

Schiffman, Daniel A.

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# Political-Legal Institutions and the Railroad Financing Mix, 1885-1929

Daniel A. Schiffman\*

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**Abstract:** During the 19<sup>th</sup> Century, U.S. railroads relied primarily on debt issues to finance their growth. This policy contributed to major financial crises, beginning in 1857, 1873 and 1893. Nevertheless, railroads failed to reduce their leverage over 1900-1929, and suffered severe consequences during the Great Depression. In order to explain this puzzle, I focus on several key political-legal developments that originated around 1885. These are: (a) Changes in the bankruptcy process; (b) the emergence of large institutional investors, whose holdings came to be restricted by state laws; and (c) an increase in the power of federal railroad regulators, who refused to grant essential rate increases. I construct a counterfactual in order to measure the effects of regulatory policy. I find that railroads would have paid significantly higher dividends, had rates kept up with inflation over 1910-1916.

\*Department of Economics, Bar Ilan University, Ramat Gan, Israel 52900. E-mail: [schiffd@mail.biu.ac.il](mailto:schiffd@mail.biu.ac.il) . I am indebted to the following for useful comments and suggestions: Charles Calomiris, Charles Himmelberg, Glenn Hubbard, Michael Riordan, and Manuel Lobato. The usual disclaimer applies.

## I. Introduction

During the Great Depression, U.S. railroads suffered from a severe case of debt deflation and financial distress. Many firms were highly leveraged; they struggled to maintain interest payments in the face of a drastic fall in revenues and profits. The heavy pressure to avoid default led to reductions in real activity (Schiffman 2001a), which had serious repercussions for the general economy. Despite U.S. Government assistance, many railways eventually succumbed to bankruptcy. By 1938, one-third of all railway mileage was operated by bankrupt firms. The railroad crisis, in which high leverage played such a prominent role, prompted a reexamination of the financing choices that railroad firms had made in the past.

Two central questions come to mind: (a) What were the initial considerations that determined the capital structures of railroads? Did these considerations shift over time? If so, how and why? (b) By the late 19<sup>th</sup> Century, it was painfully obvious that highly leveraged firms could not survive a general economic downturn. The early 20<sup>th</sup> Century saw the emergence of large scale stock financing in the industrial sector. Why didn't railroads respond to these realities by reducing their reliance on debt and shifting to equity?

In a previous paper (Schiffman 2001b), I found that debt financing mitigated significant agency and control problems that impinged on 19<sup>th</sup> Century financial markets. At the same time, stocks were very expensive to underwrite.

This is why debt became the leading instrument of external finance. Around 1885, a new host of factors emerged that affected the financing choices of railroads. Among these factors were developments in the bankruptcy system, state regulation of institutional investors, and federal regulation of the railroads themselves.

The present paper elaborates on post-1885 developments and explains their significance. In addition, it makes a quantitative assessment of the claim that federal regulation made railroad stocks unattractive to investors. The major findings of the paper are: (a) The issuance of contingent claims securities in place of fixed claim securities (a common practice in reorganizations) had unanticipated negative consequences for firms, by restricting their future financing options; (b) In the early 1900's, state legislatures prohibited the purchase of railroad stock by institutional investors. This factor may have been only marginally important, since institutions tended toward conservative investment strategies even in the absence of regulation; (c) The rate policy administered by the Interstate Commerce Commission prevented railroads from paying competitive dividends, and effectively closed off the option of a significant shift towards stock financing.

The remainder of the paper is organized as follows: Section II reviews the quantitative data on railroad financing from 1890-1929, Section III explores the

institutional and regulatory developments that are at the core of the paper, and Section IV concludes.

## **II. The Railroad Financing Mix, 1890-1929: What Do the Numbers Say?**

The ICC's statistics go back to 1890; industry-level data are available for selected balance sheet items. Although it is not possible to compute the exact debt to capital ratio, we can compute the ratio of long term debt to long term debt plus paid-in share capital.<sup>1</sup> From 1890-1929, this ratio rose from 50.9% to 58.6%. Exactly when did the shift towards debt occur, and under what circumstances? Table 1 shows constant annual growth rates, by decade, of funded debt (over one year term) outstanding, interest accrued, paid-in share capital (both common and preferred), equity (when available—see table for definition), operating revenues, and net income (see table for definition).

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<sup>1</sup>Under the accounting system used by railroads, “capital stock” appears on the liability side of the balance sheet. This item is equal to the historical sum of paid-in share capital, both common and preferred. “Funded debt” also appears as a liability (“funded” means over one year term). Total capital can be approximated as “capital stock” + “funded debt”. Data on short term debts and accounts payable are not available. These tended to be small relative to “capital stock” and “funded debt.”

**Table 1**

<b>Selected Operating and Financial Indicators, All U.S. Railroads:</b> <b>Annual Growth Rates by Decade (1890-1940)</b> (Source: ICC. Includes Funded Debt and Stock Held by Railroads. Excludes Funded Debt Matured and Unpaid. Net income = profits after taxes and interest but before dividend payments. Paid-in share capital equals the historical total of funds raised through sales of stock, both common and preferred. Equity = paid-in share capital + surplus + undistributed net income. Until 1916, the ICC's reporting date was June 30. From 1916, it was December 31.) The decade 1910-1919 is split into two periods, due to federal control during 1917-1919.						
<b>Period</b>	<b>Funded Debt</b>	<b>Interest Accrued</b>	<b>Paid-in Share Capital</b>	<b>Equity</b>	<b>Operating Revenue</b>	<b>Net Income</b>
1890-99	2.11%	1.41%	2.52%	—	2.50%	5.85%
1900-09	6.32%	4.71%	3.09%	—	5.82%	6.38%
1910-16	2.62%	2.91%	1.86%	2.31%*	3.58%	2.38%
1917-19	-0.37%	0.21%	-1.14%	-0.58%	12.95%	-13.14%
1920-29	1.07%	1.67%	0.94%	2.78%	0.11%	8.17%

\*This figure is based on 1911-16 data. Corporate surplus was not reported for years prior to 1911.

