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Losing to Win: U.S. Steel's Pricing, Investment Decisions, and Market Share, 1901–1938

THOMAS K. McCRAW AND FOREST REINHARDT

U.S. Steel held two-thirds of the American market in 1901, but by the 1930s its share had dropped to one-third. Such a decline is consistent with the economic theory of oligopoly pricing and capacity expansion, but the available data offer limited opportunities for formal testing of hypotheses. A close examination of U.S. Steel's early history leads us to argue that Chairman Elbert Gary's desire for price stability, his fear of antitrust litigation, and shortcomings in the firm's organizational capability constrained it from the unbridled pursuit of discounted profits that the economic theory assumes.

An examination of the United States Steel Corporation's declining market share over its first four decades permits a useful exploration of several themes: the underlying nature of oligopolistic competition; the interrelationships among pricing policy, capacity utilization, and investment decisions; and the effects of public antitrust policy on private decision making in dominant firms. Standard historical accounts of U.S. Steel's decline, following the lines pursued by the Justice Department in its antitrust litigation against the firm from 1911 to 1920, have focused on pricing policies and the umbrella U.S. Steel held over the industry. Yet the company's pricing behavior by no means tells the whole story, even when re-examined in the light of modern economic theory. U.S. Steel's decisions on capacity expansion were equally important. Here again, modern oligopoly theory cannot fully account for the firm's secular decline. A more complete explanation must consider not only U.S. Steel's pricing and investment decisions but also the constraints imposed by the threat of antitrust prosecution, together with other objectives pursued by the firm.

The 1901 merger that created U.S. Steel was capitalized at \$1.4 billion, a sum that included a fair amount for anticipated earnings (later estimates placed the "overcapitalization" of the company at about 40 percent). The most important company going into the merger was Carnegie Steel, for which the financial syndicate headed by J. P. Morgan paid \$480 million. In 1901 Gross National Product was \$20.7 billion, so

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the capitalization of U.S. Steel was equivalent to about 6.8 percent of GNP. A commensurate transaction today, with GNP at about \$5 trillion, would be \$340 billion. Andrew Carnegie and his colleagues would receive nearly \$117 billion.

Carnegie's company represented by far the most efficient competitor in the industry. Much of its success was derived from a combination of management techniques that have since become standard in efficient big businesses: recruitment of topflight executives, construction and acquisition of modern plants, systematic vertical integration, and continuous rationalization of process technology. What made the Carnegie enterprise distinctive, however, were two additional policies: hard driving and scrap and build. Hard driving meant pushing blast furnaces beyond their rated capacities, through hotter blast, greater volume, and constant pressure to get additional output. It was much like what a twentieth-century test pilot does in "pushing the envelope" with a jet airplane: see how fast and high it might be made to fly regardless of what its designers had predicted.

Under the related policy of scrap and build, whenever any superior production method appeared, Carnegie Steel rapidly adopted it, with apparent disregard of the short-term cost. Andrew Carnegie did not pioneer new technology so much as he rapidly commercialized it, and he went to extraordinary lengths to discover less expensive ways of producing steel. Once when his young assistant Charles Schwab reported the development of a superior design for a rolling mill, Carnegie ordered him to raze and reconstruct an existing three-month-old mill. Carnegie Steel thoroughly deserved its international reputation as the most relentless, ruthless competitor in the steel industry.¹

As for the newly merged entity: "It is difficult to convey any adequate idea of the magnitude of the Steel Corporation," journalist Ray Stannard Baker wrote in *McClure's* in 1901.

A mere list of the properties owned or controlled would fill an entire number of this magazine. It receives and expends more money every year than any but the very greatest of the world's national governments; its debt is larger than that of many of the lesser nations of Europe. It absolutely controls the destinies of a population nearly as large as that of Maryland or Nebraska. . . . It owns or controls 115 fine steamships on the great lakes, and six important railroad lines and several smaller ones. In Pennsylvania, its coal possessions cover over 75,000 acres of land worth \$1200 an acre, besides 30,000 acres of other land and quarries, and 98,000 acres of leased natural-gas lands. It owns no fewer than 18,309

¹ Harold C. Livesay, *Andrew Carnegie and the Rise of Big Business* (Boston, 1975), pp. 116-17, 150. On Carnegie Steel, see also Joseph Frazier Wall, *Andrew Carnegie* (New York, 1970); and James Howard Bridge, *The Inside History of the Carnegie Steel Company* (New York, 1903). For Charles Schwab's favorable predictions of the results of the merger, see Charles Schwab, "What May Be Expected in the Iron and Steel Industry," *North American Review*, 172 (May 1901), pp. 655-64.

coke-ovens. . . . Of blast furnaces it owns eighty, producing 9,000,000 tons of pig iron yearly, and of steel plants its owns about 150.²

The response of the American public to the formation of this new trust to end all trusts was mostly negative.³ Perhaps more important, the reaction of the capital markets was overwhelmingly favorable. Despite press complaints about the watering of U.S. Steel's stock, all securities sold expeditiously. Investors were apparently reassured by the earning potential of the new giant and by Morgan's underwriting. In time they were proven right.⁴

Once the ink was dry on the new securities, Morgan installed Schwab as head of the company. Many observers expected Schwab to proceed with a rationalization along the lines of Carnegie Steel. Instead, Schwab made a series of social and political blunders and resigned after only two years at the helm. Morgan's fateful choice of a replacement was Elbert Gary, a lawyer who had chaired U.S. Steel's executive committee. This shift in 1903 from the production-oriented Schwab to the lawyer-financier Gary provided an appropriate symbol for the future corporate strategy of U.S. Steel. Gary remained chairman for almost 25 years, until his death in 1927. Under his leadership the company followed a series of policies that differed radically from the hard-driving, low-dividend, scrap-and-build regime epitomized by Andrew Carnegie.

Unlike most successful mergers, U.S. Steel under Gary did little to rationalize production facilities, innovate product lines, or consolidate management structure. Through U.S. Steel's Pittsburgh-plus system, the firm facilitated price coordination with smaller competitors, but saddled itself with a locational inertia that minimized its ability to

² Ray Stannard Baker, "What the U.S. Steel Corporation Really Is, and How It Works," *McClure's*, 18 (Nov. 1901), p. 6. Many other accounts of U.S. Steel take the same awestruck tone. The U.S. District Court's opinion in the antitrust case of 1915 begins as follows: "The subject-matter of the litigation is of such magnitude and complexity, and the record is of such size, that the effort to set bounds to this discussion has not been easy." See *United States v. United States Steel Corporation et al.*, District Court, New Jersey, 223 Federal Reporter (1915), p. 58. On the first page of a three-part 1936 *Fortune* series, one reads: "It is extremely difficult, if not impossible, to visualize the workings of the Steel Corporation as a whole." See "The [United States Steel] Corporation," *Fortune*, 13 (Mar. 1936), p. 59.

³ Much was made in the American popular press about the size, overcapitalization, and antitrust implications of the merger. Nor was the reaction confined to the United States alone. Britain's *Iron and Coal Trades Review*, for example, was quoted in *The Iron Age*, 67 (Mar. 14, 1901), pp. 2-3, to the effect that U.S. Steel would be too "vast . . . cumbersome . . . unnatural and . . . subversive of public and vested interest" to survive.

⁴ See George J. Stigler, "The Dominant Firm and the Inverted Umbrella," *Journal of Law and Economics*, 8 (Oct. 1965), pp. 167-72. For elaborations and some differing views, see Donald D. Parsons and Edward John Ray, "The United States Steel Consolidation: The Creation of Market Control," *Journal of Law and Economics*, 18 (Apr. 1975), pp. 181-219; and Michael E. Burton, "The 1901 Establishment of the U.S. Steel Corporation: For Monopoly and/or Efficiency?" (Ph.D. diss., University of California at Los Angeles, 1985).

exploit new opportunities in growing geographical markets.⁵ Organizationally it persisted in the form of a loose holding company, long keeping intact about 200 subsidiaries—including such giants as Carnegie Steel, Illinois Steel, American Sheet and Tin Plate, and American Steel and Wire. Many of these subsidiaries had overlapping markets and duplicate sales forces.⁶ Overall, between 1901 and the 1930s, U.S. Steel's share of the American market dropped from about two-thirds to one-third. Gary, as chairman and chief strategist, therefore seems guilty of a profligate dissipation of the market power and organizational capabilities he had inherited.

Yet Gary's strategy also yielded strong profits for shareholders and brought stability to an industry long plagued with price wars and producer distress. In addition, U.S. Steel, unlike several other famous trusts, escaped dissolution under the Sherman Act. Viewed in this light, Gary's policies seem remarkably successful.

During his long tenure, the company endured constant public scrutiny by the press. It underwent two detailed investigations by the Bureau of Corporations and the Stanley Committee of the House of Representatives. It defended itself in a prolonged antitrust suit (1911–1920), several smaller investigations during World War I, and still another thorough investigation by the Federal Trade Commission (1921–1924). The records of these proceedings provide an abundance of primary evidence on the company's behavior.⁷

The performance of U.S. Steel and its competitors over its first decades is detailed in the following tables and figures. Table 1 shows, in brief, what happened in different segments of the market during Gary's chairmanship. U.S. Steel's share of the broadest product category,

⁵ Under the Pittsburgh-plus system, prices of steel products of different locales were standardized through the device of adding phantom freight charges from the "basing point" of Pittsburgh, regardless of where the products had actually originated. Later a few other basing points were added.

