Thinking About Competition

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Competition and Units of Analysis

Like many indispensable words, "competition" has flexible and sometimes ambiguous meanings. When economists use it, for example, they generally mean something different from what other people mean. Whether standing alone or accompanied by an adjective-- perfect, imperfect, workable, monopolistic, oligopolistic-- "competition" remains for economists a term of art. It has technical parameters that are often crucial to the assumptions behind mathematical models and it lies near the heart of entire analytical systems such as static equilibrium and marginalism.

For businesspeople, lawyers, and historians, "competition" is most often employed not as a term of art but in its common-sense usage. This is one reason why economists and lawyers tend to talk past each other when they discuss antitrust policy, why economists become impatient with loose newspaper discussions of "competitiveness," and why businesspeople get exasperated with the jargon in which economists conduct their discourse.

The best way for historians to begin thinking about competition is simply to look at its evolving definitions. The earliest known dictionary reference is a 1604 definition of the word "competitor": "He that sueth for the same thing, or office, that another doth." In the nearly four centuries that have passed since 1604 the common-sense meaning of the word has changed remarkably little. In 1755 Dr. Johnson's dictionary rendered "competition" as "the act of endeavouring to get or do what another endeavours to gain at the same time." By the 1890s the *Oxford English Dictionary* had shortened this to "the striving of two or more persons for the same object" [8, pp. 7-8].

It would seem apparent that the two or more must be striving against each other. Yet this is not necessarily the case. Soldiers in an army strive together for victory. So do members of a football team. Military alliances (NATO, the Warsaw Pact) and groups of teams (the Big Ten, the National Football League) strive together to isolate themselves from other groups. Of course, armies and football teams also struggle against opponents in wars and games and individual members of teams compete for starting assignments. Overall, however, it remains clear that serious ambiguities inhere in "competition," involving a mixture of cooperation and rivalry.

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From the word's etymology we can see that this has always been the case. The appending of the Latin verb, *peto* (to seek), to *com* (a frequent rendering of "with," after the preposition *cum*) resulted in *competo*, which means "to seek together"-- and more often with a common purpose than in opposition. From the beginning, therefore, we see this curious but significant circumstance: two potentially conflicting principles-- striving and cooperation-- folded together into a single word. Nor is it a peculiarity of English and Latin alone. The same ambiguity appears in the French word *concurrence*, the Italian *concorso*, the German *Koncurrenz*, and the Spanish *concurrencia*, all of which are close synonyms for *competition* in English.

For clarity, perhaps we should add to our definition an element of explicit opposition between competitors: "The striving of two or more against one another for the same objective." Note that this definition encompasses four distinct elements, without any one of which competition cannot be said to be occurring. Yet we still leave open a number of important matters: the intensity of the striving, the desired number of participants (is a duopoly sufficient?), the rules of the contest, and-- perhaps most mischievous-- the definition of "the same objective" [8, pp. 9-12].

The relative emphasis that we, as scholars, accord each of the four elements often becomes a function of the chosen unit of analysis. Consider the fourth element in our definition. When we read news stories about "competitiveness" we infer that the unit of analysis is the country (America versus Japan) or some mixture of industry and country (American semi-conductors versus Japanese semi-conductors). But what is the implied "same objective" for which the competitors are striving? Growth of GNP? Growth of industrial market share?

One of the many conceptual problems of "competitiveness" is that, like the seventeenth-century notion of mercantilism to which it is related, it tends to imply a zero-sum game. So if Japan's GNP grows at 5% and America's at 3%, America would seem to be uncompetitive. Yet this is absurd since both countries' GNPs are growing at an acceptable rate and the question of a "same objective" is not at issue. If we move from the macroeconomic to the country-industry level, however, we see a different picture. Suppose Japan's market share of the world semi-conductor industry was 43% in 1985 compared with America's 50%. If in 1986 it became 45% and America's only 40% (as indeed happened), then we can generalize that America's semi-conductor industry has quite likely become less competitive. This remains true even though the size of the market has grown and competition within it is not a zero-sum or negative-sum game.

I propose that in discussing competition and competitiveness we make our units of analysis explicit, and I suggest the following simple list as a partial menu:

a. One individual versus another. Myles Standish versus John Alden, Marvin Hagler versus Ray Leonard, Henry Ford II versus Lee Iacocca.

b. One company versus another. Ford versus GM, Coke versus Pepsi, IBM versus NEC. This is the level of competition on which our sub-discipline focuses most frequently. The important decision-making occurs at corporate headquarters and that is where we tend to concentrate our research. It is also where we have the strongest comparative advantage over rival disciplines in academic competition.