Between 1900 and 1929, funded debt grew by 149%, while paid-in share capital grew by 69.7%. Table 1 shows that this difference in growth rates was maintained in every decade (except the years of federal control, 1917-1919), and it was greatest in the 1900-09 period. If we consider equity, a more complex picture emerges. From 1911-1916, equity grew at virtually the same rate as debt

(2.31% and 2.30% per year, respectively),<sup>2</sup> which is very close to the growth rate of equity; from 1917-1919 both fell, with equity falling at a slightly faster rate; and from 1920-1929, equity grew much faster than debt. The ratio of debt to debt plus equity stood at 51.5% in 1911 and 1916, fell to 49.4% in 1919, reached 52.3% in 1921, then fell to 47.1% in 1929. These numbers make it is clear that, as a group, the railroads did not expand their debt recklessly during the 1920's.<sup>3</sup> Unfortunately, it is not possible to make comparisons with 1890 and 1900, because we have no data on retained earnings prior to 1911.

In summation, railroad finance developed in an uneven and sometimes unsteady pattern, over the period 1890-1929. What were the major events, internal and external, that may have influenced the financial decisions of railroads?

The period 1893-97 was disastrous for railroads, and was dominated by a wave of bankruptcies and reorganizations that encompassed close to one-quarter of U.S. railway mileage. But at the end of this process, both debt and interest

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<sup>2</sup> This differs from the 2.62%/year growth shown in Table 1; the year 1910 has been excluded in this calculation in order to facilitate a comparison with the growth rate of equity. The latter is computed over 1911-1916, due to a lack of data for earlier years.

<sup>3</sup> According to figures compiled by Hickman (1953), industry (excluding railroads) expanded its outstanding bonded debt by 8.2% per year from 1920-1929. The corresponding figure for railroads is 1.13% per year (this is close to the 1.07% shown in Table 1). Despite this rapid expansion, industry remained a relatively low-debt sector in 1929, having begun the decade with very low levels of debt. For manufacturing, net interest payments on long term debt were 3.7% of that sector's contribution to National Income. The corresponding figure for railroads was 9.1% (author's calculations, based on data from Kuznets 1941).

accruals were sufficiently scaled down so that their 1890-99 growth rate was exceeded by the growth rates of stock outstanding, operating revenues and net income. Interest accrued grew more slowly than funded debt, reflecting a slow but steady decline in the average interest rate paid.

The decade 1900-1909 was one of robust growth in revenues and profits, along with expansion that was financed through the sale of securities in a strong capital market. But growth in external financing was heavily weighted towards debt. Interest rates continued to fall, which certainly added to the attractiveness of debt financing. From 1890-1909, net income grew faster than funded debt, but this trend did not continue in 1910-16. There were several reasons: Wages and prices for fuel and materials rose significantly; although specific figures are unavailable, we know that over 1910-16, the general price level rose by 4.8% per year.<sup>4</sup> Yet the ICC (which had been granted ratemaking authority in 1906) refused to grant sufficient rate increases; average rates fell by 0.34% per year.<sup>5</sup> (Section III (iii) elaborates on the influence of ICC regulation.) In addition, tax

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<sup>4</sup> The general price index was compiled by the Federal Reserve Bank of New York and is available from the NBER's Macro History Database. Wages receive a weight of 15%, while transportation costs have a weight of 5%. An alternative index that excludes transportation costs would show a higher rate of increase. It is worth noting that over the 1910-15 period, the index grew at 3% per year; it surged upward by 17.6% in 1916 alone.

<sup>5</sup> This figure is a weighted average of changes in freight and passenger rates. The weights used are the shares of each type of traffic in total revenues (during 1910-16, approximately .69 for freight and .31 for passengers).



accruals rose by 7.35% per year. The average interest rate rose as well. Dividends (expressed as a dollar amount) declined by 2.80% per year, including a 27% drop in 1915 alone.<sup>6</sup> This compares very unfavorably to the corresponding figure for 1900-09, an increase of 9.7% per year.

From December 1917-December 1919, revenues surged but net income fell dramatically. This was the period of federal control, an emergency measure intended to address the coordination problems that accompanied World War I.<sup>7</sup> Operating costs rose 24% per year (especially maintenance, which rose 32% per year); the U.S. Railroad Administration had to pay much higher prices to obtain scarce labor and materials. The ratio of operating costs to operating revenues rose from 70.6% to 85.6%. The government's agreement with the railroads effectively locked in the low profits of the previous three years.<sup>8</sup> Investors received lower dividends (an average of 3.84% of book value of stock in 1917-19, vs. 4.57% on average from 1910-16).

In 1920 the railroads were returned to private ownership. Winning the war required maximal utilization and minimal maintenance; the railroads inherited deteriorated facilities and equipment, and initially, large-scale

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<sup>6</sup> In November 1914, *The Magazine of Wall Street* noted that many railroads had cut dividends recently. What precipitated these decisions? "Two floods, two droughts, rising prices for railway supplies, new wage agreements and the installation of new safety equipment tell the tale."

<sup>7</sup> Federal control began on December 26, 1917 and ended March 1, 1920.

<sup>8</sup> For more details regarding federal control, see Godfrey (1974).

expenditures were required. Operating revenues showed virtually no growth over 1920-29, as autos, trucks, buses and airplanes took away traffic that had previously moved by rail. Still, net income expanded at a fast clip due to efficiency improvements that reduced operating expenses by 2.9% per year. New external financing was tilted slightly in favor of bonds, although placements of stock surged during 1927-29, causing equity to grow substantially.

### **III. Institutional and Regulatory Developments, 1885-1929**

In Section II, we documented two main facts: (a) Debt continued to dominate railroad capital structures after 1885; (b) The predominance of debt intensified from 1900 to 1929, as debt grew substantially faster than did equity. A series of new developments, whose effects were felt beginning as early as 1885, encouraged these trends. Here, we discuss three key developments in detail: The institutional features of the bankruptcy process, the increased influence of institutional investors, and the role of federal rate regulation.

