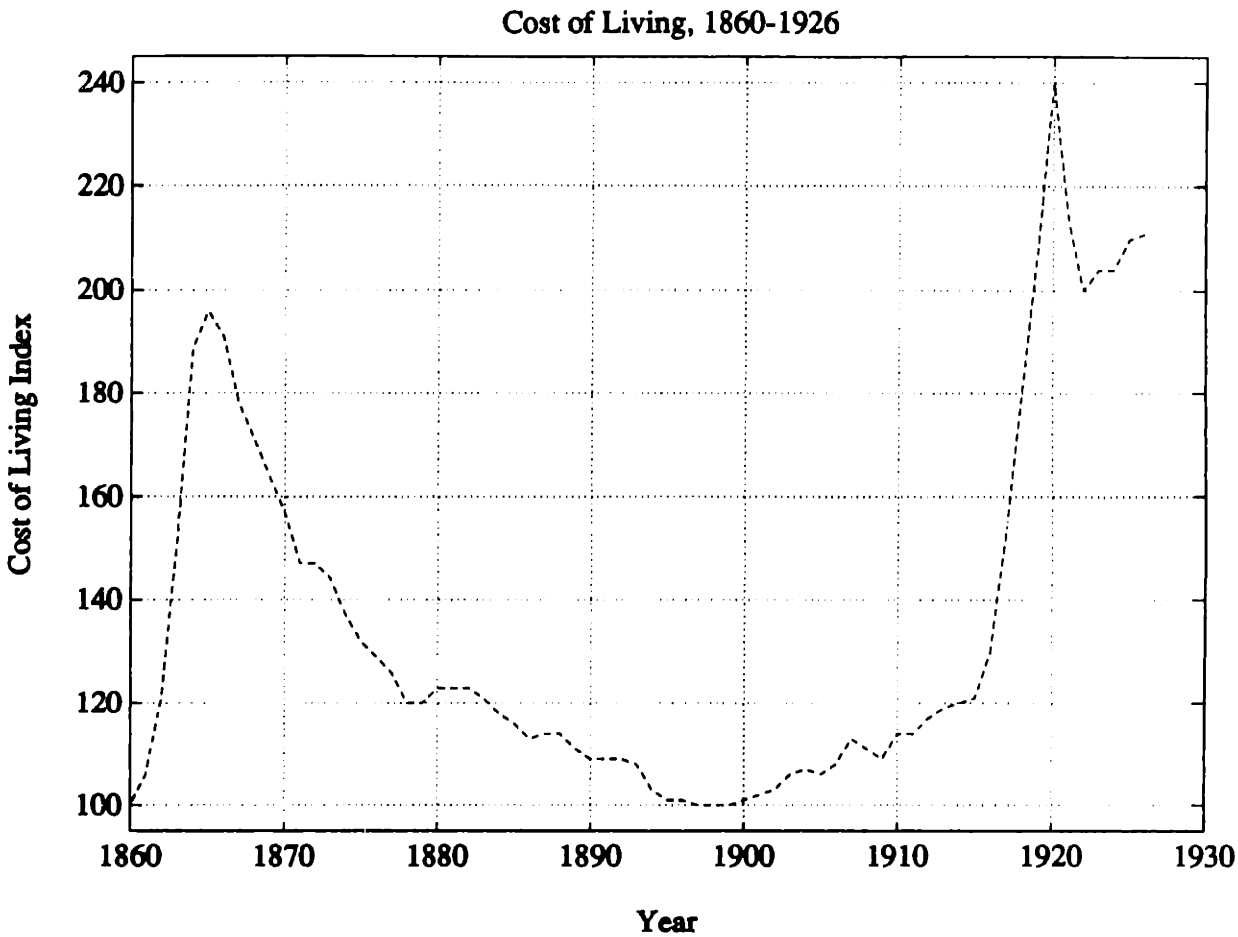
Bituminous coal was the second largest single input for the railroads, and the "average price in cents per net ton, f.o.b. mines" is my measure of coal prices. One

[1] Paul A. David and Peter Solar, "A Bicentenary Contribution to the Cost of Living in America," *Research in Economic History, Volume 2*, edited by Paul Uselding, (Greenwich: JAI Press, 1977), p. 16.

[2] J.C. Hooker, "A 'Cost-of-Living' Index for Steam Railroads," *The Journal of Accountancy*, 38 (1924), p. 27.

[3] Thor Hultgren, *American Transportation in Prosperity and Depression*, (New York: National Bureau of Economic Research, 1948), p. 255.

Figure 2-1:



source of inaccuracy is that these are spot prices, whereas many railroads may have entered into long-term contracts and so would not be affected immediately by changes in spot prices.[4] Additionally, here coal is measured in net tons, not B.T.U.'s, which is a quality-adjusted unit of measurement. Anthracite coal was also a major fuel source, but to a lesser extent than soft coal.

[4]There are indications that the financially stronger roads secured long term fixed-price contracts for some inputs prior to World War I. "Railroads Hit Hard by Advanced Prices," *New York Times*, October 15, 1916, Section 7, p. 6.

Table 2.1: Input Price Inflation

Year	Labor	Bituminous Coal	Anthracite	*Railway Age* Index
1900	$548	$1.04	$1.49	—
1901	549	1.05	1.67	—
1902	562	1.12	1.84	—
1903	593	1.24	2.04	—
1904	600	1.10	1.90	—
1905	589	1.06	1.83	—
1906	607	1.11	1.85	—
1907	661	1.14	1.91	—
1908	667	1.12	1.90	—
1909	644	1.07	1.84	—
1910	677	1.12	1.90	—
1911	705	1.11	1.94	—
1912	721	1.15	2.11	—
1913	760	1.18	2.13	—
1914	795	1.17	2.07	100
1915	815	1.13	2.07	107
1916	867	1.32	2.31	137
1917	989	2.26	2.85	177
1918	1424	2.58	3.40	212
1919	1509	2.49	4.14	216
1920	1817	3.75	4.85	236
1921	1632	2.89	5.00	187
1922	1591	3.02	5.01	179
1923	1585	2.68	5.43	194
1924	1570	2.20	5.43	189
1925	1597	2.04	5.30	184
1926	1613	2.06	5.62	183

The Labor column consists of the average annual income of wage earners employed by the steam railroads. Paul Douglas, *Real Wages in the United States, 1890-1926* (Boston: Houghton Mifflin, 1930, p. 325.

The two sets of coal prices are for net tons, f.o.b. mines, and are averages for the year. Sam H. Schurr and Bruce C. Netschert, *Energy in the American Economy, 1850-1975* (Baltimore: Johns Hopkins Press, 1960), p. 545.

The *Railway Age* Index consists of the average cost of railway materials and fuel, and was first calculated for 1914. D.A. Steel, "Railroads Feel Rising Trend of Material Costs," *Railway Age*, Volume 112, January 3, 1942, p. 82.

The last column reports a cost index prepared in 1942 by the industry publication *Railway Age*. Although this index does not cover the years before 1914, it is still informative, as it helps document the sharp rise in railroad costs during World War I.

Despite the imperfections in the data, these prices show an upward trend during the period 1910-1917, and that is their most important feature. The presence of long-term contracts may have temporarily insulated the railroads from the effects of inflation, but as long as that insulation was only temporary, stagnant rates harmed railroad performance. Although the prices for 1918-1926 are not of primary interest, note that they generally continued to rise until their 1920 peak, and then declined.

While inflation was an important element in the Commerce Commission's economic environment, statutory changes shaped the Commission's legal environment.

2.2 The Legal Environment: Statutory Changes

Table 2.2 highlights the major statutory changes, the chief rate cases, and other important developments affecting the railroads.

Although the 1887 law establishing the Interstate Commerce Commission prescribed that railroad rates be "just and reasonable," the Commission did not formally receive the authority to set maximum rates until the Hepburn Act of 1906.[5] Even this law did not alter the regulatory regime as significantly as the Mann-Elkins Act of 1910. The Mann-Elkins Act gave the Commission the power to pass judgment on *proposed* rate advances. In the past, the I.C.C. could not set maximum rates unless it had determined that existing rates were unreasonable. Moreover, the Mann-Elkins Act allowed the I.C.C. to suspend proposed rate increases up to 10 months while it considered their reasonableness. Prior to this change, the disputed rates remained in effect while the Commission investigated.

[5]In some sense, the Hepburn Act *restored* the I.C.C.'s authority to prescribe maximum rates. From 1887 to 1897 the Commission prescribed maximum rates, having judged that such authority was implicitly granted by the the Interstate Commerce Act. In 1897, however, the Supreme Court ruled "that the power to prescribe rates or fix any tariff for the future is not among the powers granted to the Commission." *Interstate Commerce Commission v. Cincinnati, N.O. & T.P.R. Co.* 167 U.S. 479 (1897), Sharfman, *Volume I*, pp. 25-26.

An additional change involved the fundamental orientation of the Commission. Since its inception, the primary focus of the Interstate Commerce Commission had been directed toward rate discrimination, or more generally the rate *structure*, rather than the overall *level* of rates. The Mann-Elkins Act and the inflation that followed forced the I.C.C. to give explicit consideration to the rate level.

Table 2.2: Chronology

1887	I.C.C. established
1903	Elkins Anti-Rebating Act
1906	Hepburn Act * I.C.C. receives maximum rate authority
June 1910	Mann Elkins Act * power to judge *proposed* rate advances * suspension power
July 1910	I.C.C. suspends Eastern & Western Rate advances
Feb 1911	I.C.C. denies Eastern & Western Rate increases in *Advances in Rates, Eastern Case*, and *Advances in Rates, Western Case*
Oct 1913	I.C.C. suspends rates in the *Five Per Cent Case*
July 1914	I.C.C. grants partial increase in the *Five Per Cent Case*
Aug 1914	World War I
March 1915	I.C.C. suspends rates in the *1915 Western Freight Rate Advance Case*
Aug 1915	I.C.C. grants minor increases in the *1915 Western Freight Rate Advance Case*
March 1917	I.C.C. receives evidence in the *Fifteen Per Cent Case*
April 1917	United States enters World War I
June 1917	Southern & Western roads denied any increase, Eastern roads receive a partial increase in the *Fifteen Per Cent Case*
Dec 1917	President Wilson announces Federal operation of the railroads, with a guaranteed net income
May 1918	Director General of the Railroads orders a 25% freight rate increase
March 1920	Railroads returned to private control, and Transportation Act of 1920 brings friendlier regulation

Moreover, Congress, through a provision in the Mann-Elkins Act, encouraged the Commission to resist nominal rate increases. This provision directed that "whenever there shall be filed ...a new ...rate ...the burden of proof to show that the ...proposed increased rate is just and reasonable shall be upon the common carrier."[6] As interpreted by the I.C.C., this required a railroad seeking an advanced rate "to prove the new rate as a whole was reasonable, not merely that the increase in the rate was reasonable."[7] In practice, this burden of proof was difficult for the railroads to satisfy, as the next section demonstrates.

Table 2.2 also reports the Presidential and Congressional actions of 1917-1920, which are discussed in greater detail in section five. Briefly, the developments of 1917-1920 brought the final crisis to this regulatory regime and triggered the transition to a new regime. With U.S. entry into the First World War in April of 1917, inflation, already significant, accelerated, and war-related traffic began to overburden the railroad system. In response to the crisis in transportation, the railroads were nationalized from the end of 1917 until March, 1920. During that period, the railroads were under the control of a Railroad Administration, not the I.C.C.. Furthermore, during the nationalization period the railroads were guaranteed "an annual compensation not exceeding their respective annual net operating income for the 3 years ending June 30, 1917."[8] Before returning the railroads to private control, Congress passed the Transportation Act of 1920, directing that the I.C.C. consider the financial needs of the railroads in its ratemaking decisions. Other aspects of the 1920 Act signalled a new, more protective approach to regulation of the railroads.[9]

I now consider the developments during the intervening period, just after the Mann-Elkins Act of 1910.

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[6]quoted by Albro Martin, *Enterprise Denied* (New York: Columbia University Press, 1971), p. 173.

[7]20 *I.C.C. Reports* (1911) 307.

[8]Aaron A. Godfrey, *Government Operation of the Railroads, 1918-1920* (Austin: San Felipe Press, 1974), p. 47.

[9]D. Philip Locklin, *The Economics of Transportation* (Homewood: Richard D. Irwin, 1966), pp. 228-239.

2.3 Railroad Rate Requests and Commission Responses

The importance of the legislative changes of 1906 and 1910 became evident with their implementation. Several times between 1911 and 1917, the railroads, facing rising costs, sought a general advance in freight rates only to have the I.C.C. suspend the proposed rates, undertake a lengthy investigation, and then deny the request.[10] The I.C.C. ruled against the railroads in four major rate cases.[11] The exception was the *Five Per Cent Case* (1914), in which the Eastern Roads, after an initial delay, were granted a 5% freight rate advance.

This Commission response, "delay and denial," is illustrated in table 2.2. Several months delay always elapsed between the roads' request and the Commission's decision. This decision, if not an outright denial, granted a "partial increase" of negligible financial benefit. In the *1915 Western Freight Rate Advance Case*, for example, the rate advances approved by the Commission were expected to increase aggregate revenue by only one quarter of one per cent.[12] The relief granted in the *Fifteen Per Cent Case* was similarly meager; the Western and Southern roads were denied any increase, while the Eastern roads received an increase only on mineral and class rates.[13]

Of course, the I.C.C. possessed other mechanisms to grant rate relief apart from general rate advances. Rates on particular commodities could be and were adjusted. Furthermore, an item could be reclassified into a higher rate class, so that the effective rate would increase. One measure of the general rate level is the "average freight revenue per ton-mile," derived by dividing total freight revenue by the total number of ton-miles. This is a good summary statistic, accurately reflecting the general level

[10]Although the bill was signed into law in June of 1910, the first rate case was decided in March of 1911, and so 1911 can be considered the beginning of this regulatory regime.

[11]These cases were: *Advances in Rates, Eastern Case* (1911); *Advances in Rates, Western Case* (1911); The *1915 Western Rate Advance Case* (1915); and the *Fifteen Per Cent Case* (1917). I.L. Sharfman, *The Interstate Commerce Commission: A Study in Administrative Law and Procedure. Volume III-B.* (New York: Oxford University Press, 1936) p. 33.

[12]*Financial Review*, 1916, p. 14.

[13]Class rates applied to "goods shipped in boxes, bundles, bales, crates, and other comparatively small packages." "Railroads To Get $16,000,000 a year in Higher Rates," *New York Times*, July 19, 1914, Section 1, p. 1.

of railway rates.[14] Table 2.3 reports both the nominal and real freight revenue per ton-mile, considered here in turn. We see that nominal railway rates generally *declined* during 1911-1917.[15] Although nominal average freight revenue per ton-mile rose from .719 in 1916 to .728 in 1917, this was still well below the .757 for the year ending June 30, 1911.[16] It is also clear that Federal Control and the Transportation Act of 1920 were associated with higher rates, as the rates from 1918-1926 were significantly above those of 1911-1917. The pattern of real rate changes is even starker, with sharp declines in 1911-1917 partially reversed in 1918-1926.

[14]C.C. McCain, "The Necessary Readjustment of Railway Rates," *Political Science Quarterly*, Vol. XXIV, December 1909, pp. 634-635.

[15]A change in the overall freight mix could have contributed to this decline. An initial examination of the traffic composition figures suggests, however, that any change in the freight mix was insignificant. In fact, the percentage of tonnage composed of manufactured goods (for which the railroads charged a high rate) actually rose from 14% in 1911 to 15% in 1916. *Financial Review*, 1918, p. 154.

[16]In 1916 the Commission changed its reporting period from the 12 months ending June 30th to the 12 months ending December 31st.

Table 2.3: Revenue Per Ton-Mile

Year Ended	Average Freight Revenue Per Ton-Mile, in cents	
	Nominal	*Real*
Jun. 30, 1900	.729	.722
Jun. 30, 1901	.750	.735
Jun. 30, 1902	.757	.735
Jun. 30, 1903	.763	.720
Jun. 30, 1904	.780	.729
Jun. 30, 1905	.766	.723
Jun. 30, 1906	.748	.693
Jun. 30, 1907	.759	.672
Jun. 30, 1908	.754	.679
Jun. 30, 1909	.763	.700
Jun. 30, 1910	.753	.661
Jun. 30, 1911	.757	.664
Jun. 30, 1912	.744	.636
Jun. 30, 1913 †	.729	.613
Jun. 30, 1914	.737	.614
Jun. 30, 1915	.735	.607
Jun. 30, 1916	.719	.553
Dec. 31, 1916	.719	.508
Dec. 31, 1917	.728	.437
Dec. 31, 1918	.862	.446
Dec. 31, 1919	.987	.442
Dec. 31, 1920	1.069	.471
Dec. 31, 1921	1.294	.625
Dec. 31, 1922	1.194	.591
Dec. 31, 1923	1.132	.555
Dec. 31, 1924	1.132	.547
Dec. 31, 1925	1.114	.529
Dec. 31, 1926	1.096	.523

Nominal freight revenue per ton-mile was reported by the U.S. Bureau of the Census, *The Statistical History of the U.S. from Colonial Times to the Present* (New York: Basic Books 1976), p. 733. These figures were in turn deflated by the David-Solar consumer price index to generate real freight revenue per ton-mile. Paul A. David and Peter Solar, "A Bicentenary Contribution to the History of the Cost of Living in America," in *Research in Economic History, Volume 2*, edited by Paul Uselding (Greenwich: JAI Press, 1977), p. 16.

†Class I and II railroads.

Since costs were increasing, this revenue pattern was likely to generate financial problems. John Moody anticipated this result in his investment guide of 1912:

> A fractional change in transportation rates, especially in freight, may make a vast difference in the operating results and gross and net income of a railroad property. If a railroad, the operating costs of which must naturally increase with increasing costs of materials and advancing wages, cannot maintain its freight rates or cannot raise those rates in some ratio to the advancing costs of operation, it is apt to be in a very bad way indeed. A difference in one or two mills [thousandths of a dollar] per ton per mile on the average freight tonnage of a railroad during the year, may add or deduct millions of dollars from the aggregate gross business.[17]

The changes in rates reported in table 2.3 are on the order of several mills, and so this deterioration in the rate level was quite serious. The next section examines some of the consequences of this regulatory regime on railroad financial performance.

2.4 Effects on Railroad Performance: Contemporary Views and Supporting Quantitative Evidence

A substantial body of contemporary opinion considered the I.C.C.'s decisions to be shortsighted and misguided. The first rate case, the *Advances in Rates, Eastern Case* (1911), resulted in a decision very surprising to business interests. Recall that the I.C.C. flatly denied the entire requested rate increase. On the day the decision was announced, February 24, 1911, a "Features of the Market" column in the *Wall Street Journal* had reported light market activity the previous day due to anticipation of the rate decision. It also noted, "The current belief regarding the rate decision was that it would come after the market's close, and that the eastern roads would get between 35% and 40% of what they asked for, while the western lines would receive from 60% to 70% of their demands. Traders argued that the announcement of the

[17]John Moody, *Moody's Analyses of Railroad Investments*, (New York: Analyses Publishing Company, 1912), p. 96.

decision would be construed as bullish, no matter what the roads obtained ... The fact that stocks did not respond in a substantial way to optimistic forecasts of large rate increases tended to confirm the belief that the decision was already discounted." The *New York Times* also reported the decision as surprising, but less so than implied by the *Journal.*

Even persons without a direct interest in the railroads argued on their behalf. An editorial in the *New York Herald* in 1913 contended, "The Interstate Commerce Commission has a sick patient on its hands. The plain truth is that this situation must be met quickly. There has been more humbug in the attacks upon the railroads than in any other discussion in the last ten years."

Not all the members of the Commission were blind to the damage inflation had wreaked upon the railroads. In his dissent from the *Five Per Cent Case* (1914), Commissioner Winthrop Daniels, a former Professor of Political Economy at Princeton, wrote:

> The world-wide phenomenon of rising prices is by this time no novelty. Since 1906 the average rise in the world's price level is estimated by competent statisticians at from 30 to 50 per cent. It has mirrored itself in the rising cost of living; it has evoked, and most properly, advances in wages and salaries; it has coincided with an increase in the nominal rate of interest where part of the interest so-called is but compensation for the anticipated depreciation of the capital sum later to be repaid. This rise in the price level must eventually be reckoned with in railroading. For a time its effects may be masked by adventitious increases in the volume of traffic, but this temporary relief in its very nature is uncertain, and sooner or later the difficulty is sure to reappear. For a time it may be circumvented by extraordinary economies, but in its nature it is inexorable. It must be faced, not trifled with. It is hardly an adequate remedy to accord to carriers relief only when their returns have reached the well-nigh desperate level now shown in central freight association territory. Even before this inadequate return is evidenced, higher rates are warranted. Such a solution of the present case would have done no less than justice to the carriers and would have promoted the welfare of the community they serve.[18]

By 1917, not even shippers protested against a proposed increase in freight rates.[19]

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[18]31 *I.C.C.Reports* (1914) 454.

[19]Sharfman, 1936, p. 90.

The critical assessment by contemporaries can be examined in light of various pieces of quantitative evidence. I survey several such pieces here. Some of this evidence is noisy, or suggests that the railroads remained profitable during the Progressive Era, but the weight of evidence supports the view that the Commission's rate denials undermined railroad profitability. This view is also confirmed by the reactions of the stock market to I.C.C. decisions, a phenomenon which is investigated in chapter three.

2.4.1 Railroad Receiverships

A strong indication that the rate denials induced financial distress is provided by the pattern of railway receivership. Some of the weaker roads experienced severe difficulties during the nineteen teens, and several defaulted on their debt obligations. Many of these roads subsequently had their operations placed under the control of receivers. Table 2.4 indicates the pattern of receivership for 1899-1926. The salient characteristic is the steady increase from June 1911 to June 1916 in both the miles of road operated by receivers and the number of firms in receivership. In fact, the 37,353 miles operated by receivers on June 30, 1916 was a record at that time.[20]

[20]Godfrey, p. 7.

Table 2.4: Railroads in Receivership

Date	Miles of Road Operated By Receivers	Number of Roads In Receivership
Jun. 30, 1899	9,853	71
Jun. 30, 1900	4,178	52
Jun. 30, 1901	2,497	45
Jun. 30, 1902	1,475	27
Jun. 30, 1903	1,185	27
Jun. 30, 1904	1,323	28
Jun. 30, 1905	796	26
Jun. 30, 1906	3,971	34
Jun. 30, 1907	3,926	29
Jun. 30, 1908	9,529	52
Jun. 30, 1909	10,530	44
Jun. 30, 1910	5,257	39
Jun. 30, 1911	4,593	39
Jun. 30, 1912	9,786	44
Jun. 30, 1913	16,286	49
Jun. 30, 1914	18,608	68
Jun. 30, 1915	30,223	85
Jun. 30, 1916	37,353	94
Dec. 31, 1916	34,804	80
Dec. 31, 1917	17,376	82
Dec. 31, 1918	19,208	74
Dec. 31, 1919	16,590	65
Dec. 31, 1920	16,290	61
Dec. 31, 1921	13,512	68
Dec. 31, 1922	15,259	64
Dec. 31, 1923	12,623	64
Dec. 31, 1924	8,105	61
Dec. 31, 1925	18,687	53
Dec. 31, 1926	17,632	45

Source: United States Interstate Commerce Commission's *Statistics of Railways in United States, 1930*, (Washington: Government Printing Office, 1932), p. S-61.

There was a decrease in mileage for 1917, but this was primarily an anomaly. As the I.C.C. noted in its statistical report for 1917, "This marked decline in mileage is due to the fact that a number of large roads were reorganized during the calendar year 1917 and only roads of lesser importance went into receivers' hands during the year."[21]

[21]The United States Interstate Commerce Commission, *The Statistics of Railways in the United States, 1917*, (Washington: Government Printing Office, 1919) p. 15.

Table 2.5: Entry into Receivership

Year	Number of Roads	Miles	Bonds and Stocks
1900	16	1,165	$ 78,234,000
1901	4	73	1,627,000
1902	5	278	5,835,000
1903	9	229	18,823,000
1904	8	744	36,069,000
1905	10	3,593	176,321,000
1906	6	204	55,042,000
1907	7	317	13,585,000
1908	24	8,009	596,359,000
1909	5	859	78,095,000
1910	7	735	51,427,500
1911	5	2606	210,606,882
1912	13	3784	182,112,497
1913	17	9,020	477,780,820
1914	22	4,222	199,571,446
1915	12	20,143	1,070,808,628
1916	9	4,439	208,159,689
1917	19	2,486	61,169,962
1918	8	3,519	242,090,800
1919	7	244	11,886,779
1920	10	541	21,620,150
1921	14	1,744	63,872,113
1922	12	4,330	329,114,860
1923	10	2,218	87,913,581
1924	11	920	30,223,372
1925	6	11,368	680,422,080
1926	6	88	2,821,400

Source: *Railway Age*, January 5, 1929, p. 67.

Figure 2-2:

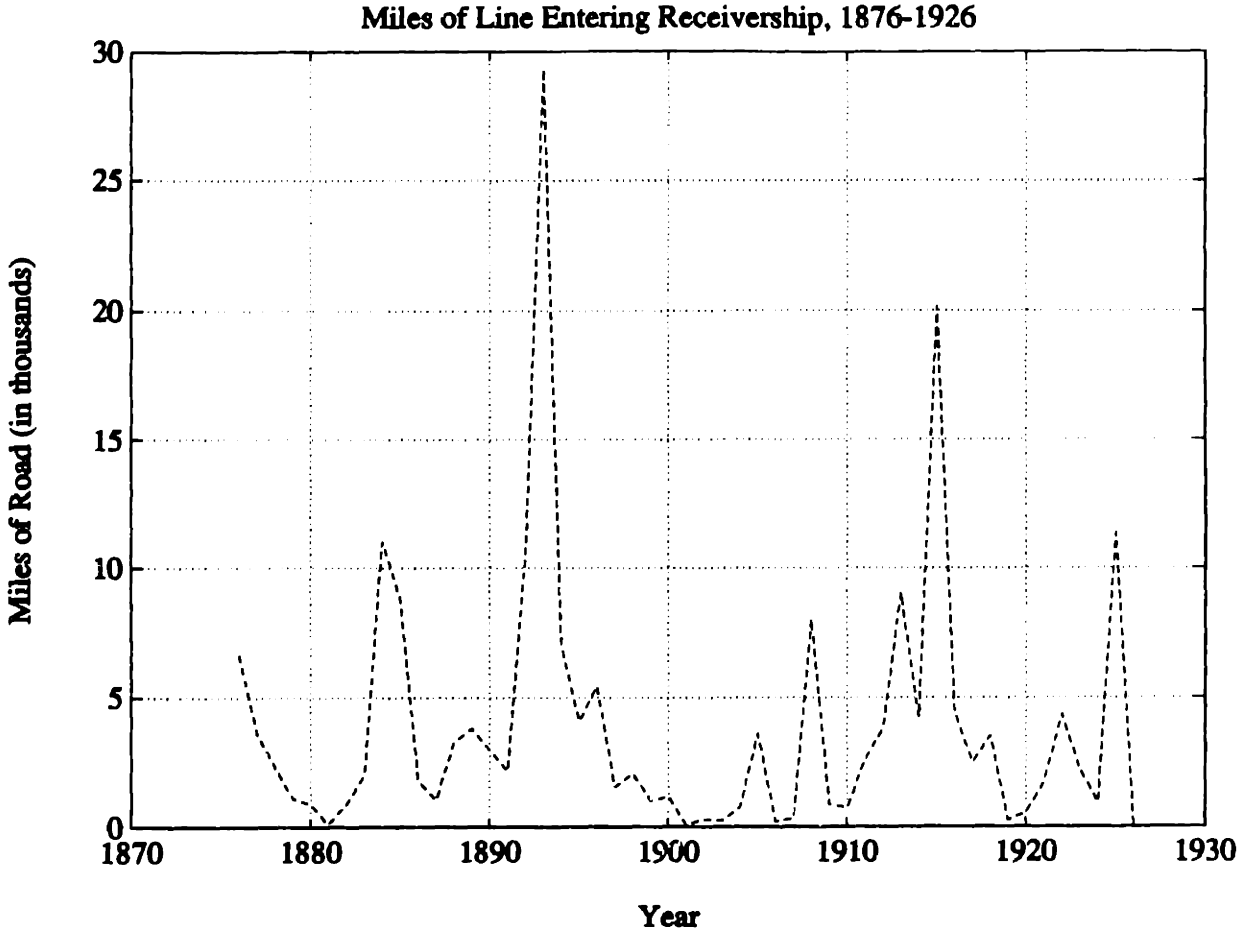

Table 2.4 details the *stock* of railroads in receivership; another important indication of railroad financial distress is the *flow* of railways into receivership. Table 2.5 and figure 2-2 address this issue. Table 2.5 details the total number, mileage, and capitalization of roads entering receivership from 1900-1926. Figure 2-2 displays the mileage of roads entering receivership from 1876-1926, and thereby provides a perspective on the mileage figures from table 2.5.[22]

Consider first the period before 1910. During these years railroad failure "characterizes and concentrates about panic years."[23] Specifically, the peaks in new re-

[22]1876 is the first year for which figures are available.