⁶ U.S. Steel represented a combination of combinations, climaxing a series of mergers of about 180 iron and steel companies existing in the late 1880s into nine very large firms in the late 1890s, and finally into one giant holding company in 1901. The U.S. Steel merger was part of a great wave of combinations in many industries, a movement that began in 1895, peaked in 1899, and finally ended in 1904. During this period, more than 1,800 manufacturing firms merged into 157 consolidated corporations. Many of these, such as General Electric, National Biscuit, and International Harvester, dominated their industries for generations to come and, like U.S. Steel, became household words in American society. The standard work is Naomi R. Lamoreaux, *The Great Merger Movement in American Business, 1895–1904* (New York, 1985).

⁷ The best original documentary sources are U.S. Department of Commerce and Labor, *Report of the Commissioner of Corporations on the Steel Industry*, 3 parts (Washington, DC, 1911 to 1913); U.S. House of Representatives, *Hearings before the Committee on Investigation of the United States Steel Corporation*, 8 vols., 62nd Cong., 2nd sess. (Washington, DC, 1911), the Stanley Committee hearings; U.S. House of Representatives, *Report on the Investigation of the United States Steel Corporation*, 3 parts, 62nd Cong., 2nd sess. (Washington, DC, 1911), the Stanley Committee report; and the voluminous records of the antitrust case cited in fn. 2. The availability of this copious primary data goes far to offset the disadvantage that U.S. Steel's corporate archives remain closed to independent scholars.

TABLE 1
PERCENTAGE OF TOTAL OUTPUT PRODUCED BY UNITED STATES STEEL

Category of Product	1901	1911	1913	1919	1927
Iron Ore	45.1%	45.8%	46.4%	42.1%	41.4%
Blast-furnace Products	43.2	45.4	45.5	44.0	37.7
Steel Ingots and Castings	65.7	53.9	53.2	49.6	41.1
Steel Rails	59.8	56.1	55.5	62.0	53.3
Heavy Structural Shapes	62.2	47.0	54.0	43.8	38.8
Plates and Sheets	64.6	45.7	49.1	44.3	36.5
Wire Rods	77.6	64.7	58.4	55.4	47.4
Wire Nails	65.8	51.4	44.6	51.9	42.0
Tin and Terne Plate	73.0	60.7	58.6	48.4	40.5
Total Finished Products	50.1	45.7	47.8	44.6	37.7
Unweighted Average	61.9	52.3	51.7	49.1	42.1
Standard Deviation	10.8	6.7	5.1	6.2	4.9

Notes: Average and standard deviations exclude "total finished products."

Source: N.S.B. Gras and Henrietta M. Larson, *Case Book in American Business History* (New York, 1939), p. 612.

ingots and castings, fell from 66 percent in 1901 to 41 percent in 1927, and continued downward to 33 percent in 1934. Thus, the corporation lost half of its overall share during its first three decades. Another clue to the company's passive strategy may be inferred from its market share decline in the most dynamic growth sectors of the industry: structural shapes (essential to bridge and building construction) and light flat rolled products (notably sheet and tin plate for the powerful new automobile and consumer goods industries). In Table 1 we see structural shapes declining from about 62 percent share to about 39 percent, plates and sheets from 65 to 37 percent, and plate from 73 to 40 percent. The table also shows that the company standardized its shares in all product lines, as Gary had said he intended to do.

Other important aspects of U.S. Steel's business may be observed from the numbers in Table 2. The first is the immense magnitude of the undertaking: for many years, U.S. Steel remained the largest manufacturing enterprise in the country by any measure. Yet the numbers also reveal a striking cyclical nature of the firm's business. In 1916, U.S. Steel increased its employment by 62,000 workers. Five years later, it laid off 76,000. The sales figures tell a similar story. In 12 of the 35 years between 1903 and 1938, the company's sales rose by 20 percent or more over the figure for the previous year. In seven other years, sales fell by more than 20 percent. Fully half of all years, therefore, were characterized by either explosive sales growth or severe contraction. Similarly, annual profits ranged from almost a half billion dollars during World War I to large losses during the Great Depression.

In general, U.S. Steel's profits were respectable even when one ignores the huge spike caused by World War I. Profitability fell

TABLE 2
SELECTED DATA ON UNITED STATES STEEL, 1901 to 1938

Year	Workers (thousands)	Sales (\$ million)	Percentage Change in Sales on Previous Year	Profits (\$ million)	Profits as Percentage of Sales	Ingot Capacity (million gross tons)	Percentage Market Share of Ingot Production
1901						9.4	66%
1902	168	\$ 561		\$140	25%	10.0	65
1903	168	537	-4%	116	22	11.2	63
1904	147	444	-17	80	18	11.5	61
1905	180	585	32	126	22	12.9	60
1906	202	697	19	163	23	13.4	58
1907	210	737	6	167	23	14.8	56
1908	165	482	-35	67	14	15.6	56
1909	196	646	34	101	16	17.2	56
1910	218	704	9	125	18	17.8	54
1911	197	615	-13	93	15	18.1	54
1912	221	746	21	88	12	18.8	54
1913	229	797	7	117	15	18.5	53
1914	179	558	-30	58	10	19.0	50
1915	191	727	30	110	15	19.2	51
1916	253	1,231	69	313	25	20.8	49
1917	268	1,706	39	487	29	22.0	45
1918	269	1,749	3	441	25	22.2	44
1919	252	1,445	-17	159	11	22.3	50
1920	268	1,757	22	176	10	22.4	46
1921	192	997	-43	72	7	22.7	55
1922	215	1,101	10	72	7	22.7	45
1923	261	1,577	43	155	10	22.8	45
1924	247	1,271	-19	126	10	22.8	43
1925	250	1,412	11	133	9	23.1	42
1926	253	1,515	7	160	11	22.7	42
1927	232	1,318	-13	126	10	23.2	41
1928	222	1,382	5	147	11	23.8	39
1929	254	1,502	9	220	15	24.2	39
1930	253	1,175	-22	113	10	25.2	41
1931	216	725	-38	-1	0	26.1	39
1932	164	355	-51	-5	-2	27.8	36
1933	173	521	47	-30	-6	27.3	35
1934	190	589	13	-12	-2	27.3	33
1935	195	776	32	12	2	27.3	33
1936	222	1,100	42	67	7	26.7	35
1937	261	1,396	27	130	9	25.8	37
1938	202	767	-45	3	0	25.8	33

Sources: U.S. Steel Corporation, *T.N.E.C. Papers* (New York, 1940) [Exhibits prepared for the Temporary National Economic Committee], vol. 2, pp. 138, 142 (capacity and market share); and Gertrude D. Schroeder, *The Growth of Major Steel Companies, 1900-1950* (Baltimore, 1955), appendix, table 1, p. 216 (other data).

gradually over time, and U.S. Steel, like its competitors, lost money during part of the Great Depression. Overall, the firm's profit margins do not suggest any obvious superiority or inferiority of management. Table 3 shows average annual profit figures for the top seven firms

TABLE 3
PERCENTAGE PROFITABILITY, 1901 TO 1930: ANNUAL AVERAGES

Company	Profitability
U.S. Steel	12.6%
Bethlehem	10.3
Republic	10.1
Jones & Laughlin	8.2
Youngstown	16.3
Inland	16.9
Armco	13.7

Source: Gertrude D. Schroeder, *The Growth of Major Steel Companies, 1900-1950* (Baltimore, 1955), p. 175.

during the period 1901 to 1930, expressed as a percentage of gross fixed assets. Clearly, the American steel industry enjoyed healthy profits—under policies worked out primarily by U.S. Steel.

“COMPETITION” UNDER CARNEGIE AND GARY

Buried in the volumes of testimony taken by the antitrust prosecutors and the investigators from the Bureau of Corporations and the Stanley Committee is a vast array of comments on competition by lawyers, economists, and steel executives. Throughout the antitrust proceedings, the word competition and its cognates occur thousands of times. The meaning of the words varies widely, yet, as a whole, these comments provide a detailed picture of what was happening in the industry after 1901.

Gary himself was called to the stand during the trial. He had this to say about pricing policies: “The Steel Corporation has endeavored to prevent sudden and violent fluctuations downward by its advice, but more particularly by its own action in fixing its prices, and has endeavored to prevent the unreasonable increase in prices at times when the demand was greater than the supply and there was a general disposition in the trade to take advantage of these conditions and unduly increase prices.”⁸

However self-serving, Gary’s testimony was corroborated by U.S. Steel’s customers. An agricultural implement manufacturer who purchased bars and plates from U.S. Steel’s Carnegie subsidiary described the firm’s practices: “Our experience has been that, on advancing markets, the Carnegie Company were [sic] as low and frequently lower than competitors, while on declining markets they were generally a little higher.” The president of Pacific Coast Steel, a competitor of Gary’s, said: “I have always found the competition of the United States Steel

⁸ *United States v. United States Steel Corporation* (1915), p. 90.