#### **(i) The Bankruptcy Process and its Influence on Financing Options**

Bankruptcy institutions were seriously flawed, in that new corporations often emerged from the process with a capital structure that made stock sales impossible. In many cases, fixed charges were not reduced sufficiently, and the next recession brought another bankruptcy. Even if fixed charges were reduced

significantly, this was often accomplished by substituting contingent charges against the new company for fixed charges against the old. The new contingent charges often took the form of “income bonds”, which obligated the firm to pay interest, but only if earned. Essentially, these securities were a form of preferred stock, and differed from the latter in name only. They were rarely issued except in reorganizations, and were considered an unattractive investment.

What were the major features of bankruptcy? Until 1898, the U.S. had no formal bankruptcy law; corporate insolvencies were resolved by means of the equity receivership. In over 90% of receiverships during 1867-97, existing managers were appointed as receivers (Tufano 1997). They had the power to operate the railroad, disaffirm leases and contracts, suspend interest payments to creditors, and raise cash by means of supersenior securities called receivers’ certificates.<sup>9</sup> Meanwhile, concerned parties, usually bondholders, formulated a plan of reorganization and argued for its approval by the court.

There was a coordination problem inherent in this process: Security holders, no matter how junior, could block prospective plans of reorganization in order to press for better terms. Judges set low “upset values” (a price at which junior stockholders could be bought out, if they did not agree to participate in the new company) in order to solve this “hold-out” problem. In most cases,

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<sup>9</sup>The latter were first used in 1872. They were strenuously challenged in the courts until 1886, when their legality was upheld by the Supreme Court. By 1895, they had become widely accepted.

bondholders accepted new bonds in place of unpaid interest, reduced interest payments (sometimes in the form of adjustment bonds, whose interest rates rose over time) and the substitution of contingent charge securities (preferred stock and income bonds) for fixed interest securities. Preferred and common stockholders were assessed in order to raise new funds; part of the proceeds was used to pay off the receivers' certificates.

During the pivotal years of 1893-1898, private bankers, led by JP Morgan and Kuhn Loeb, played a major role as reorganization managers and became acknowledged specialists in this field. They also made important changes in corporate governance structures. Voting trusts were established in over 50% of 1890's railroad reorganizations. The voting trust was authorized to vote on behalf of shareholders, and its function was to exercise oversight over management. It had three to five members who were typically representatives of the private bankers who had reorganized the company. Usually, its term of service lasted for five years or until the new company began to pay dividends. After this point, the bankers would retain some measure of influence by holding one seat on the new board of directors.<sup>10</sup> The bankers used their power to engineer a large-scale merger movement; by 1906, seven "communities of

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<sup>10</sup>Voting trusts and interlocking directorates became a thing of the past in 1914, when the Clayton Act enjoined bankers from serving on the boards of corporations whose securities they underwrote.

interest” controlled two-thirds of the nation’s railroad mileage, and 85% of railroad operating revenues.

Tufano (1997) examines the 57 railroad receiverships that occurred from 1884-1899, based on an earlier study in Poor’s Manual of Railroads 1900. Total fixed charges (for all 57 firms) were reduced by 35%. This was done by reducing the amount of bond principal outstanding by 22% and reducing the average interest rate paid from 5.78% to 4.72%. In fourteen cases, income bonds were provided for in the capital structure of the new company. An examination of Poor’s Manual (1900) shows that 48% of the reduction in (fixed charge) bond principal was accomplished by retiring old fixed interest bonds and replacing them with income bonds. Thus, a 10.6% reduction in fixed charges resulted from the substitution of income bonds for “straight” (fixed interest) bonds.

Tufano asserts that the substitution of contingent claims reduced the likelihood of bankruptcy. Based on 20<sup>th</sup> Century experience, it appears that in the short run this innovation was beneficial, but in the long run, it hampered the ability of firms to raise money via stock. A full investigation of the subsequent development of the 57 reorganized firms would be quite useful, but is beyond the scope of this paper. Nevertheless, some partial evidence can be offered here. As of December 17, 1917, two of the fourteen firms (that were issuers of income bonds in reorganization from 1884 to 1899) were bankrupt once more. These

firms accounted for 23% of the income bonds issued in the reorganizations of 1884-99.

What were the hidden pitfalls of income bonds? Contingent charges were often cumulative—if interest had not been paid in one or more previous years, no dividends could be paid until the arrears had been paid *in full*. Suppose that a depression hit, necessitating the suspension of contingent interest payments. If the charges were cumulative, the firm would need several years of recovery in order to catch up on arrears while paying current fixed and contingent charges. In the meantime, (barring a boom of fantastic proportions), stockholders would receive no dividends. From the view of a common shareholder, it made no difference whether interest charges were fixed or contingent (or new preferred stock was issued); too many senior claims on earnings made it very unlikely that he or she would ever receive a dividend. Financing through stock consequently became virtually impossible.

It was precisely during Tufano's sample period that private bankers emerged as leaders in railroad reorganization (JP Morgan began his activity in this area in 1884). Assuming that they understood the potential dangers of cumulative income bonds, why did they choose to include these securities in new capital structures? According to a 1935 memorandum written by RFC staff members, the cumulative provision was meant to protect holders of income bonds from "improper diversion of funds" by management. In other words,

noncumulative income bonds would create an incentive for managers to tunnel, then declare that earnings were insufficient to cover contingent interest. Managers could do so with impunity, at least in the short term. Making income bonds cumulative took away this incentive.

Fears of tunneling also led to restrictive covenants, which ultimately imposed costs on the new firm. For example, firms commonly agreed to give holders of (new) contingent claims the right to vote on any proposed issue of mortgage bonds or preferred stock. This worsened the cash flow constraints of firms that could not sell common stock. However, it would not have been rational for investors to purchase contingent claim securities without such protection, since the firm, by issuing new senior securities, could effectively turn their investments into interest-free loans.

It is also possible that the pattern of assessments in reorganization added to the appeal of bonds and detracted from the appeal of stocks. Tufano reports that in 37 of the 57 reorganizations (of 1884-99), security holders were assessed and a total of \$96 million was raised. Of this sum, common and preferred stockholders supplied \$87 million; just \$9 million came from bondholders.

