Measurement and Organizational Effectiveness: The ICC and Accounting-Based Regulation, 1887-1940

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The Interstate Commerce Commission (ICC) has inspired a rich historical literature, yet few studies have evaluated how the accounting measures developed to inform regulation influenced the agency's operational effectiveness. The major works have concentrated on political, legal, or economic issues, but statistics and accounting were critical in implementing policy. They were mirrors reflecting the far-flung activities of thousands of workers and billions of dollars worth of equipment and facilities. The reports and schedules derived from this data shaped the perceptions of federal administrators about the national transportation enterprise they tried to control.

What were the organizational goals the ICC directed its accounting system toward achieving? Basically, there were two inherited from earlier state efforts to regulate the railroads. First, there was the desire to use accounting to assure probity. This was critical to investors who wanted reliable information to gauge risk and return accurately. Many also saw accounting as an effective mechanism for resolving the problem of informational asymmetry associated with the separation of ownership and control in emergent giant business organizations. Greater financial disclosure, it was believed, could make managements more accountable. Second, measurement practices also were central in evaluating rate equity. This was particularly important to farmers and small business operators who enjoyed very limited market power and were concerned about the vulnerability of their ventures to high transportation costs [1; 3; 8; 21, pp. 47-53; 24, pp. 6-20; 36, pp. 17-25; 38; 48, pp. 66-90].

Three epochs were discernible in the ICC's pursuit of these objectives during its first half century. It initially strove to standardize railroad accounting through the promotion of uniform formats and methodologies. It also adapted an existing value of service system for evaluating rates because of the difficulties encountered in measuring the actual costs of providing service. During the 1920s it began to rely on a fair value accounting system that utilized estimates of the costs of reproduction of

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railroad assets. Finally, during the Great Depression it used marginal costing to coordinate rates between railroads and the interstate trucking and inland water transport industries.

First Phase: Value of Service and Self-Executory Accounting, 1887-1906

The development of the ICC's accounting and statistical reporting system was begun by its first chief statistician, Henry Carter Adams. This innovator was highly receptive to the idea that government had an important role to play in assuring equity in a society that was being radically transformed by industrialization and urbanization. Christian values inculcated by his Congregationalist minister father rendered him sensitive to the connections between the moral and secular worlds. As an undergraduate at Iowa College he witnessed the activism of the Grangers for state intervention over railroad affairs. Later, at the recently founded Johns Hopkins University (where he earned the first doctorate granted in the social sciences), he discovered in the writings of the German historical school of economists an appealing rationalization for his social intuitions. He shared the historicists' misgivings about individualism and the *laissez-faire* doctrines of the Manchester school. He embraced the thesis that the common good could best be promoted by an activist state guided by experts drawn from such specializations as his own, economics. This pattern of thought was reinforced when he was a visiting scholar during the 1870s at the University of Berlin, a center of the historicist movement. There he participated in a seminar led by Ernst Engel, Chief of the Prussian State Statistical Bureau, who was then applying his special knowledge to further Bismarck's railroad nationalization program [1; 14, pp. 8-11; 20, pp. 170-97; 40; 44].

What were the salient features of Adams's reporting system? Working cooperatively with two professional organizations--the National Association of State Railroad Commissioners and the Association of American Railway Accounting Officers (AARAO)--he devised a valuable annual compendium, *Statistics of Railways of the United States*. This tome provided investors and students of railroad affairs with a rich lode of financial and operating information: balance sheets, operating statements, summarizations of interline investments and operating agreements, and schedules detailing personnel, plant, and safety [28, 1896, pp. 111-20; 48, pp. 1-8].

Adams also wanted rigidly uniform reporting formats and methodologies to provide strong incentives for regulatory compliance. Properly structured reports would place managements in a fish bowl in which infractions could be discovered easily. In this way the regulatory regime would be both efficient and "self-executory," that is, encouraging automatic obedience to law. Moreover, he felt that accounting was a "science" which required statistical homogeneity to support valid inferences and to allow meaningful comparative analyses [2; 28, 1896, pp. 111-20; 39, pp. 32, 89-90; 40].