[23]William Z. Ripley, "Railroad Receivership and Reorganisation," *Railway Age Gazette*, August

ceiverships in 1884, 1893, and 1908 were associated with the panics of 1884, 1893, and (fall) 1907.[24]

This contrasts sharply with the nineteen teens, during which receiverships rose despite the absence of widespread financial distress. As Harvard Professor of Economics William Z. Ripley noted in 1914, judging by the "rising mileage of railroads in distress,"

> ...the present day bears definite earmarks of a severe depression. Yet ...the railroads seem peculiarly marked out for suffering, for the well understood reason of steadily rising costs of operation along with fixity under governmental regulation of the rates chargeable for services rendered.[25]

In fairness to the Commission, one caveat is in order: several roads went into receivership chiefly because of earlier financial mismanagement for which the I.C.C. escapes blame. Yet this increase in receiverships remains as evidence of lean times for the railroads, lean times due in large part to the Commission's rate regime. This is all the more startling because the boom in rail traffic should have brought a period of railroad prosperity. Indeed, it is noteworthy that the level of receiverships rose at an increasing rate over time; I.C.C. rate policies had a cumulative detrimental effect. Railroad fortunes improved in the 1920's with its more enlightened rate regime. Although a large amount of mileage entered the hands of receivers in 1925, this was due almost entirely to a single railroad.[26] Furthermore, the surrounding years were characterized by a small level of new receiverships. Thus, the peak in 1925 did not indicate widespread railroad distress.

2.4.2 Accounting Data

Accounting data may also shed light on railroad financial performance, but is subject to several caveats. Ideally, one would like to relate the cash flows from railroad

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28, 1914, p. 385.

[24]For a discussion of these financial panics, see Milton Friedman and Anna Jacobsen Schwartz, *A Monetary History of the United States, 1867-1960*, (Princeton: Princeton University Press, 1963).

[25]Ripley, 1914, p. 386.

[26]The Chicago, Milwaukee and St. Paul operated 11,007 of the 11,368 miles of line which entered receivership that year. "Railways in Receivership," *Railway Age*, Volume 80, January 2, 1926, p. 123.

operations to the level of the capital stock in order to calculate an economic rate of return. Two problems prevent this. First, accounting rates of return need not be systematically related to economic rates of return.[27] Second, the capital accounts of American railroads for this period are suspect. In 1907 the Commerce Commission first prescribed a system of accounts for the railroads. But these regulations were not sufficient to guarantee uniform accounting practices. An investigation in 1926 revealed a wide variation in railroad accounting practices with respect to depreciation of equipment. Steam locomotives had been assigned services lives between 4 and 55 years by different roads, and steel freight cars had been given lives from 8 to 50 years.[28] The following accounting data, then, should be interpreted with caution.

An initial indication of railroad profitability is presented in table 2.6, which reports some figures derived from railroad income statements. Several features of the net income numbers are noteworthy. First, (nominal) net income for both 1914 and 1915 was considerably lower than (nominal) net income for 1910 and 1911, despite the general rise in the price level. Second, net income was higher in 1916 and 1917 because of the large volume of traffic generated by World War I. Although net income then declined in the 1918 to 1920 period, this is somewhat misleading, since these figures do not include the payments by the Federal government during Federal Control. During that period, the Class I railroads received $ 642,000,000 from the government to cover the difference between actual and guaranteed net income.[29] The depression of the early 1920's held down railroad traffic and hence net income, but by the mid 1920's, railroad earnings had stabilized at a higher level.

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[27]Franklin M. Fisher and John J. McGowan, "On the Misuse of Accounting Rates of Return to Infer Monopoly Profits," *American Economic Review* 73 (1983) 82-97.

[28]D. Philip Locklin, *The Economics of Transportation* (Homewood: Richard D. Irwin, 1966), pp. 522-524.

[29]Walker D. Hines, *War History of American Railroads* (New Haven: Yale University Press, 1928) p. 315.

During this period, a Class I railroad was a road with annual operating revenues above $ 1,000,000. The Class I railways dominated the industry. In 1911, for example, they operated 85.1 % of total railway mileage, and earned 96.5 % of total operating revenue. U.S. Interstate Commerce Commission, *Statistics of Railways in the United States, 1911*, pp. 13, 54-55.

Table 2.6: Income Statement Information

Year Ended	Net Income
Jun. 30, 1900	$252,760,000
Jun. 30, 1901	273,450,000
Jun. 30, 1902	314,989,000
Jun. 30, 1903	338,324,000
Jun. 30, 1904	317,308,000
Jun. 30, 1905	364,811,000
Jun. 30, 1906	434,229,000
Jun. 30, 1907	488,014,000
Jun. 30, 1908	443,987,000
Jun. 30, 1909	441,063,000
Jun. 30, 1910	583,191,000
Jun. 30, 1911	547,281,000
Jun. 30, 1912	453,125,000
Jun. 30, 1913 †	546,761,000
Jun. 30, 1914	395,492,000
Jun. 30, 1915	354,787,000
Jun. 30, 1916	671,398,000
Dec. 31, 1916	735,341,000
Dec. 31, 1917	658,225,000
Dec. 31, 1918	442,336,000
Dec. 31, 1919	496,609,000
Dec. 31, 1920	481,951,000
Dec. 31, 1921	350,540,000
Dec. 31, 1922	434,459,000
Dec. 31, 1923	632,118,000
Dec. 31, 1924	623,399,000
Dec. 31, 1925	771,053,000
Dec. 31, 1926	883,422,000

Source: U.S. Bureau of the Census, *The Statistical History of the U.S. from Colonial Times to the Present* (New York: Basic Books 1976), p. 736-737.

†Class I and II railroads and their lessor subsidiaries.

Financial hardship manifested itself in additional ways. For instance, because the Commission failed to provide the railroads with an adequate return on investment, it may have reduced the incentive to invest, and thereby undermined the American transportation system.[30] The evidence on this point is admittedly mixed.

Table 2.7 details an important component of investment, the maintenance expenditures on way and structures, and on equipment. Although these expenditures were treated as an accounting expense, in economic terms they were largely an investment.[31] Maintenance expenditures were substantially higher from 1918-1926 than they were in 1911-1917. Note in particular the increase in 1918, with the onset of federal control. The bulge in expenditures in 1920 is also significant. The railroads were returned to private control on March 1, 1920, although the federal government's guarantee of net income was retained until the end of September. The railroads exploited this situation by accelerating maintenance and charging this accounting expense to the government.[32]

Of course, since there was considerable inflation in labor and materials prices, a nominal increase in expenditures could be a decrease in investment in real terms. A large part of maintenance expenditures were payments to labor, and we have already viewed the substantial wage inflation of this period in table 2.1. The extent of inflation in equipment prices is revealed in table 2.8, which displays an index of locomotive and freight car prices for 1911-1926. Note that most equipment prices doubled between 1915 and 1917, and in the 1920's remained far above the levels of 1911-1915. Once this is considered, the differences in investment between 1911-1917 and 1918-1926 appear much less substantial.

[30]In order to isolate the effect of the Commission on investment, one needs a model of railroad investment. That issue is beyond the scope of this thesis.

[31]John Moody, *Moody's Manual of Investments, Steam Railroads*, (New York: Moody's Investor Service, 1927), p. xiv.

[32]Godfrey, p. 92.

Table 2.7: Railroad Investment

Year Ended	Maintenance Expenditures: Way & Structures	Equipment
Jun. 30, 1900	$211,221,000	$181,174,000
Jun. 30, 1901	231,057,000	190,300,000
Jun. 30, 1902	248,382,000	213,381,000
Jun. 30, 1903	266,422,000	240,430,000
Jun. 30, 1904	261,280,000	267,185,000
Jun. 30, 1905	275,046,000	288,441,000
Jun. 30, 1906	311,721,000	328,555,000
Jun. 30, 1907	343,545,000	368,062,000
Jun. 30, 1908	329,373,000	368,354,000
Jun. 30, 1909	308,450,000	363,913,000
Jun. 30, 1910	368,507,000	413,110,000
Jun. 30, 1911	366,025,000	428,367,000
Jun. 30, 1912	367,448,000	450,373,000
Jun. 30, 1913 †	421,232,000	511,561,000
Jun. 30, 1914 †	419,278,000	532,139,000
Jun. 30, 1915	381,532,000	509,819,000
Jun. 30, 1916	421,501,000	570,326,000
Dec. 31, 1916	439,195,000	609,105,000
Dec. 31, 1917	460,447,000	700,073,000
Dec. 31, 1918	673,084,000	1,120,611,000
Dec. 31, 1919	800,912,000	1,245,264,000
Dec. 31, 1920	1,069,436,000	1,613,950,000
Dec. 31, 1921	787,537,000	1,271,921,000
Dec. 31, 1922	755,030,000	1,269,971,000
Dec. 31, 1923	843,224,000	1,485,555,000
Dec. 31, 1924	821,793,000	1,279,680,000
Dec. 31, 1925	844,186,000	1,278,227,000
Dec. 31, 1926	894,886,000	1,300,680,000

Source: U.S. Bureau of the Census, *The Statistical History of the U.S. from Colonial Times to the Present* (New York: Basic Books 1976), p. 736-737.

†Class I and II railroads.

Table 2.8: Equipment Price Inflation

Year	Locomotives	Freight Cars:		
		All Steel	*Wood & Steel*	*All Wood*
1911	98	89	92	96
1912	100	93	98	102
1913	107	110	113	93
1914	93	97	94	100
1915	100	102	101	93
1916	143	156	146	141
1917	210	199	169	201
1918	206	247	253	253
1919	212	265	282	282
1920	258	274	298	298
1921	216	175	197	197
1922	202	156	175	175
1923	224	203	209	201
1924	216	196	196	182
1925	208	169	195	196
1926	230	184	196	196

These numbers were compiled by the President's Conference Committee on Federal valuation. "The chart represents careful studies made by the engineers of that organisation in co-operation with the equipment builders ...to derive the figures shown, data were assembled covering the prices of 10,500 locomotives, [and] nearly 275,000 freight cars ...The prices in all instances were 'as sold' and cover the date of sale, not the date of delivery." "Car and Locomotive Prices Reach Peak in 1920," *Railway Age*, Vol. 70, January 7, 1921, pp. 87-91.

The average price for 1910-1914 served as the base price, with an index value of 100. The figures for 1918-1926 were reported in "Railway Equipment Prices," *Railway Age*, Vol. 86, January 5, 1929, p. 113.

There is qualitative evidence, however, that the level of investment from 1911-1917 was inadequate to accommodate the growing traffic. Winthrop Daniels, a member of the Interstate Commerce Commission and an ally of the railroads, made this assessment in late 1916, in the midst of a railroad car shortage:

> The ultimate fact is that the American railways as a whole are at present unable to handle the total volume of American commerce at peak load ... The essential cause of this unpreparedness is that in recent years the requisite additions to equipment and facilities have not been made.[33]

As indicated earlier, the effect of the I.C.C. on investment cannot be isolated without a formal model. But it remains noteworthy that the level of investment apparently lagged during a period of rising demand.

The evidence surveyed here suggests that from 1911-1917 the Commission was not exactly a dear friend of the railroads. Of course, certain questions cannot be answered; we cannot use these data to predict the effect of a regulatory policy different from the one pursued by the I.C.C.. Nevertheless, one question of this type should be addressed. During 1911-1917, several people argued that any rate increase would simply be absorbed by higher (union) wages, and so there would be no significant improvement in the roads' financial condition or the quality of service. This leads to the suggestion that the railroad unions, and not the I.C.C., were primarily responsible for the problems of the railroads. Although this argument has some merits, it is ultimately unpersuasive.

Evidence of union rent sharing would not be surprising, since that would be consistent with the modern experience of regulated industries, and the transportation industries in particular.[34] In fact, it is probable that the I.C.C.'s rate denials held down railroad wages. My goal is to establish that railroad wages rose no more than the cost of living and the wage level in other industries. This in turn implies that estimates of the power of the unions were exaggerated. Once the unions are largely

[33]From a speech to the Toledo Transportation Club on November 23, 1916, reprinted in *Railway Age*, 62, January 5, 1917, p. 19, and quoted by Godfrey, p. 7.

[34]For the case of trucking, see Nancy L. Rose, "Labor Rent Sharing and Regulation: Evidence from the Trucking Industry," *Journal of Political Economy*, 95 (1987), p. 1146-1178.

absolved of responsibility for the railroads' plight, the onus falls squarely upon the regulatory regime.

2.4.3 The Role of Labor

One issue is undisputed; concerns about union power did play a role in the I.C.C.'s decision in the first rate case under the Mann-Elkins Act, the 1910 rate case. Harvard Economics Professor William Ripley claimed in 1912 that "The occasion for the renewal of the upward movement [in rates] in 1910 was an insistent demand of railroad employees all over the country for a rise in wages. And the acquiescent attitude of the railroad managers toward their employees suggested a tacit understanding that wages were to be raised on the condition that the brotherhoods support the movement to recover this advance from the public through an increase in freight rates."[35] Louis Brandeis argued before the I.C.C. on behalf of the shippers, contending that through "scientific management" the railroads could remain profitable without resort to a general increase in rates. This argument apparently was persuasive, and cited by the Commission in its report denying the requests. "This Commission certainly could not permit the charging of rates for the purpose of enabling the railroads to pay their laborers extravagant compensation as measured by the general average compensation paid labor in this country as a whole."[36] Furthermore, after the rate denial was announced, the head of the trainmen union, W.G. Lee, wrote that "Employees will be the ones to lose through it. The decision establishes a dangerous precedent ... At this rate we will ultimately have a Commission empowered to prevent the workingman of the country from demanding increased pay."[37]

Although this factor played its largest role in the 1910 rate dispute, it remained a point of concern in later cases. Even some advocates of increased rates worried about labor's power. In 1914, the *Journal of Political Economy* advocated higher rates while

[35]William Z. Ripley, *Railroads. Rates and Regulation*, (New York: Longmans, Green, and Co, 1912), p. 596.

[36]"Advances in Rates - Eastern Case," 20 *I.C.C. Reports*, 278.

[37]quoted by Albro Martin, *Enterprise Denied*, (New York: Columbia University Press, 1971), pp. 233-234.

still admitting, "those who regard the rate increase as desirable find themselves in an embarassing dilemma, because of the apparent power of the railroad employees' organizations to exact from the roads a constantly increasing measure of their earnings in the form of higher wages ... There is no assurance whatever that if the desired rate advances were to be granted, the roads would long be able to retain them, and use the funds thus obtained for the purpose of providing better equipment or of disposing more satisfactorily of their maturing [debt] obligations."[38]

In order to address the validity of these concerns, I first examine two closely related measures of railroad wages and wages in other industries. These measures are average hourly earnings and average full-time weekly earnings. I then survey qualitative evidence on this point.

These measures share a common feature, since each is derived by dividing the total compensation paid to a class of workers by some unit of work, usually a unit of time. As a result, these data are money earnings, not wage rates. But this is better suited to our purposes. As a report of the National Industrial Conference Board explained, "Since both the wage rate and the time worked enter into the computation of earnings, it is believed that the latter forms a more accurate index of industrial activity and labor welfare than would rates alone. Another advantage of the earnings figure is its inclusion of income from piece work as well as from production premiums and bonuses. In short, earnings represent actual income rather than presumptive income based on rates of pay."[39]

Several factors make "money earnings" the appropriate measure of compensation for railroad employees. First, the majority of engine and train service employees were paid under a "dual system" which took account of both hours and mileage.[40] For these employees, therefore, no quoted "hourly rate" exists. Furthermore, under this "dual system" those employees receiving a high "rate" of pay per mile or per hour

[38]"Arguments for Higher Railroad Rates," *Journal of Political Economy*, 22 (1914), p. 88.

[39]National Industrial Conference Board, *Wages in the United States, 1890-1926*, (New York: National Industrial Conference Board, 1927), p. 23.

[40]Harry E. Jones, *Railroad Wages and Labor Relations, 1900-1946*, (Bureau of Information of Eastern Railways, 1947), p. 2.

faced restrictions on the number of miles per month they could work.[41] As a result, even if one calculated an (implicit) hourly rate, it could be a misleading indicator of an employee's earning potential.

Figure 2-3, reproduced from the National Industrial Conference Board study on wages, shows the average hourly wage earnings in the railroad industry, manufacturing industries, and the building trade from July, 1914, into the 1920's.[42]

Railroad hourly earnings are comparable to those in manufacturing, and well below those in the building trade. More significantly, railroad wages move with the other two series, suggesting that economy-wide forces, and not railroad unions, were primarily responsible for the increase in nominal wages.

This view receives corroborating support from the trends of the second compensation measure, average full-time weekly earnings.[43] Figure 2-4 summarizes these data from Paul Douglas' *Real Wages in the United States, 1890-1926.*

The level of railroad compensation is below that in the manufacturing sector and the construction industry, and the upward movement in earnings is similar for the

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[41]Jones, pp. 145-146.

[42]National Industrial Conference Board, *Wages in the United States, 1914-1926*, (New York: National Industrial Conference Board, 1927), p. 15.

The railroad data were compiled from reports of the Interstate Commerce Commission. Total annual compensation was divided by total annual hours worked to find hourly earnings for each class of railroad employee. These earnings figures were then weighted by employment in each class to form "average hourly earnings, railroads."

The manufacturing data were derived from surveys conducted by the Conference Board of "approximately 1700 plants in 25 basic industries, covering one week or the payroll period in each month." (p. 20) Hourly earnings were then "obtained by dividing the total weekly payroll in money for each group of wage earners by the total actual man hours worked by that group." (p. 23)

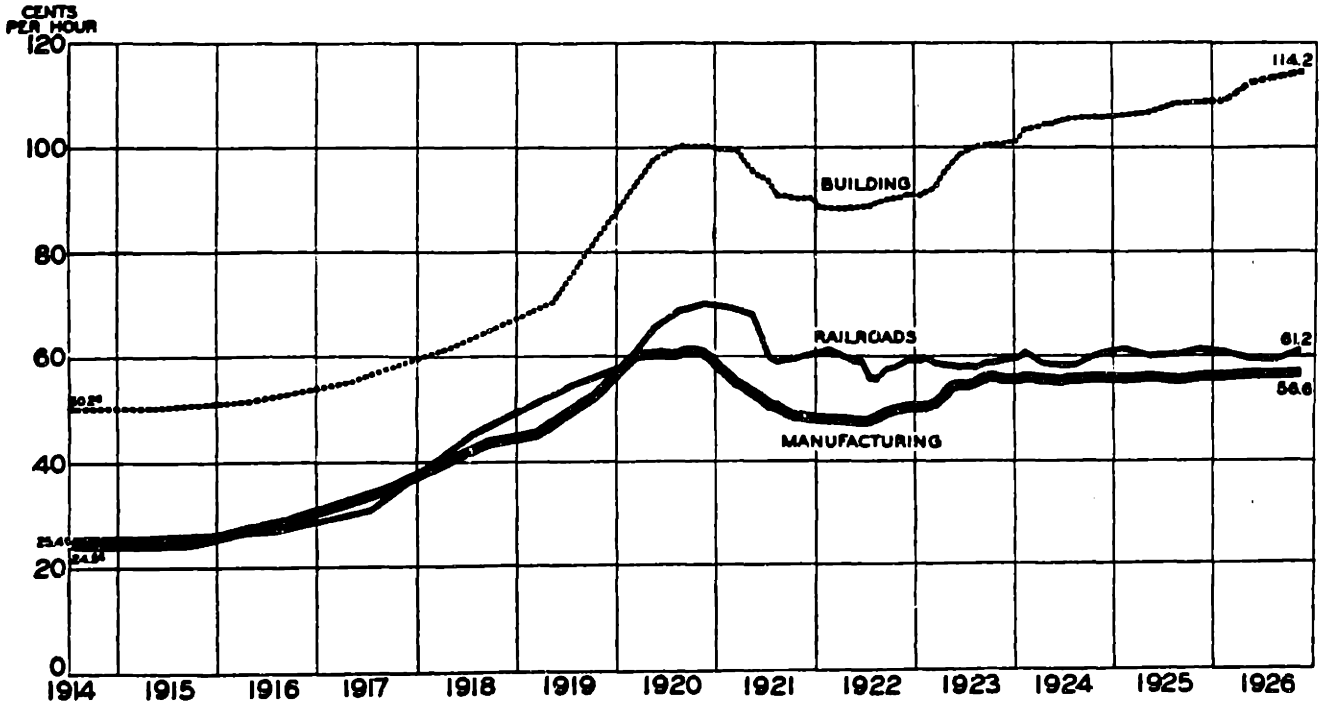
The data on the building trade were reported in the industry trade publication *American Contractor.*

[43]In Paul Douglas' terminology, "full-time weekly earnings" are obtained when "the hourly earnings are multiplied by the established number of hours per week." p. 7.

For the data on railroads, Douglas relies on the I.C.C. reports. In 1915, however, the I.C.C. changed its reporting, so that the earnings of most classes of railroad labor "were predominantly expressed in hourly instead of daily units, as before." (p. 166). For 1915-1917, Douglas multiplied the average hourly earnings by an estimate of the number of hours worked per day to derive average daily earnings. This was appended to the I.C.C. series on average daily earnings, 1910-1914, and each year's figure was multiplied by 6 to arrive at "full-time weekly earnings." (pp. 166-167)

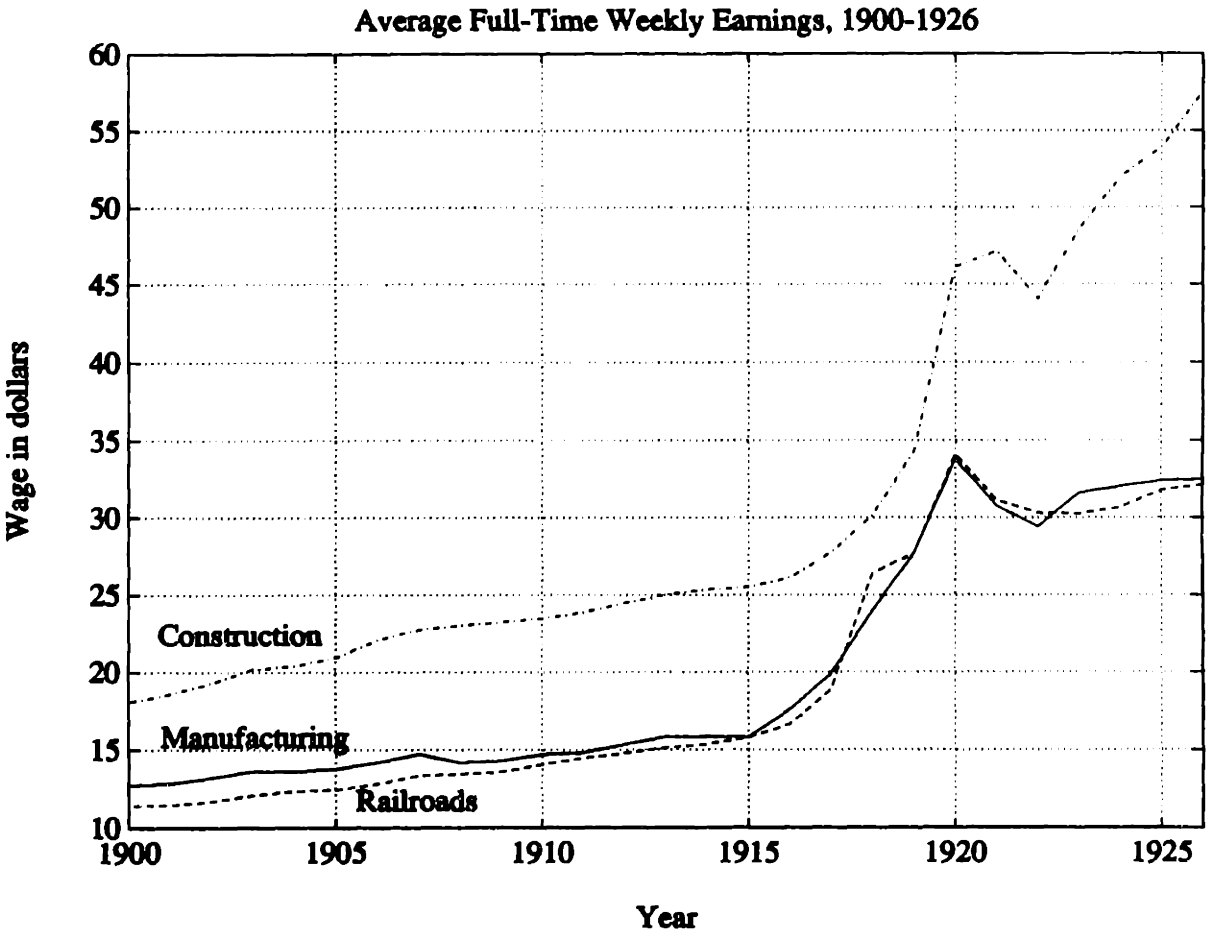
Statistics for both the manufacturing industries and the construction industry were calculated from data from the Bureau of Labor Statistics. The BLS conducted separate studies on union wage rates and hours, and actual earnings as reported on payrolls. While the weekly earnings in manufacturing reported here are a weighted average of results from these two types of studies, the figures on the building trade are from union rates exclusively.

Figure 2-3: Average Hourly Wages, Manufacturing, Railroads and Construction, 1914-1926



Sources: National Industrial Conference Board, *American Contractor*, Interstate Commerce Commission

Figure 2-4:


Average Full-Time Weekly Earnings, 1900-1926
Wage in dollars
Year
Construction
Manufacturing
Railroads
60
55
50
45
40
35
30
25
20
15
10
1900
1905
1910
1915
1920
1925

three industry groups. This is essentially the same picture as that provided by the National Industrial Conference Board's figures on hourly earnings.

There is another source of information concerning relative labor compensation. In the contemporary literature, a large body of testimonial evidence indicates that railroad labor *lost ground* to both the cost of living and relative to other wage earners in 1916 and 1917, and perhaps in 1914 and 1915 as well. By 1917, there are widespread acknowledgements of railroad labor shortages engendered by wages no longer competitive with the booming steel, munitions, and other war industries.

Recall that in the 1910 rate case, the I.C.C. vowed not to grant freight advances for the purpose of giving railroad employees "extravagant compensation" out of line with compensation in other industries. After the initiation of Federal control, the Director-General of the Railroads appointed a Wage Commission to investigate the labor situation and make recommendations concerning wages. In its April, 1918 report, it found railroad wages far from extravagant. "It has been a somewhat popular impression that railroad employees were among the most highly paid workers. but figures gathered from the railroads disposed of this belief."[44] Additionally, this Commission viewed the increase in railroad wages as a response to the rising cost of living and rising wages in other industries. "It took neither tables nor charts nor briefs to make evident that, if the roads were to hold those men they had, concession must be made to the imperious demand of rising prices for the staples of living. Furthermore, an unprecedented call had come for men of certain trades in connection with the new industries that had been created by the war in Europe, and this, long before our entry into the conflict. Machinists and ironworkers of all kinds found themselves to be essential to the great munitions plants, and day labor of the most unskilled character rose into high demand. To meet this competition, the roads had advanced wages by slow steps at first, and later more rapidly."[45]

Based on the recommendations of this report, the Director General acted on May 25, 1918, ordering that the pay of railroad employees be increased by as much as

[44] *Report of the Railroad Wage Commission to the Director General of the Railroads*, April 30, 1918 (Washington: Railroad Wage Commission, 1918), p. 17.

[45] *Report of the Railroad Commission to the Director General of the Railroads*, p. 13.

43% for some classes of workers.[46] That such a large advance was deemed necessary is powerful evidence in support of the conclusion reached in 1920 by another federal body, the United States Railroad Labor Board: "By December, 1917, the social and industrial changes which had accompanied the World War had thrown ... [railroad] wages seriously out of line with those in other industries and with the cost of living."[47]

One would expect that a serious wage disparity would undermine the ability of the railways to maintain an adequate labor force. This very problem arose, and was laid before the I.C.C. by railroad executives in their testimony on the *Fifteen Per Cent Case* of 1917. President Samuel Rea of the Pennsylvania Railroad stated the situation concisely: "The carriers are not generally able in their present financial condition, to compete for labor with industrial concerns, ...and the result is that the carriers are daily losing the services of a large number of employees."[48] The extent of labor turnover in the railroad industry may be inferred from the experience of particular roads. On March 22, 1917, F.D. Underwood, President of the Erie Railroad, testified that his railroad "turned over its forces in the mechanical department three and one-quarter times from August, 1915, to August, 1916."[49] Daniel Willard of the Baltimore and Ohio indicated a similar bleak situation. "We are not paying the rates that steel plants and munitions factories are paying; and, in fact, other undertakings are paying at the present time and we are not getting the service. Our figures show that in August [1917] our turnover in the mechanical department was 18 per cent, and in the maintenance-of-way department it was 24 per cent – one fourth of all the men left that branch. It is impossible, then, for labor to change forces to that extent and still get efficient results."[50]

Although railroad executives had a vested interest in painting a bleak picture, the

[46]"Decision No. 2" *Decisions of the United States Railroad Labor Board*, Vol. I, 1920, (Washington: Government Printing Office, 1921), pp. 14-15.

[47]"Decision No. 2" *Decisions of the United States Railroad Labor Board*, Vol. I, 1920, (Washington: Government Printing Office, 1921), p. 14.

[48]Testimony delivered November, 1917, and quoted by William G. McAdoo, former Director-General of the Railroads, in *Railroad Revenues and Expenses*, Hearings before the Committee on Interstate Commerce, U.S. Senate, 67th Congress, Second Session, Volume IV, January, 1922, p. 1765.

[49]quoted by McAdoo, p. 1764.

[50]quoted by McAdoo, p. 1766.

levels of labor turnover they describe are entirely plausible. Several sources cite losses of railway employees to the steel, munitions, and shipbuilding industries. In the case of the steel industry, the actions of U.S. Steel suggest the tightness of the labor market at this time, and consequently the problems the railroads faced. In 1916, U.S. Steel voluntarily increased wage rates 10% three separate times, for a cumulative wage advance of over 33%.[51] This was followed in 1917 by two advances of approximately 10% each. It is not surprising, then, that the railroads would be losing skilled workers to such an industry.

In the final analysis, I reject the idea that the unions drove the railroads to ruin. While the perception of union power may have helped justify denials in requested rate increases, railroad wages, suitably adjusted, appear to have risen no more than manufacturing wages or the cost of living. Inflation remains as the driving force of the story. If the unions are absolved, responsibility rests with the resistance of the regulatory system to granting rate increases in the face of rising input costs.

