Interchanging Parts: Productive Railroad Cooperation in the Late 19th and Early 20th Centuries

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July 2020

Abstract: Although many economic and business historians have examined how American railroads colluded to raise rates or limit service, they have ignored the many ways railroads cooperated to exchange cars and freight between companies and build needed interconnections. This article examines such productive cooperation in three spheres: first, the setting of policies on "interchange," or the exchange of cars and freight between railroads lines; second, the creation of "car service associations" to organize and track cars and costs shared between roads; and third, the building of cooperative infrastructure such as belt railways or union stations. Finally, the article will examine how regulatory battles over car and freight exchange were an underappreciated part of the struggle to regulate railroads.

Introduction

When historians and economists discuss examples of railroad cooperation, the universal touchstones are the pools created during the late 19th century. These pools organized competing railroad lines to keep rates high and prevent discounts to shippers. They sparked widespread political opposition and were an impetus for both the Interstate Commerce Act of 1887 and the Sherman Antitrust Act of 1890, which together effectively banned them. From the perspective of economists, these pools were also an archetypal example of horizontal agreements between competing companies, also known simply as cartels, which tend to be anti-competitive and anti-consumer.

The costs to consumers and to overall output of such pooling agreements are not here subject to dispute. But the focus on pools and cartels ignores the many ways that railroads cooperated productively in the late 19th and early 20th centuries to further access to a national transportation network, ensure efficient and universal standards, and lower costs. Like many industries that share natural monopoly or network characteristics, but which do not have a universal monopoly of a

market, railroads needed to integrate their networks across different regions. Thus railroads created new contracts, systems, and private associations for interconnection, which demonstrates the ability of companies to cooperate to increase output.

While most economic theories emphasize competitive market equilibriums, the Austrian tradition has shown how economic agents have to continually evolve new market processes, including by building new cooperative institutions to lower transaction costs.[1] Austrians also have emphasized how diffuse groups can create new types of emergent or spontaneous orders outside of state mandates.[2] The railroads' cooperative contracts and institutions are prime examples of such emergent orders that lower transaction costs and increase output. They were an essential part of the process that increased total railroad freight from 3 billion ton-miles in 1860 to 141 billion in 1900, even while charges per ton dropped by over 80%.[3]

This article will look at the three main ways railroads cooperated productively in the 19th century, which cooperation has been largely ignored by previous economic and business historians.[4] It will

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[1] Israel Kirzner, *Competition and Entrepreneurship* (Chicago: The University of Chicago Press, 1973); Peter J. Boettke, "Evolution and Economics: Austrians as Institutionalists," *Research in the History of Economci Thought and Methodology* 6 (1989): 73-89.

[2] Paul Lewis, "Notions of Order and Process in Hayek: The Significant of Emergence," *The Cambridge Journal of Economics* 39, no. 4 (2015): 1167-1190; David Rehr, "Hayek's Legacy of Spontaneous Order," *Federal Reserve Bank of Minneapolis,* June 1, 1992. Of course, the recent Industrial Organization literature and the New Institutional Economics literature also discusses different types of economic ordering outside of pure competitive markets. See, e.g., Oliver Williamson, "The Theory of the Firm as Governance Structure: From Choice to Contract," *The Journal of Economic Perspectives* 16 (2002): 171-195.

[3] "Railroad Freight Ton-Miles, Revenue for the United States," https://fred.stlouisfed.org/series/M03003USM253SNBR "Revenue Per Freight Ton-Mile, Thirteen Railroads for United States" https://fred.stlouisfed.org/series/A0303FUSA259NNBR
and "Revenue Per Freight Ton-Mile, All Railroads in the United States," https://fred.stlouisfed.org/series/A0303DUSA259NNBR
and "Index of the General Price Level for United States," https://fred.stlouisfed.org/series/A0303FUSA259NNBR, FRED, Federal Reserve Bank of St. Louis,

[4] For typical railroad studies that pay no or almost no attention to interconnection or interchange between different railroads, see Albro Martin, *Railroads Triumphant: The Growth, Rejection & Rebirth of a Vital American Force* (New York: Oxford University Press, 1992); Richard Orsi, *Sunset Limited: The Southern Pacific Railroad and the Development of the American West, 1850-1930* (Los Angeles: University of California Press, 2005); Richard White, *Railroaded: The Transcontientals and the Making of Modern America* (New York: W.W. Norton 2011); Christian Wolmar, *The Great Railroad Revolution: The History of Trains in America* (New York: Public Affairs, 2012). For typical economic work which focus on collusive railroad pool, see Robert H. Porter, "A Study of Cartel Stability: The Joint Executive Committee, 1880-1886," *The Bell Journal of Economics* 14, no. 2 (1983): 301-314. Some works described below discuss one or another type of interconnection policy, but rarely as part of a discussion of railroad cooperation. One classic work which does focus on interconnections is George Rogers Taylor and Irene D. Neu, *The American Railroad Network, 1861-1890* (Chicago: University of Illinois Press, 2003 [1956]), but its almost singular focus was the standardization of gauges. There is related literature that describes the potential benefits of cartels for high fixed-cost industries in this period, but such analysis has not been applied to railroads. See George Bittlingmayer, "Decreasing Average Cost and Competition: A New Look at the Addyston Pipe