The chief statistician also believed that accounting was critical in equitably apportioning the burden of railroad costs among consumer groups.

For example, he applied break-even analysis in assessing the adequacy of overall rate levels for particular lines. Individual rates, however, were evaluated in the context of the value of service (that is, what particular consumers could afford to pay) rather than the cost of service because of the difficulties in assigning the joint costs of common facilities to particular classes of service. As early as 1893 Adams had been persuaded by his AARAO colleagues that it was impossible to develop any economically meaningful method for allocating the joint costs even between freight and passenger service [2; 17, pp. 54-5; 28, 1893, p. 83; 43, pp. 67-70, 168-84].

The accounting-based regulatory system was structured so as not to impair overall national transportation efficiency. At most locations served by the railroads there were no other more efficient alternatives. At those points served either by intersecting lines or water-borne transport, efficiency was preserved simply by relaxing regulation and allowing market forces to operate.

The ICC also tried to channel the inevitable income redistribution resulting from rate regulation toward particular social objectives. Value of service was viewed as an effective mechanism for subsidizing the hard-pressed farmer and growing ranks of urban labor. High rates on passenger service and high value manufactures were allowed to compensate the railroads for the low rates on food and fuel staples [12; 16; 18, pp. 8-16; 30, pp. 10-12; 42].

Some railroad managements, however, were dissatisfied with the value of service system and developed alternative accounting measures to support their positions in rate hearings. These lines prepared special studies to prove that the allowed tariffs were insufficiently remunerative to cover the costs of service. Although federal accountants did not at this time form estimates of the costs of service, they were in these cases compelled to evaluate the reasonableness of railroad projections. The gradual recognition of the importance of cost of service information led eventually to the development of an informal evaluative framework known as the "zone of reasonableness." Its ceiling was the rate based on value of service; its floor was the rate based on the estimated cost of service. Later, as we shall see, the floor on certain socially important categories such as foods was allowed to be as low as the long term marginal cost of service ("out of pocket cost" in the parlance of the industry) [7; 8; 43, pp. 166-84; 46, vol. 3B, pp. 452-459].

But several factors ultimately frustrated accounting-based regulation during this period. The ICC was hampered by its inability to recruit seasoned railroad accountants. Since it did not come under civil service at this time, staff selection usually was influenced by political rather than professional considerations. Administrative procedures also were lax initially. It took several years, for instance, to clear the avalanche of rate schedules the railroads began to file in 1888. Management practices often were too informal. Adams, for example, frequently directed the department from his home at Ann Arbor, Michigan or from the summer resort of Cotuit, Massachusetts [10, pp. 128-35; 40].

Serious measurement problems also undermined regulation. Although the railroads filed with uniform accounting formats, the Supreme Court

ruled that the ICC lacked the power to prescribe uniform accounting methods. Nor did federal control extend to several important ancillary services such as equipment leasing, express, and terminal switching companies that were suspected of serving as "blind pockets" for illegal rebating. Moreover, there were uncertainties about the reliability of the industry's valuation of its capital assets. This was partly due to the different amortization methods used by companies in the industry. It also resulted from the loss of original cost records either at time of construction or in subsequent mergers or reorganizations. In addition, there was confusion about the value of generous government land grants. Some contemporaries even suspected deliberate asset overstatement at some companies to facilitate fraudulent "stock watering" [4; 5; 27, 1903, pp. 22-26; 28, 1889, pp. 42-43].

The Supreme Court also challenged the ICC during the 1890s. It curtailed the agency's judicial authority and rendered inoperative its powers over long-haul short-haul discriminations. This tribunal in 1898 also provided new guidelines for applying accounting in regulation that the ICC initially was incapable of satisfying. In Smyth v. Ames, a Nebraska case, the court stated that the railroads were entitled to earn a "fair return" on the "fair value" of assets employed in public service. But it did not specify how fair value was to be determined. The court, apparently aware of the egregious state of contemporary accounting, preferred a flexible and eclectic approach for these measurements. It thus accepted as relevant in constructing a rate base not only the original cost of assets but also their current reproduction cost and the market value of the enterprise's securities [10, pp. 257-307; 24, pp. 35-36; 43, pp. 461-79; 46, vol. 1, pp. 26-34, 74-77; 48, pp. 92-96; 49].