After 1917 the executive and legislative branches altered this regulatory regime. These adjustments were embodied in Wilson's nationalization Proclamation, the Federal Control Act of 1918, and the Transportation Act of 1920.

2.5 Nationalization and the Transportation Act of 1920

President Wilson nationalized the railroads under the authority granted by the Army Appropriations Act of August 29, 1916.[52] In his proclamation exercising this authority, Wilson pledged that each railroad would receive a guaranteed annual compensation equal to its average net operating income for the previous three years; this pledge was subsequently enacted into law. This extraordinary measure was sparked in large

[51] *Financial Review*, 1917, p. 59.

[52] I.L. Sharfman, *The Interstate Commerce Commission: A Study in Administrative Law and Procedure, Volume I* (New York: Commonwealth Fund, 1931), pp. 143-144.

part by the financial problems of the railroads in the preceding years.[53]

The Federal Control Act of March 21, 1918, which established the administrative details of federal operation, significantly "curtailed the powers of the Interstate Commerce Commission and relegated its activities to a distinctly subordinate status."[54] Specifically, the President, through his appointed agent, the Director General of the Railroads, was empowered to initiate interstate and intrastate rates. Moreover, these rates were not subject to suspension by the Interstate Commerce Commission. This rendered "inoperative the Commission's suspension and investigation authority conferred by the Mann-Elkins Act of 1910."[55]

Wilson appointed his Secretary of the Treasury, William McAdoo, as his first Director General. McAdoo quickly took advantage of his "paramount authority" in railroad matters,[56] filling the senior administrative posts of the U.S. Railroad Administration with railroad executives.[57] Unsurprisingly, this pattern of appointments generated criticism from shipping interests. Clifford Thorne, counsel to several shipping groups, complained that "the American shipper finds himself at the mercy of Mr. Edward Chambers, six months ago an official of the Santa Fe Railroad."[58]

Shortly after the passage of the Federal Control Act, the Director General ordered a 25% increase in freight rates.[59] I.L. Sharfman noted the difference between federal control and the regulatory regime that had preceded it:

> The summary rate-making authority of the Railroad Administration was in even more striking contrast to the restraints imposed upon the carriers and the difficulties encountered by them for almost a decade in seeking to enlarge the flow of their operating revenues. The rate increases im-

[53]The need for central control of transportation facilities to meet the nation's military requirements played an important role in Wilson's decision to initiate federal control. Nevertheless, the guarantee of net income, on very favorable terms, was related to economic, not military, necessity. In his address to Congress on January 4, 1918, President Wilson acknowledged that the financial situation constituted "one of the strongest arguments for assuming control of the railroads at this time." Sharfman, 1931, p. 153.

[54]Sharfman, 1931, p. 154.

[55]Sharfman, 1931, p. 162.

[56]Sharfman, 1931, p. 162, quoting Wilson's proclamation of December 26, 1917.

[57]"Shippers Dissatisfied," *Traffic World*, January 26, 1918, pp. 160-161.

[58]"Thorne Discusses G.O. No. 28," *Traffic World*, July 6, 1918, p. 42

[59]The order was issued May 25, 1918. Walker D. Hines, *War History of American Railroads* (New Haven: Yale University Press, 1928), p. 193.

pinged directly upon the regulatory powers of the Interstate Commerce Commission.[60]

The response of shippers to federal control was crystallized by Clifford Thorne, who asked, "Have we had government operation of the railroads or railroad operation of the government?"[61]

There was an attempt in 1919, ultimately unsuccessful, to restore the Commission's suspension power.[62] The next important legislative development was the Transportation Act of 1920, which returned the railroads to private control and established a new peacetime regulatory regime.[63] In adopting the Transportation Act, Congress implicitly repudiated the rate policy that had prevailed prior to the War. This is apparent from several features of the 1920 Act.

First, the Commission was directed under the Rule of Ratemaking to establish "such rates so that carriers as a whole ... will, under honest, efficient and economical management ... earn an aggregate net railway operating income equal, as nearly may be, to a fair return upon the aggregate property value of such carriers."[64] This "guarantee" was opposed by a variety of shipping organizations, but was retained in the final version of the bill.[65] For the first two years of the Act's implementation, Congress specified that 5.5% would constitute a "fair return," although the I.C.C. was authorized to add up to 0.5% to provide for improvements and betterments. Second, the Commission was given the power to implement this new mandate. For the first time the I.C.C. was authorized to set minimum rates, to control new construction,

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[60]Sharfman, p. 160.

[61]Clifford Thorne, "The Transportation Question," *American Cooperative Journal*, Volume 24 (March, 1919), p. 240, quoted by K. Austin Kerr, *American Railroad Politics, 1914-1920* (Pittsburgh: University of Pittsburgh Press, 1968), p. 181.

[62]Kerr, p. 15.

[63]For an excellent discussion of the evolution of the Transportation Act, including the competing visions offered in the House and Senate bills, see K. Austin Kerr, *American Railroad Politics, 1914-1920* (Pittsburgh: University of Pittsburgh Press, 1968), pp. 204-227.

[64]quoted by D. Philip Locklin, *Railroad Regulation Since 1920*, (New York: A.W. Shaw Co., 1928), p. 22. Note that the I.C.C. was directed to devise rates that would give a fair return to *carriers as a whole*. Such rates could yield less than a fair return to "weak roads" while offering more than a fair return to "strong roads." The Recapture Clause, which addressed the recapture of excess earnings, sought to alleviate this problem. See Locklin, pp. 33-39.

[65]"Cowan's Report to Shippers," *Traffic World*, November 8, 1919, pp. 1060-1061, "State Commissioners' Views," *Traffic World*, January 10, 1920, p. 57, "Memorial to Shippers," *Traffic World*, January 10, 1920, pp. 57-58.

and to disallow abandonments of lines. Finally, joint ratemaking by railroad pools became permissible, subject to the approval of the Commission.[66] This was directly contrary to the original 1887 Act, which prohibited pooling.

Although the Transportation Act generally expanded the Commission's powers, it curtailed the I.C.C.'s power in one notable respect. Under the Mann-Elkins Act, the Commission was able to suspend proposed rate increases for up to ten months. The Transportation Act cut this suspension period in half, to five months.[67] This was another reaction to the experience of the inflationary nineteen teens, during which lengthy suspensions had imposed serious costs upon the carriers.

This legislation implied an important change in orientation for the Commission. As the Supreme Court noted in 1922, "the act made a new departure ...The new measure imposed an affirmative duty on the Interstate Commerce Commission to fix rates ... to maintain an adequate railway service."[68] Opponents of the Act recognized this change as well, predicting dramatic (and dire) consequences. Senator Robert La Folette warned that the result of the Act would be "to mortgage the people of this country to the railroads. Jay Gould would turn green with envy if he could see how his successors in railway manipulation, under the plan of this bill, are about to exploit the people under a law passed by Congress far more successfully than he was ever able to do by his unlawful methods."[69]

In the aftermath of these legislative changes, the I.C.C. did adopt a friendlier policy toward the railroads. This was evident in the Commission's response to the first general rate case under the Rule of Ratemaking. Despite the Director General's rate increase of May, 1918, there was a widespread consensus that further rate advances would be required once the roads were returned to private control.[70] In the spring of

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[66]Locklin, 1966, pp. 228-239.

[67]Sharfman, 1931, p. 202.

[68]*Wisconsin Railroad Commission v. Chicago, Burlington, and Quincy Railroad Company*, 257 *United States Reports* 585.

[69]Robert M. La Folette, *Congressional Record*, Volume 56, Part 1, 66th Congress, 2nd Session, December 10, 1919, p. 513. These remarks were directed against the Rule of Ratemaking provision of the Senate bill, which was included in the final version of the Transportation Act.

[70]Sharfman, 1936, p. 102. Although the railroads were returned to private control on March 1, 1920, the guarantee of net income provided under federal control was extended until September 1, 1920.

1920, the railroads sought a general increase in rates.[71] The Commission's response, delivered in a *unanimous* decision, contained several features favorable to the railroads. First, the I.C.C. exercised its option to allow an additional 0.5% return, and therefore sought to fix rates that would generate a 6% return on railroad property.[72] Second, the Commission ordered a generous increase in rates. Passenger fares and excess baggage rates were increased 20%. Freight rates were increased 40% in eastern territory, 25% in southern territory, 35% in western territory, 25% in Mountain-Pacific territory, and 33.33% on freight between territories.[73] In sharp contrast to previous determinations, in this case the authorized freight advances exceeded the roads' original requests. This additional revenue was authorized to cover wage advances granted during the rate investigation.[74]

I.L. Sharfman's assessment of this decision underlines the contrast with the policy of the antebellum Commission:

> In making such liberal provisions for the carriers the Commission was influenced both by the requirements of the new legislative provisions and by the pressure of the contemporary railroad situation. The authorization of very substantial percentage increases in rates, effected through applications filed at the Commission's suggestion and supported with unanimity by all its members was an unprecedented determination in the unfolding of the regulatory process. Prime emphasis was placed upon revenue needs, with frank avowal of the dominant influence which such needs should wield; no obstacle to general relief was found in inequalities of operating results among different carriers; there was no effort to question the validity of the financial requirements because of past railroad misdeeds; and for the first time the rate level was adjusted with reference to a definitely established and openly proclaimed property valuation and rate of return. The Commission proceeded without hesitancy and on the basis of a broad construction of the statutory rule of rate-making to perform the task of establishing such rates as would effectuate the new Congressional approach of affirmatively furthering the development of the transportation system.[75]

Within two years of this decision, the Commission ordered a 10% reduction in

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[71] *Increased Rates, 1920*, 58 *I.C.C. Reports*, 220.
[72] Sharfman, Volume III-B, p. 105.
[73] Locklin, 1928, p. 26.
[74] Sharfman, 1936, p. 112.
[75] Sharfman, 1936, p. 113

freight rates,[76] in its determination of the case *Reduced Rates, 1922.*[77] Although the railroads opposed these rate reductions, this case differed substantially from the unsuccessful rate advance cases of 1911-1917. In those earlier cases, the Commerce Commission ignored changing economic conditions, and refused to adjust railroad rates in response to the rising price level. In contrast, in the *Reduced Rates* case the I.C.C. surveyed prevailing economic conditions and incorporated that information into its decision. Economic conditions had changed since 1920, when the Commission authorized large general rate advances. Wages and most prices had declined from their 1920 peak.[78] As table 2.1 on page 28 and table 2.8 on page 48 indicate, the prices of many railroad inputs had fallen as part of this general trend. Since freight rates were "still near their peak," the Commission ruled that widespread deflation justified a reduction in freight charges.[79] Serious consideration was given to the revenue needs of the carriers, so this case, although decided against the railroads, actually solidified the administrative outlook embraced in the 1920 rate advance case. As a contemporary economist commented:

> The Commission in the 1922 case clearly announced the acceptance of a grave responsibility: the responsibility for fixing a general rate level sufficiently high to insure adequate transportation for the public and successful continuance of private operation of the railroads. Regardless of the correctness of its prediction as to increased tonnage and declining expenses, it assumed outspokenly the responsibility of adjusting rate levels of the revenue needs of the carriers. The rule of rate making is established as a working tool.[80]

To Gabriel Kolko, the Transportation Act represents "the final victory of the railroads under the Wilson administration," and the "logical culmination" of the railroads' efforts to stabilize their industry through federal regulation.[81] When viewed against the backdrop of the economic conditions of 1911-1917, however, a far different

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[76]Sharfman, 1936, p. 132

[77]68 *I.C.C. Reports* 676.

[78]Sharfman, 1936, p. 130.

[79]68 *I.C.C. Reports* 732-734.

[80]Homer B. Vanderblue and K.F. Burgess, *Railroads: Rates-Service-Management* 1923, pp. 116-117.

[81]Gabriel Kolko, *Railroads and Regulation*, (Princeton University Press, 1965), p. 229.

picture of this legislation emerges.

The Transportation Act was a dramatic departure from and reaction to the rate policy the I.C.C. had followed prior to Nationalization. The Commission was directed in 1920 to consider the railroads' economic interests precisely because it had ignored them previously. Kolko is correct in assigning major importance to this legislative change, but his interpretation is flawed. It was not a "final victory," but rather the beginning of a new regulatory regime which would differ significantly from the one it replaced.

2.6 Conclusion

The U.S. economy from 1911-1917 was characterized by two large trends. First, it was a period of business expansion, particularly after the outbreak of World War I. Since transportation is a derived demand, railroad business grew with the higher level of economic activity. A second and related trend was widespread inflation, affecting most goods, including inputs used by railroads. The first of these macroeconomic trends fostered railroad prosperity, while the second served to undermine it. This was reflected in the slow decline of railroad performance in response to the countervailing pressures of these two macroeconomic forces. By 1916 or early 1917, the economies of density had been largely exhausted, so that without a general rate increase, continued inflation threatened the railroads' viability.

This chapter has described the economic and legal environment facing the I.C.C. in the nineteen teens, and has documented the Commission's refusal to grant requested rate increases in the face of rising input costs. Several pieces of evidence surveyed here support the contention that the I.C.C.'s rate regime significantly undermined railroad profitability.

There is an additional source of evidence concerning whether the railroads' financial prospects were harmed by the I.C.C.'s rate policies. Under the assumption of efficient asset markets, the prices of shares reflect all information available to the stock market. Therefore, we should be able to discern the effect of the I.C.C.'s rate

policies upon the railroads by examining stock market data. I turn to this in the next chapter.

Chapter 3

Stock Market Reactions to I.C.C. Decisions

This chapter investigates the reaction of the stock market to the regulatory events of 1910-1917. I conclude that stock market data support the view that I.C.C. actions undermined railroad profitability. In particular, my event study shows that several Commission decisions resulted in statistically significant and economically meaningful negative excess returns. Moreover, the change in regulatory regime signalled by Wilson's Nationalization decision generated large positive excess returns, a result which strengthens the assessment that the preceding regime was unfavorable to the railroads.

This dissertation and this chapter in particular also serve as contributions to the recent renewal of interest in the origins and implementation of the Interstate Commerce Act (ICA). Gilligan, Marshall and Weingast (1989) offer a multiple-interest group interpretation of the Interstate Commerce Act. In particular, they argue that the short haul pricing constraint, an ICA provision against discrimination between long haul and short haul shipments, could have been the result of a coalition of railroads and short haul shippers. In a companion paper Gilligan, Marshall and Weingast (1990) employ an event study methodology to examine developments in 1886-1887, and obtain results consistent with their theory. Prager (1989) also conducted an event study, focusing on court decisions of the 1890s which sharply restricted the powers of

the Interstate Commerce Commission. She found that these decisions generated negative excess returns on railroad stocks, and she interprets this as evidence in support of the revisionist view of the I.C.C..

This chapter, while not directly addressing their evidence, does touch upon some similar issues. In particular, the results in this chapter suggest that further work should focus on the implementation of the Interstate Commerce Act, rather than on its origins.

The plan of this chapter is as follows. The first section presents a general overview of the behavior of the stock market. The bulk of the chapter then investigates these developments more formally by employing an event study methodology. In the second section I detail the specification I employ. In the third and fourth sections the sample, data, and events are described. Estimation issues are addressed in the fifth section. I then present results and a concluding discussion.

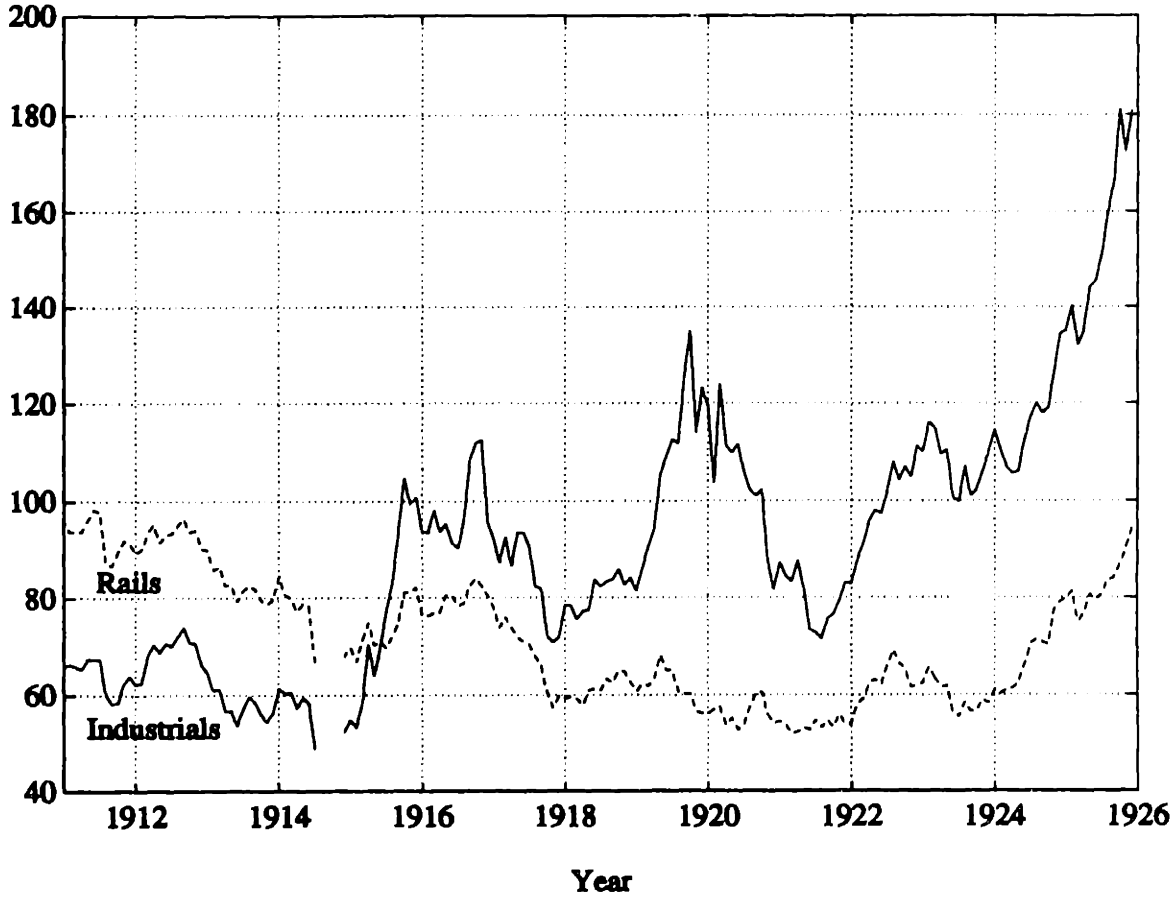
3.1 Overview on Stock Market Behavior

This section surveys informal stock market evidence of the impact of the Commission on the railroads. Figure 3-1 presents the movement of the *New York Times* railroad and industrial stock price indices for 1911-1925.[1] Several features merit comment. First, prior to World War I, although the *movement* of the railroad stocks closely paralleled that of the industrial issues, the *level* of rail stocks was consistently and substantially higher than that of the industrials. By 1915, however, the industrial issues had overtaken the railroad stocks. Second, railroad stock prices declined precipitously after November 1916. Yet in this period as well, the parallel movement of the railroad and industrial indexes makes it difficult to isolate the impact of the rate regime on the railroads.

Specific numbers indicate the decline in railroad values, and help to ascertain the differences between the rails and the industrials. Paul Warburg, vice governor of the

[1]The *New York Times* railroad and industrial stock price averages were more representative than the corresponding Dow Jones averages.

Figure 3-1: New York Times Stock Averages, 1911-1925



Federal Reserve Board, testified before the I.C.C. in November of 1917,

> From all the information available to me, the index price of railroad stocks has gone down about 20% since the beginning of the war in 1914, down to the present time, while the index price of industrial stocks has undergone but little change. If we should figure that the value of railroad bonds has decreased by about 10% and that of railroad stock by about 20%, we should find that the shrinkage in railroad values since the beginning of the war, on that basis would amount to about $2,800,000.[2]

The Dow Jones averages confirm this report. The day before the exchange closed on account of the war, July 29, 1914, the railroad index stood at 89.91, and the industrials at 71.42. On November 17, 1917, the rails had fallen to 75.34, while the industrials had slipped to 70.41.[3] One explanation for the relatively poor performance of rail stocks was offered by an editorial in *Railway Age Gazette*:

> There is one fundamental difference between the situation of other industries and that of the railways. While in other industries great increases in prices have occurred, in the railway industry the average rates received are little, if any, higher than they were before the war in Europe commenced. The railways, however, have been subjected to increases in the cost of labor and materials as great as those which other industries have had to meet.[4]

The railroads were certainly not "war brides," firms which greatly benefitted from the war effort, such as U.S. Steel and American Beet Sugar; the railways did not participate in the prosperity brought by macroeconomic expansion.

Turning attention to the sharp, parallel declines in 1917, there were several major events which adversely affected both industrial and railroad securities. First was the uncertainty generated by the United States' entry into the war on April 6. Furthermore, the issuing of two "Liberty Loan" bond series directly disrupted the financial

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[2] "Warburg Warns Against Sapping Railroad Credit," *Wall Street Journal*, November 17, 1917, p.6.

[3] The *New York Times* averages indicate an even worse relative performance by the railroads. On July 29, 1914, the railroad index was 70.41, and the industrial index was 54.44. By November 17, 1917, the railroad average had declined to 57.10, but the industrials had risen to 68.41.

[4] "Railroad Rates and National Defense," *Railway Age Gazette*, Vol. 63, No. 19, November 9, 1917, p. 834.

markets. As *Bradstreet's* noted, "The borrowings the government effected, comprising the two Liberty Loans aggregating $5,800,000,000, with short-term certificates for $3,000,000,000, meant the enlistment of capital in the nation's cause and practically diverted it from the channels of investment."[5]

Although some forces and events affected the entire market, the decline in railroad and industrial stock prices can be traced, in part, to separate causes. This separation is important, since it allocates considerable blame for the plight of the railroads on the Commerce Commission's rate regime. A *Railway Age Gazette* editorial accurately noted that "Industrial stocks may reflect a fear of a tax on excess profits, price-fixing, etc., but railroad stocks can reflect such fears only to a limited degree. The railways have already had their regulation."[6]

The *Financial Review* concurred in this diagnosis:

> The liquidation was induced in part by the uncertainty of the outlook, in part by a desire to get funds with which to pay for subscriptions to the new Liberty Loan bonds, and in part by a steady waning of confidence in both railroad securities and in industrial properties, in the one case because of the inability to get advances in freight rates commensurate with the rise in operating costs, and in the other because of the price fixing policy of the Government and the large excess profits taxes that would have to be paid.[7]

The major issue here is the extent to which the decline in railway securities in 1917 (and previous years) was caused by the I.C.C., rather than by extraneous forces. This was a subject of debate at the time. During the hearings on the *Fifteen Per Cent Case* in November, 1917, Clifford Thorne, a counsel for the shippers, claimed that "the decline in security values is not due to inadequate railroad credit or inadequate railroad earnings; it is due to the war."[8] And in an earlier rate case, the Commission concluded, "we are of the opinion that railroad credit as evidenced by interest on

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[5] "The Stock Market in 1917," *Bradstreet's*, Vol. XLVI, no. 2062, January 5, 1918, p. 4.

[6] "Railroad Stocks Now and in July, 1914" *Railway Age Gazette*, Vol. 63, no. 10, September 7, 1917.

[7] *Financial Review*, 1918, p. 58.

[8] "Washington Correspondence," *Railway Age Gazette*, Vol. 63, No. 20, November 16, 1917, p. 891.

their loans has not been relatively more impaired than credit generally, public or corporate."[9]

Contemporary business opinion rejected this view. The Comptroller of the currency, John Skelton Williams, in a November 1917 letter to the I.C.C., wrote that:

> The apprehension and fear that the railroads of the country may not be allowed to charge rates which will adequately offset the heavy increases in wages and in all materials which they use in operation is in a large measure responsible for the shrinkage which has taken place in the railway security market in the past year.[10]

Bradstreet's review of the stock market in 1917 acknowledged the influence of the Liberty Loans, war taxes and income taxes on the market. It went on to highlight, however, the specific circumstances affecting the railroads:

> As a consequence of fixed rates with constantly increasing wages and prices for coal or materials, the rail carriers' position during the year became dangerous, involving chances that the expanding operating expenses would jeopardize not only the dividends but even the fixed charges of certain companies. The liquidation and severe decline in bonds and stocks of this kind, heretofore regarded as among the most conservative investments, was one of the most unsettling elements in the situation.[11]

As acknowledged, there is too much noise in these stock market trends to draw any firm inferences; that problem is addressed by the event study. The decline of the railroads relative to the industrials is suggestive, however, and certainly consistent with my contention that the Commerce Commission's policy harmed the roads.

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[9]This was stated in the Commission's decision in the *1915 Western Rate Advance Case*, 35 *I.C.C. Reports* 532, 1915.

[10]"Causes of the Decline in Railroad Credit," *Railway Age Gazette*, Vol. 64, No. 10, March 18, 1918, p. 500.

Williams had been a railway executive and a banker for 20 years. When he became Comptroller in 1913, he divested himself "of all financial interest in railroads and in banks." In 1918 he was named director of the division of finance and of purchase of the United States Railroad Administration.

[11]"The Stock Market in 1917," *Bradstreet's*, Vol. XLVI, No. 2062, January 5, 1918, p. 4.

3.2 Event Study Methodology: Specification

I employ an event study methodology to ascertain the precise effect of the I.C.C.'s rate policies upon railroad stock returns.[12] I compute the expected or "normal" return to a security i at time t according to the capital asset-pricing model: $E(R_{it}) = \alpha_i + (1 - \beta_i)R_{ft} + \beta_i R_{mt}$, where R_{ft} is the risk free rate of interest, and R_{mt} is the return to the market portfolio at time t. The coefficient β_i represents the portion of the return that cannot be fully diversified. I make several adjustments to formulate a regression equation. First, the coefficient β_i need not be constant over time.[13] In particular, the period studied here includes World War I. The war was a large stimulus to certain sectors of the economy, and so it could have altered the relationship between the return on railroad equity and the market return. I therefore allow the CAPM parameters to change with the start of World War I. Second, I employ dummy variables with a value of 1 during the week of a regulatory event and zero otherwise.

Although stock returns provide a direct measure of the effect of a regulatory event on *equity* values, our primary interest is the event's effect on *profits*. Since the response of a firm's equity values to an event is affected by that firm's capital structure, I control for this feature. Following Rose (1985), I divide each event dummy variable by the share of equity in the value of the firm. Ideally, this adjustment would employ the market value of equity and the market value of the firm. Since these data are unavailable, I employ the book value of equity and of the firm as an admittedly rough approximation for market values. With this alteration, the coefficient on the event dummy variable will measure the response of *profits* to the regulatory event.

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[12]For other examples of event studies used to investigate the effects of regulation, see Binder (1985), Rose (1985), and Smith, Bradley, and Jarrell (1986). Two recent event studies involving the passage of the Interstate Commerce Act in 1887 have been performed by Prager (1989) and by Gilligan, Marshall, and Weingast (1990).

[13]Chi-fu Huang and Robert Litzenberger, *Foundations for Financial Economics* , 1988, p. 304.

These adjustments imply the following process for generating returns for firm i:

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \gamma_i PWt + \lambda_i(PW_t)(R_{mt} - R_{ft}) + \frac{\Sigma \delta_{is} D_{st}}{1 - LEVERAGE_{it}} + \epsilon_{it} \tag{3.1}$$

for t = 1,... T, in which

R_{it} = return from holding one share of firm i's common stock for week t

R_{ft} = risk free rate at time t

R_{mt} = return on the market portfolio in week t

PW_t = a dummy variable equal to one for all weeks after the onset of World War I in August 1914, and zero otherwise

D_{st} = a dummy variable with a value of one if an event occurs in week s, and zero otherwise

$LEVERAGE_{it}$ = share of debt in the book value of firm i at time t

ϵ_{it} = a serially uncorrelated random disturbance

With a sample of N firms, there are N equations of the form outlined in 3.1. In estimating this system of equations, I allow the contemporaneous covariance, $E(\epsilon_{it}\epsilon_{jt}) = \sigma_{ij}$, to be nonzero. This is reasonable, since firms in the railroad industry are subject to common unobservable shocks. The noncontemporaneous covariances, $E(\epsilon_{it}\epsilon_{jr})$, are restricted to be zero. An additional methodological question concerns restrictions on estimates of the event coefficients, the δ's. Two approaches employed in certain event studies are problematic. The first approach constrains all firms to have an identical response to each event. This approach will miss differences in event responses between firms. The second approach estimates a unique event response for each firm. Hypothesis tests employed with this approach possess very low power. An increase in sample size does not improve the situation, since the number of event coefficients grows with the number of firms. Rose (1985) proposed and implemented two alternatives, both of which have been adopted in the subsequent literature.[14]

First, one can form groups of firms based upon *a priori* information concerning

[14]Prager (1989), Whinston and Collins (1989), and Gilligan, Marshall, and Weingast (1990) are examples.

the similarity of event responses. The estimated event coefficients are allowed to vary between groups, but are constrained to be equal for firms within a group. Second, one can model the event responses as functions of firm characteristics. This allows individual firm event responses to be estimated, but without the loss of power associated with the completely unconstrained system. In this paper, I implement only the first approach. The second, *heterogeneous-response* model is inappropriate for this particular application.[15]

During 1910-1917, there were three rate regions considered by the Interstate Commerce Commission – East, West, and South. The roads in these regions filed requests for rate increases jointly, and faced similarities in traffic and business conditions. Moreover, in its rate decisions, the I.C.C. often treated the various rate regions differently. Although railways within a region often filed joint rate requests, such requests did not necessarily involve all the roads within that region. As a result, for any given event the roads in each of the three rate regions can be divided into two subgroups – those with a *direct* interest, (e.g., those directly party to a particular rate case), and those with only an *indirect* interest. I therefore create initially (at most) six groups for each event, and constrain the event response to be equal for all roads within a particular group.