Company and its subsidiaries fair; its existence has been beneficial to the steel and iron trade of the country.”⁹

The policies of the old (pre-1901 merger) system were attacked sharply in the testimony by witness after witness, including Gary himself:

There was a competition that was bitter, fierce, destructive. If it did not absolutely drive competitors out of business, it so harassed and injured them as to prevent them from extending their business, or from taking advantage of their location, and at times compelled them to close their mills, discharge their employes [sic], and disrupt their organization, and in fact, was a competition that, in the opinion of those in charge of the United States Steel Corporation, I might say the opinion of those in control of the industry generally in this country at the present time, was calculated to destroy, to injure instead of build up, to prevent extensions of the trade, to limit the capacity or the opportunity of many who were engaged in the trade.¹⁰

Exonerating U.S. Steel in the antitrust case, the court summarized as follows: “[A] single large concern, by lowering the price of any substantial steel product it sells, can depress the obtainable price.” On the other hand, “[N]o single large concern, by raising or even maintaining the price of any substantial steel product, can raise the obtainable price.” As important as the policies of U.S. Steel were, in the end the forces of supply and demand remained decisive. All prices depended “on whether the consumption of steel was such that the mills were crowded with orders from buyers, or whether buyers were crowded with offers from mills. . . . [T]he prices at which steel products have been bought from the Steel Company and its competitors have been fixed by business conditions—over demand or over supply.”¹¹

Ultimately, the court pronounced the old competition bad, and the new better: “[N]o testimony has been produced on this record that a return to the old trade war system of ruinous competition would, as a matter of fact, benefit the public interests. On the contrary, the proof is that present business methods and ethics are more to be desired.”¹² A concurring opinion put the issue in even broader compass, holding that the 1901 merger had been for horizontal not vertical reasons and that a monopoly had been intended but not achieved. Yet, despite their more skeptical view of U.S. Steel, the concurring judges concluded as follows:

The testimony abundantly shows that the power of the [U.S. Steel] corporation to control prices was efficient only when in cooperation with its competitors. It has

⁹ *Ibid.*, pp. 78, 90–91.

¹⁰ *Ibid.*, p. 95.

¹¹ *Ibid.*, pp. 88–89.

¹² *Ibid.*, p. 95. Although the court drew a distinction between the old competition and the new, its remarks on prices, on pp. 88–89, downplay the market power U.S. Steel possessed. The concurring opinion partly alleviated this apparent contradiction.

never raised and maintained prices by its own action. It has done it only by joint actions, and when joint action was either refused or withdrawn, the corporation's prices were controlled by competition. . . . There is no evidence that it attempted to crush its competitors or drive them out of the market, and in its competition it seemed to make no distinction between large and small competitors. In fact, its conduct towards its competitors, as shown by the testimony, has been conspicuously free from that business brutality, meanness, and unfairness which characterized the conduct of certain large corporations found guilty of violating the Anti-Trust Law.¹³

When the Supreme Court upheld the lower court ruling, it followed the lead of this concurring opinion.

All opinions at both levels exhibit consistent ambiguity toward the idea of competition. For the judges it implied price competition, for which the critical data obviously pertained to U.S. Steel's pricing behavior. Yet it also encompassed vaguer notions of fairness that were difficult to measure and for which the ultimate evidence was not intent or behavior but results: in particular, the decline in the company's market share, which had as much to do with investment decisions (notably the expansion of capacity) as with pricing. Let us take up these two topics sequentially.

PRICING

In their attempts to understand U.S. Steel's behavior during the early period of its existence, contemporary observers paid a great deal of attention to its pricing policies. For these observers, as for modern economic historians, monopoly power was, almost axiomatically, the power to set monopoly prices. Today, in "strategy" courses taught at leading business schools, market power is defined as a firm's ability to raise prices without provoking an adverse competitive response. The ability to set monopoly prices is simultaneously the most visible symptom of market power and the source of allocative inefficiency and social inequity.

Did U.S. Steel possess this kind of power in the early years after its formation? Scholars have long known, in a general way, that prices stabilized after 1902 under the leadership of U.S. Steel. The trends evident in the following figures show a little more precisely what happened in important product markets. In Figure 1 we see that between 1895 and 1900, prices for wire and nails first doubled, then fell back to their original level, then almost tripled, and finally fell by about 30 percent. After the U.S. Steel merger in 1901, prices stabilized and showed little fluctuation even during the Panic of 1907. Similar patterns hold for other important products, as shown in Figure 2. The same

¹³ *Ibid.*, pp. 165–66, 172. The reference in the last sentence of this quotation is to the 1911 cases against Standard Oil and American Tobacco.

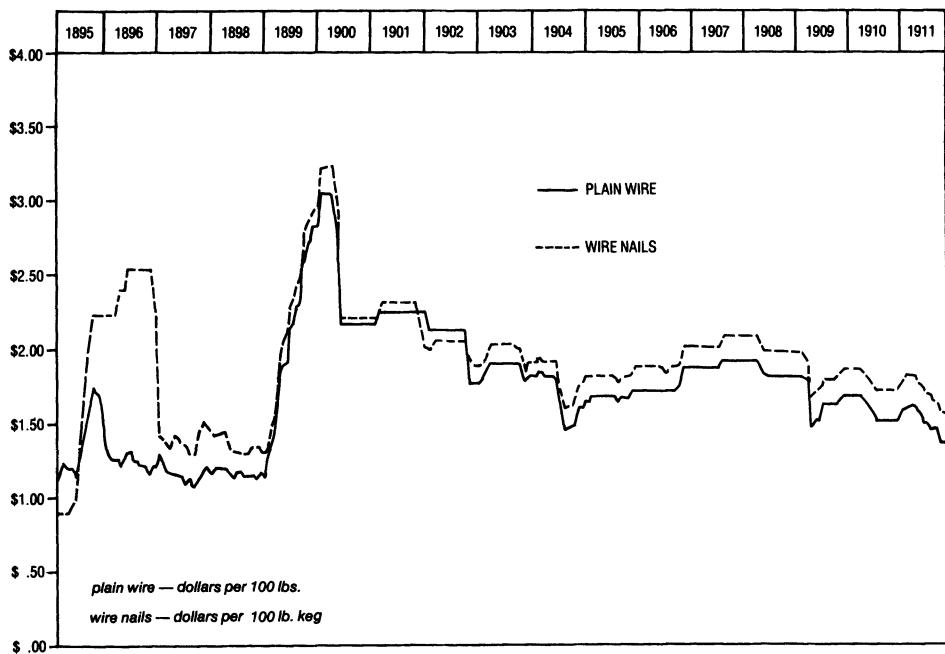


FIGURE 1

AVERAGE MONTHLY PRICE OF PLAIN WIRE AND WIRE NAILS AT PITTSBURGH,
1895-1911

Source: United States vs. United States Steel Corporation et al., District Court, New Jersey, Government Exhibits 218 and 219, Nov. 19, 1912.

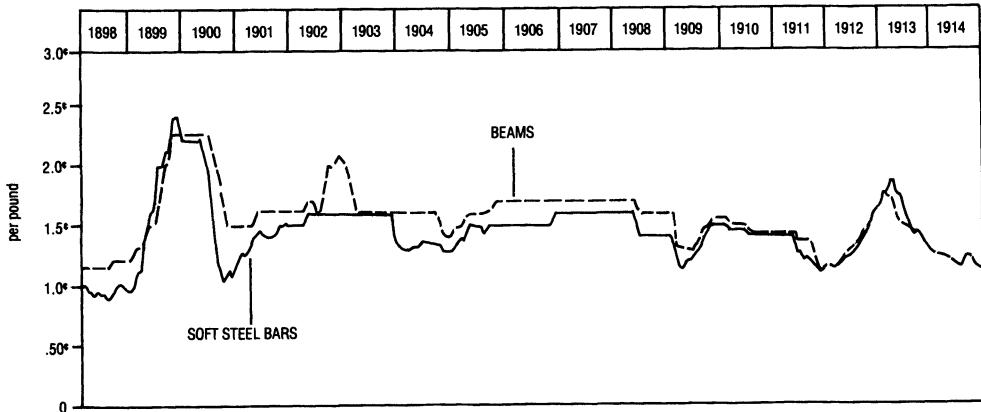


FIGURE 2

PRICES OF BEAMS AND BARS, 1898-1914

Source: Adapted from *The Iron Age*, 95 (Jan. 7, 1915), pp. 16ff.