c. One industry versus another. Many variations are possible here. One is industrial marketing: should Japanese automobile executives, pressed in export markets by the appreciating yen, continue to purchase Japanese steel or should they use cheaper Korean imports? Another is relative profit levels: in the competition for profits that goes on among industries, why have pharmaceuticals historically experienced such healthy returns (I avoid the term "supernormal.")? Why is there a persistent hierarchy of industrial profit levels when economic theory suggests that they should converge [18]? Or, in the competition among industries for talented managers, why did the best young businesspeople go into steel in the 1890s, automobiles in the 1920s, and so on, down to investment banking and consulting in the early and middle 1980s? (They will likely abandon investment banking in droves during the late 1980s.)

d. One sector versus another. What accounts for the rise of the house of labor and its subsequent fall? Why have agriculture, transportation, manufacturing, financial services, and government each claimed a leading share of the factors of production in different periods of history? Can we ever again safely think of stage theories as explanations?

e. One country or country-industry versus another. America versus Japan, American semi-conductors versus Japanese [16]. For historians this is perhaps the richest field of analysis, but also one of the most difficult. Why did the British cotton textile industry decline and what does its decline suggest about the assumptions of neo-classical economics [12, 13]? Why did German chemical companies outpace those of all other countries? Why did the Swiss dominate the watch industry for so many centuries and how did the Japanese displace them so rapidly [7]?

We could continue this list of units of analysis (market versus command economies, bloc versus bloc in the Cold War, etc.). But let us instead return to more prosaic conceptual ground and restate what already may be obvious: business historians deal, intimately and inescapably, with competition. For us it comprises the kind of consuming preoccupation that the question of "being" represents for philosophers and "matter" for physicists. Yet the meaning of competition remains ambiguous. Among other difficulties it mixes notions of cooperation with those of rivalry and it varies with the unit of analysis being employed. Many different units are appropriate and useful for business history, and to do a proper job we often need to address several of them at once. The vocabulary of economics is helpful but its technical meanings-- so necessary for

rigorous mathematical formulations-- excessively constrain the usefulness of economists' definitions of "competition" for everyday historical discourse.

A Rudimentary Typology

I want to illustrate some of what I've said about competition through a brief look at the histories of two American industries, oil and railroads, followed by a more detailed examination of steel. Much of this essay concerns the evolution of the Carnegie company and the United States Steel Corporation, but as a framework for that discussion it is appropriate to review some of the different ways in which competition actually goes on in business.

What we might call competition type A is what Adam Smith envisioned: an unlimited number of participants in an industry, each powerless to affect the behavior of others simply because the participants are so numerous. This is what economists mean by "perfect competition," and most of them fully realize that, just as moral perfection is not vouchsafed to mankind, perfect competition has never existed in the world of business. Yet to the extent that it represents not only an ideal world but one toward which we should seek to move public policy, perfect competition becomes a knotty problem. Should it be construed primarily as a means or an end? Should it promote maximum participation or maximum efficiency?

Perhaps an analogy will clarify the question. Imagine that a marathon race is to be run under type A competition. Theoretically, the number of runners should be limitless, but let us hypothesize at least some control: say, a severe limit of only .02 percent of mankind-- one million of the earth's five billion inhabitants. However well organized and however exciting a spectacle to behold, a race involving one million runners would be unlikely to yield a record time for the marathon. Even with painstaking attempts to stagger the participants and hold intermediate heats the congestion would probably overwhelm all efforts. In fact, the whole idea seems ludicrous. Yet this is what the notion of perfect competition implies.

Let us consider a second scenario, type B competition. Here, only certain individuals are permitted to make the race. Often the right to run is handed down from parent to child for many generations. Once the race begins, everyone obeys certain rules and the emphasis is on quality rather than speed. If 1000 persons begin at the start, then the race ends in a 1000-way tie. Yet peace prevails throughout the running and a good deal of cooperation among the participants fosters a sense of fellowship. Then, too, everyone recognizes that some runners have exhibited purer athletic form than others and in that sense have run a better race. Trouble arises only if interlopers try to jump in. By prior agreement of the 1000 authorized runners the intruders are expelled at once, even if some of them are fast runners with good form.

In economic life, the counterpart to type B competition is collusion by producers to limit output, keep prices high, and maintain a stable situation in which all participants can survive. In economic theory, type B competition (cartelization) is undesirable because it interferes with allocative efficiency. That is, it distorts the allocation of goods and services on both the supply and demand side and therefore inhibits economic growth. It is also politically inequitable in that cartelized parts of the economy prosper at the expense of uncartelized ones. Yet in historical fact, as distinct from theory, type B competition for many centuries constituted the normal way of doing business. All the way back to Roman times the award of corporate charters often meant the grant of monopoly rights to engage in a certain type of trade. In medieval England such organized trades as weavers, goldsmiths, mercers, haberdashers, and shoemakers received charters from the crown that permitted exclusive trading and associational price fixing. Later on, in both Europe and Japan, cartelization became routine and it did have some virtues. It greatly facilitated quality control, prevented price-gouging, and brought a certain stability to commerce. Still, as Adam Smith and other classical economists showed beyond any doubt, type B competition was on balance a bad thing, for the economic and political reasons mentioned above.