An additional issue is created by the presence of railroads that entered receivership during the sample period. Several of these roads were successfully reorganized and emerged from receivership with a new capital structure.[16] The effect of the I.C.C. on these firms could be very significant, since one anticipates that the roads hurt most were those that were forced to enter receivership. On the other hand, there is likely to be considerable noise in the estimated share price responses for these firms, both before and after receivership. As a result, I create additional groups for the "receivership railroads" in each rate region. A railroad is placed in that group for all

[15]As the next paragraph explains, not every road within a region participated in every rate decision. It therefore becomes necessary to include this involvement as part of any "heterogeneous response" model. The addition of one or two firm characteristics to the model burns up the "extra" degrees of freedom, resulting in imprecise estimation.

[16]For the receivership railroads, I allow the β_i to differ before, during, and after receivership. Additionally, the week of the initial issue of a new class of equity is dummied out.

events, even if it is in receivership for only some of the events. Although there can be a total of twelve groups, in practice the number ranges from five to seven, depending on the nature of the event. Note also that a (non-receivership) firm can be in different groups for different events.

3.3 Sample and Data

Sample selection was intrinsically linked with data preparation, and so I describe these procedures jointly.

If an interstate railroad's common stock was traded on the New York Stock Exchange for any week from January 8, 1910 until January 5, 1918, that railroad's stock was considered for inclusion in the sample. This totalled 65 roads. Closing stock prices for the last trading day of the week were gathered from the *New York Times*, with the *Wall Street Journal* as a supplementary source.[17] If no closing price was available for a particular week, the average of the closing bid and ask for the last trading day of the week was substituted. If only the bid or ask was available, that was substituted. Finally, if neither a bid nor an ask were available, then no return was calculated for that week and the subsequent week.

Returns were calculated from these prices, with an adjustment for dividends and stock splits.[18] The New York Stock Exchange was closed from July 31, 1914 until December 12, 1914, on account of the War in Europe, and so no weekly returns were computed over this period. This trading hiatus results in a sample of 398 weeks of returns. Moreover, when the exchange was reopened, the stocks of only certain firms were allowed to be traded. These restrictions were gradually removed in subsequent weeks, but no weekly returns were calculated for the period when a stock was not allowed to trade.[19]

[17] A normal trading week ran from Monday to Saturday, with a half-day of business on Saturday.

[18] The size of the dividends and the ex-dividend dates were gathered from the *New York Times* and the *Wall Street Journal*. The annual dividend summary in the *Financial Review* was employed to guarantee that all dividends were included.

[19] From December 12, 1914 until April 1, 1915, the Stock Exchange imposed minimum price restrictions on a number of stocks. This raises the possibility that my calculated return does not

Of the 65 railroads initially considered for the sample, 22 possessed returns for all 398 weeks and did not enter receivership. Six firms entered receivership and were reorganized; these firms possess "substantially complete" returns; except for the issuance of new equity, returns were complete. The other 37 firms possessed substantially incomplete returns, including 26 traded irregularly.[20] These firms were excluded from consideration here. The 28 firms studied in this paper are listed in table 3.1. Table 3.2 presents some statistics on the weekly returns of these railroads.

Previous event studies on the period before 1926 have employed monthly event windows, and have calculated the monthly return on the market portfolio from the Cowles Commission (1939) index of all stocks. In this present study, I employ a weekly event window, which should allow me to estimate the effects of regulation more precisely.[21] The tradeoff is that the Cowles index of all stocks is available on only a monthly basis.[22] The most representative market index available on a weekly basis for this period is the *New York Times* index of 50 stocks, consisting of 25 railroad and 25 industrial stocks.[23] Unfortunately, it is a simple arithmetic average of stock prices, and so this index possesses the unattractive property that a stock's influence on the index is proportional to its price.[24] I rectify this situation by forming

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measure the true return during this period, if, for example, the minimum price restriction were binding. Further investigation reveals that no adjustment to the calculated returns is necessary. Throughout the period of restricted trading, minimum prices were lowered if they became binding. As H.G.S. Noble, Chairman of the Special Committee in charge of establishing minimum prices, indicated, "It is therefore the object of the Committee to keep minimum prices as far as possible in conformity with supply and demand while at the same time using them as a check against unforseen panic." *Commercial and Financial Chronicle*, January 9, 1915, p. 108.

[20]As a result, most of their recorded returns are based on closing bid and ask, rather than on closing prices.

[21]In their simulations of different event study methodologies, Brown and Warner (1980) found that narrowing the event window improves the power of hypothesis tests considerably.

[22]The Cowles index is not ideal, however. For instance, it treats the average of a stock's high and low prices in a month as that stock's price for the month, rather than using the closing price for the month.

[23]It is more broadly based than the Dow Jones Industrial Average, which consisted of between 12 and 20 stocks during this period. The *New York Times* index is available in published sources starting in 1911. I calculated the index for 1910, by employing the list of stocks from 32the start of 1911.

[24]There is no justification, other than simplicity of computation, for this weighting scheme. See James H.Lorie, Peter Dodd, and Mary Hamilton Kimpton, *The Stock Market: Theory and Evidence* (Homewood: Dow Jones-Irwin, 1985), pp. 33-54 for a discussion of the thecry and practice of stock market indexes.

Table 3.1: Sample of Railroads Employed

Railroad	Rate Region
Chesapeake and Ohio	East
Erie	East
Lake Erie and Western	East
New York Central	East
New York, New Haven, and Hartford	East
New York, Ontario, and Western	East
Norfolk and Western	East
Pennsylvania	East
Reading	East
Wheeling and Lake Erie*	East
Atchison, Topeka, and Sante Fe	West
Chicago and Alton†	West
Chicago Great Western	West
Chicago, Milwaukee, and St.Paul	West
Chicago and Northwestern	West
Chicago, Rock Island and Pacific*	West
Illinois Central†	West
Kansas City Southern	West
Minneapolis, St.Paul and Sault-Ste. Marie	West
Missouri, Kansas and Texas*	West
Missouri Pacific*	West
Northern Pacific	West
Southern Pacific	West
Texas and Pacific*	West
Union Pacific	West
Wabash*	West
Louisville and Nashville	South
Southern Railway	South

*Railroad entered receivership during 1910-1917

†The Chicago and Alton and Illinois Central railroads had extensive operations in the Midwest, and so they switch classifications from "East" to "West" depending upon the particular rate case.

Table 3.2: Statistics on Railroad Returns

Railroad	Mean	Standard Deviation	Minimum	Maximum
Atchison, Topeka, & Santa Fe	0.000243	0.015669	-0.07091	0.086538
Chesapeake & Ohio	0.000195	0.031722	-0.14173	0.18317
Chicago & Alton	0.004622	0.13525	-0.34677	0.84375
Chicago Great Western	-0.00261	0.054685	-0.22917	0.41667
Chicago, Milwaukee, & St. Paul	-0.00193	0.027315	-0.11886	0.24917
Chicago & Northwestern	-0.00023	0.014003	-0.05306	0.096681
Chicago, Rock Island & Pacific*	-0.00666	0.096549	-0.45714	0.49359
Erie	-0.00106	0.046014	-0.17647	0.24546
Illinois Central	0.000077	0.01645	-0.07048	0.075145
Kansas City Southern	-0.00126	0.046431	-0.22115	0.21875
Lake Erie and Western	0.002488	0.090154	-0.29897	0.36585
Louisville and Nashville	0.000458	0.018254	-0.08	0.068108
Minneapolis, St. Paul & S.S. Marie	0.00019	0.021973	-0.12552	0.10569
Missouri, Kansas & Texas*	-0.00216	0.087229	-0.3	0.66667
Missouri Pacific*	0.000118	0.106616	-0.46939	0.611111
New York Central	-0.00033	0.019504	-0.0642	0.12205
New York, New Haven & Hartford	-0.00305	0.036314	-0.16466	0.22059
New York, Ontario, and Western	-0.00084	0.042221	-0.16129	0.21795
Norfolk & Western	0.001194	0.016533	-0.07031	0.09555
Northern Pacific	-0.000029	0.018558	-0.07386	0.11327
Pennsylvania	-0.000011	0.012464	-0.04323	0.11905
Reading	0.000719	0.025906	-0.12	0.13499
Southern Pacific	0.000088	0.019601	-0.10185	0.07717
Southern Railway	0.000424	0.047214	-0.15854	0.22619
Texas and Pacific*	0.000361	0.069808	-0.32231	0.33333
Union Pacific	0.000419	0.019566	-0.09381	0.10145
Wabash*	-0.00245	0.163832	-0.57143	1.333333
Wheeling and Lake Erie*	0.010748	0.175252	-0.48387	1.222222

*Entered Receivership During Sample Period

an equally weighted index of the 50 stocks composing the *New York Times* index. This new measure gives equal weight to equal relative price changes in each of the 50 stocks.[25] For the risk free rate of return, I employ the imputed weekly rate on 60 day time loans, as reported by the *Financial Review* for various years.[26]

3.4 Event Selection

In table 3.3 I describe the individual events in detail. An initial investigation of the *Financial Review* and the *New York Times Index* for the years 1910-1917 revealed "event candidates." I then examined daily editions of the *Wall Street Journal* and the *New York Times* to pinpoint the event window. In certain cases an "event candidate" failed to be classified as an event because contemporary news accounts indicated that the occurrence was not a surprise.

Table 3.3: Event Descriptions

1. TAFT: President Taft instructs his attorney general to seek an injunction preventing proposed rate increases of the Western Trunk line association from going into effect. *May 31, 1910.*

   Although this did not involve the I.C.C., it was part of the political movement which resulted in the passage of the Mann-Elkins act in June, 1910.

2. PACRATE: I.C.C. rules against the Western Railroads in the *Pacific Rate Case. June 29, 1910.*

   At this time, the Mann-Elkins Bill had become law, but had not yet taken effect. As a result, the *Pacific Rate Case* was decided under earlier statutes. However, this adverse ruling could have cast light on the Commerce Commission's attitude toward general rate advances.

3. FIRSTACT: I.C.C. suspends Eastern and Western rate advances, until it can determine their reasonableness. *July 14, and July 20, 1910.*

[25] Returns based on my index have been corrected for stock splits and dividends.

[26] Time loans were "made to stock and bond brokers and investment bankers on securities as collateral." A standard time loan required collateral "worth in the market about 130 per cent of the amount of the loan." Frederick R. Macauley, *Some Theoretical Problems Suggested By Movements of Interest Rates, Bond Yields, and Stock Prices in the United States Since 1856* (New York: NBER, 1938), Appendix E. Since there were no Treasury Bills at this time, the rate on time loans represents the best measure of the risk free rate of interest.

This was the I.C.C.'s first action under the Mann-Elkins Law, and the decision to suspend a general advance in rates was in direct opposition to an announced policy to use the suspension power only sparingly.

4. DENIAL: I.C.C. denies Eastern and Western rate advances in the first cases decided under the Mann-Elkins Act. *After the close of business, February 23, 1911.*

5. BRANDEIS: I.C.C. retains Louis Brandeis as its Counsel for the *Five Per Cent Case* (which involved only the Eastern roads). *October 10, 1913.*

   In the 1910-1911 rate cases, Louis Brandeis had been an effective advocate for shippers opposed to railroad rate increases. The railroads might fear that Brandeis would once again act contrary to their interests. Additionally, the I.C.C.'s decision to employ someone who had previously opposed the railroads might indicate a lack of impartiality by the Commission

6. INQUIRY1: The Commission demands detailed information from the roads before it will rule on the *Five Per Cent Case. December 27, 1913.*

   Railroad executives had expected a speedy inquiry; these demands could have undermined those expectations.

7. INQUIRY2: I.C.C. makes additional inquiries on "spur service" and "spotting of cars," indicating further delay in deciding the *Five Per Cent Case. February 6, 1914.*

8. DELAY: I.C.C. suspends rates for another six months in the *Five Per Cent Case*, pending completion of its investigation. *February 16 - 19, 1914.*

   Several incidents compose this "aggregate event." On February 16, the Commission announced that it was suspending the proposed rates until September 12, pending the completion of its investigation. This caused some to believe that no decision would be reached before September. On February 18 it was announced that President Wilson had urged Chairman Clark of the I.C.C. to give an early decision in the rate case. Finally, on February 19 Commissioner Harlan stated that a decision would be issued before June 15.

9. FIVEPERCENT: Details of the decision in the *Five Per Cent Case* are reported. Only partial increases are granted. *July 19, 1914.*

   The July 19, 1914 New York Times contained a detailed account of the decision, which was not formally announced until July 29. The I.C.C. granted a five per cent average increase on class rates, those rates applying "on goods shipped in boxes, bundles, bales, crates, and other comparatively small packages."[27] However, all proposed increases on "commodity" rates were denied. Some important

[27] "Railroads To Get $16,000,000 a year in Higher Rates," *New York Times*, July 19, 1914, Section 1, p. 1.

commodities included coal, other minerals, lumber, grain and petroleum. Furthermore, the I.C.C. made numerous suggestions on how railroad "waste and extravagance" might be reduced.

10. 1915WEST: I.C.C. grants only minor increases in the *1915 Western Freight Rate Case.* Two Commissioners dissent sharply, arguing that a full rate advance is justified. *August 11, 1915.*

    Two factors cloud the interpretation of this event. The dissents of Commissioners Daniels and Harlan drew considerable attention in the press, particularly the "conversion" of Commissioner Harlan to the railroad side. This feature lessens the negative ramifications of the decision. A second factor was another railroad case, announced August 12. In this rate discrimination case, the Commission ordered the anthracite coal rates from Pennsylvania to the seaboard reduced approximately 10%. By employing a one-week event window, the anthracite decision becomes a part of the Western Rate Advance event. However, there are indications that the anthracite decision was anticipated, and further that its revenue effects were not very large. (Because many coal roads controlled coal companies, the revenue the railroads lost was gained by their coal subsidiaries).

11. WESTPASS: (Positive Event) Western Passenger Rate Increases are approved. *December 11, 1915.*

    The I.C.C. allowed interstate passenger fares in the West to rise from 2 cents per mile to 2.4-2.6 cents per mile.

12. FIFTEENPERCENT: I.C.C. decision in the *Fifteen Per Cent Case* grants only partial advances. *Announced the night of June 29, 1917.*

    The Western and Southern roads were denied any increase, while the Eastern roads received, on average, a 7% advance in class rates.

13. REOPEN: (Positive Event) Eastern roads move to reopen their request in the *Fifteen Per Cent Case. October 12, 1917.*

    There are indications that the railroads sought to reopen this case only after receiving indications that their request would be handled favorably.

14. NATIONALIZATION: President Wilson announces Federal operation of the Railroads, with a guaranteed net income. *Announced the night of December 26, 1917.*

    The onset of Federal control was anticipated by late December, but its precise form was unknown until Wilson's proclamation. The *New York Times* indicated on December 11 that President Wilson had decided upon Federal operation, and the December 19 *Wall Street Journal* concurred. "The best informed men in the Administration agree that there is no longer any doubt that the Government itself shortly will assume direction of the operation of the railroads."

> The market's response to this event contained two components. First, announcement of details of Wilson's plan reduced uncertainty concerning the particular features of Federal control. Second, the market assessed this new regime relative to the alternative of continued I.C.C. rate jurisdiction.

I have included as events the announcement of unexpected delays in deciding some of the rate cases. Such delays affect a firm's expected profit stream in two ways. First, there is a *impact effect*: any possible increase in rates is postponed, thereby reducing revenues. Second, and perhaps more importantly, there is a *signalling effect*: a delay could signal a skeptical attitude of the I.C.C. toward the rate request, and so lead the market to view the prospects for a rate increase more pessimistically. This is because certain attitudes were logically paired. If the Commissioners thought, as the railroad executives did, that rate relief was both clearly justified and urgently needed, then a quick, favorable ruling would be likely. If, however, the Commissioners did not consider the railroads' case to be compelling, and therefore felt no sense of urgency, they would conduct a lengthy investigation, with an unclear outcome. Moreover, the delays in events 6, 7, and 8 (INQUIRY1, INQUIRY2, and DELAY) were caused by the I.C.C.'s desire for more detailed information from the railroads. This could indicate a high, perhaps an unreasonably high, burden of proof placed on the roads by the Commission. The railroads might very well to fail to meet this burden of proof, and so be denied their requested rate advance.

Additionally, for all the events there is the possibility of a signalling effect affecting railroads without a direct interest in the proceedings. For example, event 2 is the adverse ruling of the I.C.C. in the *Pacific Rate Case*, which directly affected the revenues of Western Railroads. The returns to Eastern and Southern railroads could suffer as well if the market inferred from this action that the I.C.C. was likely to be hostile to the interests of the Eastern and Southern railroads. This distinction is related to my earlier division of railroads into those with a direct and those with only an indirect interest in an event. For railroads indirectly involved in a rate decision, we observe only the signalling effect; there is no impact effect. For railroads directly involved in a case, we observe the impact and signalling effects jointly. Because of the possibility of signalling effects, I have allowed nonzero event responses for roads

not directly involved in an event.

To keep track of these effects, I have constructed a table of expected signs of responses, both impact and signalling. This is table 3.4. For each event, the expected impact effect is on the first line, and the expected signalling effect is on the second line.

In most cases I have identified a particular day as the date of an event, although in all cases I have employed a one-week or two-week event window. I utilize a two week event window for events 3 and 12 (FIRSTACT and FIFTEENPERCENT) to allow the market to process additional information. In FIRSTACT, the I.C.C. indicated in the first week that it would suspend the proposed rate increases, and then in the second week the Commission pressured the roads to suspend the rates "voluntarily." In the *Fifteen Per Cent Case*, the Commission's decision was announced on a Friday night; headlines about the case were available the following day, but many investors could not read the actual decision until the following week.[28]

For most events, one can determine the expected sign of the response *a priori*. Two exceptions are event 9, the decision in the *Five Per Cent Case*, and event 12, the decision in the *Fifteen Per Cent Case*. In those two cases, only partial rate increases were granted. Depending on what the market expected, these decisions could represent either pleasant or unpleasant surprises. A third and more complicated exception is provided by event 10, 1915WEST. First, while only minor freight rate increases were approved, two Commissioners dissented sharply, arguing for a full rate advance. This could augur better future prospects for the railroads. The positive signalling effect could swamp the ambiguous impact effect. As the *Wall Street Journal* remarked, "What the Western roads have obtained in money amounts to little. But they succeeded in splitting the Commission along new lines. The conversion of Commissioner Harlan to the railroad view is particularly an achievement."[29] This positive signalling effect could be felt by other railroads, including the Eastern roads directly affected by the anthracite rate reduction of that same week. For these Eastern firms, the impact

[28] "The Stock Market," *Wall Street Journal*, July 2, 1917, p. 4.
[29] "Review and Outlook," *Wall Street Journal*, August 13, 1915, p. 1.

Table 3.4: Expected Signs of Event Responses

(First line is impact effect, second line is signalling effect)

	East	West	South
TAFT	0	-	0
	-	-	-
PACRATE	0	-	0
	-	-	-
FIRSTACT	-	-	0
	-	-	-
DENIAL	-	-	0
	-	-	-
BRANDEIS	-	0	0
	-	-	-
INQUIRY1	-	0	0
	-	-	-
INQUIRY2	-	0	0
	-	-	-
DELAY	-	0	0
	-	-	-
FIVEPERCENT	+/-	0	0
	+/-	+/-	+/-
1915WEST	-	+/-	0
	+	+	+
WESTPASS	0	+	0
	+	+	+
FIFTEENPERCENT	+/-	-	-
	-	-	-
REOPEN	+	0	0
	+	+	+
NATIONALIZATION	+	+	+
	+	+	+

and signalling effects have opposite signs, but only the net result of these two effects is observed.

In addition to predicting the expected sign of event responses on *a priori* grounds, one can predict the expected magnitude of the event responses. This is determined by two factors: the objective importance of the event, and the degree to which the event had been anticipated and therefore discounted by the market. I will consider each factor in turn, surveying the qualitative and then the quantitative evidence.

Of the fourteen events, nine can be considered major events, and five can be seen as less important events. Even among the major events, certain ones are of a particularly large magnitude. The first four events, and especially event 4, DENIAL, had the immediate effect of reducing or freezing revenues. Moreover, if signalling effects exist, they should be present in these early actions. The annual *Financial Review* of 1912, noted that the impact of the first rate denial was magnified by its nature as a "test case" of the new law:

> The denial of the right to make any general increases in rates over this vast area was viewed with grave apprehension. These were the first cases coming before the Commission since it had been vested with authority, under the law of 1910, to decide as to the propriety of contemplated advances in rates before allowing them to go into effect, and that the test should have yielded such unfavorable results for the carriers was not regarded as offering a very hopeful portent for the future for any class of roads.[30]

Of all the events, the Nationalization decision is expected to have the largest single effect, since it marked an entire regime change. A large positive response would support my hypothesis; the regulatory regime under the I.C.C. was unfavorable to the railroads, and so a change in regime would be viewed favorably.

The events of lesser importance are those with little direct effect on railroad revenues. These are events 5-8 (BRANDEIS, INQUIRY1, INQUIRY2, DELAY) and event 11 (WESTPASS). The former group consists of a series of actions in the *Five Per Cent Case*. Event 5, the appointment of Louis Brandeis as I.C.C. Counsel, would

[30] *Financial Review*, 1912, p. 19.

have no impact effect; its only possible effect would be as a signal of hostile I.C.C. intentions. The other three events in that group are all delays in the Commission's investigation. Such delays could directly harm the railroads, particularly at this inflationary time. But such an effect is an order of magnitude smaller than the effect of a rate denial or rollback. As with the BRANDEIS event, the larger part of these actions' significance lies in their potential as signals of the Commissioners' attitudes. Finally, event 11 (WESTPASS) is of lesser importance because it involves passenger traffic; freight revenues typically were three times as large as passenger revenues.

The second factor influencing the estimated response to a regulatory action is the degree to which the market anticipated that action. This is far trickier to ascertain than the objective importance of an event, and it is a maintained hypothesis that all the events in this study were, to at least some extent, unanticipated. Nevertheless, the significance of the railroad industry during this period generates an opportunity to distinguish between totally unanticipated and partially anticipated regulatory changes. The importance of the railways to businessmen and investors guaranteed that conjectures about the I.C.C. would be gathered and disseminated; before "Fed watching" there was "I.C.C. watching." Contemporary business publications contain unusually precise accounts of investors' expectations of railroad developments.

The early events can certainly be characterized as complete surprises. Once again, event 4, DENIAL, is noteworthy. A column written just prior to the rate denial reported, "The current belief regarding the rate decision is that it would come after the market's close, and that the eastern roads would get between 35% and 40% of what they asked for, while the western lines would receive from 60% to 70% of their demands."[31] After the Commission's announcement and the subsequent adverse market reaction, another columnist noted, "What made the break [in stock prices] ... the more emphatic was that there had been no preliminary movement of the market to indicate what the rate decision might be. This says a good deal for the discretion of the Interstate Commerce Commission, as news of that character has a way of leaking

[31] "Features of the Market," *Wall Street Journal*, February 24, 1911, p. 4.

out when it is calculated to exercise a serious influence either way."[32]

Similarly, the Nationalization of the railroads, the final event, contained entirely unexpected features, especially the guarantee of net income. "The idea of a guarantee came as a complete surprise, and had the effect of completely changing views as to the prospects of the roads."[33]

Conversely, news concerning the decision in the *Five Per Cent Case* trickled out. Throughout June and July, 1914, there were rumors of an impending unfavorable decision.[34] Nevertheless, the July 19, 1914 *New York Times* report on details of the upcoming decision was more authoritative than any news that preceded it, and so I selected that as the event.

In addition to this qualitative evidence about the objective importance of an event, and the degree to which it had been anticipated, we have strong quantitative evidence concerning these factors. Recall that in identifying the events listed in table 3.3, I was often able to pinpoint a particular day as the event. Consider the volume of stock sales on the days surrounding two of these event dates, those for DENIAL and NATIONALIZATION, as detailed in table 3.5.[35]

The surge in sales immediately following an event date is a clear indication of important news.[36]

3.5 Specification: Estimation

In applying the CAPM in an event study, one can usually safely consider the return on the market portfolio to be exogenous, and estimate a system such as in 3.1 by

[32] "Review and Outlook," *Wall Street Journal*, February 27, 1911, p.1

[33] *Financial Review*, 1918, p. 64.

[34] See, for example, *Wall Street Journal*, June 20, 1914, and "The Stock Market," *Wall Street Journal*, July 17, 1914, p. 4.

[35] A similar pattern holds for some of the other events, but these two are the most dramatic in this regard. The sales figures come from Phyllis Pierce, *The Dow Jones Averages, 1885-1985* (Homewood: Dow-Jones-Irwin, 1986).

[36] For a model of the link between news and trading volume, along with a review of the empirical literature, see Jiang Wang, "A Model of Competitive Stock Trading Volume," MIT Mimeo, January, 1992. The decline in sales volume after the initial surge also suggests that the market processed new information quickly.

Table 3.5: Stock Market Volume

Date	Sales (in thousands)	
Event 4, DENIAL:		
February 20, 1911	394	
February 21, 1911	252	
February 22, 1911	Holiday	
February 23, 1911	267	(Decision announced at night)
February 24, 1911	1001	
February 25, 1911	405	
Event 14, NATIONALIZATION:		
December 24, 1917	423	
December 25, 1917	Holiday	
December 26, 1917	420	(Wilson address at night)
December 27, 1917	1199	
December 28, 1917	1192	
December 29, 1917	493	

Seemingly Unrelated Regressions (SUR). In the present case, however, such an approach generates biased and inconsistent results. Railroad stocks composed between 40 and 50 percent of the capitalization of the stock exchange during this period.[37] A proxy portfolio designed to replicate market movements must therefore contain a large component that is specific to the railroad industry.

There are two, mutually consistent ways to view the estimation and interpretation problems this creates. First, such a market variable is not exogenous; it is determined simultaneously with the dependent variables, the returns of individual railroads. There is a second way to view this problem. If the return on the market portfolio is significantly affected by the regulatory events in question, then that effect can be properly considered as part of the event response we seek to estimate. The estimated coefficient on the dummy variable does not pick up this part of the effect.

This problem leads me to employ the simultaneous equations counterpart of SUR,

[37] "Capitalization of United States Corporations and Securities Listed on the Stock Exchange," *Commercial and Financial Chronicle*, January 16, 1915, p. 185.

Three-Stage Least Squares (3SLS). Before giving further details on estimation, I present evidence suggesting that the return on the market portfolio is not exogenous.[38]

It would not be surprising if railroad events affected a portfolio of railroad stocks. I argue here that I.C.C. actions influenced the returns on even the industrial stocks. I have partitioned the 25 firms from the *New York Times* industrial index into three groups based upon my judgment of each firm's sensitivity to railroad developments. This division is reported in table 3.6. The first group consists of railroad equipment manufacturers, whose fortunes were directly tied to the railroads. The second group is composed of those firms moderately influenced by the railroads – chiefly producers of metals demanded in large part by the railroads.[39] The final group consists of those firms without an immediate interest in railroad developments.

If my events affected the return on industrial stocks, then a positive industrial return should occur in weeks of positive events, and a negative return should occur in weeks of negative events. But more importantly, there should be a certain *pattern* in the returns of the three groups of industrial stocks. An adverse railroad regulatory development should cause the "high railroad sensitivity" firms to experience a greater loss than that experienced by the "moderate railroad sensitivity" group, which in turn should be more than the loss experienced by the "low railroad sensitivity" group. The converse holds for a positive regulatory development. I therefore form equally weighted portfolios for each of the three groups, and in table 3.7 I report the returns on each portfolio in each event week. This procedure helps to distinguish market movements caused by railroad events from those movements that coincide with, but are not caused by, regulatory actions.

Seven of the nine major events have the expected pattern of returns. The first exception is 1915WEST. But since that event contains both the Western freight and the anthracite decisions, the expected pattern of responses is unclear. The other

[38]In the spirit of full disclosure, I note that I initially employed (SUR), oblivious to the simultaneity problem. The subsequent poor results helped alert me to the problem. Despite this chronology, I have full confidence in this current approach.

[39]For instance, prior to World War I railroads usually purchased 30-35% of U.S. Steel's production. *Financial Review*, 1912, p. 21.

Table 3.6: Composition of *NYT* 25 Industrials

Firm	Primary Outputs
High Railroad Sensitivity:	
American Car & Foundry	Freight & Passenger Cars
American Locomotive	Locomotives
Pressed Steel Car	Freight Cars
Moderate Railroad Sensitivity:	
Amalgamated Copper	Copper mining
International Steam Pump	Pumps for mining & oil exploration
National Lead	Lead products
Republic Iron and Steel	Steel Products
Tennessee Copper	Copper mining & treatment
U.S. Steel	Steel Products
Utah Copper	Copper mining, electricity generation
Low Railroad Sensitivity:	
American Agricultural Chemical	Fertilizer, glue, gelatin
American Beet Sugar	Sugar
American Can (Preferred)	Cans
American Cotton Oil	Cotton Seed Products
American Smelting & Refining	Bar Gold & Silver, pig lead
American Telegraph & Telephone	Telephone service
Central Leather	Sole leather
Consolidated Gas	Gas & Electricity, New York City
Great Northern Ore Certificates	Iron ore
International Harvester	Agricultural Machinery
People's Gas	Gas, Chicago
U.S. Rubber	Rubber products
Virginia Carolina Chemical	Acids, chemicals, fertilizers
Western Union	Telegraph service
Westinghouse Co.	Electric lighting & power machinery

Primary outputs were found in Malcolm R. Burns, "An Empirical Analysis of Stockholder Injury Under Section 2 of the Sherman Act," *Journal of Industrial Economics*. 31 (June 1983), p. 349, as supplemented by *Moody's Analyses of Public Utilities and Industrials*, 1918.