By the end of this period accounting based regulation was in disarray. But as we shall see in the following section circumstances changed radically during the early years of the present century.

Second Stage: The Emergence of Fair Value Accounting, 1906-1929

The revival of accounting-based regulation came during Theodore Roosevelt's administration. This regime pursued a policy of upgrading federal administrative capabilities. With respect to the railroads Roosevelt favored strengthening accounting capabilities to satisfy the Smyth v. Ames guidelines as well as extending federal power over rates and financing activities [43, ch. 15; 46, vol. 1, pp. 35-40; 47, pp. 249-59].

But the legislation needed to achieve these ends developed slowly during the years before World War I. The Hepburn Act (1906) enhanced federal control over the maximum rates railroads could charge and strengthened regulatory accounting in several ways. It granted the ICC power to supervise ancillary railroad activities, to prescribe uniform methodologies, to audit railroad accounts, and to require the annual recording of equipment depreciation [27, 1907, pp. 139-44; 28, 1907, pp. 9-24]. Later, the Mann Elkins Act (1911) placed the onus of proving the need for rate adjustments on the railroads and authorized new procedures that affected accounting. To promote administrative efficiency this legislation also shifted the emphasis from evaluations of the structure of

individual rates to evaluations of the reasonableness of overall rate levels. Consequently, the analysis of rates of return earned on a railroad's assets became more crucial in judging rate equity [37, pp. 188-95; 43, pp. 594-96; 46, vol. 3B, pp. 1-32; 47, pp. 261-66]. Next, the Valuation Act (1913) provided the data called for in Smyth v. Ames. It authorized a nationwide inventory of railroad assets, requiring them to be valued on the basis of their original cost, their estimated 1914 cost of reproduction, and the 1914 cost of reproduction less depreciation [25, p. 81; 46, vol. 1, pp. 117-32, vol. 3A, pp. 33-42, 95-319].

During the post-war period fair value accounting was incorporated in key provisions of the National Transportation Act of 1920 that was designed to preserve and enhance the nation's transportation industries. Fair value accounting reflected price level fluctuations that worried railroad managers, investors, and regulators. Rates were deemed to be reasonable if they did not collectively exceed 5 3/4% of the reproduction costs of total assets. The choice of this method was conditioned in part by a desire to avoid a repetition of the crises that emerged during the period 1910-1918 when a sticky rate structure failed to generate sufficient revenues to keep pace with escalating costs. Fair value, however, promised to provide greater leeway to the railroads for raising rates and, thus, strengthen their ability to maintain their financial and physical capital. Moreover, fair value data also was applied in evaluating the proposed financing of regional consolidations that were intended, in part, to strengthen the railroads' capabilities in competing with the emergent air line and trucking industries. The proposed mergers sought to increase railroad efficiency by eliminating redundant services and unprofitable "short" lines. This information was thought to be useful in preventing stock watering abuses in these mergers and in evaluating rates for the reorganized entities [24, pp. 94-97; 41, ch. 2; 46, vol. 1, pp. 177-224, vol. 3A, pp. 51-55].

Several developments, however, impeded the application of fair value accounting. One problem was the slowness of the valuation project. The first "tentative" report (Texas Midland Railroad) was not issued until 1918 and the first of the final reports (San Pedro, Los Angeles and Salt Lake Railroad) did not appear until 1923. Valuations of many of the larger lines were not completed until later in the decade. Thus, only limited reliance was placed on this information in the rate advance cases of the early 1920s [45; 51].