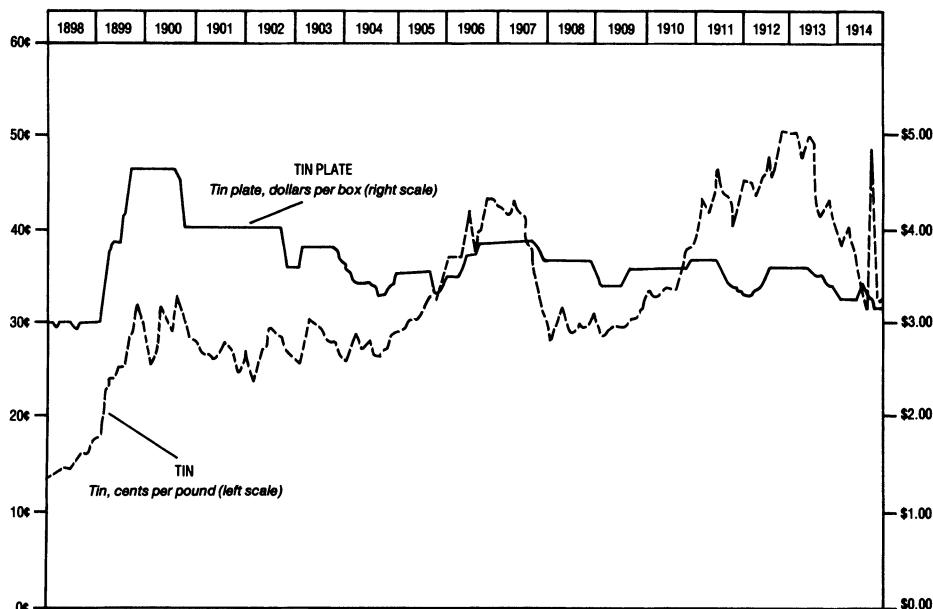


FIGURE 3

TIN AND TIN PLATE PRICES, 1898-1914

Source: See Fig. 2.

pattern appears again in Figure 3, which contrasts the rapid movement in the price of tin, which steel companies had to purchase in a more or less open market, with the more stable price of tin plate, which they manufactured.¹⁴

According to Gary's testimony in the antitrust case, the company decided at the end of each year what its prices were going to be during the coming year, and then actually kept them at that level.¹⁵ This policy did bring an unprecedented measure of price stability to the industry, as the figures suggest; but it also gave U.S. Steel's competitors an opportunity to undercut the leader's prices and thus increase their market share. The competitors did so, and Gary's own managers often grumbled that his pricing policies were misguided.¹⁶

Gary, however, together with the company's admirers, was extremely pleased with U.S. Steel's record of bringing price stability to a wildly cyclical industry. While the famous system of Gary dinners involving executives from many companies lasted only a short while, the company's policy of publishing its prices for the upcoming year

¹⁴ Roughly speaking, the metallurgical content of tinplate is about one percent tin, which accounts for about 15 percent of the final product's price.

¹⁵ *United States v. United States Steel Corporation et al.*, District Court, New Jersey (1912-1915), Transcript of Trial Testimony, pp. 4882-83.

¹⁶ Robert Hessen, *Steel Titan: The Life of Charles M. Schwab* (New York, 1975), pp. 186-87.

remained a lasting force for stabilization.¹⁷ Thus, U.S. Steel's policies gave rise to a chorus of accolades of the sort quoted earlier from testimony in the antitrust case, and, ironically considering some of the presumed aims of antitrust policy, they contributed mightily to the company's victory in that case.

Additional evidence suggests that Morgan and Gary regarded their activities in steel as a means to stabilize not only the industry, but the macroeconomy. Gary, in fact, sometimes advocated governmental pricing of steel in the pattern of the Interstate Commerce Commission's supervision of railroad rates. He seems to have conceived of the steel industry as a type of industrial utility.¹⁸ Then, too, the purchase by Gary and Morgan in 1907 of the Tennessee Coal, Iron, and Railroad Company (TC & I), the antitrust implications of which were later scrutinized by the Justice Department, appears to have been motivated primarily by a desire to avert financial panic rather than to obtain assets at bargain prices. Gary secured the personal approval of President Theodore Roosevelt and Secretary of State Elihu Root before purchasing TC & I, and they at least regarded the macroeconomic considerations as important. Gary's testimony in the antitrust case and in many other proceedings shows him unmistakably to have been preoccupied with the pursuit of stability, both for his own industry and for the national economy. As for Morgan, his activities both in steel and in finance (as during the national liquidity crises of 1894 and 1907, when he performed the role of central banker) also demonstrate an overriding concern with stability.

As Gary and other witnesses testified, U.S. Steel's practice was to cut prices last in recessions, thereby losing market share to more aggressive competitors but maintaining higher profit percentages for as long as possible. In upturns, U.S. Steel raised prices last, thereby recapturing some market share at the expense of short-term profit percentage. This policy, along with the three other possible pricing strategies for market leaders at different stages of the business cycle, can be summarized in Table 4.

At about the same time U.S. Steel was following the first of these policies, companies such as Standard Oil and Du Pont were pursuing different courses. Their objectives seem to have been to keep their manufacturing plants running full and steady regardless of business conditions. Although the patterns by no means were always the same, in general they often cut prices ahead of their rivals in recessions,

¹⁷ For a discussion of the Gary dinners and their aftermath, see Maurice H. Robinson, "The Gary Dinner System: An Experiment in Cooperative Price Stabilization," *The Southwestern Political and Social Science Quarterly*, 7 (Sept. 1926), pp. 137-61.

¹⁸ See, for example, *The Iron Age*, 87 (June 8, 1911), pp. 1404-7, for a summary of Gary's testimony before the Stanley Committee; and *The Iron Age*, 89 (Feb. 29, 1912), pp. 540-41. Gary's proposals along this line did not often sit well with other steel executives. See editorial in *The Iron Age*, 87 (June 15, 1911), p. 1446.

TABLE 4
ACTUAL AND POTENTIAL PRICING POLICIES

	In Recessions	In Upturns
U.S. Steel's actual policy	Cut prices last: lose market share, maintain high margins	Raise prices last: gain market share, forgo high margins
What the reverse policy would have been	Cut prices first: gain market share, sacrifice profit margins	Raise prices first: lose market share, increase profit margins
How best to maximize short-term profitability	Cut prices last: lose market share, maintain profit margins	Raise prices first: lose market share, increase profit margins
How best to maximize market share and (perhaps) long-term profitability	Cut prices first: gain market share, sacrifice profit margins	Raise prices last: gain market share, forgo high margins

sacrificing some profitability in order to maintain scale economies and take a larger share of a shrinking market. In upturns, they often gave back this market share and enhanced their profitability. As demand recovered, they sometimes undertook new construction programs and sometimes did not; and, as we will suggest below, this kind of investment decision was as important as pricing policy. Overall, unlike U.S. Steel, they tried to pass on to their rivals most of the capacity utilization effects of cyclicalities. Standard Oil specifically priced at levels that would discourage competitors from investing in new plant, a policy deliberately eschewed by U.S. Steel.¹⁹

A dominant firm could also cut prices last in recessions but lead price increases in expansions. This could result in loss of market share both in good times and bad, but it might also allow maximum absolute profits over the entire business cycle. In the steel industry, as we have seen, neither Gary nor Carnegie followed any such pattern. Carnegie, in fact, pursued the only remaining policy mentioned in Table 4: he cut prices first in recessions and raised them last in upturns, maximizing capacity utilization and long-term market share at the expense of short-run profitability.

Whatever the motivation for U.S. Steel's pricing policies, many modern business strategists would argue that the company deserved its competitors' praise since it was essentially giving them its markets. Certainly the policy of announced prices made it easy for the smaller firms to undercut U.S. Steel's prices and thereby increase their sales. As Schwab's biographer notes: "Gary's blueprint for stability within the industry often worked against the dominant position of his own

¹⁹ Ralph W. Hidy and Muriel E. Hidy, *Pioneering in Big Business, 1882-1911* (New York, 1955), pp. 28, 117-18, 194.

corporation.’’ U.S. Steel’s fixed prices ‘‘served as a magnet to draw aggressive smaller firms into price and product competition with the giant steel corporation.’’²⁰

In modern economics, dynamic limit pricing theory implies that, in order to maximize the present value of future profits, market leaders ordinarily should lose share gradually over time. That is, a monopolist should set the price of its product somewhere on a spectrum between the price that maximizes short-run profits and the highest price that maximizes long-term market share. If the price is set to maximize short-run profits, these excess profits will induce other firms to enter the business, resulting in a rapid erosion of market share. On the other hand, the dominant firm may be able to set prices low enough that no rival will think it worthwhile to enter.²¹

The appropriate strategy under dynamic limit pricing ordinarily lies between these extremes and depends on subjective appraisals by the market leader of the likelihood of entry under different conditions. The entry-deterring price depends on the elasticity of demand for the product, on potential entrants’ costs, and on potential rivals’ perceptions of possible profits after they enter the market. All of these factors are difficult for the dominant firm to estimate. Further, each factor changes over time, so the entry-deterring price and the optimal price will change over time as well.

It is hard for a dominant firm to estimate these parameters contemporaneously, and even harder for historians to reconstruct such subjective estimates long after the fact. Because of the dynamic nature of the model, no single pattern of market share decline uniquely confirms the theory. Probably for this reason, attempts to apply dynamic limit pricing theory directly to historical market share and profit data for U.S. Steel or any other industry leader have been few. U.S. Steel’s pattern of market share decline is consistent with the theory on a qualitative level, and one could reconstruct determinations that would lead to the kind of market share decline the firm in fact experienced. Yet this would be an exercise in speculation, and corroborating evidence from corporate archives would be necessary to clinch the argument. For now, the available data on market share and profits neither directly confirm nor refute the model.