Table 3.7: Returns on Industrial Stocks, Event Weeks

	Sensitivity to Railroad Developments:		
	Low	*Moderate*	*High*
TAFT	-0.06202	-0.08713	-0.14249
PACRATE	-0.05763	-0.06512	-0.06805
FIRSTACT	-0.02381	-0.03652	-0.04266
DENIAL	0.004443	-0.0336	-0.06928
BRANDEIS	-0.03969	-0.03054	-0.0206
INQUIRY1	-0.00163	-0.00005	0.015851
INQUIRY2	-0.00932	-0.01146	-0.03623
DELAY	-0.02103	-0.01851	-0.03674
FIVEPERCENT	-0.0094	-0.02569	-0.03441
1915WEST	0.011961	0.004432	0.091531
WESTPASS	0.00748	-0.00584	-0.01816
FIFTEENPERCENT	-0.00730	-0.01181	-0.01697
REOPEN	-0.00471	0.011321	0.060188
NATIONALIZATION	0.058559	0.051246	0.108716

exception, NATIONALIZATION, is more noteworthy. In that case, however, the return on the high rail group is nearly double that of the other two groups. This fact, coupled with strong qualitative evidence, implies that NATIONALIZATION was the cause of the large returns that week.

A second feature of table 3.7 is the magnitude of the market movements. One caveat is in order; here we list the return on equity, whereas the results in the next section are estimated changes in railroad *profits*. Even accounting for this fact, many of the industrial market movements are large: a loss of between 6.2% and 14% in the week of TAFT, an average loss near 6% for the PACRATE week, and a gain between 5 to 10% the week of NATIONALIZATION.

If the return on the market portfolio is not exogenous, then one must find instruments for it. Several instrument candidates were employed in estimating the system in equation 3.1 by Three-Stage Least Squares. The return on an equally weighted portfolio of the group of 14 industrial firms with "low railroad sensitivity" constitutes the first instrument candidate. Contemporary business publications noted that the volume of bank clearings was an "excellent barometer of business" that was viewed with great interest by investors.[40] Moreover, this barometer possessed a recognized seasonal component, varying both with the agricultural cycle and the number of business days in a week. As a result, the deseasonalized percentage change in the volume of bank clearings is used as a second instrument.[41] Finally, noteworthy news events can be identified as factors that would move the market. Therefore dummy variables for the start of World War I, the sinking of the Lusitania, and U.S. entry into World War I are also employed as instruments.

[40]See, for example, the *Wall Street Journal*, October 13, 1913, p. 1.

[41]Data were obtained from the *Commercial and Financial Chronicle* for various weeks from 1910 to 1917. Deseasonalization was accomplished by regressing the percentage change in bank clearings on 9 seasonal dummies in the frequency domain. The residuals from this regression are the deseasonalized percentage change in bank clearings.

3.6 Results

Table 3.8 presents summary statistics of results from unconstrained estimation of system 3.1; a separate event-response is estimated for each firm and each event. The CAPM parameter estimates (on CONSTANT, MARKET, POSTWAR, and POSTWARMARKET) are reasonable.[42] Although the "average response" to such events as TAFT, PACRATE, and NATIONALIZATION are economically significant, there is considerable heterogeneity in the responses, as indicated by the divergence between the minimum and maximum estimated coefficients. The final column of table 3.8 reports the p values from 14 Wilcoxon Signed Rank tests, one for each event. The test addresses the hypothesis that the median response to the specified event is zero. This hypothesis can be rejected for six of the events at the 5 % level of significance (TAFT, PACRATE, DENIAL, INQUIRY1, WESTPASS, and NATIONALIZATION).

These results are not my primary focus, however. As I described earlier, I formed groups of firms based upon *a priori* evidence that their response to a particular event should be the same. Estimated event coefficients were constrained to be identical for firms within a group, but were allowed to differ between groups.

This procedure generated the estimated event responses that are recorded in the next two tables. Due to space considerations, the results on the non-receivership and receivership samples are separated into tables 3.9 and 3.10 respectively. Consider first the results in table 3.9. The results, while mixed, demonstrate some strong stock market responses to identified events. Here it is important to recognize the distinction between major and minor events. None of the minor events (BRANDEIS, INQUIRY1, INQUIRY2, DELAY, and WESTPASS) generates a statistically significant effect.[43] The estimated *direct* effects are statistically significant for five of the nine major events (TAFT, PACRATE, 1915WEST, REOPEN, and NATIONALIZATION). The first three of these events also provide evidence for the existence of a

[42] "MARKET" is actually my market measure less the risk free rate of interest.

[43] Moreover, the cumulative effect of the four events leading up the the *Five Per Cent Case*, (BRANDEIS, INQUIRY1, INQUIRY2, and DELAY) is not different from zero at conventional levels of significance.

Table 3.8: Summary Statistics, Unconstrained Estimation, 3SLS

	Average Coefficient	Standard Deviation	Minimum	Maximum	Wilcoxon Test: (p value)
CONSTANT	-0.00024	0.00075	-0.00353	0.00115	
MARKET	0.71281	0.03352	0.17314	1.42537	
TAFT	-0.00755	0.00614	-0.03655	0.00999	0.003
PACRATE	-0.01018	0.00613	-0.04304	0.00673	0.000
FIRSTACT	0.00011	0.00428	-0.01319	0.01101	0.640
DENIAL	-0.0053	0.00601	-0.02977	0.01541	0.009
BRANDEIS	-0.00301	0.00588	-0.12002	0.07248	0.350
INQUIRY1	-0.00344	0.00585	-0.0155	0.00741	0.004
INQUIRY2	-0.00494	0.00586	-0.08063	0.01243	0.162
DELAY	0.01136	0.00586	-0.01845	0.17629	0.998
FIVEPERCENT	-0.00267	0.00585	-0.05896	0.05642	0.112
1915WEST	0.02079	0.00583	-0.03317	0.30467	0.989
WESTPASS	0.00163	0.00582	-0.01665	0.01868	0.047
FIFTEENPERCENT	-0.00098	0.00436	-0.01483	0.02138	0.130
REOPEN	0.00455	0.00613	-0.09626	0.08053	0.071
NATIONALIZATION	0.04565	0.0066	-0.03349	0.20626	0.000
POSTWAR	-0.00107	0.00118	-0.00616	0.00461	
POSTWARMARKET	0.04328	0.05027	-0.29611	0.94372	

signalling effect, through the estimated *indirect* effects.[44] TAFT and PACRATE are particularly important since they were actions at the beginning of the Mann-Elkins regulatory regime.

1915WEST has an economically meaningful positive sign for the Western roads directly involved, and the Eastern, Western and Southern roads not directly party to the case. I think that is probably due to the fact that two Commerce Commissioners dissented sharply, arguing for a full rate advance. This type of signalling effect would likely have a larger effect than simply a better than expected decision; winning allies on the Commission promises a more persistent effect. The Eastern anthracite roads composed the group directly affected by 1915WEST, or more precisely by the anthracite rate reduction that same week. Their estimated profit loss of .69% does not statistically significantly differ from zero, but does statistically significantly differ from the 1.03% gain experienced by other Eastern roads.[45]

The biggest individual direct effect, unsurprisingly, is that associated with NATIONALIZATION, with a profit gain of 2.9% and 3.4% for Eastern and Western roads respectively. Paradoxically, the response of the Southern group (consisting of only two railroads) is negative, although it does not differ substantially from zero.

The estimated responses on several other events are disappointingly small. Chief among these are DENIAL, FIVEPERCENT and FIFTEENPERCENT. As I noted previously, the *Five Per Cent* decision was partially anticipated by the Stock Exchange. There is every indication, however, that both the DENIAL and FIFTEENPERCENT events were surprises. In table 3.10, we have the results for the 6 receivership railroads, of which 5 are Western roads and only 1 is an Eastern road. This latter fact may help explain the lack of precision with which the Eastern effects are estimated. For the Eastern road, the largest single effect is the indirect response to 1915WEST. This is consistent with a strong signalling effect, but even this estimated

[44]The hypothesis that *all* signalling effects are zero can be rejected at the 5% level of significance. The test statistic, which is distributed as χ^2_{27}, has a value of 41.91.

[45]The test statistic, distributed as χ^2_1, takes a value of 17.99. The hypothesis that the Eastern anthracite and non-anthracite roads had the same response to 1915WEST can therefore be rejected at any level of significance.

Table 3.9: Constrained Estimation, 3SLS

Subsample: 22 Non-Receivership Railroads

(t statistics in parentheses)

	East:		West:		South:	
	Direct	Indirect	Direct	Indirect	Direct	Indirect
TAFT		-0.00394	-0.00796	-0.00832		-0.0047
		(-1.1302)	(-2.5782)	(-1.9647)		(-0.9132)
PACRATE		0.000178	-0.01429	-0.00786		0.005269
		(0.0569)	(-3.9802)	(-1.9751)		(1.0196)
FIRSTACT	-0.00163		0.001886	-0.00141		0.002813
	(-0.7334)		(0.8425)	(-0.3832)		(0.7846)
DENIAL	-0.00352		-0.00344	-0.00051		-0.00578
	(-1.1396)		(-1.1222)	(-0.0963)		(-1.1284)
BRANDEIS	0.000622			-0.0029		-0.00168
	(0.2090)			(-0.9705)		(-0.3219)
INQUIRY1	-0.00362			0.00046		-0.00282
	(-1.1995)			(0.1539)		(-0.5774)
INQUIRY2	-0.00481			0.006018		-0.00276
	(-1.5896)			(2.0082)		(-0.5623)
DELAY	0.005124			0.003111		0.006015
	(1.6927)			(1.0377)		(1.2262)
FIVEPERCENT	0.000368			-0.00079		-0.0046
	(0.1217)			(-0.2628)		(-0.9404)
1915WEST	-0.00689	0.010322	0.008411	0.00734		0.010069
	(-1.6765)	(3.1148)	(2.8714)	(1.7904)		(2.1650)
WESTPASS		-0.00049	-0.00018			0.000831
		(-0.1625)	(-0.0622)			(0.1789)
FIFTEENPERCENT	0.000731		-0.00128		0.004284	
	(0.3264)		(-0.5538)		(0.9593)	
REOPEN	0.006485			0.006687		0.013257
	(2.0586)			(2.0576)		(2.1109)
NATIONALIZATION	0.029342		0.034011		-0.00995	
	(8.6503)		(9.7201)		(-1.4713)	

Table 3.10: Constrained Estimation, 3SLS

Subsample: 6 Receivership Railroads
(t statistics in parentheses)

	East:		West:	
	Direct	Indirect	Direct	Indirect
TAFT		0.01575	0.012552	-0.00179
		(.0975)	(.5897)	(-.0636)
PACRATE		0.00826		-0.00841
		(.0514)		(-.4728)
FIRSTACT	0.10929		0.00497	0.00011
	(.9864)		(.3391)	(.0055)
DENIAL	0.02828		0.00171	0.00681
	(0.1819)		(.0840)	(.2445)
BRANDEIS	-0.01146			0.0238
	(-.0744)			(1.4558)
INQUIRY1	-0.00287			-0.00323
	(-.0154)			(.2023)
INQUIRY2	-0.02301			-0.03101
	(-.1229)			(-1.9369)
DELAY	-0.1529			-0.00591
	(-0.8160)			(-.3689)
FIVEPERCENT	-0.1295			0.03609
	(-.6934)			(2.2589)
1915WEST		0.32191	-0.00459	
		(1.6648)	(-.2901)	
WESTPASS		-0.06621	-0.00145	
		(-.3503)	(-.0919)	
FIFTEENPERCENT	0.01667		0.00609	
	(.2200)		(.4379)	
REOPEN	-0.06093			-0.00042
	(-.5492)			(-.0218)
NATIONALIZATION	-0.01491		0.07871	
	(-.1775)		(2.5028)	

gain of 32% does not statistically significantly differ from zero.

The Western receivership roads also generally have small and imprecisely estimated responses. The estimated effect of NATIONALIZATION, a gain of 7.87%, is a noteworthy exception. It is unclear *a priori* whether receivership railroads (or more generally, weak roads) should benefit more or less than average from Nationalization. On one hand, the guarantee of net income that accompanied Nationalization was based on the average of a firm's net income over the three previous years; roads that performed poorly during that time received a lower guarantee. On the other hand, Nationalization with the net income guarantee implied a willingness by the Federal Government to bolster the fortune of weak roads; this policy would be especially valuable to railways whose survival was in danger. The estimated response supports the second interpretation.

3.7 Conclusion

The results presented in this chapter support the contention that several I.C.C. actions in the years 1910-1917 significantly reduced railroad profitability. Moreover, the change in regulatory regime signalled by Nationalization generated the largest positive response, and therefore strengthens the assessment that the preceding regime was unfavorable to the railroads.

This unambiguously refutes Kolko's contention that the Commerce Commission was sympathetic to the railroads over the entire period of 1887-1917. The implications for more recent work are more ambiguous. Since this paper examines a later period than those studied by Gilligan et al. (1990) and by Prager (1989), it cannot directly confirm or refute their results. The evidence in this paper does, however, address some of their interpretations. Gilligan et al. indicate that early decisions by the I.C.C. concerning the short haul pricing constraint "reversed some of the gains and losses of the ICA for railroads." As they note, this raises the possibility that the Commission implemented the Interstate Commerce Act differently than its authors had intended.

Their results, coupled with Prager's "pro-revisionist" findings for the 1890s and this paper's "anti-revisionist" results for the Progressive Era suggest that investigation of the *implementation* of the Interstate Commerce Act would be more worthwhile than further study of its *origins*.

Such an investigation should concentrate on the interaction between the regulatory agency and the political and economic environment in which it operated. A similar examination of other periods of the I.C.C. could be a worthwhile area for future research into the regulatory process.

Chapter 4

Issues in Contemporary Positive Political Economy

Since George Stigler's seminal paper (1971), there has been considerable development in the study of the political economy of regulation.[1] Initially, the "public interest" theory of regulation, which had been dominant for decades, was replaced by a variety of "private interest" theories.[2] In its beginning stages, the "private interest" approach was identified with a single-interest, "producer protection" view of regulation; Stigler contended that regulation is likely to favor well-organized, and therefore often industry, interests. Building upon Stigler's work, Peltzman (1976) and Becker (1983) developed more general models in which the pressures from multiple, opposing inter-

[1]George Stigler, "The Theory of Economic Regulation," *Bell Journal of Economics*, 2 (1971), p. 2-21.

Two excellent surveys of these developments are: Thomas Romer and Howard Rosenthal, "Modern Political Economy and the Study of Regulation," *Public Regulation: New Perspectives on Institutions and Policies*, edited by Elizabeth E. Bailey, (Cambridge: MIT Press, 1987), pp. 73-116.

Roger G. Noll, "Economic Perspectives on the Politics of Regulation," *Handbook of Industrial Organization, Volume 2*, edited by Richard Schmalensee and Robert Willig, (Elsevier, 1989), pp. 1253-1287.

Important intellectual predecessors to Stigler include Downs (1957) and Olson (1965). Anthony Downs, *An Economic Theory of Democracy* (New York: Harper and Row, 1957). Mancur Olson, *The Logic of Collective Action*, (Cambridge: Harvard University Press, 1965).

[2]A recent, well-reasoned attempt to integrate "public interest" and "private interest" approaches is provided by Michael E. Levine and Jennifer L. Forrence, "Regulatory Capture, Public Interest, and the Public Agenda: Toward a Synthesis," *Journal of Law, Economics, and Organization*, 6 (1990) p. 167-198.

ests are reflected in regulatory policy.[3]

One criticism of the early "private interest" literature on economic regulation is that it ignored the role of institutional structure in affecting political outcomes.[4] Economists treated the political system as a "black box" which translated interest group pressure into (privately beneficial) regulatory outcomes. More recent students of political economy have addressed this criticism through formal models of legislative and regulatory processes. In particular, the principal-agent framework has been employed to characterize the relationship between Congress and the regulatory bureacracy it establishes and oversees.[5]

Several important issues remain unresolved, however. These include the nature of interest group influence on regulation, the extent of Congressional control over agency decisions, and the mechanisms through which this control is exercised. This chapter addresses a number of these issues by exploiting the natural experiment provided by developments involving the Interstate Commerce Commission in the Progressive Era.

This choice of empirical setting is particularly appropriate. As the first United States federal regulatory agency, the I.C.C. has long been a subject of study by economists, historians, and political scientists, serving as a proving ground for competing theories of political economy. As a result, the literature on the I.C.C. has paralleled advances in the study of the political economy of regulation. I.L. Sharfman's exhaustive five volume treatise (1931-1937) embraced an implicit "public interest" theory of regulation; the Commerce Commission was portrayed as a collection of public officials, advancing the public good by successfully balancing the competing needs of the railroads and their customers.[6] This assessment of the I.C.C. came under attack in the fifties and sixties by those who viewed the Commission as the servant

[3]Sam Peltzman, "Toward A More General Theory of Regulation," *Journal of Law and Economics*, 19 (1976) p. 211-240.

Gary Becker, "A Theory of Competition Among Pressure Groups for Political Influence," *Quarterly Journal of Economics*, 98 (1983) p. 371-400.

[4]Romer and Rosenthal, p. 81

[5]One important contribution along these lines was Barry R. Weingast, "The Congressional-Bureacratic System: A Principal-Agent Perspective (with Applications to the SEC)," *Public Choice*, 44 (1984) p. 147-192.

[6]I.L. Sharfman, *The Interstate Commerce Commission: A Study of Administrative Law and Procedure* Five Volumes, (New York: Oxford University Press, 1931-1937).

of the railroads; the "capture school" of regulation had arrived. Marver Bernstein (1955) argued that the Commerce Commission had passed through a regulatory life cycle, and in its final phase the I.C.C. had come to identify with the interests of the regulated industry.[7] In slight contrast, historian Gabriel Kolko (1965) argued that federal regulation, from its very beginning, had been designed and implemented to advance the railroads' interests, by serving as a mechanism to enforce cartel rates.[8]

Contemporary work on the I.C.C. has focused on the interaction between interest groups and the institutional structure of Congress. In the context of Congressional debate over the original 1887 Interstate Commerce Act (I.C.A.), Fiorina (1982, 1986) studies Congressional choice between two alternative regulatory forms: enforcement by the courts or enforcement by an administrative agency. He advances a model in which legislator uncertainty over post-enactment enforcement influences the choice of enforcement mechanism.[9] Gilligan, Marshall, and Weingast (1989, 1990) offer a multiple-interest group interpretation of the I.C.A., a thesis they test by exploiting the difference between the House and Senate versions of the Act.[10]

The researchers surveyed here have profitably focused on two periods from the I.C.C.'s long history: the late nineteenth century, especially the years surrounding the establishment of the Commission in the 1887 Act to Regulate Commerce, and the 1930s, which brought the extension of the Commission's authority to the competitive motor carrier industry.[11] The political and economic events of the early twentieth cen-

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[7]Marver Bernstein, *Regulating Business by Independent Commission*, (Princeton: Princeton University Press, 1955).

[8]Gabriel Kolko, *Railroads and Regulation, 1877 - 1916*, (New York: Norton, 1965).

Empirical evidence consistent with Kolko's thesis was provided by Paul MacAvoy's study of trunk line grain rates. Paul MacAvoy, *The Economic Effects of Regulation: The Trunkline Railroad Cartels and the I.C.C. before 1900*, (Cambridge: MIT Press, 1965).

[9]Morris Fiorina, "Legislative Choice of Regulatory Forms: Legal Process or Administrative Process?" *Public Choice*, 39 (1982) p. 33-66.

Opcit, "Legislator Uncertainty, Legislative Control, and the Delegation of Legislative Power," *Journal of Law, Economics, and Organization*, 2 (1986), p. 33-51.

[10]Thomas W. Gilligan, William Marshall, and Barry R. Weingast, "Regulation and the Theory of Legislative Choice: The Interstate Commerce Act of 1887," *Journal of Law and Economics*, 32 (1989) p. 35-61.

Opcit, "The Economic Incidence of the Interstate Commerce Act of 1887: A Theoretical and Empirical Analysis of the Shorthaul Pricing Constraint," *Rand Journal of Economics*, 21 (1990), p. 189-210.

[11]Of course, the partial deregulation of motor carrier operations in the late 1970s through 1980

tury, the bridge between these two periods, has been largely unexplored by economists and political scientists.[12] This is an unfortunate oversight, since the dramatic changes in the regulatory system from 1906 to 1920 involve a rich set of issues. Careful study of these regulatory developments can shed light on three research issues in political economy.

First, regulatory capture. As I have argued in earlier chapters, the "revisionist" view of I.C.C. railroad regulation advanced by Kolko is inconsistent with the Commision's actions and the effects of those actions on railroad profitability during this period. Nevertheless, this experience may very well be reconciliable with a broader "private interest" approach to regulation. It is possible, for example, that during the Progressive Era shippers "captured" the I.C.C.. Evidence of such an occurrence would be at variance with the "producer protection view" of regulation that Stigler and others have offered.

Regardless of which *interests* were served by the I.C.C.'s actions, a separate issue is which *institutions* were responsible for those actions. This leads to the second research question. Were the I.C.C.'s rate denials compatible or incompatible with Congressional and Presidential preferences and intent? In other words, were these decisions the result of agency autonomy from the elected branches of government, or a reflection of Congressional\Presidential dominance of agency decisionmaking? As Weingast and Moran (1983) have noted in their work on the F.T.C., these two theories of bureacratic behavior cannot be empirically distinguished during periods of policy stability. Incidents of policy change, such as those embodied in the Mann-Elkins and Transportation Acts, offer the opportunity to ascertain the responsiveness of agency

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has sparked considerable study of both political causes and economic effects. For an examination of the former, see Martha Derthick and Paul J. Quirk, *The Politics of Deregulation*, (Washington: Brookings, 1985), who discuss the deregulation of the motor carrier, airline, and telecommunications industries.

[12]Several historians have made noteworthy contributions in this area. Kolko's narrative extends through 1916, with some additional remarks about the 1920 Transportation Act. Albro Martin gives a detailed and critical account of the I.C.C. in the Progressive Era in *Enterprise Denied* (New York: Columbia University Press, 1971). K. Austin Kerr's *American Railroad Politics, 1914-1920* (Pittsburgh: University of Pittsburgh Press, 1968), is an invaluable guide to the struggle over railroad policy at the Congressional and Presidential levels.

actions to Congressional\Presidential preferences.[13]

Third, during the Progressive Era there was considerable Congressional debate and action concerning both the structure of the I.C.C. and the substance of railroad policy. McCubbins, Noll, and Weingast (1987, 1989, 1990), aka McNollgast, have advanced a framework, discussed in chapter one, in which elected officials employ administrative structure and procedures to bias agency policies in favor of those officials' constituency.[14] By examining roll call votes on these issues, I can test their thesis, or, alternately, I can estimate the expected incidence of various procedures on the relevant interest groups.

The plan of this chapter is as follows. Initially I review the theoretical framework advanced by McCubbins, Noll, and Weingast, which explores the political role of administrative structure and procedures. An appropriate way to test this model is to examine Congressional roll call votes, and so in the succeeding section I present an econometric specification of roll call voting, and I discuss both parametric and semiparametric approaches. The sample of votes and data are then described. Finally, I present results and a concluding discussion.

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[13]Barry R. Weingast and Mark J. Moran, "Bureaucratic Discretion or Congressional Control? Regulatory Policymaking by the Federal Trade Commission," *Journal of Political Economy*, 91 (1983), p. 765-800.

[14]To quote their (1989) definitions of these terms: " ...'process' refers to the rules and standards that apply to policy decisions by an agency and guide judicial review, whereas 'structure' refers to the allocation of resources and decisional authority among agencies and within an agency. Examples of process are rules of standing and evidence and the assignment of burden of proof, whereas a flow chart depicting the sequence of actions and identifying the associated actors would reveal examples of structure. Most often, structure refers to 'veto gates' - those points in the process where policy can be killed - and which actors control them."

Matthew McCubbins, Roger Noll, and Barry Weingast, "Administrative Procedures as Instruments of Political Control," *Journal of Law, Economics, and Organization*, 3 (1987), p. 243-77.

Opcit, "Structure and Process, Politics and Policy: Administrative Arrangements and the Political Control of Agencies," *Virginia Law Review*, 75 (1989), p. 431-82.

Opcit, "Positive and Normative Models of Procedural Rights: An Integrative Approach to Administrative Procedures," *Journal of Law, Economics, and Organization*, 6 (1990), p. 307-342.

4.1 The "McNollgast" Thesis: Administrative Procedures and Political Control of Agencies

The "McNollgast problem," outlined in chapter one, is the inability of ex-post legislative actions to sanction and reverse, and thus presumably deter, regulatory agency deviations from enacted policies. If legislators are risk-averse, each will have an incentive to prevent such deviations, even if each has no reason to believe such deviations are likely to be biased away from his ideal point.[15] The "McNollgast solution" is administrative structure and procedures, which are determined *ex-ante* to constrain and channel agency policy *ex-post*. Given the need to delegate policy implementation to an agency and the desire that the implemented policy serve constituent interests, a (second-best) solution is to "enfranchise the constituents of each political actor" in the decisionmaking process of the regulatory agency. For example, giving a particular constituency standing to challenge agency decisions in court helps enfranchise that constituency. In the phrasing of McCubbins, Noll, and Weingast, regulatory structure *mirrors* the politics of the enacting coalition; interests involved in the congressional debate are represented in agency proceedings. Moreover, this structure should *stack the deck* in favor of those interest groups that were important to legislators in the enacting coalition.

This framework implies that a Congress member's vote on regulatory structure can be explained by that member's preferences over (the resulting) policy outcomes. If those policy preferences can, in turn, be linked to observable measures of constituent interest, the "McNollgast" thesis can be tested. In the next section, I discuss an econometric specification of Congressional voting and related estimation issues.

[15]Of course, if a legislator believes that a post-enactment deviation is likely to move the policy further from his ideal point, his incentive to prevent such deviation is strengthened. For example, a member of the House of Representatives might fear that after enactment, the Senate and the President could collude and move the implemented policy toward their ideal points by means of agency appointments.

4.2 Econometric Specification of Roll Call Voting

We consider a vote by a member of Congress on a motion, amendment, or bill as a random variable y_i which takes on the value 1 for a "yea" vote and 0 for a "nay" vote.[16] This qualitative response is assumed to be a function of an $m \times 1$ vector of observable legislator and constituent characteristics x_i and a disturbance term ϵ_i for $i = 1, \ldots, N$. We assume that ϵ_i is distributed independently of x_i, so we may write the probability of a "yea" vote conditional on x_i as:

$$P(y_i = 1|x_i) = E(y_i|x_i) = G(x_i'\beta) = m(x_i); \quad i \quad = 1, \ldots, N \tag{4.1}$$

where β is an $m \times 1$ vector of unknown parameters, $G(\cdot)$ is a function that remains to be specified, and $m(\cdot)$ is the mean regression of y_i on x_i. Equation 4.1 represents a single index model, since the influence of x_i on the conditional expectation of y_i is channeled through its effect on the index $x_i'\beta$.

I advance two approaches for estimating specification 4.1. The first, traditional approach is to construct a model that implies a specific functional form for $G(\cdot)$, and then to estimate β through an appropriate technique, such as maximum likelihood. The second, semiparametric approach seeks information about the coefficients β without imposing a particular functional form on $G(\cdot)$. I view these as complementary, not competing approaches.

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[16] In applying this framework, I will a vote in favor of the "railroad position" as a 1, with the "railroad position" specified based upon *a priori* information. This classification system assists in comparing results from different bills.

A separate issue is that I exclude from consideration those legislators who did not cast a vote. This could be accommodated within an ordered trinary choice framework. I have retained the binary choice framework for two reasons. First, my primary concern is the expected effect of various bills on certain interests. This inference is accomplished by studying the characteristics of legislators who voted "yea" or "nay." Second, there is likely to be considerable heterogeneity within the "nonvoting" category, including ill and absent legislators with those who consciously chose to avoid taking a public position.

4.2.1 A Parametric Approach

Specification

The most common parametric framework is to model the binary choice of "yea" or "nay" as a function of a continuous latent index variable.[17] Specifically, assume an unobservable variable y_i^* such that

$$y_i^* = x_i'\beta - \epsilon_i; \quad i \quad = 1, \ldots, N \tag{4.2}$$

where ϵ_i is a continuously distributed random error. The discrete response $y_i = 1$ is then triggered when the latent variable crosses a threshold, typically normalized to zero.[18] So y_i is determined by

$$\begin{aligned} y_i = 1 \quad &\text{if} \quad x_i'\beta - \epsilon_i > 0 \\ y_i = 0 \quad &\text{if} \quad x_i'\beta - \epsilon_i \leq 0 \end{aligned} \tag{4.3}$$

Therefore, the probability of a yea vote is the probability that $\epsilon_i < x_i'\beta$.

Following the important work of McFadden (1974), we can derive this formulation from utility maximization.[19] The latent variable y_i^* will then represent the different in the utilities associated with the two alternatives. This is demonstrated by the following spatial model of voting, which follows Poole and Rosenthal (1985).[20]

Policies are represented as points in a policy space Θ, a subset of $\Re^k$. For many

[17]This framework is explained by G.S. Maddala, *Limited-Dependent and Qualitative Variables in Econometrics*, (New York: Cambridge University Press, 1983), pp. 13-78. See also Takeshi Amemiya, *Advanced Econometrics*, (Cambridge: Harvard University Press, 1985), p. 267-359, and Thomas Stoker, "Discrete Response Models," 14.385 Note Supplement, March 1990.

[18]Since ϵ_i is distributed continuously, the latent variable y_i^* equals zero with zero probability.