Despite the unequal burden of assessments, stockholders in bankrupt companies did not always fare badly. Daggett (1908) calculated that for eight reorganizations done from 1893-98, stockholders who chose to pay what they were assessed and then held their stock for six months earned, on average, a

107% annualized return. These figures notwithstanding, bankruptcy poses great risks for junior security holders, and investors may have feared that in future situations, the railroads would not recover as strongly as they did in the late 1890's.

The private banks were prime movers in another development that favored debt at the expense of equity. During the post-1897 merger movement, it was common practice for acquiring firms to issue bonds and use the proceeds to buy up the stock of the company being acquired. The stock itself would serve as collateral for the new bonds. The issuance of these "collateral trust bonds" partially reversed the progress that had so recently been made in reducing fixed charges.

In the 20<sup>th</sup> Century, prior to the Depression, reorganizations became more contentious and more difficult than they had been in the 1890's. Anecdotal evidence indicates that despite the continued involvement of private bankers (as well as their allies, the insurance companies), firms sometimes emerged from bankruptcy with virtually the same fixed charges as before. It was no surprise that such firms experienced early and severe financial distress in the years of the Depression. The reorganizations of 1910-1929, and their contributions to the disaster of the early 1930's, are an important topic for future research.



## **(ii) A New Source of Funds: Institutional Investors**

Financing choices were also influenced greatly by increased interest in railway securities on the part of institutional investors. In keeping with a conservative investment philosophy, they tended to choose bonds over stocks. The railroads had no choice but to cater to these preferences and accept the greater risks of reliance on bond financing.

The involvement of institutional investors in railway securities began with the life insurance companies in the early 1880's. Life insurers developed a close relationship with investment banking houses, which handled railway security issues. Originally, insurers purchased both stocks and bonds of railways, but after 1906, they were legally barred from buying stock. In April of that year, New York State passed a law designed to reform the insurance business. One of its provisions was to prohibit life insurers from investing in stocks or collateral trust bonds (bonds which are secured by shares of stock in another corporation). Existing holdings of such securities had to be sold by the end of 1911 (later extended to 1916). By the end of 1907, nineteen other states had followed New York's example.

After 1900, banks became active investors in the railroads. In many states, their investment choices were restricted by law; among railway securities, only high grade bonds were acceptable. In the key state of New York, such

restrictions took effect in 1900.<sup>11</sup> By the late 1920's, institutions of higher education and investment trusts (which emerged from obscurity in the late 1920's) occupied a prominent position among holders of railroad bonds. New York regulated the trusts from 1909, subjecting them to the same restrictions on investments as savings banks. The actions of state legislatures effectively reinforced the inherent conservatism of institutional investors.

### **(iii) “Enterprise Denied”—The Role of Government Regulation in Harming Railroad Credit**

The era of 1898-1917 was a very prosperous one for the nation, marked by technological innovation and strong financial markets. The railroads enjoyed robust growth in traffic and productivity. Through consolidation of the industry, ruinous rate wars became a thing of the past. Why didn't the railroads take advantage of this situation? Shouldn't they have reduced their fixed charges, by placing greater emphasis on equity finance and retained earnings? The answer is that they were prevented from doing so by federal regulatory policies, which

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<sup>11</sup> As of 1906, New York permitted banks to invest in railway bonds subject to certain conditions. The major conditions of interest were: (a) That the firm paid a dividend of at least 4% on all stock in the previous five years; (b) That the book value of stock outstanding was least one third of the debt outstanding; (c) For railroads operating principally in New York, plus certain roads included in a grandfather clause, earnings had to be sufficient to cover all fixed charges; for other U.S. roads, earnings had to be sufficient to cover fixed charges five times. This legislation was almost definitely inspired by the events of 1893-1898.

harmed their profitability and financial standing. Our story comes mainly from Albro Martin's Enterprise Denied (1971).<sup>12</sup>

As an introduction to this section, a brief review of railroad legislation is in order. Railroads came under federal regulation in 1887, with the passage of the Interstate Commerce Act.<sup>13</sup> The newly established ICC did not have the power to set rates. Its main power was to rule on complaints from shippers and other parties, subject to appeal in the federal courts. From 1887-1897, the ICC's decisions were overturned in 90% of rate cases that were appealed. In 1906, the Hepburn Act authorized the ICC to set maximum rates and order compliance with its decisions within thirty days. The federal courts were directed to accept ICC rulings unless appellants could prove that the rate in question was fair, and

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<sup>12</sup>Martin's view is diametrically opposed to that of Kolko (1965). Kolko stresses that the railroads always supported federal regulation. They saw it as a boon because it protected them from capricious and contradictory state regulation and ended the destructive rate wars of the 19<sup>th</sup> Century. He sees the ICC as essentially pro-railroad, and concludes that federal regulation was, on balance, a triumph for the railroads. But Kolko's evidence is weighted toward legal and political rhetoric, not economic analysis. He interprets the actions of the ICC (and other major actors) mainly in light of their statements. Martin shows that the ICC spoke very positively of the railroads' needs, while in fact giving them little in the way of rate increases. Despite this, railroads had no choice but to be diplomatic with the ICC, because they hoped to win future rate cases, and because state regulation was far worse. Kolko discusses the status of railroads in the capital markets only superficially, and provides little economic analysis. See n. 19 for a clear cut example, which demonstrates some of the flaws in Kolko's argument.