examine, first, rules of interconnection or "interchange," namely, the sharing of tickets, routes, and rolling stock between different companies; second, the creation of "car service associations" to organize and distribute freight cars and costs across different railroad lines; and third, the organization of belt lines and union stations to connect different lines. The article will then look at the political battles over interconnections, which were an important part of the railroad regulatory movement, but which have received scant attention from historians.[5] Finally, the article will discuss what these early examples of interconnected networks can teach us about modern network industries.

The Regulatory Response to Interconnection

In the earliest years of railroading, many state governments had no interest in facilitating interconnections. In fact, many early state laws were designed to *prevent* interconnection. Local merchants at railroad termini desired the benefits of break bulk or wagon transport between different stations, and feared local traffic being diverted to far-off lines. Thus many early charters forbid interconnections, or established different gauges explicitly to prevent the interconnection of state railroad lines with "foreign" ones.[6] Gradually, however, more charters and general railroad laws authorized connections. The federal government itself passed a law in 1866 that authorized interstate railroads to carry other companies' freight and passengers, and to form continuous through lines.[7]

Case," *Journal of Law and Economics*, 25 (1982): 201–229; J.R. Kinghorn, "Kartels and Cartel Theory: Evidence from Early Twentieth Century German Coal, Iron and Steel Industries," *Essays in Economic and Business History* 14 (1996): 339–363.

[5] For typical works focused on railroad regulation that largely ignore interconnection, see Gabriel Kolko, *The Triumph of Conservatism: A Reinterpretation of American History, 1900-1916* (New York: The Free Press, 1963) and *Railroads and Regulation, 1877-1916* (Princeton: Princeton University Press, 1965); Albro Martin, *Enterprise Denied: Origins of the Decline of American Railroads, 1897-1917* (New York: Columbia University Press, 1971); Mark Kanazawa and Roger Noll, "The Origins of State Railroad Regulation: The Illinois Convention of 1870," in *The Regulated Economy: A Historical Approach to Political Economy,* eds., Claudia Goldin and Gary Libecap (Chicago: University of Chicago Press, 1994), 13-54; James W. Ely, *Railroads and American Law* (Lawrence, KS: University Press of Kansas, 2001); Samuel DeCanio, *Democracy and the Origins of the American Regulatory State* (New Haven: Yale University Press, 2015); Zachary Callen, *Railroads and American Political Development: Infrastructure, Federalism, and State Building* (Lawrence, KS: Kansas University Press, 2016).

[6] Anthony J. Bianculli, *Trains and Technology: Track and Structures, Vol. 3, Tracks and Structures* (Wilmington: University of Delaware Press, 2001), 75; Taylor and Neu, *American Railroad Network*.

[7] Although the law was only permissive, not mandatory, and said such connections could not be authorized without state sanction, some claimed it established a *de facto* policy of a national railroad network: "This act may properly be regarded as the charter of the America railroad system, for it is clearly in the nature of a grant of power." *Hearings on Act to Regulate Commerce, 1894,* 121.

Despite the growing interconnections of railroads described above, many smaller railroads complained about lack of access to broader networks. Sometimes too, railroads that were interested in interconnections could not come to agreement on terms. Game theory teaches us that when two companies negotiate in a bilateral monopoly situation, the final price is determined by each companies' bargaining power, which is itself largely determined by each firms' patience.[8] Such situations can lead to extended denials of service or failure to come to agreement, which can inspire demands for government action.