Dynamic limit pricing theory is especially hard to apply to the case of

²⁰ Hessen, *Steel Titan*, p. 187.

²¹ Darius W. Gaskins, Jr., ‘‘Dynamic Limit Pricing: Optimal Pricing Under Threat of Entry,’’ *Journal of Economic Theory*, 3 (Sept. 1971), pp. 306–22; Morton Kamien and Nancy Schwartz, ‘‘Limit Pricing and Uncertain Entry,’’ *Econometrica*, 39 (May 1971), pp. 441–54; and Morton Kamien and Nancy Schwartz, *Dynamic Optimization: The Calculus of Variations and Optimal Control in Economics and Management* (New York, 1981), pp. 206–11. See also Hideki Yamawaki, ‘‘Dominant Firm Pricing and Fringe Expansion: The Case of the U.S. Iron and Steel Industry,’’ *Review of Economics and Statistics*, 67 (Aug. 1985), pp. 429–37.

U.S. Steel because of the high probability that the company's top management had other objectives besides maximizing long-term discounted profits. The theory does not readily accommodate the possibility that decision makers might be interested in stability for its own sake, let alone constrained by fears of antitrust litigation—as was clearly the case with U.S. Steel.

At a more general level, any theory that emphasizes pricing policies necessarily downplays decisions about capacity expansion, even though these obviously can have a decisive effect on long-term market share. In U.S. Steel's case, the available data on capacity expansion and utilization strongly suggest that price is not the whole picture and perhaps not even the most important single factor.

CAPACITY

If U.S. Steel's pricing policies were encouraging entry, it should follow that other firms' capacity expansions and utilizations consistently exceeded U.S. Steel's. Yet historically this was not the case, as Table 5 shows. From 1902 until the Great Depression, U.S. Steel maintained a higher level of capacity utilization than its competitors, and often much higher. These numbers (the fourth and fifth columns in Table 5) appear to refute any proposition that U.S. Steel, by adhering to rigid pricing policies, ordinarily allowed its rivals' mills to run more steadily than its own. The peculiar patterns of capacity expansion for U.S. Steel and for the industry as a whole are shown in columns 8 through 11 of Table 5. In four of its first six years, U.S. Steel added more ingot capacity than the rest of the industry combined; in four of its first eight years, it increased capacity by 10 percent or more. Given the huge base figures, these additions represented large jumps. Such behavior seems uncharacteristic of the passive giant portrayed in most historical accounts of U.S. Steel.

On the other hand, after 1907 U.S. Steel expanded capacity much less rapidly than did other companies. As Table 5 shows, in only six of the next 30 years did it add more or retire less capacity than did the rest of the industry. In Figure 4 we have condensed the information in Table 5 to permit a more vivid presentation of trends in production, capacity growth, and capacity utilization on the part of U.S. Steel and its competitors.

This sustained policy of not matching, much less preempting, competitors' capacity expansions is crucial to any understanding of the decline of U.S. Steel's market share. It contrasts sharply with the behavior of other "trusts"—Standard Oil in the nineteenth century, Alcoa in the twentieth—and also with the investment patterns modern business strategists would recommend. Without U.S. Steel's record of sluggish capacity expansion during the 30 years after 1907, its decline in

TABLE 5
STEEL INGOT CAPACITY, PRODUCTION, AND EXPANSION, 1901-1938

Year	Total Capacity ^a	Total Production ^a	Capacity Utilization		U.S. Steel share of:		Capacity Expansion ^b		Change in Capacity on previous year	
			U.S. Steel	Others	Capacity	Production	U.S. Steel	Others	U.S. Steel	Others
1901	21.5	13.5	94%	38%	44%	66%				
1902	22.7	14.9	97	41	44	65	602	635	6.4%	5.3%
1903	23.9	14.5	82	42	47	63	1,178	22	11.7	0.2
1904	25.2	13.9	73	40	46	61	337	953	3.0	7.5
1905	26.3	20.1	94	60	49	60	1,334	-224	11.6	-1.6
1906	27.4	23.4	101	71	49	58	563	537	4.4	4.0
1907	28.5	23.4	89	75	52	56	1,332	-232	9.9	-1.7
1908	30.3	14.0	50	42	51	56	813	987	5.5	7.2
1909	34.0	24.0	78	63	50	56	1,567	2,133	10.1	14.5
1910	35.2	26.1	79	69	51	54	688	512	4.0	3.0
1911	36.0	23.7	71	61	50	54	238	562	1.3	3.2
1912	38.0	31.3	90	75	50	54	739	1,261	4.1	7.0
1913	39.0	31.3	90	71	47	53	-326	1,326	-1.7	6.9
1914	39.7	23.5	62	56	48	50	502	187	2.7	0.9
1915	41.3	32.2	85	71	47	51	230	1,375	1.2	6.6
1916	45.8	42.8	100	88	46	49	1,613	2,881	8.4	13.1
1917	49.6	45.1	92	90	44	45	1,205	2,621	5.8	10.5
1918	52.5	44.5	88	82	42	44	161	2,766	0.7	10.0
1919	54.5	34.7	77	54	41	50	133	1,809	0.6	6.0
1920	55.6	42.1	86	69	40	46	13	1,141	0.1	3.5
1921	57.4	19.8	48	25	40	55	341	1,399	1.5	4.2
1922	58.4	35.6	71	55	39	45	0	1,040	0.0	3.0
1923	58.6	44.9	89	69	39	45	108	120	0.5	0.3
1924	59.4	37.9	72	59	38	43	14	773	0.1	2.2
1925	61.1	45.4	82	70	38	42	309	1,396	1.4	3.8
1926	57.8	48.3	89	80	39	42	-376	-2,948	-1.6	-7.8
1927	60.0	44.9	80	72	39	41	428	1,791	1.9	5.1
1928	61.5	51.5	85	83	39	39	585	848	2.5	2.3
1929	63.8	56.4	90	87	38	39	440	1,879	1.9	5.0
1930	65.2	40.7	66	60	39	41	961	421	4.0	1.1
1931	69.0	25.9	39	37	38	39	912	2,902	3.6	7.3
1932	70.3	13.7	18	21	40	36	1,766	-406	6.8	-0.9
1933	70.2	23.2	29	35	39	35	-499	350	-1.8	0.8
1934	69.8	26.0	32	41	39	33	0	-436	0.0	-1.0
1935	70.0	34.1	41	54	39	33	0	291	0.0	0.7
1936	69.8	47.8	63	72	38	35	-685	429	-2.5	1.0
1937	69.8	50.6	72	73	37	37	-885	870	-3.3	2.0
1938	71.6	28.4	36	41	36	33	18	1,801	0.1	4.1

^a Total capacity and total production are listed in million tons.

^b Capacity expansion is listed in thousand tons.

Source: U.S. Steel Corporation, *T.N.E.C. Papers* (New York, 1940) [Exhibits prepared for the Temporary National Economic Committee], vol. 2, pp. 138, 142.

market share could not have occurred (given industry pricing patterns), unless its utilization rate compared with that of other companies had fallen much faster than it did in fact. (Again, see Table 5 and Figure 4.)

Sometimes game theory is useful in analyzing investment decisions

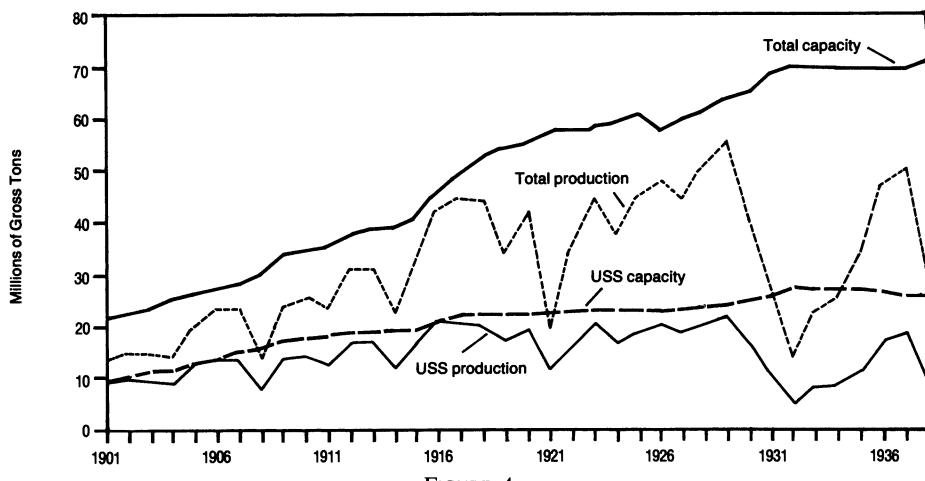


FIGURE 4

STEEL INGOT CAPACITY AND PRODUCTION IN THE UNITED STATES, 1901-1938

Source: Calculated from United States Steel Corporation, *T.N.E.C. Papers*, vol. 2, pp. 138-39, 142-43.

such as U.S. Steel's. For a well-specified set of technologies and costs, game-theoretic models can be employed to derive equilibrium investment strategies both for the leader and for potential entrants.²² The application of these models to the historical data is difficult, however, and to our knowledge has not been attempted for U.S. Steel. The company's own perception of available technologies and costs can be estimated, but not with much precision throughout the long period of decline, which covered three decades. If U.S. Steel's archives were open to independent scholars, such a task would be more plausible. Even so, the possibility that the firm was constrained by other considerations such as antitrust tends to confound game-theoretic models. It is impossible to say, simply by examining the pattern of U.S. Steel's decline, whether the company was behaving in accordance with game-theoretic concepts developed some 60 years later. Further, even if U.S. Steel could be shown not to have behaved as game theory would predict, it would remain unclear whether this implied poor management on the part of the company, some weakness in the theory, or the presence of additional constraints.