<sup>13</sup>The ICA's main provisions were: (1) that rates be "just and reasonable," and that they be posted at all stations and depots; (2) outlawing the giving of rebates and drawbacks to shippers; (3) prohibiting pooling of traffic Requiring among roads; (4) prohibiting price discrimination between long and short hauls; (5) establishing the ICC. In 1903, the Elkins Act made it illegal for shippers to ask for a rebate.

the ICC's decision unfair.<sup>14</sup> This law elevated the ICC from a state of weakness to a position of power and influence; at the same time, it placed the railroads at a great legal disadvantage. In 1910, the Mann-Elkins Act authorized the ICC to suspend rate increases, pending a hearing involving all affected parties, and established the Commerce Court as a court of appeals for ICC rulings.<sup>15</sup>

According to Martin, railroad credit deteriorated and investment stagnated after 1907 because (1) costs rose but rates remained at 1887 levels, due to “archaic Progressive” federal regulation.<sup>16</sup> In an inflationary economy with

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<sup>14</sup>Suppose that the ICC refused an application for higher rates, and a railroad appealed the decision. Not only did the appellant have to justify the increase that it sought, but it also had to show that the current rate had been reasonable to begin with. Since rates were differentiated by commodity and region, there were thousands of individual rates. There was no hard and fast criterion for setting rates; the question of what constituted a “just and reasonable” rate was never definitively answered. Therefore, it was virtually impossible to meet the standard of evidence demanded by the law.

<sup>15</sup> Other provisions of the Mann-Elkins Act were: (1) Prohibiting railroads from acquiring other lines; (2) extending the ICC's jurisdiction to telephone, telegraph, cable and wireless companies. The Commerce Court antagonized Congress by reversing almost all ICC decisions appealed to it (almost always, the Commerce Court was later overruled by the Supreme Court). It was abolished in 1913, when its remaining support evaporated due to the implication of one of its judges in a corruption scandal.

<sup>16</sup>In Martin's writings, the term “archaic Progressivism” represents a philosophy characterized by the following: (1) Fear and loathing of big business, and a belief that business and financial leaders were guilty of a conspiracy to exploit the common person; (2) the assumption that all large enterprises that were experiencing difficulties had been destroyed by mismanagement, monopolistic practices and financial abuses. If only these practices were ended, profitability would be restored; (3) A complete failure to comprehend the principles of economics and finance. Specifically, archaic Progressives were unable to understand that the continued growth and

increasingly assertive labor unions, materials, fuel and labor became significantly more expensive. In addition, large expenditures were made on items that served the public interest, but had little potential for increased revenue (e.g. new passenger terminals and government-mandated safety improvements).<sup>17</sup> The railroads appealed for rate increases, but the ICC refused repeatedly to grant them relief.<sup>18</sup> The resulting decline in profitability reduced the amount of funds available for plowback; (2) the investor community was unwilling to pour money into an industry that faced “the passage of the Hepburn Act, the movement to apply the antitrust laws to the railroads, the hostility of state legislatures, [and] the rising demands of increasingly powerful labor unions.” That is, investments in railroads came to be considered speculative; external funds could be attracted only by paying high dividends and interest rates. When low operating earnings

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development of any industry is contingent on the reinvestment of retained earnings as well as the payment of adequate returns to stockholders. To archaic Progressives, any “excess” profits earned by the railroads belonged by right to shippers and the public. The distinction between real and nominal prices was also lost on archaic Progressives.

<sup>17</sup>New York’s Penn and Grand Central Stations, Washington’s Union Station and Kansas City’s Union Station are among the new facilities that were opened in the early 1910’s.

<sup>18</sup>With the exception of a few commissioners, the ICC held a narrow, judicial view of its responsibilities. The Commission confined its attention to determining the reasonableness of individual rates, and took no little or no responsibility for adjusting the general level of rates or for facilitating the overall growth and development of the railway system. Martin writes that the ICC’s approach was rooted in the unworkable legislation passed by Congress. The members of the ICC failed to realize that circumstances required them to go beyond the literal meaning of the law.

forced many firms to cut their dividends, and drove some into bankruptcy, external funding dried up.

In his view, had the railroads been free of “archaic Progressive” regulation (which precluded rate increases), the effects of rising labor costs could have been mitigated, profitability could have been maintained, and investment would have been adequate to cope with increased demand. Furthermore, the railroads would have been able to handle the challenges brought about by World War I, and federal control (which lasted from 1917-20) might have been avoided. He argues further that, absent archaic Progressive regulation, innovations such as the diesel locomotive and air-conditioned passenger cars might have been introduced after 1914, instead of in the mid-1930’s.

But beyond the loss of new investment and technological progress, there were other, less tangible costs. To Martin, the most deleterious consequence of archaic Progressive regulation was the creation of a perverse set of incentives. The railroads came to realize that no matter what they accomplished in improving technology, productivity and service, they would receive no monetary reward. In this environment, it was essential for the railroads to avoid showing healthy profit margins or generous dividends. Any evidence of free cash flow would have been used to justify opposition to rate increases.

Martin’s emphasis on the perversion of economic incentives suggests the possibility that ICC regulation distorted financing choices as well. The railroads

came to have a strategic interest in showing large fixed charges. They hoped that evidence of financial stress would move the commissioners to approve a rate increase. On the other hand, this approach communicated negative signals about expected railroad profitability, and is likely to have made the stock market less receptive to new offerings. There was a similar problem in the field of labor relations. In the 1880's, railway unions ("brotherhoods") first emerged as a force to be reckoned with. Reports of high net incomes made it easier for them to mount a "concerted movement" for wage increases; through high fixed charges, net incomes could be kept down, forcing unions to limit their demands somewhat.

As Martin admits, counterfactual conjectures cannot and should not be seen as definite indications of what would have happened in the absence of a particular factor. We cannot be certain that major technological innovations would have arrived twenty years before they did and that federal control would have been avoided under an alternative regulatory policy. However, Martin is on solid ground in arguing that the ICC impoverished the railroads and "slowly but inexorably" ruined their credit. On this point, Martin writes:

One danger signal that turned up at this early stage in the new era of regulation [after the passage of the Hepburn Act-DS] was the fact that the roads were forced to rely much more heavily on outside financing (stocks and bonds) than on retained earnings. They were able to do this by turning increasingly to foreign capital, by

emphasizing new forms of financing, such as equipment trusts, and by paying a consistently rising price for the funds they raised. Sales of stock, which in pre-1907 years had averaged only 16% of funds raised annually (including retained profits), were to average 25% in the period 1907-14. In the pivotal year 1912 they reached 42% of the total, when equities were expanded by \$317 million, or nearly one-third more than in any previous year. Dividend rates were well maintained up to 1911, when they averaged 5.4%, thus encouraging investment in railroad equities. But after the shattering events of 1910 and 1911 [the denial of a request for higher rates and a decline in profitability while the general economy prospered-DS]...the story was different.