Many states began mandating interconnections between railroad lines and allowing state bureaus or courts to decide on terms if the railroads could not agree. In fact, states formed some of the earliest American regulatory systems to arbitrate such interconnections. In 1842, Maine established a special tribunal, outside of the normal court and legislative system, to determine the "terms of connection" and the "rates and which passengers and merchandise coming from the one [road] shall be transported over the other" if the interconnecting railroad companies failed to agree on terms.[9] This may represent one of the earliest regulatory commissions in the United States.[10] Beginning in 1870, several states, such as Michigan and Pennsylvania, actually put equal railroad interchange rules in their constitutions.[11]

Although most of the discussion of the Interstate Commerce Act of 1887 focused on federal supervision of freight and passenger rates, and especially the ban on rates decided by pools, other parts of the act actually demanded railroads work together on the issue of interchange. Section three mandated that all railroads provide "reasonable, proper, and equal facilities for the interchange of

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[8] Joel Watson, *Strategy: An Introduction to Game Theory,* 2nd ed. (New York: W.W. Norton & Company, 2008), 203-211, 216-217.

[9] See discussion of this law and others in *Atchison, T & SFR Co V. Denver & NO R Co.* 110 US 667, 677 (1884). New York laws demanded each railroad allow interchange "fairly and impartially" from 1847, but these decisions were not delegated to a commission until years later. See, New York Railroad Commission, *Annual Report of the Railroad Commissioners of the State of New York* (New York, 1886), 497.

[10] For other commissions with such power up to 1890s, see William Crafts, "What is the Best Kind of a Railroad Commission," *American Law Review* (Sept. 1893): 811-812. For early bank regulatory commissions at about the same time, see Judge Glock, "The Forgotten Visitorial Power: The Origins of Administrative Subpoenas and Modern Regulation," *Review of Banking and Financial Law* 37 (April 2018): 205-265.

[11] *Atchison, T & SFR Co V. Denver & NO R Co*. 110 US 667, 677-8 (1884). The Supreme Court declared that express companies could generally be denied a demand for equal interchange of freight and cars, except in a few states, such as New Hampshire or Maine, which required it explicitly. *St. Louis & Southern Ry Co. v Southern Express* (The Express Cases) 117 US 1.

traffic."[12] The 1906 Hepburn Act expanded this mandate, and allowed the Interstate Commerce Commission to establish through routes and rates on its own authority.[13] For decades, a significant proportion of state and federal regulatory decisions actually dealt with the terms of and facilities for railroad interconnection.[14]

Some states also began regulating car service associations, but in this case to counter the associations' efforts. Many state laws extended the time shippers had to fill or unload cars, slowing down the attempt of car service bureaus to increase shipping speeds. The Interstate Commerce Commission opposed such efforts, but had no authority over intrastate shipments.[15] After the 1906 car famine, at least 25 states also enacted "reciprocal demurrage" charges, which forced railroads to deliver shippers cars in set times after a shippers' request. The ICC also opposed reciprocal demurrage, to little effect, and the Hepburn Act forbid states the power to regulate the delivery of cars for interstate shipments.[16] Many outside of the shipping community also opposed the new state requirements. The *New York Times* pointed out that reciprocal demurrage was different from the usual demurrage charged by railroads against shippers, and could more easily be analogized to fining shippers for refusing to provide freight to railroads when cars were ready.[17]

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[12] For rare mention of this clause during the debate leading to the law, see 18 *Congressional Record* 841. Senator Shelby Cullom, perhaps the most important author of the act, did say that the clause included under its jurisdiction all instrumentalities of railroads, including "fast-freight lines, express companies, sleeping-car companies" and others. 17 *Congressional Record* 3472. Courts generally didn't agree, and many, including many smaller railroads, demanded their inclusion in the subsequent Hepburn Act of 1906. 39 *Congressional Record* 2077, 3421. By contrast with the American situation, Charles Francis Adams, one of the premier railroad experts of the era, declared that interconnection was the whole purpose of the English regulatory commission, which "was in fact designed to insure to the community an easy and equitable interchange of traffic over railroad lines." Charles Francis Adams, *Railroads: Their Origins and Problems* (New York: G.P. Putnam and Sons, 1878), 92. See similar account of English Commission in Joseph Nimmo, *Report on Internal Commerce of the United States, 1879* (Washington: Government Printing Office, 1879), 144.

[13] See "The Interstate Commerce Commission," *Railway World,* June 7, 1907, 481-482; William Ripley, *Railroads: Rates and Regulation* (New York: Longmans, Green & Co., 1913), 547-548.

[14] See dozens of interchange decisions listed in one year in Louisiana Railroad Commission, *Annual Report of the Railroad Commission of Louisiana to December 31, 1919,* 151-153; See also Interstate Commerce Commission, *Third Annual Report of the Interstate Commerce Commission*, *1889* (Washington: Government Printing Office, 1889), 81-82. 152.