We have seen that dynamic limit pricing provides a useful conceptual framework but is not amenable to direct empirical testing. Game-theoretic models of investment are also useful as behavioral paradigms, but are equally difficult to test against historical data.²³ Both sorts of

²² Jean Tirole, *The Theory of Industrial Organization* (Cambridge, MA, 1988), contains numerous examples and comprehensive bibliographies.

²³ One implication of both dynamic limit pricing theory and of game-theoretic models of investment is that higher barriers to entry should lead to higher profits for the dominant firm, slower

models, furthermore, assume that the sole objective of the firm is the maximization of discounted profits and that the firm is unconstrained by either legal problems or other institutional factors. To provide a more satisfying explanation of U.S. Steel's decline, we need to relax these counterfactual assumptions. As we have seen, U.S. Steel was concerned with industry stability as well as with its own profits. The fear of antitrust litigation and the apparent inability of its managers to overcome inadequacies in organizational structure and performance also played important roles in its decline.

ANTITRUST CONSTRAINTS

Lurking in the background of U.S. Steel's management decisions in its first two decades is the long shadow of the Department of Justice. The avowed purpose of the firm's creation, as Gary expressed it, was "to form and complete an organization which would give us a self-contained, complete, rounded-out business proposition that would enable us to manufacture at the lowest cost all of the principal forms of

declines in its market share, or both. Steel is ordinarily regarded as having substantial barriers to entry. Comparative work on turn-of-the-century mergers, however, shows that barriers to entry in steel were not especially high and that U.S. Steel's loss of market share was not atypical of that of contemporary trusts.

Richard Caves, Michael Fortunato, and Pankaj Ghemawat have used the qualitative analytic framework provided by dynamic limit pricing to investigate the declining market share of major trusts of the early twentieth century. They have shown that a sample of 34 companies with a mean market share of 69 percent in 1905 had dropped by 1929 to a mean of 45 percent. They examined the effects of entry barriers, profit levels of the largest participant in each industry, and erosion of market share experienced by each dominant firm. As one might predict, they found that trusts protected by high entry barriers maintained higher profits, slower erosion of market share, or both. The table below shows some of their findings for U.S. Steel and the other 33 companies studied:

	U.S. Steel	Mean of All Trusts Studied
Profit Rate, 1901–1916 (Return on Invested Capital)	6.41%	7.16%
Profit Rate, 1917–1933	6.71%	7.36%
Percentage of market supplied by average plant of dominant firm	0.90%	5.08%

See Richard E. Caves, Michael Fortunato, and Pankaj Ghemawat, "The Decline of Dominant Firms, 1905–29," *Quarterly Journal of Economics*, 99 (Aug. 1984), pp. 523–46. The quoted data come not only from that article but also from the working papers behind it, which are available from its authors.

The last line of numbers listed is a measure of one kind of entry barrier. The authors also examined others, including degree of vertical integration, presence of patent protection, capital investment required for a plant of minimum efficient scale, and so on. For most of these categories, barriers in the steel industry were lower than average.

Less recent but still useful literature on the subject includes Dean A. Worcester, Jr., "Why 'Dominant Firms' Decline," *Journal of Political Economy*, 65 (Aug. 1957), pp. 338–46; Shaw Livermore, "The Success of Industrial Mergers," *Quarterly Journal of Economics*, 50 (Nov. 1935), pp. 68–96; and Eliot Jones, *The Trust Problem in the United States* (New York, 1921).

finished steel [to sell to] all parts of the world.''²⁴ Yet, even before the company was formed, Gary had considered the possibility that it could be successfully prosecuted under the Sherman Act. He is reported to have said to Morgan in 1901:

If there should be a direct attack by the Attorney General against the new corporation at the beginning of its business career, the attack would probably be successful for the reason that so large a percentage of the iron and steel business is included in the new company; as the intentions of the organization have not been demonstrated, the Corporation is liable to be held a monopoly in opposition to the Sherman Law. But I also think that if the Corporation with its business is properly managed and it is allowed to continue in business until it has proven that the intentions of the managers are good, that there is no disposition to exercise a monopoly or to restrain legitimate trade, then in that case, if there is a contest, the company will be held to be legal.²⁵

Gary was a first-rate lawyer, and in this case he was exactly right.

Until 1907–1908, as the numbers in Table 5 suggest, U.S. Steel did not behave as if it were seriously concerned with the danger of antitrust prosecution. Then it reversed course. Several events occurred during the period 1906 to 1908 that might have made the company adopt a more careful approach to its drive to expand capacity. In 1906 Gary publicly expressed his fear of "unreasonable political action," noting that "the atmosphere seems to be charged with distrust and suspicion," falling on "good and bad enterprises alike." Accordingly, he urged that "Every one in charge of great [business] responsibilities should be stimulated to use greater efforts to promote what is good, and to prevent what is bad."²⁶ And, indeed, in 1906 the Justice Department launched major antitrust suits against American Tobacco and Standard Oil, the second and third largest industrial corporations after U.S. Steel. Then, during the Panic of 1907, U.S. Steel purchased the Tennessee Coal, Iron, and Railroad Company. Gary's publicly proclaimed purpose in making this acquisition was to rescue a Wall Street brokerage firm from bankruptcy, and U.S. Steel portrayed its purchase as an act of industrial statesmanship. Even so, Gary was sufficiently sensitive to the antitrust implications to board a train for Washington and secure clearance for the merger from President Theodore Roosevelt.²⁷ Meanwhile, the Panic itself prompted a new wave of criticism of trusts, and the Bureau of

²⁴ Testimony of Elbert Gary, *United States v. United States Steel Corporation*, p. 4757.

²⁵ Quoted in Ida M. Tarbell, *The Life of Elbert H. Gary: The Story of Steel* (New York, 1925), pp. 123–24.

²⁶ Quoted in *The Iron Age*, 77 (Mar. 29, 1906), p. 1117.

²⁷ See Robert H. Wiebe, "The House of Morgan and the Executive, 1905–1913," *American Historical Review*, 65 (Oct. 1959), pp. 49–60; and Robert H. Wiebe, *Businessmen and Reform: A Study of the Progressive Movement* (Cambridge, MA, 1962), chap. 4. Gary's anxious state of mind in the 1906 to 1908 period is vividly recalled in a long retrospective interview he gave with Bureau of Corporations investigators on Oct. 6, 1911. See the interview transcript in the Bureau's records, Steel Investigation, File 1940-1, National Archives, Washington, DC.

Corporations began a long investigation into the affairs of U.S. Steel. In Congress, important bills were introduced foreshadowing the antitrust legislation eventually passed in 1914.²⁸ Also, in the presidential election of 1908, even the more conservative of the two candidates, William Howard Taft, urged vigorous antitrust prosecution. The Republican Taft, who won the election, was steeped in a kind of literal legalism and known to be committed to antitrust as a matter of principle. His Democratic opponent, William Jennings Bryan, was seen by many voters as an antibusiness radical.

Ida Tarbell, who interviewed Gary at length during the 1920s and prepared his biography, believed that he limited his company's market share so as to ensure victory in potential antitrust cases. Gary's strategy, wrote Tarbell,

was not to allow in any branch [product line] over 50 per cent of the business, and oddly enough, it was William Jennings Bryan who set this per cent figure for him! Along in 1906 Bryan was advocating 50 per cent as a legal limit for the size of a business, and Judge Gary had seized the figure. 'If we confine ourselves voluntarily to a size approved by the most popular and trusted of radicals, we surely cannot be attacked for monopoly,' he told his associates. They had acquiesced and had succeeded fairly well in keeping the percentage down, even in the leading products.²⁹

The idea that fear of antitrust litigation constrained U.S. Steel should not be overdrawn. Clearly, some of the firm's aggressive capacity expansions during its first six years—both through acquisition and new construction—could well have provoked antitrust prosecution. Even after capacity expansion slowed, U.S. Steel inaugurated the famous (if short-lived) Gary dinners, at which prices were openly discussed. Later, these dinners were held to be in violation of the Sherman Act, although the point was moot since they had ceased before the antitrust case was brought in 1911. Also, if antitrust fears had been the binding constraint of U.S. Steel's expansion, one might expect its relative decline to reverse or abate after the Supreme Court's decision of 1920 in the company's favor.