During the 1898-1906 period, plowback averaged \$156 million per year from net income, and that accounted for one-third of the railroads' growth needs. During 1906-1914 plowback dropped to \$122 million per year, and provided for just 18% of total growth needs. The year 1911 is a case in point; plowback fell to its lowest level since 1898. Despite cuts in dividends (from 5.4% to 4.6% of stock book value, on average), plowback was even lower in 1912.

At the same time, the financial markets lost confidence in the prospects of the railroads. "External financing dried up altogether or was greatly reduced in



1912 and 1913.” Physical investment programs had to be canceled for lack of funds, and a severe deficiency developed in this area. Had net new investment continued to grow with traffic according to pre-1907 relationships, \$5.6 billion more would have been invested during 1907-1914.

In the 1890’s, slightly over one-third of railroad stocks had paid dividends. This proportion was steadily increased until it exceeded two-thirds in 1907, but no further progress was made. From 1907 to 1914, dividends averaged 4.8% of book value. At the same time (circa 1910), industrial and utility securities began to account for the majority of trading on the major exchanges; this displaced the railroads from their position of dominance. The policy and regulatory environment caused harm to the railroads precisely at a time when alternative investment opportunities were growing rapidly. Beginning in 1914, the Allied war effort became a magnet for funds. In 1915, a year of low traffic, railroads paid dividends on just 58% of their stocks, and the average dividend was below 3.7%.<sup>19</sup> In that year, industrials prices boomed, but rail prices failed to keep pace (see Figure 1).

Railway stocks and bonds were very difficult to sell, despite the efforts of the investment banks. Many railways were forced to resort to short term loans;

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<sup>19</sup>To support his claim that federal regulation increased railroad profits, Kolko makes the following statement: “The percentage of railroad stock paying dividends increased from 39% in 1888 to 67% in 1910, and the average rate of dividends on all stock rose from 2.1% to 5% over the same period.” He makes no mention of financial developments after 1910, nor does he mention the increase in bankruptcies that occurred during 1913-16.

Martin gives a figure of about \$1 billion, which exceeds one-third of 1915 operating revenues. During 1915 and 1916 there was a wave of receiverships, which peaked at 14.7% of U.S. railway mileage (as of June 30, 1916). This figure was the highest since 1896 (See Figure 2).

During the period of federal control, the ICC was brushed aside while the U.S. Railroad Administration approved large across the board rate increases. The government guaranteed the railroads a return equal to that earned during the period of July 1, 1914 to June 30, 1917. This locked in the low profits of the preceding years until six months after the end of federal control on March 1, 1920. While the government provided loans for the purchase of badly needed new equipment, maintenance work was kept to an absolute minimum, for obvious logistical reasons. The properties were returned in poor condition, and the carriers demanded extensive compensation from the government. In most cases, they were forced to settle for much less than they wanted, and to reenter the capital markets in order to finance a complete overhaul and modernization program.

In 1921-24, railroads absorbed 13.3% of all new private financing in the U.S. Over that same period, stock sales accounted for just 4% of new funds raised by railroads (no stock was sold in 1921). The corresponding figure for all corporate issues was 21%. Although stock played a greater role in railroad finance from 1927 to 1929, the financing mix continued to emphasize bonds over

stock. The proportion of stocks in total funds raised by railroads was 23%, compared to 52.5% for all corporate issues.<sup>20</sup>

The Transportation Act of 1920 was a watershed in the history of railroad regulation--for the first time, regulators were charged with the responsibility of ensuring adequate earnings. Railroads were supposed to earn a return of 5.75% per year on property investment. Nevertheless, this goal was not achieved in any year during the 1920's (although the rate of return did exceed 5% in 1925-26 and 1927-28). The emergence of competition from trucks, buses and other transportation alternatives made rate increases a much less effective strategy for increasing profitability.

While we must be cautious in sketching counterfactuals, it is possible that regulation deprived the railroads of a potential opportunity to alter their financing mix and reduce their reliance on debt. Suppose that railroads, over the 1910's, had paid generous dividends each year while reinvesting nice sums in property and equipment. In that case, the stock market would have been willing to provide much greater resources. The railroads might have been able to sell new stock and retire a significant amount of their long term debt.

Since the counterfactual depends on generous dividend payments, we must determine what path dividends would have taken, had the ICC pursued a more flexible policy. Suppose the ICC had decided to link railway rates (both

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<sup>20</sup> These computations were made by the author based on data from Moody's 1941.

passenger and freight) to the cost of living index, beginning on January 1, 1911. Also suppose that shippers and the public understood that real rates were being held constant (no money illusion), and note that at the time, there were no serious alternatives to rail transportation. It is therefore reasonable to assume that the new rate policy would have left physical traffic volumes unaffected. Using the rates implied by the hypothetical ICC policy, we can compute a hypothetical series for operating revenues (shown in Table 3).<sup>21</sup> Hypothetical revenues always exceed actual revenues, and the difference is most pronounced in 1916, as the cost of living rose 17.5% and traffic grew by almost 24%.

Using data from 1890-1910, we can estimate the following historical relationship:  $\text{Log difference of net income} = -0.069 + 3.139 * \text{Log difference of operating revenues}$  (adjusted  $R^2 = 0.673$ , t-statistics: -1.75 and 6.34). Plugging in the hypothetical log difference of operating revenues, we obtain predicted values for the log difference net income, from which the predicted level of net income may be computed.<sup>22</sup> There is a dramatic difference between the actual and hypothetical paths of net income, especially in 1915 and 1916.

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<sup>21</sup>A negligible amount of revenues was attributable to neither freight nor passenger service; I assume that these miscellaneous revenues would not have been affected by the hypothetical rate policy.