[15] National Association of Railway Commissioners, *Proceedings of the Twentieth Annual Convention* (Report on the Committee on Car Distribution and Car Shortage), 14-15; See formal car service and demurrage rules, Louisiana Railroad Commission, *Annual Report of the Railroad Commission of Louisiana to December 31, 1919,* 48-53.

[16] The Hepburn Act did, however, demand carriers provide cars in a reasonable time to shippers and this was enforced through demurrage-type cases. National Association of Railway Commissioners, *Uniform Demurrage Code*: *Committee Reports and Proceedings* (Washington: Government Printing Office, 1910), 4-6; *Chicago, R.I. & Pac. Ry. Co. v. Hardwick Elevator Co.*, 226 U.S. 426 (1913).

[17] "Reciprocal Demurrage," *New York Times,* Jan. 23, 1908, p. 8. As a modern railroad executive pointed out about recent debates on the same subject, the reciprocal demurrage charge against railroads doesn't deal with the same sort of incentive problem that demurrage tries to solve for shippers. "Railroads already have strong incentives to improve asset utilization…But customers do not have those natural incentives, since the customer's primary interest is in his own traffic – not the overall network." Randy Gordon, "Railroads Oppose STB Policy Action on Demurrage, Accessorial

Some of the earliest state laws attempted to inhibit belt and union stations as well. Railroad expert Joseph Nimmo said in 1894 that "Many of us can remember when a union railroad depot was a phenomena. For years railroad mangers regarded joint traffic as an entangling alliance, and courts treated such traffic as in the nature of a partnership between corporations, and as such *ultra vires*." But gradually, the states began authorizing railroad companies to invest in other companies, which could include joint infrastructure companies.[18] Early regulators soon tried to mandate the use and terms of existing infrastructure, by requiring set charges for the use of bridges or stations.[19] Some state commissions also mandated construction of the new infrastructure, including sidetracks and interconnections to new lines.[20] Finally, some states began building their own belt lines or connecting roads, such as San Francisco's Belt Railway, created by the State Board of Harbor Commissioners in 1889 to switch trains between different lines along the waterfront.[21] With existing information, however, we cannot be sure if the public construction was more costly than private alternatives, or if mandates on use of private infrastructure reduced the return on it, and thus inhibited its construction.

Regulators cemented their control of railroads' interconnections and infrastructure during World War I, when the government nationalized the companies. The subsequent 1920 Transportation Act, which returned the railroads to semi-private status, mandated that the ICC organize them into national networks. Previous cooperative associations became a subsidiary part of this new system, since the act demanded that the ICC give recognition to "such rate groups or territories as the Commission may from time to time designate," including those associations that organized through

Practices," *National Grain and Feed Association Newsletter,* June 14, 2019, https://www.ngfa.org/newsletter/railroads-oppose-stb-policy-action-on-demurrage-accessorial-practices/

[18] *Hearings on Act to Regulate Commerce*, *1894,* 120-121. This early and beneficial use of "holding company" corporate authority is often forgotten in the debates on holding companies as attempts at horizontal collusion.

[19] See discussion in Revell, *Building Gotham* 82-92. In this, as in other instances, the regulators did not seem "captured" by the railroads, despite regulators' agreement with the pools' interchange terms, since the railroads, especially the largest ones, often resisted attempts to force access and mandate connections and infrastructure. See Ibid.

[20] "Compulsory Construction of Industrial Sidetracks," *Yale Law Journal* (Apr. 1911); 503-507, and provision of Hepburn Act, 34 *Statutes at Large*, 585 (1906). The Supreme Court said that mandating such connections without a hearing, and merely on shipper request, was a denial of due process of law. *Missouri Pacific Ry. Co. vs. Nebraska and Missouri Pacific Ry. Co. vs. Farmers' Elevator Co.*, 217 U.S. 196 (1910)

[21] "The State Belt Railroad," *National Park Service,* https://www.nps.gov/goga/learn/historyculture/state-belt-railroad.htm

traffic. Although many of the railroads' independent organizations survived and continued to advise on terms of interconnection, they lost their stature relative to federal regulators.[22]

Conclusion

In the early 1890s, despite the formal abolition of the pooling systems, Joseph Nimmo estimated there were over 87 different associations of railroad officials working across company lines, in everything from standardization of freight classes to uniform accounting practices to exchanging information on best practices for traffic managers. Only later were many of these standards, such as those involving automatic car couplings by the Master Car Buildings Association, adopted by the government.[23] Some of these private associations survive into the present. Railinc Corporation, for instance, is a for-profit subsidiary of the American Association of Railways, which tracks cars across other companies' lines and has a clearinghouse or settlement system to net car earnings across them.[24]