[19]Daniel McFadden, "Conditional Logit Analysis of Qualitative Choice Behavior," in P. Zarembka, ed., *Frontiers in Econometrics*, (New York: Academic Press, 1974), p. 105-142.

[20]This is a standard model in political science. See James M. Enelow and Melvin J. Hinich, *The Spatial Theory of Voting*, (New York: Cambridge University Press, 1984), and Douglas Rivers, "Heterogeneity in Models of Electoral Choice," *American Journal of Political Science*, 32 (1988), p. 737 -757. To my knowledge, Poole and Rosenthal were the first to derive a linear logit specification from a spatial model of voting. Keith T. Poole and Howard Rosenthal, "The Political Economy of Roll Call Voting in the 'Multi-Party' Congress of the United States," *European Journal of Political Economy*, 1 (1985) 45-58.

of my applications the policy space will be unidimensional (pro-railroad versus anti-railroad), but certain cases may involve two or three dimensions. Legislators have preferences over this space, and each legislator i has an ideal point $z_i \in \Theta$. A roll call involves a choice between two alternatives, "nay," denoted θ_0, and "yea," denoted θ_1, with $\theta_0, \theta_1 \in \Theta$. The exact location of each alternative is known to the legislator, but unobservable to the researcher, although in most applications I will hypothesize *a priori* the relative position of the two choices.

Legislator preferences are represented by a quadratic utility function decreasing in distance from the ideal point, plus an additive disturbance term ν.[21]

The utilities from voting "yea" and "nay" are, respectively:

$$U(z_i, \theta_1, \nu_{i1}) = (\theta_1 - z_i)'A(\theta_1 - z_i) + \nu_{i1} \tag{4.4}$$

$$U(z_i, \theta_0, \nu_{i0}) = (\theta_0 - z_i)'A(\theta_0 - z_i) + \nu_{i0} \tag{4.5}$$

where A is a symmetric, negative semidefinite $k \times k$ matrix. The elements of A have the interpretation of the "salience weights" attached to different dimensions of the policy space.[22]

Legislator i votes for θ_1 over θ_0 if and only if $U(z_i, \theta_1, \nu_{i1}) > U(z_i, \theta_0, \nu_{i0})$. Algebraic manipulation of equations 4.4 and 4.5 implies that this legislator votes for θ_1 if and only if

$$\nu_{i0} - \nu_{i1} < -(\theta_0 - z_i)'A(\theta_0 - z_i) + (\theta_1 - z_i)'A(\theta_1 - z_i) \tag{4.6}$$

Simple matrix algebra reveals that condition 4.6 is equivalent to:

$$\nu_{i0} - \nu_{i1} < -\theta_0'A\theta_0 + \theta_1'A\theta_1 + z_i'A(\theta_0 - \theta_1) \tag{4.7}$$

[21]The random component reflects unmeasured aspects of the legislator's choice problem, aspects that may be rooted in unmodeled psychological factors. See Daniel McFadden, "Econometric Models of Probabilistic Choice," in *Structural Analysis of Discrete Data With Economic Applications*, edited by Charles F. Manski and Daniel McFadden, (Cambridge: MIT Press, 1981), p. 198-272.

[22]Enelow and Hinich, p. 16-20. This interpretation is somewhat misleading in the present context, however, since these salience weights will not be estimable.

The right hand side of condition 4.7 consists of two unknown constants and a term linear in z_i. The unobservable ideal point z_i is assumed to be an linear function of an observable $m \times 1$ vector of legislator and constituent characteristics x_i:

$$z_i = \tilde{\beta}' x_i \tag{4.8}$$

where $\tilde{\beta}$ is an $m \times k$ matrix of unknown coefficients.

Substituting, we can now express condition 4.7 in terms of observable variables:

$$\nu_0 - \nu_1 < -\theta_0' A \theta_0 + \theta_1' A \theta_1 + x_i' \tilde{\beta} A (\theta_0 - \theta_1) = x_i' \beta \tag{4.9}$$

As this indicates, even perfect knowledge of β would not make it possible to disentangle $\tilde{\beta}$, the influence of constituent characteristics, from $(\theta_0 - \theta_1)$, the contribution of the spatial separation of the two alternatives.[23] For our purposes, however, that is not a serious failing. In applying this specification to particular roll call votes, the primary focus will be on the *relative* influence of different constituent variables. For example, if we find that the number of railroad employees in a state increased the probability of that a Senator voted for a measure, while the number of farmers decreased that probability, we would infer that the measure was expected to help the railroads (or more specifically, railroad employees), and hurt farmers. Under the maintained hypothesis on the signs of the elements of $\tilde{\beta}$, estimates of β will allow us to test the hypothesized signs of elements of $\theta_0 - \theta_1$.

We assume that every ν_{ij}, $i = 1, \ldots, N; j = 0, 1$, is an independent draw from a Type I extreme-value distribution. As McFadden (1974) proved this is equivalent to assuming that

$$\epsilon_i \equiv \nu_{i0} - \nu_{i1} \tag{4.10}$$

is an independent draw from a logistic distribution. With this final assumption we

[23]Romer and Rosenthal (1987) have raised this point as a criticism of the "constituent interest" model of roll call voting. Endorsing the work of Poole and Rosenthal, they advocate the alternative, unidimensional, "ideological" model. Such a model is inappropriate here, however, for even if it afforded high predictive power, it could not indicate the expected incidence of various bills across different interest groups.

can complete our parametric specification of the function $G(\cdot)$:

$$P(y_i = 1|x_i) = P(\epsilon_i < x_i'\beta) = \frac{\exp(x_i'\beta)}{1 + \exp(x_i'\beta)} = \frac{1}{1 + \exp(-x_i'\beta)} \tag{4.11}$$

As equation 4.11 indicates, ϵ_i and β_i could be multiplied by the same scale factor without changing the probability of a yes vote. We shall normalize by assuming that $\text{Var}(\epsilon_i) = \sigma^2 = 1$, since we can estimate only β/σ.

Estimation

Since the data (y_i, x_i), $i = 1, \ldots, N$, constitute an i.i.d. random sample, and the qualitative response y_i is a Bernoulli random variable, the log of the likelihood function of model 4.11 is:

$$\mathcal{L}(\beta) = N^{-1} \sum_{i=1}^{N} [y_i \ln(\frac{1}{1 + \exp(-x_i'\beta)})] + [(1 - y_i) \ln(\frac{1}{1 + \exp(x_i'\beta)})] \tag{4.12}$$

The maximum likelihood estimator $\hat{\beta}$ is then the solution to the first order condition

$$\frac{\partial \mathcal{L}(\hat{\beta})}{\partial \beta} = N^{-1} \sum_{i=1}^{N} [y_i - \frac{1}{1 + \exp(-x_i'\hat{\beta})}] x_i' x_i = 0 \tag{4.13}$$

Under standard regularity conditions (Amemiya, 1985, pp. 270-271), it can be shown that the estimator $\hat{\beta}$ exists with probability approaching 1, and is consistent for β. Furthermore,

$$\sqrt{N}(\hat{\beta} - \beta) \rightarrow \mathcal{Y} \sim N(0, \mathcal{I}^{-1}) \tag{4.14}$$

where the information matrix $\mathcal{I}$ is given by

$$\mathcal{I} = -E(\frac{\partial^2 \mathcal{L}(\beta)}{\partial \beta \partial \beta'}) = \sum_{i=1}^{N} \frac{\exp(-x_i'\beta)}{[1 + \exp(-x_i'\beta)]^2} x_i x_i' \tag{4.15}$$

Computationally, the maximum likelihood estimator can be obtained by application of an iterative technique such as Newton-Raphson to any initial estimate. Since

the log likelihood function is globally concave, the procedure will converge to $\hat{\beta}$ for any initial estimate.

4.2.2 A Semiparametric Approach

Specification

The parametric specification in the previous section employed a number of strong, albeit standard, assumptions on the distribution of error terms and on other functional forms.[24] The cumulative result of these assumptions was to replace the very general function $G(\cdot)$ in equation 4.1 with the specific functional form in equation 4.11. Recent work in semiparametric estimation suggests another way to approach this problem. Stoker (1986), Härdle and Stoker (1989), and Powell, Stock, and Stoker (1989) have each derived methods to estimate β consistently up to a multiplicative scale factor.[25] As I argued in the previous section, my primary concern is estimates of β up to scale.

In particular, Härdle and Stoker (1989) have developed a method of average derivative estimation (ADE). I adopt this approach, and the exposition below directly follows Härdle and Stoker (1989) and Stoker (1991).[26]

As in equation 4.1, we let $m(\cdot)$ denote the conditional mean regression of y on x.[27] We assume $m(\cdot)$ is continuously differentiable almost everywhere, and that x is

[24]Two assumptions in particular deserve attention. First, I have assumed that the relationship between constituent interest and a legislator's ideal point is linear. This assumption has been criticized by Romer and Rosenthal (1987) as inconsistent with a fundamental characteristic of politics: its non-marginal nature. More specifically, the change in position of a "pivotal" voter can generate a discontinuous change in policy.

A second assumption is that the ϵ_i are distributed logistically. This may not be such a crucial assumption, since the logistic distribution is very similar, except at the tails, to its most common alternative, the normal distribution. But it may be that neither of these distributions is appropriate.

[25]Thomas M. Stoker, "Consistent Estimation of Scaled Coefficients," *Econometrica* 54 (1986), p. 1461-1481.

Wolfgang Härdle and Thomas M. Stoker, "Investigating Smooth Multiple Regression by the Method of Average Derivatives," *Journal of the American Statistical Association* 84 (1989), p. 986-995.

James L. Powell, James H. Stock, and Thomas M. Stoker, "Semiparametric Estimation of Index Coefficients," *Econometrica* 57 (1989), p. 1403-1430.

[26]Thomas M. Stoker, *Lectures on Semiparametric Econometrics, Lecture 3, Average Derivative Estimation*, August 1991. Preliminary Manuscript.

[27]For notational simplicity, I suppress the subscript i from x and y in much of the following discussion.

continuously distributed according to a density $f(x)$.[28] This density is also assumed to be differentiable, and to vanish on the boundary of its support.

We are interested in how the qualitative response, y, changes with x, and so it is natural to focus on the derivative of the regression function with respect to x: $\partial m/\partial x \equiv m'(x)$. The average derivative δ is then the expectation of $m'(x)$ with respect to x:

$$\delta = E(m') \tag{4.16}$$

Thus δ represents the average response of y to changes in x.

One motivation for ADE is that average derivative estimates can serve as a check on the robustness of the parametric estimates of β. Recall the single index model specified in equation 4.1. The restriction that the influence of x upon y is channelled through an index is equivalent to the condition:

$$m'(x) = \frac{\partial E(y|x)}{\partial x} = \frac{\partial G(x'\beta)}{\partial x} = \frac{dG(x'\beta)}{d(x'\beta)}\beta \tag{4.17}$$

The response of y to small changes in x is proportional to β, although the factor of proportionality depends upon the value of the index $x'\beta$. The *average* derivative will also be proportional to β, but with a *constant* factor of proportionality:

$$\delta = E(\frac{dG(x'\beta)}{d(x'\beta)})\beta = \gamma\beta \tag{4.18}$$

As a result, under the assumption that $\gamma \neq 0$, a consistent estimate of δ is a consistent estimate of β up to scale.

A second motivation is that the ADE method allows for the relationship between y and x to be characterized concisely. Once average derivative estimates $\hat{\delta}$ have been obtained, a standardized index can be formed as $w_i = x_i'\hat{\delta}$. One can then compute the kernel estimator $\hat{G}(\cdot)$ of the regression of y_i on w_i. This estimated relationship can then be summarized by a graph.

[28] We exclude for the moment consideration of discrete variables (such as party affiliation) from x.

Estimation

Let $f' \equiv \partial f/\partial x$ denote the vector of partial derivatives of the density of x, and let $l(x) \equiv l \equiv -\partial \ln f/\partial x = -f'/f$ denote the (translation) score. Then

$$\delta = E(m') = E(l(x)y) \tag{4.19}$$

follows from integration by parts, and applying the assumption that $f = 0$ on the boundary of its support.

Several asymptotically equivalent average derivative estimators have been formulated. This paper employs the "indirect slope" estimator.[29] I briefly discuss its derivation.

Applying equation 4.19 to two particular regression functions $m(\cdot)$ will facilitate the derivation of the "indirect slope" estimator. Consider first the case in which $y = m(x) = 1$, a constant. Then $m' = 0$, and so from 4.19 we have $E(l) = E(l \cdot 1) = E(m') = 0$. This in turn implies that $E(ly) = Cov(ly) \equiv \Sigma_{ly}$. The second special case is $y = m(x) = x'$. The average derivative of x' is $E(\frac{\partial x'}{\partial x}) = I_m$, the $m \times m$ identity matrix. Applying equation 4.19 yet again, $E(\frac{\partial x'}{\partial x}) = I_m = E(lx') = Cov(l, x) \equiv \Sigma_{lx}$. Therefore

$$\delta = E(m') = [E(\frac{\partial x'}{\partial x})]^{-1} E(m') = [Cov(l, x)]^{-1} Cov(l, y) = \Sigma_{lx}^{-1} \Sigma_{ly} \tag{4.20}$$

The indirect slope estimator of δ is a sample analogue of the last term in equation 4.20. Before presenting this estimator, I digress briefly to derive some of its components.

The chief ingredient is a nonparametric estimator $\hat{l}(x)$ of the score $l(x)$. This in turn requires kernel density estimators of $f(x)$ and $f'(x)$.[30]

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[29]Thomas M. Stoker, "Equivalence of Direct, Indirect, and Slope Estimators of Average Derivatives," in *Nonparametric and Semiparametric Methods in Econometrics and Statistics*, edited by W.A. Barnett, J.L. Powell, and G. Tauchen (New York: Cambridge University Press, 1991) 99-118. For a discussion of the practical advantages of the indirect slope estimator over the asymptotically equivalent alternatives, see Stoker, *Lectures on Semiparametric Economics, Lecture 3*, p. 24.

[30]For a survey on kernel density estimation, see B.W. Silverman, *Density Estimation for Statistics*

This paper employs the Rosenblatt-Parzen kernel density estimator of the density f at a particular point x_i:

$$\hat{f}(x_i) = \frac{1}{Nh^m} \sum_{j=1}^{N} \mathcal{K}(\frac{x_i - x_j}{h}) \tag{4.21}$$

where $\mathcal{K}(\cdot)$ is the product of m univariate kernel functions, and h is the bandwidth.[31] Intuitively, we can estimate the density derivative by the derivative of the density estimator:

$$\hat{f}'(x_i) = \frac{1}{Nh^{m+1}} \sum_{j=1}^{N} \mathcal{K}'(\frac{x_i - x_j}{h}) \tag{4.22}$$

These two estimators are then combined to form an estimator of the score:

$$\hat{l}(x_i) = -\frac{\hat{f}'(x_i)}{\hat{f}(x_i)} \tag{4.23}$$

The indirect slope estimator of the vector of average derivatives is:

$$\hat{d} = S_{lx}^{-1} S_{ly} \tag{4.24}$$

where

$$S_{lx} = N^{-1} \sum_{i=1}^{N} \hat{l}(x_i)\hat{I}_i(x_i - \bar{x}) \tag{4.25}$$

and

$$S_{ly} = N^{-1} \sum_{i=1}^{N} \hat{l}(x_i)\hat{I}_i(y_i - \bar{y}) \tag{4.26}$$

$\hat{I}_i$ is an indicator function which omits those observations with a small estimated density; $\hat{I}_i = 1[\hat{f}(x_i) \geq b]$, where the parameter b is the trimming bound. Since the indirect slope estimator divides by the estimated density, the estimator is not well

and Data Analysis, (New York: Chapman and Hall, 1988).

[31] In all the results presented here, the biweight kernel has been chosen. The univariate biweight kernel $k(u) = \frac{15}{16}(1 - u^2)^2 1[\mid u \mid \leq 1]$. The m-dimensional product kernel is then $\mathcal{K}(u_1, \ldots, u_m) = \prod_{j=1}^{m} k(u_j)$.

behaved in the presence of small density values.

Under certain conditions on the density $f(\cdot)$ and the bandwidth h, $\hat{d}$ is a $\sqrt{N}$ consistent, asymptotically normal estimator of δ. If we let

$$r(y_i, x_i) \equiv m'(x_i) - \delta + [y_i - m(x_i)]l(x_i) \tag{4.27}$$

then the asymptotic variance-covariance matrix of $\hat{d}$ is $E(rr')$.

Our particular application requires a slight modification of this estimator to account for the presence of discrete variables. We will want to control for the influence of political party affiliation upon a legislator's vote by means of a dummy variable DEMOCRAT, denoted D_i, taking on a value of 0 for a Republican and 1 for a Democrat. Preserving the single-index model, specification 4.1 becomes

$$P(y_i = 1|x_i, D_i) = E(y_i|x_i, D_i) = G(x_i'\beta + D_i'\alpha); \quad i \ = 1, \ldots, N \tag{4.28}$$

Equation 4.28 incorporates a redefinition of x_i and β from the logit specification. For that specification, x_i included all predictor variables, continuous and discrete, while here x_i contains only the continuous predictors. The coefficient β is redefined accordingly.

Although we cannot apply average derivative methods to find an estimate of α up to scale, this does not prevent estimating β up to scale.[32] As Stoker (1991b) notes, this merely requires estimating the the score for each value of D, and then substituting these estimates into 4.25 and 4.26.

With this general specification in mind, we can now turn to particular roll call votes and measures of constituent interest, which are detailed in the next two sections.

[32]Of course, estimation of α by logit is straightforward.

4.3 Sample of Votes

Congressional roll calls were obtained from tapes supplied by the Inter-University Consortium for Political and Social Research (ICPSR). I extracted all votes from the 60th through 66th Congresses (1909-1921) that involved railroad issues, and I then examined the *Congressional Record* to ascertain which votes merited further formal study.[33] Table 4.1 presents a brief synopsis of these votes, and the following discussion provides greater detail.

[33]I use ICPSR numbers to refer to particular roll calls. For example, RC110H63 refers to ICPSR vote number 110 in the 63rd House of Representatives.

Table 4.1: Sample of House and Senate Votes

RC114H61		To strike Commerce Court from Mann-Elkins Bill
RC115H61	(P)	To pass Mann-Elkins Bill
RC183H62		To pass an appropriations bill that abolishes Commerce Court (CC)
RC191H62		To override Taft veto and pass appropriations bill (abolishes CC)
RC200H62		To override Taft veto and pass appropriations bill (abolishes CC) after the civil service part had been changed
RC105H64		To pass the Adamson Act: Eight Hour day
RC053H65		To approve Smith amendment requiring mandatory rate suspension
RC099H65		To approve Sweet amendment to retain I.C.C. power during fedl control
RC138H66		To approve Anderson amendment on labor section of Esch bill
RC139H66		To strike the net income guarantee for the first six months of private control
RC173H66		To recommit Esch-Cummins bill (labor? & ratemaking?)
RC174H66	P	To pass Esch-Cummins conference report
RC177S61		To require mandatory rate suspension
RC191S61		To give more standing to shippers before Commerce Court
RC199S61		To strike Commerce Court from Elkins bill
RC202S61	(P)	To pass the Elkins bill
RC213S61	(P)	To pass the Mann-Elkins Conference report
RC304S62		Amendment to abolish Commerce Court
RC251S64		To pass Adamson Act: Eight Hour day
RC065S65		To approve Sims (Smith) amendment to require rate suspension
RC218S65		To preserve I.C.C. power over rates during federal control
RC241S66		To remove the labor (i.e. anti-strike) section of Cumnins bill
RC273S66	P	To approve Conference Report (Esch-Cummins Bill)
RC399S66		To amend Esch-Cummins Act to repeal rule of ratemaking section
RC400S66		To amend Esch-Cummins Act by lowering "guarantee" to 3.5% from 5.5%

KEY:

If a "Yea" vote is definitely Pro-Railroad, denoted 'P'.

If a "Yea" vote is ambiguous, but conjectured Pro-Railroad, denoted '(P)'.

For all other votes, a "Yea" is an anti-Railroad vote.

1. *The Mann-Elkins Act and the Commerce Court*

The 61st Congress enacted the Mann-Elkins Act, which considerably strengthened the power of the Interstate Commerce Commission. A controversial feature of the bill was the establishment, at the circuit court level, of a Court of Commerce, which was to possess exclusive jurisdiction over initial appeals from I.C.C. decisions.

Congressional opponents of the Commerce Court argued that with a jurisdiction composed solely of railroad matters, the Court would become biased in favor of the railroads.

Before final passage, a series of amendments was offered to alter the structure and procedures of the Commerce Court. For example, Senator La Folette proposed an amendment to give shippers standing to bring suit in the Commerce Court against confiscatorily high rates; the unamended bill offered only the railroads the option of bring suits to challenge I.C.C. orders.[34] La Folette's proposal was narrowly rejected.

There were also attempts to remove entirely the Commerce Court from the bill. Amendments to that effect failed in the Senate 28-37 and 25-38, and a motion to recommit the Mann bill back to Committee with instructions to strike the Commerce Court provision failed in the House by a vote of 157-176.[35] The Mann bill then passed 201-126 and the Elkins bill passed 50-12.[36] The Commerce Court was included in the Conference Committee bill that became law, although unfortunately only the Senate conducted a roll call vote on the Conference Report.[37]

The Commerce Court's subsequent history gave creedence to opponents' fears of a pro-railroad bias. By December 20, 1911, fifty-seven cases had been brought

[34]RC191S61, June 2, 1910.

[35]RC171S61, May 14, 1910, RC199S61, June 3, 1910, RC114H61, May 10, 1910.

[36]RC115H61, May 10, 1910, RC202S61, June 3, 1910.

[37]RC213S61, June 17, 1910. Roll call votes record each member's position, while voice and teller votes give only the totals on each side. Fortunately, most of the important railroad legislative provisions during this period were the subject of roll call votes.

before the Court, forty-four of which were brought by railroads seeking to overturn an I.C.C. decision. Twenty-seven cases had been formally addressed by that date, and in twenty of those cases "preliminary injunctions or final decrees had been issued in favor of the railroads."[38] Moreover, in deciding these cases the Commerce Court reconsidered issues of fact settled by the Commission, acting as a "second and superior" I.C.C..[39] Direct evidence of railroad influence came with the impeachment and subsequent conviction of Judge Robert W. Archbald of the Commerce Court, who received financial considerations from railroad litigants.[40]

Congressional opponents attempted to abolish the Commerce Court soon after its creation, by means of riders to appropriations bills.[41] These early attempts were thwarted by President Taft's veto, but later efforts succeeded under President Wilson.[42] These votes directly involve Congressional choice of administrative structure, specifically the nature of judicial review of agency decisions, and therefore they are directly relevant to the McCubbins, Noll, and Weingast thesis. Additionally, Congress abolished the Commerce Court after a series of pro-railroad rulings, an action which may indicate the existence of a pro-shipper Congressional majority.

2. *Adamson Act: Eight Hour Day*

Under the threat of a nationwide rail strike, Congress established that eight hours would constitute a day's work for employees of common carriers engaged in interstate commerce.[43] This was effectively a wage increase, and so was supported by railroad labor unions and opposed by railroad management.

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[38]Sharfman, Volume I, 1931, p. 64-65n.

[39]Emory R. Johnson, *Government Regulation of Transportation*, (New York: 1938), p. 230, quoted by Ari Hoogenboom and Olive Hoogenboom, *A History of the I.C.C.: from Panacea to Palliative*, (New York: Norton, 1976), p. 67.

[40]Hoogenboom and Hoogenboom, p. 68.

[41]RC183H62, August 8, 1912, RC191H62, August 15, 1912, RC200H62, August 21, 1912, and RC304S62, August 19, 1912.

[42]RC036H63, September 9, 1913. Neither chamber held a separate roll call vote on that issue.

[43]RC105H64, September 1, 1916, and RC251S64, September 2, 1916.

On this and other labor issues, there is the possibility of shipping interests and railroad capital forming a coalition against railroad labor, since shippers feared that high railroad wages would eventually be reflected in freight rates.

3. *Sims-Smith Amendment to Require Mandatory Suspension of Rates*

This measure, offered as an amendment to a bill increasing the membership of the I.C.C., would have *required* the I.C.C. to suspend and hold hearings on *any* proposed rate increase; the existing law gave the I.C.C. the power but not the obligation to suspend and judge proposed rate advances. This procedural change would have affected the substance of railroad policy by further delaying rate increases, and thereby would have helped shippers and hurt railroads. The debate and vote on this amendment took place during the Commerce Commission's deliberations on the *Fifteen Percent Case*, and so the amendment served as a thinly veiled expression of Congress' opposition to rate increases. The Senate approved the Smith amendment 51-23, but the House voted down the identically worded Sims amendment 76-156.[44] This is fairly strong evidence that a substantial number of members of Congress, including a majority of Senators, were hostile to railroad rate advances. It further suggests that the I.C.C.'s rate denials were the result of Congressional pressure, or at least were consistent with Congressional preferences.

The Sims-Smith measure contained nearly the same language as an amendment advanced by Senator Cummins during the debate on the Mann-Elkins Act.[45]

4. *Cummins-Sweet Amendment Preserving I.C.C. Powers during Federal Control*

These amendments would have preserved the I.C.C.'s authority over rates during federal control, instead of having that authority transferred to the President and his authorized agent, the Director-General of the railroads. Congressional debate revealed the belief that this jurisdictional decision would determine the prospects for freight rate increases. The Cummins amendment failed in the

[44]RC065S65, May 22, 1917, and RC053H65, June 27, 1917.
[45]RC177S61, May 26, 1910. Cummins' proposal was rejected 29-43.

Senate 24-45, and the similarly worded Sweet amendment was rejected by the House 165-210.[46]

5. *Labor Provisions in the Esch and Cummins Bills (Transportation Act of 1920)*

The Transportation Act of 1920 marked the debut of the railway unions as serious players in the battle over national transportation policy. Railroad labor was involved in a web of coalitions, aligned with railroad capital in its quest for higher freight rates, but opposed by railroad capital and shipping groups on the issue of wages.[47] Analyzing the following votes will help test this "multiple-interest group" approach to the Transportation Act of 1920.

The Senate Committee on Interstate and Foreign Commerce reported the Cummins bill, which contained provisions that were anathema to the railroad unions. In particular, the bill established compulsory arbitration of railway wage disputes, and outlawed strikes by railroad employees. These features prompted much debate and many amendments. In one such motion, Senator Stanley moved to eliminate the entire labor section of the Cummins bill; his effort was rebuffed.[48]

The Esch bill, reported by the House Committee on Interstate and Foreign Commerce, was not as objectionable to labor groups as the Cummins bill, but did contain some features opposed by the railroad unions. The Anderson amendment to the Esch bill retained the system of labor mediation that had been established during federal control. More importantly, it removed the anti-labor provisions from the Esch bill.[49]

6. *Motion to Eliminate Six Month Guarantee of Railroad Net Income During the Initial Period of Private Control*

Representative Sims offered a motion to recommit the Esch bill to the Committee on Interstate and Foreign Commerce, with instructions to remove the

[46]RC218S65, February 22, 1918, and RC099H65, February 28, 1918.
[47]Kerr offers this interpretation of labor's role.
[48]RC241S66, December 19, 1919.
[49]RC138H66, November 17, 1919.

section which guaranteed railroad net income for the first six months of private control. The attempt to deny this subsidy to the railroads failed by a vote of 166-199.[50]

7. *House Motion to Recommit Conference Committee Report (Esch-Cummins Bill)*

   This motion appears to have been aimed at changing the labor and ratemaking provisions of the Esch-Cummins bill (i.e. the Transportation Act of 1920).[51]

8. *Final Passage of the Transportation Act of 1920*

   This vote can be considered in conjunction with previous votes to characterize the ideal points of certain legislators.[52] For example, a member who voted for the motion to recommit and, after that failed, voted for final passage reveals that he would have preferred a revised bill to the existing version, but he preferred the existing version to the status quo.[53]

9. *Amendments to Repeal or Revise the Rule of Ratemaking Section of the Transportation Act of 1920*

   The Commerce Commission granted substantial rate increases in the first general rate case decided under the Transportation Act's Rule of Ratemaking.[54] After this decision, the Senate voted on two proposals to amend the Transportation Act of 1920. The first proposal would have repealed the Rule of

[50]RC139H66, November 17, 1919.

[51]RC173H66, February 21, 1920. I cannot be certain of the intent of this measure, since the motion to recommit carried no instructions to the Committee. However, the surrounding Congressional debate suggests that the labor and ratemaking provisions were the target.

[52]RC174H66, February 21, 1920, RC273S66, February 23, 1920.

[53]Krehbiel and Rivers (1988) offer a technique to characterize legislator ideal points when one possesses a set of votes in which at least one alternative is repeated. (Here the Conference Report is paired against further committee revision, and then is paired against the status quo.) They implement their technique with an ordered probit analysis of Senate voting on the minimum wage.

This approach assumes that legislators vote "sincerely" on each issue; no one supports a "killer amendment" in an attempt to defeat a bill. Krehbiel and Rivers (1990) present theoretical and empirical evidence in support of this assumption; they argue that the alternative, "sophisticated voting," is likely to be rare in practice.

Keith Krehbiel and Douglas Rivers, "The Analysis of Committee Power: An Application to Senate Voting on the Minimum Wage," *American Journal of Political Science*, 32 (1988), p. 1150-1174.

Keith Krehbiel and Douglas Rivers, "Sophisticated Voting in Congress: A Reconsideration," *Journal of Politics*, 52 (1990), p. 548-578.

[54]*Increased Rates, 1920*, 58 *I.C.C. Reports*, 220.