<sup>22</sup>The regression was run in log differences because both series appeared to be nonstationary in levels, based on Dickey-Fuller and Phillips-Perron tests. Since many categories of operating expenses are difficult to reduce, it is possible that the revenue-profit relationship is not symmetric (that is, the relationship is stronger during downturns). To allow for this, I estimated the following regression:  $\text{Log difference of net income} = -0.01711 + 2.4552 * \text{Log difference of}$

**Table 3--Actual and Hypothetical Operating Revenues and Net Income, 1910-1916**

<b>Year</b>	<b>Cost of Living (1910=100)</b>	<b>Actual Operating Revenues</b>	<b>Hypothetical Operating Revenues</b>	<b>Actual Net Income</b>	<b>Hypothetical Net Income</b>
1910	100.00	2,812,142	2,812,142	583,191	583,191
1911	101.04	2,852,855	2,858,048	547,281	572,559
1912	104.17	2,906,416	3,025,879	453,125	639,077
1913	104.17	3,193,118	3,373,979	546,761	839,367
1914	104.17	3,127,730	3,284,192	395,492	719,629
1915	112.50	2,956,193	3,336,610	354,787	705,715
1916	132.29	3,472,642	4,627,907	671,398	1,839,120

Given a hypothetical net income series, we can calculate the maximum (average) dividend rate that could have been paid, had all net income been distributed as dividends. We also assume that dividends were paid only out of current income (not by borrowing). We can compare the maximum feasible (average) dividend rate to the actual average dividend rate, and to the maximum feasible (average) dividend rate based on actual net income. We can also compute hypothetical (average) dividend rates based on a more conservative dividend policy that is consistent with the historical record. From 1890-1910, the railroads retained 20.26% of their net income; we will use this figure in our computations (the actual retention ratio over 1910-16 averaged 19.08%).

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operating revenues in years of increasing operating revenues + 4.19493\* Log difference of operating revenues in years of decreasing operating revenues (adj.  $R^2 = 0.672$ , t-statistics: -0.258, 2.87 and 3.54). While a formal hypothesis test does not lead to a rejection of symmetry, this is probably due to the small number of observations. In any event, using this regression to construct the counterfactual has little effect on the results.

**Table 4-- Actual and Hypothetical Dividend Rates, 1910-1916**

<b>Year</b>	<b>Actual Dividend Rate</b>	<b>Maximum Feasible Avg. Dividend Rate, (Retention Ratio =0) Based on Actual Net Income</b>	<b>Maximum Feasible Avg. Dividend Rate (Retention Rate=0), Based on Hypothetical Net Income</b>	<b>Hypothetical Avg. Dividend Rate, Based on Hypothetical Net Income, Retention Ratio = 20.26% of Net Income</b>
1910	5.00%	7.19%	7.19%	5.73%
1911	5.43%	6.46%	6.76%	5.39%
1912	4.64%	5.25%	7.41%	5.91%
1913	4.29%	6.35%	9.75%	7.77%
1914	5.20%	4.56%	8.29%	6.61%
1915	3.66%	3.94%	7.85%	6.26%
1916	3.78%	7.41%	20.30%	16.19%

While a 16% dividend would (most probably) never have been paid in any year, a dividend of at least 5.9% could have been paid in each year from 1912-1916. The (hypothetical) windfall of 1916 might have provided for major upgrades of equipment and facilities, and better preparedness for the exigencies of the following year. Finally, many of the bankruptcies that occurred during 1913-16 would have been avoided.

#### **IV. Conclusion**

We have seen that given a more flexible regulatory policy, railroads would have paid higher dividends. However, we cannot be sure of the precise impact of

higher dividends on financing opportunities (and ultimately, on the debt/equity mix). Several reasonable arguments can be made against our counterfactual, to the effect that the financing mix would not have changed even if railroads had paid higher dividends: (a) Industrials would have eclipsed railroads in the stock market even if railroad stocks would have paid higher dividends. It was inevitable, given the growth and development of large industrial corporations and the technological advances that they pioneered; (b) war financing needs would have remained great in any event; (c) even if institutional investors became interested in railroad stock, prohibitive state laws would have remained on the books; and (d) some boards of directors, fearing a loss of control, would have failed to take advantage of an opportunity to shift towards stock.

Several important questions emerge from this paper. How did industrials emerge as a force on the NYSE during the early 20<sup>th</sup> Century? Why was industrial stock such an attractive investment? Did ICC rate policy help the industrials indirectly, by making railroad stocks so unattractive? I hope to answer some of these questions in future work.