Reproduction cost data also proved inappropriate for evaluating the mergers leading to regional line consolidations. This measure actually overstated the value of marginally profitable acquisition candidates. A better guide for this purpose was the discounted net present value of their future earnings streams [41, pp. 64-65, 90, 281-85].

Farmers also were unhappy with fair value in rate level evaluations. They were being squeezed during the 1920s by the combination of rising rates and falling commodity prices. They argued that they should be exempted from the rate provisions of the 1920 act because of these onerous conditions. Eventually, in 1925 Congress through the Hoch-Smith resolution directed the ICC to treat agriculture as a special case in rate matters [24, pp. 102-03; 46, vol. 1, pp. 227-35].

Prominent critics argued that policy should be guided by the "prudent investment" theory rather than fair value doctrine. Economist John Maurice Clark, ICC Commissioner Joseph B. Eastman, and jurist Louis D. Brandeis contended that a railroad's equity accounts valued at original cost was a better rate base than total assets valued at reproduction cost. Furthermore, since bondholders had agreed to accept fixed returns, they believed that it was unnecessary to revalue the portion of total assets these investors financed. In adjusting shareholder returns to accommodate changing price levels, on the other hand, they thought that it would be more efficient and equitable to reset allowable rates of return at levels consistent with current financial market conditions. This would eliminate the need for elaborate and subjective reproduction cost estimates [11, chs. 20-21; 19, pp. 73-79; 33, pp. 271-81; 46, vol. 3A, pp. 274-75].

Eastman eventually persuaded a majority at the ICC to experiment with prudent investment theory. In the O'Fallon and St. Louis Railroad case (1926) he developed a new rate base calculation that accepted the 1914 reproduction cost estimate of assets but valued subsequent additions at original cost. Although there was growing support for this position, the Supreme Court in 1929 rejected it as a violation of the Smith v. Ames precedent [15; 19, pp. 161-65; 46, vol. 3A, pp. 268-301].

Although sustained by the court in this important case, fair value was found to be wanting in addressing the new problems that emerged during the Great Depression.

Economic Crisis and the Rise of Marginal Costing, 1929-1940

The Great Depression both led to the redefinition of the ICC's regulatory objectives and the restructuring of its accounting methodologies. The New Deal's transportation policies were strongly influenced by Joseph B. Eastman, who favored the substitution of original cost for fair value measures in rate evaluations. This was incorporated in the National Transportation Act of 1933, which Eastman helped to draft. President Franklin D. Roosevelt looked with favor on the proposal. As governor of New York in 1930 he had authorized the use of original costing in the measurement of rate bases for all public service corporations. Moreover, even the most ardent fair value proponents were no longer eager to see it continued during a period of declining prices. They recognized that this could lead only to lower rates [19, chs. 11-12; 24, pp. 125-27; 50, vol. 1, pp. 16-24].

The economic crisis also motivated the ICC to place greater emphasis on subsidization of staple shipments that had characterized the old value of service system. This could help to restore the incomes of hard-hit producers of primary commodities, urban consumers, and the railroads. But this objective was now harder to achieve because of competition in transport markets from growing trucking and inland water transport industries. Eventually, this social goal was attained by creating a more elaborate regulatory structure for "coordinating" competition between the railroads and their rivals. The ICC's authority was extended over interstate trucking under

the Transportation Act of 1935 and over inland water transport under the Transportation Act of 1940 [19, ch. 13; 24, pp. 127-38].

This new structure traded off national transportation efficiency for social equity objectives. Income redistribution was achieved by pegging the rates for low value bulk commodities for the most efficient modality, inland water transport, at levels equal to the less efficient railroads' marginal costs of service. At the other end of the spectrum, rates for high value merchandise for the efficient trucking industry were set at levels that would be fully compensatory to the less efficient railroads [9, chs. 7-8; 18, pp. 20-27; 30, pp. 330-65; 53, chs. 6-7].

The reliance on marginal costs in decision-making was appropriate for an industry faced with the problem of massive underutilization of capacity. The reduction of rates to levels above long term marginal costs of service (but less than full cost) could help to build much needed traffic. Although not completely remunerative, these rates could contribute to meeting enterprise fixed overheads.