Ratemaking section, while the second proposal would have reduced the authorized railroad return from 5.5 percent to 3 percent. Both proposals were handily defeated, suggesting a friendlier Congressional attitude toward the railroads.[55]

[55]RC399S66, February 21, 1921, and RC400S66, February 21, 1921.

4.4 Data

As alluded to in the previous section, several groups had a pecuniary stake in the nature of railroad regulation. The following measures of constituent interest were employed. Owners of railroad securities obviously had a direct financial stake in the well being of the railroads. As my measure of this interest, I use the per capita dollar value of railroad bond holdings held by all banks, loan and trust companies in each of the states, as reported by the Comptroller of the Currency for 1914, deflated to 1910 dollars.[56] Although ideally we should like to identify the geographical distribution of *all* railroad security holders, the holdings by banks will likely serve as an effective proxy. The banks, particularly the mutual savings banks, held a significant percentage of their portfolio in railroad bonds, and held sixteen percent of the total railroad bonds outstanding.[57] Moreover, they were active participants in the national debate over transportation policy.[58] I therefore expect that the higher the value of the variable RRBONDS, the more likely a senator or representative will vote for the railroad position on an issue.[59]

Railroad labor was another important group with a clear stake in national railroad policy. They desired a high level of wages, and through that desire they may have possessed an induced interest in securing high rates. Evidence of union rent sharing would not be surprising, since that would be consistent with the modern experience of regulated industries, and the transportation industries in particular.[60] For my

[56] *Annual Report of the Comptroller of the Currency*, December 7, 1914, Volume 2, (Washington: GPO, 1915). Specifically, the holdings for National banks, state (commercial) banks, mutual savings banks, stock savings banks, private banks, and loan and trust companies are reported.

[57] Computed from figures in the *Comptroller's Report.*

[58] This was particularly true during debate over the Transportation Act of 1920. The National Association of Owners of Railroad Securities was formed to represent the views of insurance companies, savings banks, and trust companies. This organization advanced a plan for the return of the railroads to private control. See "Report of the Committee on Railroad Securities," *Proceedings of the Eighth Annual Convention of the Investment Bankers Association of America*, 1919, pp. 89-97. Frederic Washburn, "The Railroads and the Savings Banks," *Journal of the American Bankers' Association*, February 1919, pp. 419-421.

[59] Of course, railroad creditors were not the residual claimants of railroad profits, and as such they might be indifferent to the level of railroad revenues beyond the level sufficient to avoid default. Receivership was a genuine risk throughout this entire period, however, and so it is probable that bondholders were concerned with the overall financial health of the roads.

[60] For the case of trucking, see Nancy L. Rose, "Labor Rent Sharing and Regulation: Evidence

measure of railroad labor interest, RRLABOR, I use the number of males engaged in steam railroad occupations in each state, divided by the population of that state, as reported by the Census of 1910. Higher values of RRLABOR are expected to increase the probability that a member of Congress will vote for the "labor position" on an issue. When a vote directly involves wages or the rights of labor, the "labor position" is clear. If the vote concerns freight rates, however, labor might not possess an interest; if higher values of RRLABOR increase the probability of voting for higher rates, then that supports the existence of a railroad capital - railroad labor coalition on rate matters.

A final group with interest in and influence upon railroad policy was railroad customers, or shippers. Agricultural shippers were among the most important elements of this group, both economically and politically. Products of agriculture generated a significant percentage of railroad revenue.[61] Additionally, a large percentage of wheat, corn, and beef was transported by rail.[62] Moreover, farmers and cattle ranchers formed organizations both to oppose rate increases before the I.C.C. and to lobby Congress.[63] As my measure of this interest, I use the per capita value of farm production in thousands of 1910 dollars.[64]

Unlike the previous two measures, for which only state-level data are available, these data are available at the Congressional district as well as the state level.[65] Since

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from the Trucking Industry," *Journal of Political Economy*, 95 (1987), p. 1146-1178.

[61] *The Railway Library, 1914* (Chicago: Stromberg, Allen, and co, 1915), backcover.

[62] Cotton was the most important agricultural commodity transported primarily by water, not rail. Robert W. Fogel, *Railroads and American Economic Growth* (Baltimore: Johns Hopkins Press, 1964), p. 25.

[63] For instance, see the list of groups appearing before the I.C.C. in "Advances in Rates - Eastern Case," 20 *I.C.C. Reports*, 278.

[64] For members of the House of Representatives, I use the value of farm production in 1900 (in thousands), divided by the district population in 1900, and inflated up to 1910 prices. The value of farm production in 1910 is available, but only by state, and not by Congressional district, and so that has resulted in my choice of using values from 1900 for the House. (See the following footnote.) For the Senate, where only state-level data are relevant, I use the value of farm production (in thousands) in 1910, divided by the state's 1910 population.

[65] The data were gathered from the Census of 1900, and aggregated from the county level to the Congressional district level by Stanley B. Parsons, Michael J. Dubin, and Karen Toombs Parsons, *United States Congressional Districts, 1883-1913* (New York: Greenwood Press, 1990).

The Parsons' data was used directly for votes from the 60th through 62nd Congresses. Since Congressional redistricting took effect with the 63rd Congress, I had to re-aggregate the county data to conform with the changed Congressional district boundaries. I discerned the district boundaries

Table 4.2: Statistics on Constituency Characteristics

VARIABLE	MEDIAN	MEAN	S.D.	MIN	MAX
RRBONDS	2.954	14.62	21.16	0.003	98.82
RRLABOR	0.011	0.012	0.005	0.005	0.057
FMPROD	0.082	0.090	0.066	0.00004	0.323

Data are from the 61st Congress, House of Representatives. The value of DEMOCRAT varies by Congress, and is discussed later.

farmers desired low freight rates, I expect that the higher the value of this measure, FMPROD, the less likely a member of Congress will vote for the railroad position.

Statistics on these variables, for the 61st House of Representatives, are reported in table 4.2.

Clearly, other shippers possessed both interest in and influence upon the level of rates. In particular, the National Industrial Traffic League represented the interests of industrial shippers and merchants. I have been unable to obtain membership data of this or any related organization, however, and so no attempt has been made to quantify this influence.

A final explanatory variable is the political party of the member of Congress.[66] There are several rationales for including this variable. First, the two parties appealled to different clienteles, both nationally and within a given state or district. As Fenno (1977) has noted, a representative's constituency is not his (entire) district, but a particular majority coalition within that district.[67] As a result, political affiliation can help predict a member's vote on railroad issues. Specifically, a member coded DEMOCRAT is expected to be less likely to vote for the railroad position; the railroads were members of the Republicans' clientele. Evidence of this clientele is provided in table 4.3, which reports the median values of the three constituent

for the 63rd through 66th Congresses from Kenneth E. Martis, *The Historical Atlas of United States Congressional Districts, 1789-1983* (New York: The Free Press, 1982), and, when necessary, from various *Congressional Directories.*

[66]Political party classification was based upon data from the ICPSR roll call tapes, with a correction for minor parties based upon Kenneth Martis, *The Historical Atlas of Political Parties in the United States Congress, 1789-1989*, (New York: MacMillan, 1989).

One issue is whether "Insurgent" Republicans should be classified separately from "Regular" Republicans. I have chosen to classify these two groups together.

[67]Richard Fenno, *Home Style.* (Boston: Little, Brown, 1977).

Table 4.3: Median Values of Constituency Characteristics, by Party

PARTY	RRBONDS	RRLABOR	FMPROD
Democrats	0.853	0.011	0.088
Republicans	5.311	0.014	0.075
TESTS OF EQUALITY OF MEDIANS:			
p value	0.0001	0.0001	0.42

Data are from the 61st Congress.

characteristic variables for Democrat and Republican Representatives, respectively, in the 61st House. Railroad capital and railroad labor were more important, and farmers less important, to Republicans than to Democrats. The second half of the table reports the p values from three Wilcoxon rank-sum tests, one for each variable, which address the hypothesis that the sample of Democrat and Republican values are drawn from populations with the same median. The difference between the two samples is statistically significant for RRBONDS and RRLABOR, but not for FMPROD. A second reason why political affiliation is likely to possess predictive power is "party discipline." The party leadership may influence a member to vote for a position that is not directly in the interest of that member's district. Finally, political affiliation may serve as a crude proxy for ideology. Certain legislators may dislike the railroads more than other legislators, even controlling for constituent interest. In this context, too, we expect a DEMOCRAT to be less likely to vote for the railroad position.

4.5 Results

As the introduction noted, Congressional action on railroad policy during the Progressive Era can shed light on a number of related but distinct issues in positive political economy. I organize the results of estimation loosely according to the research issues involved.

4.5.1 Regulatory Structure and Procedures

A noteworthy example of regulatory structure was the Commerce Court, a subject of repeated battles in the early teens. Tables 4.4 and 4.5 present logit estimates of the determinants of Congressional votes on the Commerce Court. (See tables at end of chapter.) Consider first table 4.4, which concerns RC114H61, an amendment in the 61st Congress to strike the Commerce Court from the Mann-Elkins bill. In this and all other votes, I have coded the conjectured "railroad position" as $y = 1$. As a result, a positive coefficient on a constituent variable indicates that higher levels of that variable are associated with a greater probability of voting for the railroad position. In this case, the railroad position supported the Commerce Court. As the earlier discussion indicated, the structure of the Commerce Court favored the roads, since only the railways could challenge I.C.C. orders before the Court.

The results from specification (1) in table 4.4 lend some support to the McNollgast thesis. Both RRBONDS and FMPROD are of the expected signs, with a coefficient of 0.074 on RRBONDS and a coefficient of -7.268 on FMPROD. Both variables are statistically significant at 10 % level of significance. Also as expected, a DEMOCRAT was much less likely to vote for the railroads than was a Republican. The overall explanatory power is extraordinarily high, with 96.10 % of all votes correctly predicted.[68] The addition of RRLABOR in specification (2) improves the fit negligibly, and the coefficient on RRLABOR does not statistically significantly differ from zero.

[68]Fitted probabilities are computed from the regressors and the logit estimates. Any member with a fitted probability in excess of 50 % is predicted to vote "yea", and these predictions are then compared to the actual votes.

The results change markedly in specification (3), which omits party affiliation. These results display a pattern that will recur with other votes; omitting DEMOCRAT causes the coefficients on RRLABOR and FMPROD to become more positive, with the coefficient on FMPROD often reversing sign. In several instances, RRBONDS also becomes more positive, although that does not occur in the present case. And the explanatory power drops dramatically; here the log likelihood falls by nearly a factor of four. These changes are related to the differing national clienteles of the two parties. Republicans tended to represent those areas with higher values of RRBONDS and RRLABOR, and so when party is omitted, these variables pick up the effect of the Republican's pro-railroad bent. For other votes, I report the results when party is omitted, but they will not be a primary focus.

Table 4.5 details the results of three votes taken after the Commerce Court was in operation, votes to abolish the Court. Congress had more information about the effects of the Commerce Court when these votes were taken than when the Court was first established. The logit estimates are a strong confirmation of the thesis that Congress devises regulatory structures and procedures to promote constituents' interests. Focus initially on regressions (1), (4), and (7). For all three votes, the estimated effect of RRBONDS is positive, while the estimated effect of FMPROD is negative, and these effects are statistically significant at the 5 % level of significance. As with the vote establishing the Commerce Court, the level of RRLABOR was neither economically nor statistically significant. On this issue, railroad labor does not appear to be part of a coalition with railroad capital. Once again, political party has a strong explanatory power. These results are overall quite satisfactory, as they indicate the clout of railroad security owners and farmers in influencing their representatives' votes on regulatory structure.

Although the logit estimates are of the expected sign, one cannot readily discern *how much* the probability of a pro-railroad vote is influenced by each variable. Table 4.6 addresses that question, translating the logit estimates from specification (2) in table 4.5 into probabilities. For a member of Congress possessing the mean value of all explanatory variables, the estimated probability of voting for the railroad position

is 0.3059. For a Democrat (with all other variables at their means), this probability sinks to 0.1287, while for a Republican it soars to 0.6657. The second half of the table reports the probability of a pro-railroad vote when each specified variable is set one standard deviation above its mean, and all other variables are held at their means. Thus if RRBONDS is increased by 21.16 above its mean, with all other variables held at their means, the probability of a vote favoring the railroads is 0.5116. This illustrates the particularly strong influence of party affiliation, and to a lesser extent the influence of RRBONDS.

We now consider average derivative estimates (ADE). For these computations, each predictor variable was "standardized" by subtracting off its sample mean and dividing by its sample standard deviation; the derivative estimates reported here were rescaled to make them comparable to the logit estimates.[69] Monte Carlo work by Härdle and Stoker (1989) indicates accurate small-sample performance from employing a bandwidth h between 1 and 2, and so I let h equal 1.5. Additionally, the trimming bound b was set so that 5 % of the observations with the smallest estimated density were omitted.

Tables 4.7 and 4.8 present the average derivative estimates derived from votes on the Commerce Court; these can be directly compared to logit results in tables 4.4 and 4.5, respectively, column by column. Consider first table 4.7, dealing with RC114H61. Specifications (1) and (2) control for the influence of the discrete variable DEMOCRAT (D) on a legislator's vote, although this effect itself is not estimated. Thus columns (1) and (2) report that the coefficient estimate on DEMOCRAT is not available (NA). In contrast, specification (3) does not control for party affiliation, and so the corresponding cell is blank.

The results in table 4.7 are disappointing. In column (1), the estimated coefficients of RRBONDS and FMPROD are of the expected signs, but neither is statistically

[69]Average derivative estimates are invariant to any translations of the regressor data, and any nonsingular transformation. T. Scott Thompson, "Equivalence of Direct, Indirect, and Slope Estimators of Average Derivatives: A Comment," in *Nonparametric and Semiparametric Methods in Econometrics and Statistics*, edited by W.A. Barnett, J.L. Powell, and G. Tauchen, (New York: Cambridge University Press, 1991), p. 122.
Stoker, 1991b, Technical Appendix, p. 2.

significant. For this and all other ADE tables, the value of the Wald test statistic is reported for the hypothesis that all estimated coefficients equal zero. The value of 4.025, with an associated p value of .13, indicates we cannot reject the hypothesis of no derivative effect at conventional levels of significance. Adding RRLABOR in specification (2) changes the other estimated coefficients, unlike for the logit estimates, but these effects are neither economically nor statistically significant. Overall, these results contrast with the corresponding logit estimates in table 4.4. Strikingly, when party is omitted in (3), the ADEs are qualitatively and quantitatively similar to the logit results. The estimated effects of RRBONDS and RRLABOR are both statistically significant, while that of FMPROD is not. Morever, the estimated *relative* effects of the two statistically significant variables are nearly the same in the logit and ADE results. To illustrate, let $\hat{\beta}_1, \hat{\beta}_2, \hat{\beta}_3$ denote the estimated logit coefficients for RRBONDS, RRLABOR, and FMPROD, respectively, with the analogous definitions for the average derivative estimates $\hat{d}_1, \hat{d}_2, \hat{d}_3$. Comparing specification (3) from tables 4.4 and 4.7, $\hat{\beta}_1/\hat{d}_1 = 0.042/0.010 = 4.20$, while $\hat{\beta}_2/\hat{d}_2 = 4.08$. This indicates that the two sets of estimates attribute similar relative influence to RRBONDS and RRLABOR; if these ratios were equal, it would indicate identical estimated relative influence.[70]

My conjecture for the pattern of results in table 4.7 is that it is a consequence of a small sample property of the average derivative estimator in the presence of discrete variables. The analyzed vote was nearly along party lines, so the DEMOCRAT variable should explain most of the variation in the votes. The average derivative estimator controls for this influence, but may be unsuccessful in small samples when the discrete variable plays such an important role. This would reconcile the similarity of the average derivative and logit results in specification (3) with the differences the two methods yield for specifications (1) and (2).

Of course, one might question the validity of earlier conclusions on the Commerce Court drawn from the logit estimates. The average derivative estimates reported in table 4.8, however, confirm the conclusion that the Commerce Court was favored by

[70]These ratios are estimators of the scale factor γ which relates β to δ.

legislators beholden to railroad security holders, and was opposed by those with agricultural constituencies. The votes analyzed here were not overwhelmingly along party lines, and so the estimation problem conjectured above should not arise. Columns (1), (4) and (7) are similar to the logit results qualitatively, with RRBONDS and FMPROD having the expected, opposing effects. The estimated relative influence differs somewhat, however, as the coefficient ratios indicate. For example, for the results reported in column (1) of tables 4.5 and 4.8, $\hat{\beta}_1/\hat{d}_1 = 9.75$, but $\hat{\beta}_3/\hat{d}_3 = 5.96$. The average derivative estimates thus imply greater relative influence for farmers than the logit estimates indicate. A surprising result is that when RRLABOR is added in columns (2), (5), and (8), the estimated effect is negative and significant, the opposite of the hypothesized sign. It is noteworthy, however, that RRBONDS and FMPROD retain the expected sign. I will discuss a possible source of the difference between the logit and ADE results after examining other votes relevant to the McNollgast thesis.

Appropriate administrative procedure was the subject of the Sims-Smith amendment offered in the 65th Congress. This measure would have *required* the I.C.C. to suspend and investigate *any* proposed rate advance. The likely effect would have been to further delay rate increases, to the benefit of shippers and to the detriment of railroad owners. Table 4.9 reports the logit results from votes by the House and the Senate on this issue. These results are somewhat disappointing; RRBONDS has its expected predictive power, but the coefficient on FMPROD does not differ from zero at conventional levels of significance. ADEs for the House vote on the Sims amendment are presented in table 4.10.[71] They display the same half-empty, half-full quality as the logit estimates; RRBONDS has its expected positive effect, but the coefficient on FMPROD is statistically insignificant. Taken literally, these two sets of results imply that the proposed change in administrative procedure would have hurt the railroads but would not have benefitted agricultural shippers. This is not fully convincing, since the expected delays in rate advances should benefit shipping interests.

[71]No average derivative estimates were calculated for Senate votes. At most 75 Senators voted on a given bill, and with two senators from each state, the constituent interest variables are nearly discrete, not continuously distributed as the estimation theory requires.

The 65th Congress faced another structural issue as it considered legislation establishing the terms of federal control over the railroads. Recall that Wilson had taken over operation of the railroads in late December 1917. In early 1918 Congress faced the question of whether the President or the I.C.C. should possess authority over rates during the duration of federal control. The position of railway security holders on this matter was elucidated by Representative Green (R-IA): "those interested in increasing the profits of railways and raising the price of railway stocks and bonds have raised their voices in notes of glee over the prospect that through and by this bill the Interstate Commerce Commission is to be deprived of the power of fixing rates."[72] The first set of logit results reported in table 4.11, those concerning House vote RC099H65, confirm Representative Green's assessment; railway bondholders favored placing the rate authority in the hands of the President. The estimates from the Senate are much less precise, owing in part to the smaller number of observations. As with the issue of mandatory rate suspension, however, the estimated effect of FMPROD is negligible. As has been the pattern, RRLABOR is insignificant. One further point of interest is that on this issue, a DEMOCRAT was more likely to support the railroad position than was a Republican, contrary to previous votes. This is probably because the railroads favored transferring rate authority to the President, who of course at this time was a Democrat.

In this case, the average derivative estimates for the House vote, reported in table 4.12, are stronger than the corresponding logit results. FMPROD is now estimated to have a statistically significant negative influence on the probability of a pro-railroad vote. This estimated effect is strengthened when RRLABOR is included in the specification, and RRLABOR itself has a statistically significant positive effect, resurrecting the possibility of a railroad capital - railroad labor coalition on rate issues. Calculating the ratios of the logit and average derivative coefficients indicates little difference in the estimated relative influence of these variables; the ADEs are distinguished by their greater precision.

In order to explore the source of the difference on this vote, I implement the

[72] *Congressional Record*, February 26, 1918, 56-3-2707.

second stage of the Härdle-Stoker (1989) ADE method, which further relates the average derivative estimates to a particular parametric model.

Recall our respecification of the single index model from equation 4.28:

$$P(y_i = 1|x_i, D_i) = E(y_i|x_i, D_i) = G(x_i'\beta + D_i'\alpha); \quad i = 1, \ldots, N \qquad (4.29)$$

where x_i is the vector of continuously distributed constituent interest variables and D_i is the indicator variable for DEMOCRAT. Our parametric model of rollcall voting implies that $G(\cdot)$ is the c.d.f. of a logistic distribution, and we can investigate the accuracy of this distributional characterization. Let $\hat{d}$ denote the vector of average derivative estimates reported in column (2) in table 4.12. An index $w_i = x_i'\hat{d}$ is formed, and then a kernel estimator $\hat{G}(\cdot)$ of the regression of y on w is calculated. This regression is computed over the Republican sample, since for Republicans $D_i = 0$ and $E(y_i|x_i) = G(x_i'\beta) = G(x_i'\delta)$, where $G(\cdot)$ is rescaled after replacing β by δ. Since a c.d.f. is weakly monotonic in its argument, the bandwidth for the kernel regression was increased to the point at which the estimated regression $\hat{G}(\cdot)$ was monotonic in the index w; this bandwidth value is 0.60.

Figure 4-1 contains the graph of this estimator $\hat{G}(\cdot)$, and figure 4-2 displays the graph of the estimated derivative $\hat{G}'(\cdot)$. This derivative is an estimate of the density of the disturbance term ϵ, and according to the parametric model, this should be a logistic density. These graphs clearly demonstrate the inaccuracy of assuming a logistic distribution. Figure 4-2 in particular suggests that the disturbance term ϵ is drawn from a mixture of two or perhaps three distributions.[73] This constitutes a possible reason for the divergence between the logit and average derivative estimates; the logit estimates are based upon an inaccurate distributional assumption. Replication of this procedure for other votes also indicates a departure from the logistic distribution, although the multimodality is particularly pronounced in the present case. Of course, an inaccurate distributional assumption can generate inaccurate coefficient

[73]The bimodality remains pronounced when the bandwidth is increased to 1.0, and traces of bimodality remain even when the bandwidth is doubled to 1.2.

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Figure 4.1: ADE Regression

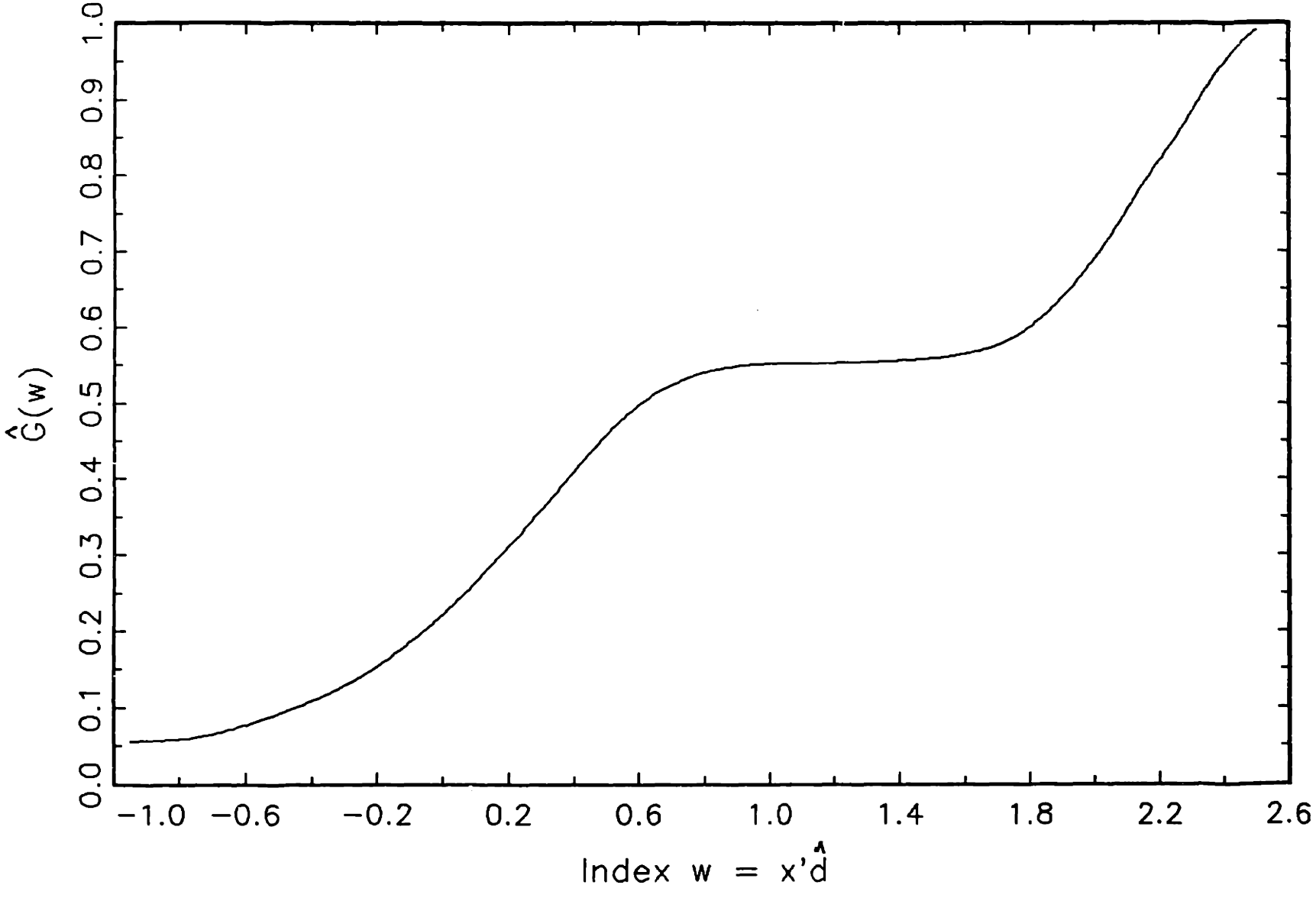

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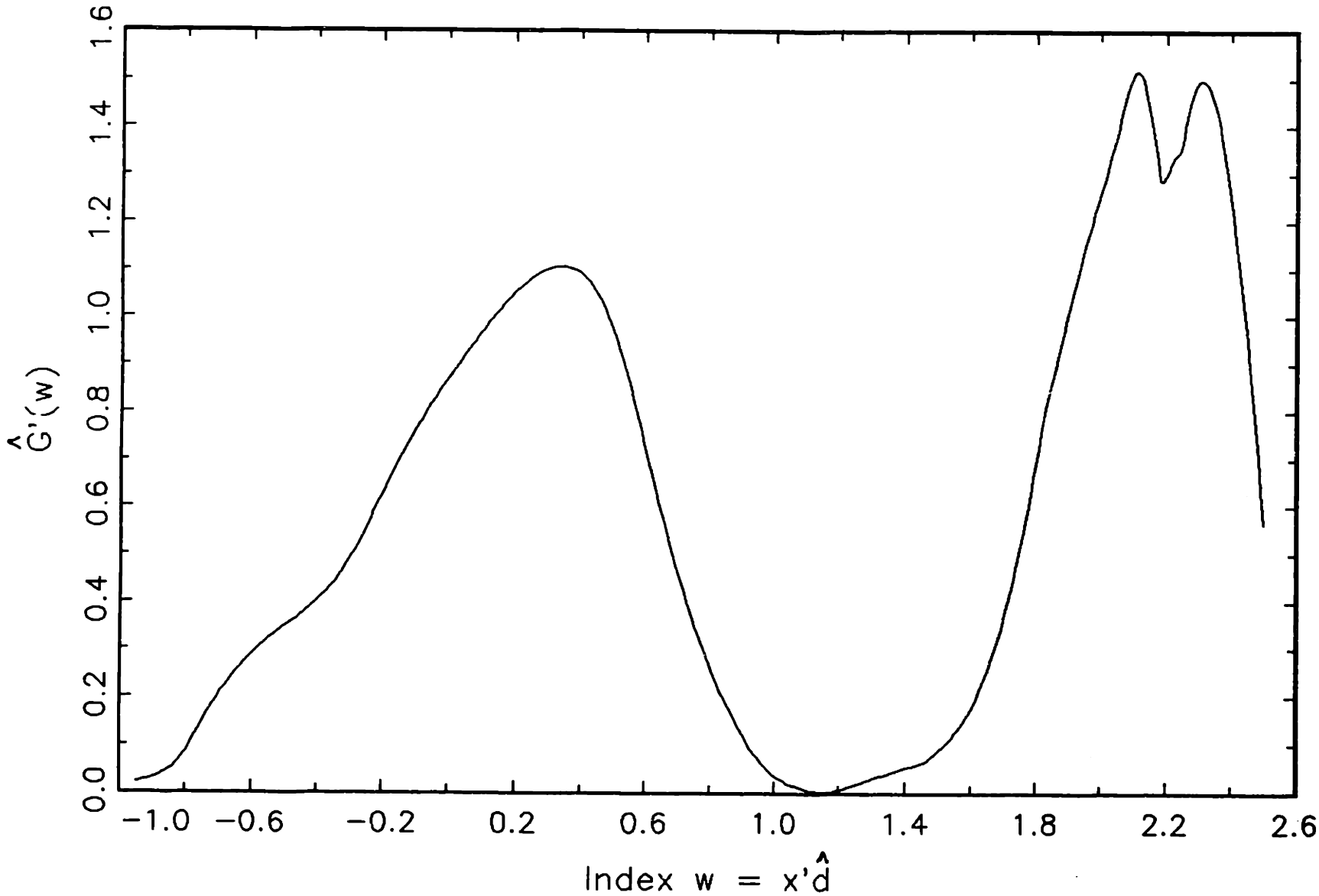
Figure 4.2: ADE Density



estimates, and so this may account for the differences in estimated influence between the logit and ADE results on other votes.