Yet antitrust considerations likely had a central role in explaining the capacity expansion figures presented in Table 5. In the final decision of 1920, the company escaped dismemberment by the narrowest possible margin. Four justices voted for the defendant U.S. Steel, three for the

²⁸ An editorial in *The Iron Age*, 81 (Feb. 13, 1908), p. 518, complained: "The scope and severity of laws to regulate business have vastly increased within a few years, and if the growth of legislation continues it will be a comparatively short time until every man who conducts an industry or business will be technically, at least, a law breaker." On the agitation within Congress, especially the powerful Hepburn Bill of 1908, see the middle chapters of Martin J. Sklar, *The Corporate Reconstruction of American Capitalism, 1890–1916: The Market, the Law, and Politics* (Cambridge, 1988).

²⁹ Quoted in Tarbell, *Life of Gary*, pp. 257–58. See also Bureau of Corporations Interview with Gary cited in fn. 27.

government. Two others, Louis Brandeis and James McReynolds, recused themselves. Brandeis had written muckraking articles against the company before coming on the Court in 1916; McReynolds, as President Woodrow Wilson's attorney general, had been indirectly involved in prosecuting the case. Had both of these men actually voted the verdict almost surely would have been five to four against the company.

The decision, in both the District Court and the Supreme Court, turned on the firm's behavior, just as Gary had foreseen in 1901. The opinions in the case refer repeatedly to U.S. Steel's loss of market share. Given the logic of the jurists' reasoning, it seems certain that had the company's share not dropped significantly from the 66 percent figure of 1901, it would have been dismembered.³⁰ The trade paper *Iron Age* summarized the outcome: "Here is the greatest corporation in the world, one whose coming many viewed with alarm, but where is one that has less power to turn to the right or to the left to carry out its own will, as against that of any related interest? It has had to be all things to all men—the servant of its competitors, its customers, its employees and the public."³¹

INSTITUTIONAL CONSTRAINTS

It is conceivable that U.S. Steel declined because it was constrained by limited access to capital or because its managers were overcautious in their appraisals of the likely growth of a market for steel. The first idea seems implausible after even a cursory look at the firm's board of directors, which included the greatest industrial capitalists and investment bankers of the period. U.S. Steel had access to whatever capital it wished to expend; indeed it built the world's largest integrated works at Gary's eponymous Chicago suburb. The second notion seems equally unlikely as an explanation for the sustained, systematic deterioration evident in Table 5.³²

A more promising set of explanations for U.S. Steel's decline can be based on a close analysis of its organizational structure. The company did not adopt the kind of well-defined managerial hierarchy character-

³⁰ The contemporary press reporting of the District and Supreme Court decisions in 1915 and 1920, like the texts of those opinions, makes much of the decline of U.S. Steel's market share and the rise of competitors' share. See, for example, *Wall Street Journal*, June 4, 5, and 7, 1915; *Commercial and Financial Chronicle*, June 5, 1915, pp. 1860–61, 1873–75; *The Iron Age*, June 15, 1915, pp. 1299–1321; *Literary Digest*, June 12, 1915, p. 1386; *Literary Digest*, Mar. 13, 1920, pp. 17–18; *Wall Street Journal*, Mar. 2 and 3, 1920; and *New York Times*, Mar. 2, 3, and 4, 1920.

³¹ *The Iron Age*, 95 (June 10, 1915), pp. 1302–4.

³² A different focus altogether is evident in Parsons and Ray, "The Creation of Market Control." They are preoccupied with the company's control of ore, its building of market power, and foreign trade. We believe that control of ore was less important than they argue (partly because the company divested very substantial portions of its ore interests), and that the company did not possess as much market power as their argument implies.

istic of the most successful giant corporations. Leading firms in other industries (oil, chemicals, automobiles—even some in steel, such as Bethlehem) developed extraordinarily efficient structures that allowed them to track costs and allocate resources rationally across product divisions and functional activities. This accomplishment, in turn, enabled them to reap economies of scale, scope, and throughput, and to build sustainable cost advantages.³³ U.S. Steel, by contrast, operated as a loose federation topped by a holding company. Elbert Gary maintained his headquarters in New York, far from any important manufacturing complex or from U.S. Steel's traditional markets. (In fact, the company virtually ceded the East Coast market to Bethlehem and other rivals.) Gary's orientation and that of top management in general remained legal and financial as opposed to industrial. In 1941 the magazine *Fortune*, in a careful retrospective, contrasted the company unfavorably with Bethlehem Steel: "U.S. Steel is a combine, born of finance; Bethlehem was born of steel. The primary job of U.S. Steel's management has been administrative. The primary job of Bethlehem's management has been creative."³⁴

The view that this kind of institutional orientation and capability is central to the history of managerial capitalism originated with Alfred D. Chandler, Jr., who has recently criticized U.S. Steel for failing to rationalize its operations. The senior managers, writes Chandler, "who were lawyers and financiers, failed to appreciate the value of operating full and steady." Although some rationalization did take place after 1901, especially in the area of plant specialization, U.S. Steel "made no attempt to create a single overall centralized, functionally departmentalized structure."³⁵

Such arguments help to explain the questions about sluggish capacity expansion posed earlier. They also suggest reasons why the company's capacity utilization rates tended to fall. If the managers in New York cared little about field operations, then the company would be unlikely to pursue product and process innovations as aggressively as did such competitors as Bethlehem and Republic. Nor would it fully exploit available scale and scope economies. The only other managerial expla-

³³ Alfred D. Chandler, Jr., *Strategy and Structure: Chapters in the History of the American Industrial Enterprise* (Cambridge, MA, 1962); and Alfred D. Chandler, Jr., *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, MA, 1977).

³⁴ "Bethlehem Steel," *Fortune*, 23 (Apr. 1941), p. 62. The same article contains the following comment about the reasons why U.S. Steel allowed Bethlehem to prosper through such deals as access to Minnesota iron ore: "The answer is that however much U.S. [Steel] disapproved of Bethlehem's upsurge, it was too big to become any bigger, for political and operating reasons. Judge Gary simply had to sit back in a forbearing, Christian manner and offer Bethlehem his blessing" (p. 144). For an insightful analysis of U.S. Steel's first three decades, see "The [United States Steel] Corporation" (cited in fn. 2).

³⁵ Alfred D. Chandler, Jr., *Scale and Scope: The Dynamics of Industrial Capitalism* (Cambridge, MA, forthcoming).

nation for the downward trend in capacity utilization is sheer incompetence. Yet this seems difficult to accept. It is true that Gary was a lawyer-financier and not an engineer or production man, but a review of his exhaustive testimony in the antitrust case and other proceedings reveals that he was solidly in control of his data and well versed in operational knowledge. Further—and again we believe this to be the most important point—U.S. Steel's utilization rates remained above the industry average for 25 years after the company's formation.

The most plausible managerial explanation of the phenomena exhibited in Table 5 and Figure 4 would run approximately as follows. First, in the early years after the company's formation, Gary, Morgan, and the executive team pursued a strategy of completing the rounded out, vertically integrated, full line of products company they had originally envisioned. They did this primarily by acquisition but also by constructing, over several years, the gigantic and efficient Gary mills in Indiana.

Second, beginning in the period 1906 to 1908, with the Gary mills under construction and their rounding out strategy more or less complete, U.S. Steel's managers now faced intensified antitrust sentiment. Accordingly, they tempered further construction and acquisition programs. Elbert Gary began to focus more on U.S. Steel's role as a stabilizing dominant firm, emphasizing intraindustry cooperation, especially with respect to prices. Meanwhile, little innovative product development and no huge new projects on the scale of the Gary mills were contemplated, despite an almost certain growth of demand.

Third, within the corporate organization, the holding company form persisted. Subsidiaries operated without much coordination except with respect to price. The best operating executives, notably Schwab and other members of the crack team assembled earlier by Carnegie, either retired or left for other steel companies where they would enjoy more entrepreneurial challenges than were possible under the Gary regime.³⁶

Fourth, by the time U.S. Steel won its antitrust suit in 1915 and defeated the government's appeal in 1920, the company's organizational capabilities had long since atrophied. Now, U.S. Steel was poorly positioned as an organization to respond to the challenges of Bethlehem, Republic, and other aggressive firms which had been helped by the spurt in demand brought on by World War I.