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Figure 1

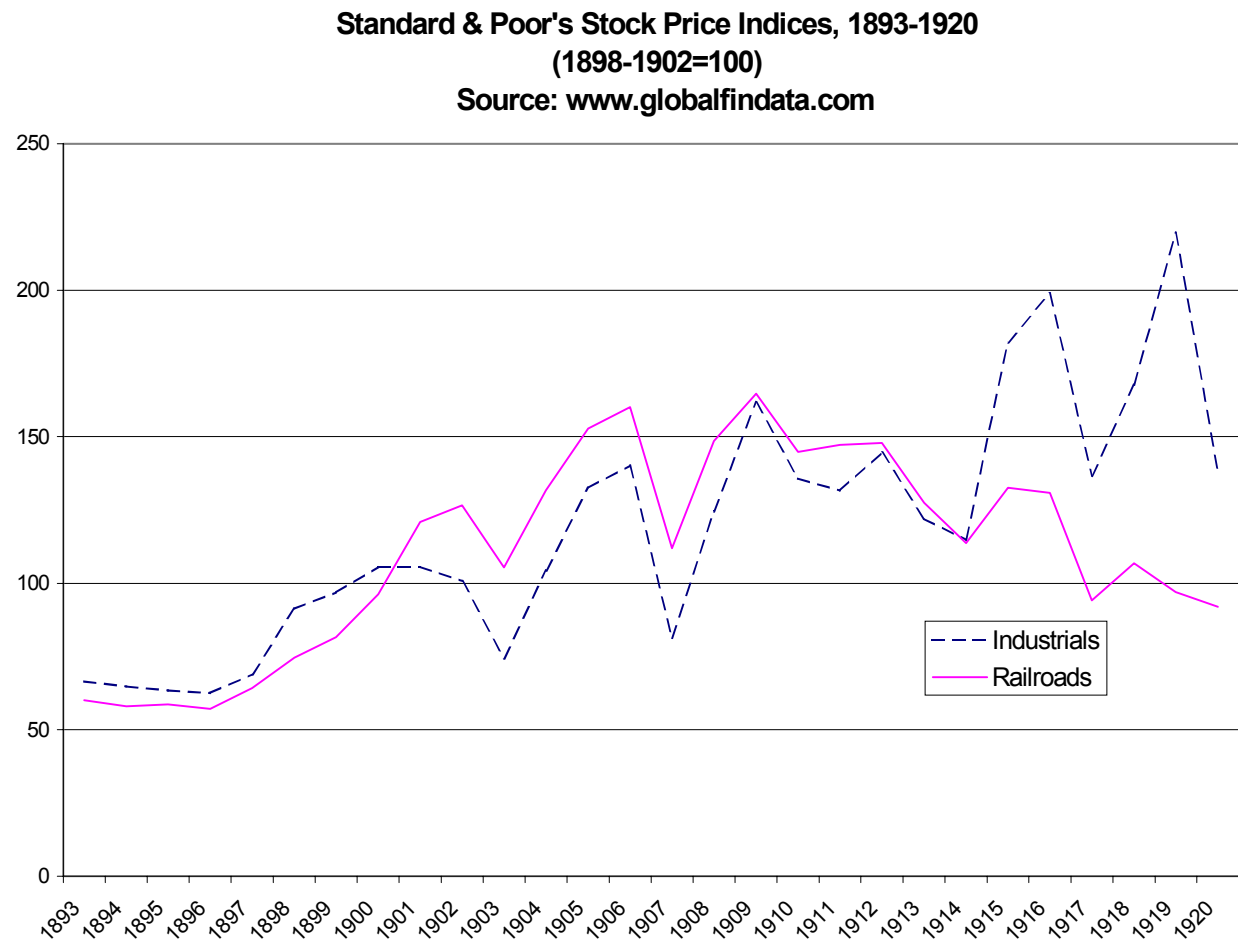
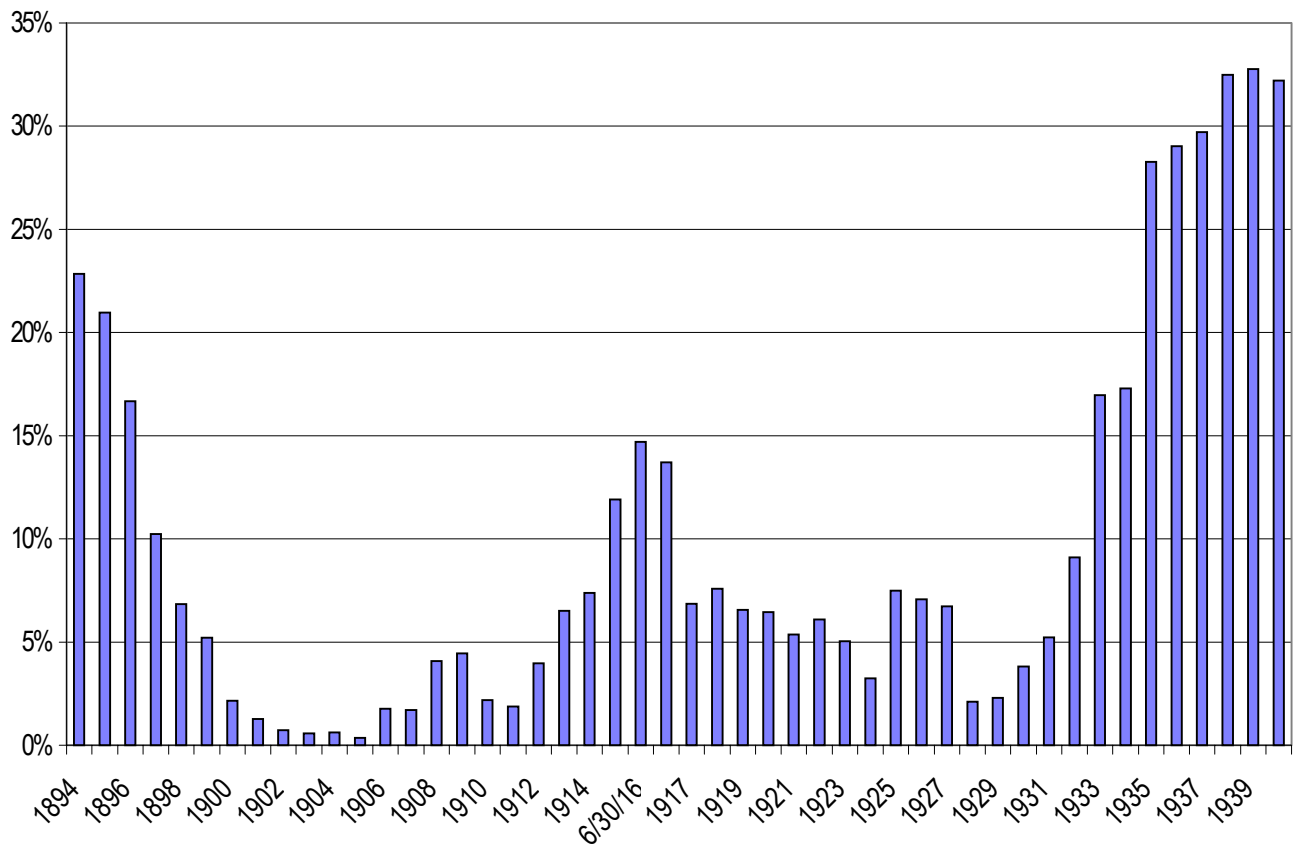


Figure 2

**Mileage in Receivership/Trusteeship as a  
Percentage of All Railway Mileage  
(Source: ICC)**



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