There is another interpretation of figure 4-1. The index w is a measure of the degree to which a legislator's constituency is pro-railroad, with a higher value of the index associated with a more pro-railroad constituency. The estimated regression function $\hat{G}(\cdot)$ shows how legislator behavior, in the form of the probability of a pro-railroad rollcall vote, responds to that constituency index. As figure 4-1 shows, when a member's constituency, appropriately weighted, is evenly divided between pro and anti-railroad interests, the index takes on a middle value, and the probability that the legislator casts a pro-railroad vote is 50 %. Moreover, small changes in that constituency, implying small changes in the index, have very little effect on legislator behavior. But if a legislator has a very pro-railroad constituency, and therefore a high value of the index, the probability of a pro-railroad vote is high, and this probability increases dramatically as the index increases. This suggests that in an evenly divided constituency, the political power of opposing interests cancels out, but when a legislator faces a constituency dominated by a particular interest, the member of Congress is very likely to accede to their wishes.

This discussion should not obscure, however, the fundamental conclusion of this section: Congressional action on regulatory structure and procedure can be explained by measures of constituent interest, thereby confirming the McNollgast thesis.

4.5.2 Labor Issues

In the discussion of the results on regulatory structure and procedures, I noted the possibility that railroad capital and railroad labor could have formed a coalition to secure higher freight rates. The results from the previous section lend mixed support to such a view. On labor issues, there is the possibility of another coalition, of railroad capital and shippers against railroad labor.

In September 1916, Congress forestalled a national railway worker strike by establishing that eight hours would constitute a day's work for employees of interstate

steam railroads, effectively granting those workers a wage increase.[74] The logit analysis of the factors behind passage of this legislation is contained in table 4.13, with the average derivative estimation in table 4.14. Consider first both sets of estimates from the House for specification (1). All coefficients are of the expected sign. RRBONDS increases the probability of voting for the railroad position (i.e. rejecting the eight hour day), while RRLABOR decreases that probability. Democrats were less likely to favor the railroads. For the logit estimation, the coefficient of RRLABOR is statistically significant at the 10 % level, while the other three variables are statistically significant at the 5 % level. The average derivative coefficients for both RRBONDS and RRLABOR are statistically significant at the 5 % level. Specification (2) adds FMPROD to the regressor list in an attempt to test the existence of a shipper-railroad capital coalition. The estimated effect of FMPROD differs in sign for the logit and ADE results, but neither effect is statistically significant. One explanation for the negligible estimated effect of FMPROD is that defeat of the eight hour day would have triggered a nationwide rail strike, which could have brought serious harm to farmers in the midst of harvest season. Thus farmers might have been exposed to competing pressures, fearing that the wage increase might be passed on in higher rates, but also fearing the impact of a strike. The second set of logit results in table 4.13, regressions (4), (5), and (6), involve the Senate's vote, and are unimpressive. Party affiliation has strong explanatory power, but the estimated effects of RRBONDS and RRLABOR, while of the expected sign, do not differ from zero at conventional levels of significance. Of course, with only a fourth of the observations present in the House, such imprecision is unsurprising.

The possible relationship between wages and freight rates was addressed again in the debate over the Transportation Act of 1920. The Committee bills in the House and Senate contained provisions hostile to organized labor, and amendments were offered to soften or strike these provisions. Table 4.15 contains logit estimates from two such votes. The explanatory power is generally quite poor; even the usually reliable

[74]Harry E. Jones, *Railroad Wages and Labor Relations*, (Bureau of Information of the Eastern Railways, 1947).

RRBONDS fails to be statistically significant in the specifications of chief interest (specifications (1), (2), (4), and (5)). The average derivative estimates of RC138H66, reported in table 4.16, are also unimpressive. One problem may be that the RRLABOR variable takes on the same value for every Congressional district within a given state. Yet intuitively railroad workers are likely to be clustered in particular districts, and to exert considerable political power over Representatives from those districts. In House debate on RC138H66, Representative Goodykoontz (R-WV) exemplified this situation when he noted, "in supporting the substitute amendment let me say that I am representing the wishes of thousands of my constituents. In my district are four large terminal yards. ... This great district includes employees of six railroads, and I am here to represent them."[75]

[75] *Congressional Record*, November 14, 1919, 58-8-8516.

4.5.3 Congressional Dominance v. Agency Discretion

As indicated in the introduction to this chapter, instances of regulatory change provide an opportunity to ascertain the extent of Congressional control over an agency's decisions. Ideally, I would estimate a relationship between agency policy (appropriately quantified) and some proxies of Congressional and Presidential preferences, as was done by Weingast and Moran (1983) and Moe (1985).[76] Such an approach is inappropriate in the current context, however. Although the I.C.C. ruled on hundreds of cases during the nineteen teens, only a few of these, the five general rate advance cases, possessed widespread economic significance.[77] After the Transportation Act of 1920, the Commerce Commission displayed a friendlier attitude toward the railroads, but this too was implemented by means of favorable decisions in infrequent, major cases.[78]

We are left with the task, then, of explaining two distinct regimes, the hostile rate regime of 1911-1917, and the friendlier regime of the early 1920s. I contend that the actions of the Commerce Commission were consistent with Congressional preferences during this period, and that the body of available evidence supports the "Congressional dominance" perspective. Any explanation of the I.C.C.'s actions during these years, however, will suffer from low power against alternative explanations.

A logical starting point for discerning Congressional preferences is to examine the factors behind the passage of the Mann-Elkins Act of 1910 and the Esch-Cummins Act of 1920. These two major pieces of legislation serve as bookends to the nineteen

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[76]Barry R. Weingast and Mark J. Moran, "Bureaucratic Discretion or Congressional Control? Regulatory Policymaking by the Federal Trade Commission," *Journal of Political Economy*, 91 (1983) 765-800. Terry M. Moe, "Control and Feedback in Economic Regulation: The Case of the NLRB," *American Political Science Review*, 79 (1985) 1094-1116.

[77]The I.C.C. ruled against the railroads in four cases: *Advances in Rates, Eastern Case* (1911); *Advances in Rates, Western Case* (1911); the *1915 Western Rate Advance Case* (1915) and the *Fifteen Per Cent Case* (1917). I.L. Sharfman, *The Interstate Commerce Commission: A Study in Administrative Law and Procedure. Volume III-B.* (New York: Oxford University Press, 1936), p. 33. The exception to this pattern was the *Five Per Cent Case* (1914), in which the Eastern roads, after an initial delay, were granted a 5 % freight rate advance.

[78]The Commission granted substantial rate advances in *Increased Rates, 1920* 58 *I.C.C. Reports*, 220. It ordered rate reductions in *Reduced Rates, 1922*, but only after careful consideration of the financial needs of the roads, and in response to a decline in the general price level. 68 *I.C.C. Reports*, 676.

teens.

Unfortunately, the votes on the Mann and Elkins bills were nearly completely party-line, and so neither logit nor average derivative estimates are instructive.[79] However, we can acquire some information by comparing votes on the Mann bill with votes on the unsuccessful amendment to strike the Commerce Court from the Mann bill, RC114H61. Of the 327 members who voted on both measures, 175 voted for both the Commerce Court and the resulting bill, 126 voted against both the Commerce Court and the bill, and only 26 voted against the Commerce Court but for the Mann bill.[80] This pattern suggests the incidence of the Mann bill was essentially the incidence of the Commerce Court provision; there was little middle ground. And from previous estimates we know that the Commerce Court was expected to help railroad capital and hurt farmers.

At the other end of the decade, the Esch and Cummins bills were designed to return the railroads to private control. Table 4.17 reports logit estimates from two motions on the Esch-Cummins Conference Report. RC173H66 was a motion to recommit the Conference Report back to Committee for changes, apparently to the labor and ratemaking sections. When this motion failed, the members voted on RC174H66, to approve the Conference Report. As in results from earlier votes, a DEMOCRAT was much less likely to embrace the railroad position, and the estimated effect of RRBONDS was positive, statistically significant, and economically meaningful. In a somewhat surprising result, the estimated effect of FMPROD is positive, and statistically significant. The average derivative results in table 4.18 confirm the positive influence of FMPROD although strangely the estimated effect of RRBONDS does not differ from zero at conventional levels of significance. This positive effect of FMPROD is less surprising if these votes largely concerned the labor issues, with the rate matters already settled. In that case, we might expect to see a railroad capital - shipper coalition. Although RRLABOR has little explanatory power, all the Repub-

[79] "Party discipline" may be a stronger factor in high-profile votes on major legislation, so this vote pattern is not surprising.

[80] No one voted against the Commerce Court and then for the Mann bill, just as we would expect if legislators vote "sincerely" on each issue.

licans who crossed party lines to vote against the Conference Report also voted in favor of the Anderson amendment to the labor section of the Esch bill (RC138H66), indicating that they were motivated by labor concerns.[81]

These two "bookend" bills appear to be at least moderately favorable to the railroads, an impression strengthened when one considers their provisions, especially those of the Transportation Act. What could account for the Congressional hostility in the intervening years? Table 4.19 begins to address this issue, by outlining the changes in the party composition of Congress over this period. The Mann-Elkins Act was passed by the 61st Congress, which possessed a majority of Republicans, the pro-Railroad party. The Democrats gained a majority in the House of Representatives with the 62nd Congress, their first House majority since the 53rd Congress of 1893-1895. The Republicans retrieved control of both houses with the 66th Congress, and would not again lose control until 1933.

Whether due to "ideological" reasons or differences in party clienteles, the Democrats were more hostile to the railroads than were the Republicans. This has been demonstrated by the estimates from several roll call votes. To illustrate this point further, consider table 4.20. Table 4.20 predicts the outcome of a vote to establish a Commerce Court (RC114H61) based upon the estimated logit coefficients from table 4.4 (specification 2) and the values of the explanatory variables from various Congresses. Estimated majority support for the Commerce Court evaporates in the 62nd Congress, and a solid majority supporting the Court does not return until the 66th Congress. Of course, we know that the 62nd Congress nearly succeeded in abolishing the Commerce Court, despite President Taft's vetos, and the 63rd Congress, under President Wilson, did abolish the Court.

Further evidence of Congressional preferences is supplied by the *outcomes* of certain votes. Many of these votes were lopsided, so there is very little variation for a statistical analysis to explain. Nevertheless, these votes still convey information about the sentiments of Congress.

As noted earlier, the Sims-Smith amendment to require the I.C.C. to suspend all

[81] Kerr, p. 220.

rate advances was offered during the Commission's deliberations over rate advances in the *Fifteen Per Cent Case.* Representative Sims, for one, was not worried about undermining the Commission's independence with his amendment:

> The commission is not any part of the executive departments of this Government. ...It is an arm of Congress, created by Congress to do that which Congress does not have the time to do for itself, and within limits, rules, and regulations which are laid down by Congress. They are to execute and carry them out within those limitations, and we have a right to say in the interest of the 100,000,000 of people that rates shall not be radically increased ...[82]

Although Sims' amendment failed in the House, the nearly identical Smith amendment was passed by the Senate. Members of the I.C.C. may very well have heeded Sims' message; they approved only minimal advances in the *Fifteen Per Cent Case.*

Contrast this motion with two measures offered in the 66th Congress. In *Increased Rates, 1920,* the Commerce Commission granted substantial rate advances in the first case decided under the Transportation Act's Rule of Ratemaking. The Senate voted on two proposals in reaction to this decision; one measure would have repealed the Rule of Ratemaking section, while the second amendment would have reduced the authorized railroad return. These motions were soundly defeated, 59-14, and 61-7, respectively, indicating Congressional concern for the roads' welfare, and tacit approval of the I.C.C.'s new attitude.

Direct legislation was not the sole mechanism for transmitting Congressional preferences to the I.C.C.. Theoretical and empirical work on Congressional control of agency decisions has focused upon the role of oversight committees.[83] Table 4.21 reports the values of constituency characteristics for the chairman of the House Commerce Committee, the oversight committee for the I.C.C., for the 61st-66th Con-

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[82] *Congressional Record,* June 27, 1917, 55-5-4369.

[83] Kenneth A. Shepsle and Barry R. Weingast, "The Institutional Foundations of Committee Power," *American Political Science Review,* 81 (1987) 85-104.

Barry R. Weingast, "Regulation, Reregulation, and Deregulation: The Political Foundations of Agency Clientele Relationships," *Law and Contemporary Problems,* 44 (1981) 147-177.

Weingast and Moran, 1983.

gresses. This indication of Congressional preferences is consistent with the time-pattern displayed by other measures. A Republican chairman with a solid railroad constituency was replaced in the 62nd Congress by a Democrat with more of an agricultural constituency. The 66th Congress brought the return of a Republican with a moderately strong railroad constituency.

Overall, the pattern of Commerce Commission action in the nineteen teens and early twenties is broadly consistent with several indications of Congressional preferences. Congress was hostile to the railroads for much of the nineteen teens, as was the I.C.C.. This hostility was replaced by a friendlier attitude at the end of the decade, which coincided with a more generous rate advance policy by the Commerce Commission. This evidence supports the view that Congress dominates agency decisionmaking.

4.6 Conclusion

The results presented in this chapter support several contentions. First, shipping interests exercised considerable political influence on railroad policy during the Progressive era; railroad industry "capture" of the I.C.C. did not occur until later years. Moreover, this influence was channelled through Congress, which appears to have exerted substantial control over decisions by the agency. One mechanism for ensuring this control was administrative structure and procedures; analyses of several roll call votes by both parametric and semiparametric techniques confirm the McCubbins, Noll, and Weingast thesis that Congress designs regulatory structure with the goal of advancing constituents' interests.

Table 4.4: Vote Establishing the Commerce Court*

	Logit Estimates:		
	(1)	(2)	(3)
	RC114H61	RC114H61	RC114H61
CONSTANT	3.031	2.989	-2.649
	(4.15)	(3.02)	(5.40)
DEMOCRAT	-9.624	-9.616	
	(4.81)	(4.80)	
RRBONDS	0.074	0.074	0.042
	(1.76)	(1.76)	(5.79)
RRLABOR		3.080	171.288
		(0.06)	(4.76)
FMPROD	-7.268	-7.305	1.067
	(1.93)	(1.92)	(0.54)
No. Obs.	333	333	333
Log Likelihood	-41.835	-41.833	-197.347
% Correctly Predicted	96.10	96.10	73.27

*: Absolute values of t-statistics in parentheses.

Table 4.5: Votes to Abolish the Commerce Court

	Logit Estimates:								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	RC183H62	RC183H62	RC183H62	RC191H62	RC191H62	RC191H62	RC200H62	RC200H62	RC200H62
CONSTANT	0.836	0.396	-2.726	3.427	3.781	-2.216	1.282	2.972	-3.239
	(1.76)	(0.50)	(4.21)	(4.47)	(3.99)	(4.50)	(1.79)	(2.07)	(4.86)
DEMOCRAT	-2.693	-2.601		-5.515	-5.615		-9.042	-9.115	
	(6.66)	(6.14)		(8.38)	(8.22)		(3.68)	(4.02)	
RRBONDS	0.039	0.041	0.052	0.040	0.039	0.043	0.108	0.095	0.053
	(3.79)	(3.85)	(5.43)	(3.42)	(3.31)	(5.52)	(2.18)	(2.04)	(4.88)
RRLABOR		28.605	119.790		-21.193	93.427		-103.092	94.916
		(0.69)	(2.97)		(0.67)	(2.95)		(1.39)	(2.39)
EMPROD	-6.688	-6.834	-1.969	-12.996	-12.884	0.590	-8.725	-8.609	2.358
	(2.43)	(2.47)	(0.79)	(3.50)	(3.43)	(0.28)	(2.26)	(2.19)	(0.84)
No. Obs.	219	219	219	274	274	274	207	207	207
Log Likelihood	-94.947	-94.703	-117.716	-77.403	-77.188	-163.965	-34.374	-33.055	-101.265
% Correctly Predicted	79.45	79.45	74.43	85.04	85.04	69.34	92.27	93.24	76.81

*: Absolute values of t-statistics in parentheses.

Table 4.6: Probability of Pro-Railroad Vote on RC183H62

		PROBABILITY
At means of variables		0.3059
As a Democrat	†	0.1287
As a Republican	†	0.6657

VARIABLE	INCREASE†	PROBABILITY
RRBONDS	21.16	0.5116
RRLABOR	0.005	0.3370
FMPROD	0.066	0.2192

†All other variables are evaluated at their means.

Table 4.7: Vote Establishing the Commerce Court, ADE*

	Average Derivative Estimates:		
	(1)	(2)	(3)
	RC114H61	RC114H61	RC114H61
DEMOCRAT	NA	NA	
RRBONDS	0.001	0.002	0.010
	(0.94)	(1.17)	(3.05)
RRLABOR		-2.315	41.952
		(0.72)	(4.77)
FMPROD	-0.219	0.020	-0.115
	(1.48)	(0.09)	(0.18)
No. Obs.	333	333	333
Wald Stat.	4.025	2.069	28.486
p value	0.13	0.56	0.00

*: Absolute values of t-statistics in parentheses. A bandwidth of 1.5 was employed, and 5 % of the observations were trimmed.

Table 4.8: Votes to Abolish the Commerce Court, ADE*

	Average Derivative Estimates:								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	RC183H62	RC183H62	RC183H62	RC191H62	RC191H62	RC191H62	RC200H62	RC200H62	RC200H62
DEMOCRAT	NA	NA		NA	NA		NA	NA	
RRBONDS	0.004	0.004	0.012	0.004	0.003	0.010	0.006	0.004	0.011
	(2.23)	(2.00)	(2.57)	(2.53)	(2.07)	(2.84)	(4.72)	(2.51)	(2.81)
RRLABOR		-14.219	8.884		-17.813	16.798		-29.791	5.127
		(3.78)	(1.06)		(4.29)	(1.70)		(10.09)	(0.64)
FMPROD	-1.123	-0.608	-0.222	-1.129	-0.733	-0.238	-1.074	-0.687	0.296
	(4.37)	(2.04)	(0.33)	(5.46)	(3.10)	(0.38)	(6.08)	(3.32)	(0.46)
No. Obs.	219	219	219	274	274	274	207	207	207
Wald Stat.	26.747	29.170	7.836	40.299	37.891	9.540	72.271	147.200	8.392
p value	0.00	0.00	0.05	0.00	0.00	0.02	0.00	0.00	0.04

*: Absolute values of t-statistics in parentheses. A bandwidth of 1.5 was employed, and 5% of the observations were trimmed.

Table 4.9: Sims-Smith Amendment to Require Rate Suspension*

	Logit Estimates:					
	(1)	(2)	(3)	(4)	(5)	(6)
	RC053H65	RC053H65	RC053H65	RC065S65	RC065S65	RC065S65
CONSTANT	0.664	0.995	0.317	-0.086	-0.865	-2.102
	(1.62)	(1.87)	(0.86)	(0.09)	(0.76)	(2.15)
DEMOCRAT	-0.522	-0.624		-1.725	-1.841	
	(1.60)	(1.81)		(2.45)	(2.50)	
RRBONDS	0.057	0.057	0.064	0.086	0.094	0.103
	(3.55)	(3.51)	(3.95)	(2.67)	(2.85)	(3.34)
RRLABOR		-26.185	-11.462		41.367	30.976
		(0.98)	(0.46)		(1.41)	(1.26)
FMPROD	-1.173	-0.497	0.324	-10.405	-10.039	-3.264
	(0.49)	(0.20)	(0.13)	(1.01)	(0.94)	(0.34)
No. Obs.	233	233	233	75	75	75
Log Likelihood	-128.757	-128.270	-129.943	-29.019	-28.026	-31.511
% Correctly Predicted	68.67	68.67	67.81	81.33	82.67	82.67

*: Absolute values of t-statistics in parentheses.

Table 4.10: Sims-Smith Amendment to Require Rate Suspension, ADE*

	Average Derivative Estimates:		
	(1)	(2)	(3)
	RC053H65	RC053H65	RC053H65
DEMOCRAT	NA	NA	
RRBONDS	0.006 (2.49)	0.008 (3.38)	0.014 (3.22)
RRLABOR		5.443 (0.94)	9.930 (0.76)
FMPROD	0.148 (0.42)	-0.119 (0.31)	-0.186 (0.26)
No. Obs.	233	233	233
Wald Stat.	6.416	12.945	11.629
p value	0.04	0.00	0.01

*: Absolute values of t-statistics in parentheses. A bandwidth of 1.5 was employed, and 5% of the observations were trimmed.

Table 4.11: Votes on Presidential v. ICC Rate Authority*

	Logit Estimates:					
	(1)	(2)	(3)	(4)	(5)	(6)
	RC099H65	RC099H65	RC099H65	RC218S65	RC218S65	RC218S65
CONSTANT	-2.402	-3.201	1.360	-0.164	-0.897	0.757
	(5.69)	(5.08)	(3.70)	(0.21)	(0.89)	(1.02)
DEMOCRAT	4.016	4.317		1.519	1.635	
	(10.64)	(9.87)		(2.52)	(2.61)	
RRBONDS	0.061	0.067	0.009	0.032	0.037	0.017
	(6.37)	(6.40)	(1.53)	(1.49)	(1.70)	(0.91)
RRLABOR		52.920	-73.487		36.462	23.869
		(1.80)	(2.87)		(1.12)	(0.86)
FMPROD	-1.698	-2.593	-3.654	-4.270	-3.566	-8.989
	(0.69)	(1.02)	(2.09)	(0.68)	(0.56)	(1.45)
No. Obs.	383	383	383	69	69	69
Log Likelihood	-157.710	-156.167	-248.555	-38.648	-37.894	-41.600
% Correctly Predicted	79.90	80.16	63.71	72.46	73.91	71.01

*: Absolute values of t-statistics in parentheses.

Table 4.12: Votes on Presidential v. ICC Rate Authority, ADE*

	Average Derivative Estimates:		
	(1)	(2)	(3)
	RC099H65	RC099H65	RC099H65
DEMOCRAT	NA	NA	
RRBONDS	0.011	0.017	0.006
	(7.58)	(11.24)	(1.81)
RRLABOR		16.957	-20.183
		(5.15)	(2.27)
FMPROD	-0.416	-0.638	-0.693
	(2.03)	(2.98)	(1.28)
No. Obs.	383	383	383
Wald Stat.	63.247	144.315	13.038
p value	0.00	0.00	0.00

*: Absolute values of t-statistics in parentheses. A bandwidth of 1.5 was employed, and 5% of the observations were trimmed.

Table 4.13: Adamson Act: Eight Hour Day*

	Logit Estimates:					
	(1)	(2)	(3)	(4)	(5)	(6)
	RC105H64	RC105H64	RC105H64	RC251S64	RC251S64	RC251S64
CONSTANT	0.537	0.772	-2.884	3.632	2.183	-3.516
	(0.59)	(0.80)	(5.07)	(2.16)	(0.98)	(3.61)
DEMOCRAT	-3.908	-3.961		-6.393	-6.111	
	(6.02)	(6.05)		(4.72)	(4.47)	
RRBONDS	0.031	0.027	0.050	0.011	0.032	0.091
	(3.03)	(2.37)	(5.52)	(0.25)	(0.62)	(3.53)
RRLABOR	-109.466	-108.158	18.895	-30.046	-22.621	23.642
	(1.89)	(1.87)	(0.58)	(0.51)	(0.38)	(0.90)
FMPROD		-2.043	2.675		12.794	23.569
		(0.69)	(0.94)		(0.90)	(2.80)
No. Obs.	298	298	298	75	75	75
Log Likelihood	-87.159	-86.919	-123.545	-12.400	-12.008	-37.521
% Correctly Predicted	84.56	85.23	82.89	96.00	96.00	76.00

*: Absolute values of t-statistics in parentheses.

Table 4.14: Adamson Act: Eight Hour Day, ADE*

	Average Derivative Estimates:		
	(1)	(2)	(3)
	RC105H64	RC105H64	RC105H64
DEMOCRAT	NA	NA	
RRBONDS	0.008	0.004	0.010
	(6.19)	(2.96)	(3.07)
RRLABOR	-22.318	-24.754	-6.366
	(8.40)	(9.06)	(1.08)
FMPROD		0.217	0.356
		(1.04)	(0.71)
No. Obs.	298	298	298
Wald Stat.	163.964	112.980	13.431
p value	0.00	0.00	0.00

*: Absolute values of t-statistics in parentheses. A bandwidth of 1.5 was employed, and 5% of the observations were trimmed.

Table 4.15: Amendments to the Labor Sections, Esch and Cummins Bills*

	Logit Estimates:					
	(1)	(2)	(3)	(4)	(5)	(6)
	RC138H66	RC138H66	RC138H66	RC241S66	RC241S66	RC241S66
CONSTANT	-0.633	-0.995	-1.247	1.232	0.900	-1.115
	(1.52)	(2.16)	(3.43)	(1.73)	(0.73)	(1.18)
DEMOCRAT	-0.342	-0.237		-2.148	-2.084	
	(1.36)	(0.92)		(3.41)	(3.19)	
RRBONDS	0.005	0.010	0.011	0.023	0.028	0.052
	(0.91)	(1.60)	(2.00)	(1.25)	(1.18)	(2.39)
RRLABOR	-10.300	-15.879	-8.791	12.491	12.563	15.093
	(0.41)	(0.62)	(0.37)	(0.48)	(0.49)	(0.61)
FMPROD		3.495	3.874		3.767	12.896
		(1.91)	(2.17)		(0.32)	(1.27)
No. Obs.	365	365	365	66	66	66
Log Likelihood	-222.411	-220.581	-221.005	-33.292	-33.238	-39.088
% Correctly Predicted	69.59	69.59	69.32	74.24	72.73	66.67

*: Absolute values of t-statistics in parentheses.

Table 4.16: Amendments to the Labor Sections, Esch Bill, ADE*

	Average Derivative Estimates:		
	(1)	(2)	(3)
	RC138H66	RC138H66	RC138H66
DEMOCRAT	NA	NA	
RRBONDS	-0.003	0.001	0.002
	(1.98)	(0.60)	(0.71)
RRLABOR	0.312	0.264	-9.311
	(0.07)	(0.06)	(1.17)
FMPROD		1.635	2.310
		(5.81)	(4.32)
No. Obs.	365	365	365
Wald Stat.	3.903	34.658	19.036
p value	0.14	0.00	0.00

*: Absolute values of t-statistics in parentheses. A bandwidth of 1.5 was employed, and 5% of the observations were trimmed.

Table 4.17: Motions on the Esch-Cummins Conference Report*

	Logit Estimates:					
	(1)	(2)	(3)	(4)	(5)	(6)
	RC173H66	RC173H66	RC173H66	RC174H66	RC174H66	RC174H66
CONSTANT	0.963	1.089	-2.285	1.323	1.388	-1.805
	(2.93)	(2.12)	(5.55)	(3.91)	(2.80)	(4.47)
DEMOCRAT	-3.322	-3.352		-2.921	-2.936	
	(11.70)	(11.18)		(10.68)	(10.22)	
RRBONDS	0.027	0.027	0.038	0.023	0.023	0.036
	(3.36)	(3.32)	(6.10)	(3.02)	(3.00)	(5.53)
RRLABOR		-9.490	106.198		-4.997	99.302
		(0.32)	(3.72)		(0.18)	(3.47)
FMPROD	5.978	6.112	8.496	4.296	4.367	7.104
	(2.53)	(2.54)	(4.48)	(1.87)	(1.87)	(3.73)
No. Obs.	414	414	414	412	412	412
Log Likelihood	-165.449	-165.398	-248.795	-180.372	-180.355	-246.015
% Correctly Predicted	85.51	85.51	69.08	82.28	82.28	68.69

*: Absolute values of t-statistics in parentheses.

Table 4.18: Motions on the Esch-Cummins Conference Report, ADE*

	Average Derivative Estimates:					
	(1)	(2)	(3)	(4)	(5)	(6)
	RC173H66	RC173H66	RC173H66	RC174H66	RC174H66	RC174H66
DEMOCRAT	NA	NA		NA	NA	
RRBONDS	0.002	-0.001	0.006	0.002	0.002	0.006
	(1.57)	(0.43)	(2.22)	(1.72)	(0.99)	(2.26)
RRLABOR		0.855	35.713		1.642	37.133
		(0.20)	(4.16)		(0.41)	(4.37)
FMPROD	0.975	1.062	2.471	0.683	1.337	2.100
	(4.64)	(4.41)	(4.62)	(3.13)	(6.01)	(3.90)
No. Obs.	414	413	414	412	413	412
Wald Stat.	21.595	20.746	53.311	10.538	39.329	48.544
p value	0.00	0.00	0.00	0.01	0.00	0.00

*: Absolute values of t-statistics in parentheses. A bandwidth of 1.5 was employed, and 5 % of the observations were trimmed.

Table 4.19: Composition of Congress by Party†

CONGRESS NUMBER	YEARS	SENATE	HOUSE
60	1907-1909	31-61	167-223
61	1909-1911	32-60	172-219
62	1911-1913	44-52	230-162
63	1913-1915	51-44	291-134
64	1915-1917	56-40	230-196
65	1917-1919	54-42	214-215
66	1919-1921	47-49	192-240
67	1921-1923	37-59	131-302

†The breakdown is given in the order, Democrats-Republicans. These totals are taken from Kenneth C. Martis, ***The Historical Atlas of Political Parties in the United States Congress, 1789-1989***. (New York: MacMillan, 1989), and may not sum to the total number of representatives because members of minor parties have been excluded.

Table 4.20: Imputed Votes on the Commerce Court, 61st-66th Congresses

CONGRESS NUMBER	*Actual Vote*
61	176-157
	Predicted Votes
61	187-146
62	111-163
64	125-173
65	193-190
66	203-162

Table 4.21: Values of Constituency Characteristics, Chairman of House Commerce Committee

CONGRESS NUMBER	PARTY	RRBONDS	RRLABOR	FMPROD
61	Republican	4.65	0.015	0.005
62-65	Democrat	0.79	0.008	0.095
65	Democrat	0.07	0.010	0.093
66	Republican	2.62	0.011	0.010

Committee assignments from data prepared by Garrison Nelson, University of Vermont, March 31, 1989: "Congressional Committee Assignments, 1789-1989."

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