This paper can only provide a preliminary overview of productive railroad cooperation. While it does not argue that every type of railroad cooperation was beneficial, or that each enhanced consumer welfare, it shows there were many positive examples of cooperation that benefited both business and consumers. And although this article can only gesture at lessons for contemporary problems, it can provide some background and insight into contemporary regulatory battles about interconnection, especially in the field of telecommunications.[25]

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[22] Edgar J. Rich, "The Transportation Act of 1920," *The American Economic Review* 10, no. 3 (Sep. 1920): 507-520; David Potter, "The Historical Development of Eastern-Southern Freight Rate Relationships," *Law & Contemporary Problems* 12, no. 3 (Summer 1947): 436. For instance, demurrage decisions came under ICC control after a 1926 Supreme Court decision. Subcommittee on Senate Committee on Commerce, *Hearings on Expediting Loading and Unloading of Railroad Freight Cars* (Washington: Government Printing Office, 1942), 5-6; But see example of how government still occasionally relied on the private Car Service Division of the American Railway Association, *Proceedings of the American Railway Association* (Chicago, 1920), 49-51.

[23] "The Automatic Car Coupler," *Everywhere West,* April 18, 2012, http://publications.newberry.org/cbq/?p=508 See David Potter, "The Historical Development of Eastern-Southern Freight," 433-435.

[24] "Interline Settlement System," *Railinc*, https://public.railinc.com/products-services/interline-settlement-system For continuing regulatory debates about issues such as "reciprocal switching," see Martha Moore, "U.S. Freight Customers Increasingly Taxed by Higher Rail Rates," *The Regulatory Review,* June 24, 2019, https://www.theregreview.org/2019/06/24/moore-us-freight-customers-taxed-higher-rail-rates/

[25] Surprisingly, for all the focus on network industries, there is relatively little economic literature dealing with interconnections. For some examples, see Mark Armstrong, "Network Interconnections in Telecommunications," *The Economic Journal* 108 (1998): 545-564; Carter and Wright, "Interconnection in Network Industries." For more modern

Since the dissolution of AT&T in the 1984, the United States federal government has regulated the terms on which different companies can connect to the telephone network. The Federal Communications Commission has issued decisions on when an existing network has to contribute costs to creating new switches, and the rates and terms of services such interconnections require. Such battles have consumed massive amounts of regulatory effort and company resources.[26]

The internet, which is classified as an "information service," does not have the same regulatory requirements as telephones. The political battle around internet regulation or "net neutrality" has focused on how networks treat producers and consumers of content, which can be easily analogized to the shippers and consumers of railroad goods in the previous century, and there has been only sporadic concern about network interconnections, or "transit" and "peering," between different internet service providers. Today, these interconnections are often done through cooperatively managed Internet Exchange Points (IXPs), or provided by "backbone" companies, which charge "transit" for up and downstream travel of information, but which often peer with each other for free transmission.[27] The general lack of public interest in interconnection is the result of its quiet and successful functioning. After all, the "internet" is by definition an "interconnected network," one which relies on standards to operate across different regions and companies' lines. These standards existed long before the public attended to such issues.

This article demonstrates that network industries are able to create productive forms of horizontal cooperation. It also shows how entrepreneurial companies and groups can create new positive-sum institutions to increase trades. Finally, the article shows that we need to understand such cooperation if we are to understand how one of the most important industries in American history managed to

literature on networks, see Daniel Birke, "The Economics of Networks: A Survey of the Empirical Literature," *Journal of Economics Surveys* 23, no. 4 (2009): 762-793.

[26] See *AT&T Corporation v. Iowa Utilities Board*, 525 U.S. 366 (1999); Steven Vogel, *Freer Markets, More Rules: Regulatory Reform in Advanced Industrial Countries* (Ithaca: Cornell University Press, 1996).

[27] See Paul Ceruzzi, *Internet Alley: High Technology in Tysons Corner, 1945-2005* (Cambridge, MA: MIT Press, 2008). A rare article on the political aspects of internet interconnection is Sarah Morris, "Missed (Inter)Connections: Why Consumers Are Big Losers in ISP Fights," *Slate,* November 14, 2014, https://slate.com/technology/2014/11/interconnection-the-most-important-part-of-the-net-neutrality-debate-you-havent-heard-about.html See also the brief mention by president Barack Obama of interconnections in his general plea for net neutrality. Barak Obama, "Statement by the President on Net Neutrality," November 10, 2014, https://obamawhitehouse.archives.gov/the-press-office/2014/11/10/statement-president-net-neutrality

create an integrated network that allowed people, goods, and information to travel seamlessly across the nation.