Prior to the Depression several developments had sparked an interest in both cost of service and marginal cost analysis at the ICC. Marginal costing had been used by some railroads, particularly in the Western states, to justify rate reductions to build traffic after the ICC's power to regulate long-haul short-haul discriminations had been restored under the Mann-Elkins Act [13; 52]. The ICC also grew more sensitive to the need for better cost information because of the criticisms of Louis D. Brandeis, Henry L. Gantt, and Harrington Emerson during the 1911 rate advance case. These advocates implied that the great variability in charges for repairs, maintenance, and depreciation suggested deliberate manipulation by railroad managements eager to justify rate increases. They argued that the ICC should try to control these charges by developing standard costing systems, as many manufacturers had done. Sensitive to the interests of the small business groups they represented in this case, Brandeis and his cohorts further maintained that precise cost data was necessary to eliminate the cross subsidies ingrained in the value of service rating system. In addition, federal accountants were impressed by the detailed cost of service estimates for particular classes of consumer developed both by the Wisconsin Public Utility Commission, the California Railroad Commission, and by AT&T, which come under the ICC's supervision in 1911 [17, pp. 8-10, 108-10; 23, ch. 9; 26, pp. 1-9; 31; 36, pp. 91-94; 37, pp. 198-224].

The ICC first began to develop internal capabilities for estimating marginal costs around 1913. This initiative was supported by Commissioner Balthasar H. Meyer, former chairman of the Wisconsin Public Utility Commission, and his ally, Commissioner Franklin K. Lane of California. The ICC engaged for this assignment University of Wisconsin trained economist Max Otto Lorenz. In addition to his studies before World War I, Lorenz was positively influenced during the 1920s by marginal cost studies sponsored by the Southern Pacific Railroad and the California Railroad Commission. Late in the 1930s his department developed formulae for projecting operating costs in each of the nation's railroad regions using regression analysis [29; 31; 34; 35; 52].

But marginal costing proved suboptimal. The primary problem was the bias and considerable error associated with the ICC's cost formulae. Allocations of overheads between freight and passenger service were ultimately arbitrary. Moreover, the relative proportions of variable and fixed costs used in developing regional cost formulae often varied materially from the actual operating results of particular lines. Besides problems of measurement precision, the continuation of the rate subsidies inherent in the New Deal's Transportation Acts acted as a drag on the national economy during the post World War II prosperity. Moreover, national economic resources were misallocated by retarding through too rigid rate regulation the development of more efficient transportation alternatives. Finally, regulation also encouraged the continued concentration of industry in the Northeastern and North Central states [18, chs. 5-8; 22, ch. 2].

Conclusion

The primary shortcoming of regulatory measurement practices was not the appropriateness of the various techniques selected but, rather, the imprecision of the information provided. Each method was broadly relevant in analyzing the economic problems regulators tried to cure during the three epochs. The value of service rating system, for instance, besides representing the normal practice in the industry at that time, was a rational choice for regulators given their social objectives and the lack of standardization of contemporary accounting. The fair value system also was logical during a period of relatively full utilization of resources. Besides diminishing doubts about the validity of asset valuations, it was useful in relating rates to changing price levels. Marginal costing, on the other hand, was a suitable choice during a period of capacity underutilization. It helped to identify situations in which rates might be reduced to build traffic but still provide positive contributions to meeting overheads. It also could be modified to coordinate intermodal competition and to redistribute income among carrier and consumer groups in dire need of economic relief.

But like literary criticism, regulatory accounting and statistics were also beset by a problem of deconstruction. Measurement lacked precision and, thus, often provided regulators with ambiguous answers to the questions raised about the complex economic processes they tried to order. The primary culprits were the persistent problems of allocating joint costs and of separating fixed and variable costs. These quandaries were not merely of historical interest. As Kaplan and Johnson have noted forcefully, they continue to vitiate the usefulness of cost accounting for decision makers in American industry [32].

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