Thus, a combination of forces, all in sequential reinforcement of each

³⁶ In 1911, Gary told Bureau of Corporations investigators "that he had been criticized sharply by his own presidents [of subsidiary companies], because they claimed that this plan [of price maintenance] was practically building up the Steel Corporation's competitors, inasmuch as the fair maintenance of prices by the Steel Corporation and the frequent failure to observe the schedule[d] prices by its competitors enabled such competitors to enlarge their proportion of the business (I have this sentence noted as 'confidential') [wrote the Bureau of Corporations investigator]; but Judge Gary said further that in his opinion the Steel Corporation from the start had too great a proportion in tubes, wire, and tin plate, and that it was his policy to let their proportion in those lines of the business be reduced." See interview citation in fn. 27.

other, ended by the 1920s with U.S. Steel still at the head of the industry—but, as an organization, one far different from the aggressive, intensely competitive company pioneered by Andrew Carnegie. Within a remarkably short time after U.S. Steel's formation in 1901, it had dissipated the legacy of managerial capability Carnegie had bequeathed it.³⁷

AN OVERALL ASSESSMENT

For three decades, U.S. Steel followed patterns of pricing and investment that guaranteed an erosion of its market share. Instead of raising barriers to entry into the steel industry, it lowered them. It neither tried vigorously to retain its existing markets nor to take advantage of new growth opportunities in structural and rolled products. For possible explanations of this puzzling behavior, we must turn to the sum of evidence presented in this article. As Tibor Scitovsky once remarked: "Nothing is ever so simple that a single explanation will adequately explain it."³⁸ So with the case of U.S. Steel and its declining market share.

When the company was created in 1901, its founders had at least three objectives. They wanted to end cut-throat competition with its wild price fluctuations and instability that had characterized the steel business in the 1890s. To do so, they assembled the largest industrial enterprise the world had yet seen. They were not ignorant of the enormous underwriting profits that would accompany the formation of such a company. And they wanted to continue to operate the firm both to reap profits and maintain stability within the industry.

The company could hardly have been more explicit about its intentions. Its very first *Annual Report* highlighted an innovative "Policy as to Prices":

The demand for the products of the several [operating] companies has been so great that prices could easily have been advanced. Indeed, higher prices have been voluntarily offered by consumers who were anxious for immediate execution

³⁷ Although cross-national comparisons are not central to our argument, we note that steel giants which merged more recently in other countries have lost share as well. In Britain, 14 companies combined in 1967 to form British Steel. The new firm had a total work force of 257,000 and a domestic market share of about 70 percent. By 1980, its share had dropped to only 48 percent. It recovered to 59 percent in 1983, by which time total employment had shrunk to about 80,000, less than one-third the original total. See Sara Coles, *The British Steel Corporation, 1967–1983* (n.p., Dec. 1983).

In Japan, the controversial merger during 1967 to 1970 of the two leading companies, Yawata and Fuji, to form Nippon Steel was also followed by loss of market share: in pig iron, from 45 percent in 1967 to 38 percent in 1984; in raw steel, from 36 to 28 percent; in hot rolled finished steel, from 37 to 31 percent. See Tsutomu Kawasaki, *Japan's Steel Industry* (Tokyo, 1985), p. 698. These figures pertain to total production, not to the domestic market alone as in the case of British Steel.

³⁸ Tibor Scitovsky, *Human Desire and Economic Satisfaction: Essays on the Frontiers of Economics* (New York, 1986).

of orders, but the companies have firmly maintained the position of not advancing prices, believing that the existing prices were sufficient to yield a fair return on capital and maintain the properties in satisfactory physical condition, and that the many collateral advantages to be gained in the long run by refusing to advance prices would be of substantial and lasting value, not only to the companies, but also to the general business interests of the country. The strong position thus taken by the companies for stability in prices both of raw material and finished products, has had a reassuring effect on the trade, and has contributed greatly toward restoring confidence in the general business situation and creating the present large demand for steel products, by dispelling any doubt as to prices in the future.³⁹

In 1902, when this statement was issued, corporations were not required to publish annual reports at all, and U. S. Steel received widespread plaudits for its pioneering example of openness.⁴⁰

If we take at face value the "Policy as to Prices" and combine it with other evidence, then it is hard to escape the conclusion that the founders of U.S. Steel succeeded brilliantly in their aims. The company returned respectable dividends to its shareholders, and prices stabilized to a degree that would have been inconceivable in the nineteenth century.⁴¹ Whether management's aims were good for the company, the industry, or the macroeconomy remain other questions. Clearly, the cost of U.S. Steel's policy was an inexorable loss of market share: not only because of pricing but even more because of decisions not to innovate with new products and not to build new plants at a rate commensurate with the pattern of overall demand. Ultimately, Gary's pursuit of "stability" had drifted into an obsession with maintaining the status quo—an ominous development for any firm, however powerful.

In economic theory, as we have seen, it is far from axiomatic that a loss of market share, taken by itself, constitutes evidence of a company's failure. Relinquishment of share by the market leader over time is consistent with at least some prescriptions of optimal business

³⁹ United States Steel Corporation, *Annual Report 1901* (New York, 1902), p. 14.

⁴⁰ The company, while criticized for its "overcapitalization," was also praised for its adherence to the "Policy as to Prices" in the face of very high demand for steel in 1901 to 1902. See, for example, *The Nation*, Mar. 13, 1902, p. 205: "The Steel Corporation started with a heavy [financial] strain on its resources. It is very fortunate for the company that this year's market for its products should have developed demands far beyond what the most sanguine prophet could have foreseen. It is still more fortunate that this tidal wave of prosperity in the iron trade should have failed to sweep away the company's managers from their original position as to prices."

⁴¹ In 1920 Gary was still evangelizing on the virtues of stability: "We think stability in business is of the highest importance and that every man, to the extent of his opportunity and ability, and even at some sacrifice, is obligated to assist in stabilizing and maintaining prices on a fair and sane level. The producer, consumer and workman will be benefited by this attitude"; *The Iron Age*, 106 (Nov. 25, 1920), p. 1428. The context was Gary's announcement that U.S. Steel would not increase prices despite increases in its costs. His obsession with stability almost never wavered, and can be followed in detail over a 20-year period in his many appearances before congressional committees and in his speeches, many of which were published in the *Proceedings of the American Iron and Steel Institute*, of which he was the perennial president. The Bureau of Corporations Records (National Archives) also has a broad collection of Gary's speeches to other groups.

behavior. Dynamic limit pricing, game-theoretic approaches to capacity expansion, and industrial organization analyses all describe circumstances in which the loss of share might benefit the leader.

On the other hand, any of these theoretical approaches to the U.S. Steel story would predict very substantial excess profits during the period of market share losses. What happened to these profits? In all likelihood, they failed to materialize fully for the same reasons that the company's market share declined so quickly: the pursuit of stability, the fear of antitrust litigation, and an institutional structure incapable of exploiting the rich legacies the company inherited from Carnegie Steel.

In the end, the overall meaning of the theoretical and empirical evidence is not a determinate matter but one of historical judgment. In our interpretation, the antitrust constraint and other political factors, together with the related deterioration of the company's managerial capabilities, loom large in explaining both the declining market share and the absence of extraordinary profits. In the first decades of the twentieth century, Gary and other top managers of U.S. Steel watched as American Tobacco, Standard Oil, Du Pont, and other giant firms lost antitrust suits and were forced to divest major portions of their companies. U.S. Steel, being much larger than any of these other firms, lived in an even more fragile glass house. Gary and his colleagues understood this and behaved accordingly.⁴² They coddled their competitors, forbore to build a modern administrative structure for their own company, took special pains to issue informative annual reports, and often made their corporate records public—sometimes even including their own cost data. And when they did come before the bench in a major antitrust suit, they won, unlike their counterparts in other industries.

Consider as one final contrast the history of Alcoa, a primary metals firm like U.S. Steel. During the first four decades of the twentieth century, both Alcoa and U.S. Steel integrated vertically and horizontally. Yet Alcoa also adopted a centralized management structure, engaged in a zealous policy of preemptive capacity expansion, and took

⁴² The evidence of U.S. Steel's attempts to stay out of trouble with the government is overwhelming. For example, an editorial titled "The Steel Corporation Helps Its Competitors," *The Iron Age*, 88 (Aug. 24, 1911), praised U.S. Steel for its actions during a strike in Britain that led to a shortage of tin in the United States: "If the United States Steel Corporation had chosen to use all its advantages for its own purposes and to ignore its competitors the opportunity here existed for reaping important benefits. This would have been ordinary commercial selfishness, and would by no means have been illegal restraint of trade. The Steel Corporation chose to do otherwise, however, and thus signally manifested its liberality and magnanimity."

Gary and others were in fact shocked when the antitrust case was actually brought against them. As the prominent banker Frank Vanderlip wrote privately in 1911, "The Steel people, however, have been hopeful up to the last that this would not happen and have tried to do everything possible to avoid it and to bring themselves in line with official opinions." Quoted in Sklar, *The Corporate Reconstruction*, p. 375, fn. 71. See also the Gary interview with Bureau of Corporations officials cited in fn. 27.

part in an international cartel. In the ultimate reckoning, Alcoa, like Standard Oil and American Tobacco, lost its big antitrust case, whereas U.S. Steel a quarter of a century earlier had won.

Seen in this light, the U.S. Steel story becomes not just an epic of administrative failure, or an example of oligopolistic inevitability, or, necessarily, a harbinger of American industrial decline. It may be all three; but fundamentally it is a story of political economy. It constitutes a vivid instance of the interrelated nature of public policy and business behavior—an exemplar of the proposition that “success” in twentieth-century American business has sometimes been defined not only in the marketplace but also in the court of public opinion. In an open democratic polity, if a firm is perceived as too large and powerful, then its management might behave too conservatively for the good of their own company; and this is what Gary and his colleagues did.