When Smith published *The Wealth of Nations* in 1776 the first industrial revolution had just begun. Mechanization of production, the appearance of important scale economies, and regional specialization then created an entirely new situation in certain industries. Thus there began to appear what we might call type C competition. Twentieth-century economists, often without the degree of rigor that characterizes most of their work, have called it "imperfect" and sometimes "oligopolistic" competition. Under a type C regime the dozen or so best marathoners in the world, fresh from a series of exhaustive heats, compete under the most orderly conditions. In certain kinds of industries type C competition, however imperfect, is far more likely to produce a record winning time than either type A or B, assuming that the runners actually do their best.

The difference is clear: under A, competition is maximized by the number of participants; under B, competition is not even the primary goal of the participants or sponsors, except in the sense of guaranteeing high quality; under C, competition is maximized by the measured results at the finish line in the form of the best winning time.

The interesting question remains, is an economic situation more "competitive" under A or C? Leaving aside type B (which did not flourish in the United States because of common-law and, later, statutory prohibitions against restraint of trade), let us compare A with C more closely. The analogy with business is a difference between maximizing the number of participants in an industry on the one hand (A) and minimizing the price of the product on the other (C). Quality in this comparison is assumed to be the same. Yet the question as framed (that is, a stark choice between A and C) cannot be answered correctly

without specification of which industry is being considered. Certain kinds of businesses, most of which require skilled labor but little capital (apparel, furniture, auto repair, leather-working, printing) seem to produce better results under some variant of A, while other, mostly capital-intensive industries (steel, aluminum, oil, auto manufacturing, chemicals) more naturally gravitate toward C. This is a profoundly important fact, clear in historical retrospect but still not sufficiently appreciated by a great majority of those who think and write about competition, including a fair number of professional economists and historians.

Since the early nineteenth century both the burden of economic opinion and the rhetoric of American public policy have consistently urged the maximization of competition. Yet what does this mean in operation? Assuming that B is illegitimate in the American setting, then only choices A and C remain. Broadly speaking, should policy be so implemented as to maximize participation (type A) or to minimize prices (C)? Should competition be regarded as primarily a political issue or an economic one?

The question, though seldom articulated in this way, actually underlies much confusion in the debate about competition during the last century, especially in the United States. The agitation over free trade versus protectionism, the prolonged debate over giant "trusts," the passage in 1890 of the Sherman Antitrust Act, the prosecution of both small and large companies (the former for pursuing type B competition, the latter for abandoning type A and setting up type C), the stop-and-go pattern of Federal Trade Commission behavior, and any number of other examples-- all reflect an uncertain and sometimes schizoid notion of what actually constitutes competition.

The Movement Toward Type D Competition

In the last three decades of the nineteenth century what I have called type B competition appeared throughout the American economy. Cartels of many kinds were set up, even in capital-intensive industries. They almost never worked well. Within the broad context of United States business history they represented a method tried and found wanting-- a transitional phase on the route to more stable arrangements. In the end such arrangements bore little resemblance to the Smithian competitive model identified above as type A competition. Nor, however, did they resemble B. Most of them grew out of type C, but they differed in significant ways. Often they took the form of very large, dominant consolidations of formerly competing firms, a phenomenon we might label type D competition. The economic theory of this type of business behavior has not been fully developed and is difficult to model.

In this essay, rather than attempt further musings about the differences between A, B, C, and D (which, I hasten to acknowledge, represent only the crudest kinds of approximations), it is probably more useful simply to set down the relevant facts: to review briefly the familiar story of what happened as one

industry after another went through the cycle of intense competition followed by abortive cartelization, and how a new series of attempted solutions began to appear. In the oil industry John D. Rockefeller used scale economies in refining to win enormous concessions from railroads and in turn manipulated that advantage to achieve a virtual monopoly of the refining business. He then integrated forward into transportation and distribution and backward into exploration and production. So low were Standard Oil's refining costs, and so advantageous its transportation expenses through ownership of great pipelines, that it almost achieved a monopoly of the industry. Not until the discovery of vast new sources of crude oil in Texas in the early twentieth century did serious rivals appear to challenge Standard's supremacy. For the history of industrial competition in America perhaps the chief significance of the Standard Oil story is that, because loose cartels turned out to be "ropes of sand" (as Rockefeller and others put it), innovative companies such as Standard experienced extremely powerful incentives to consolidate ever larger proportions of the industry within a single entity: first a "trust," then a holding company, and finally a huge corporation-- vertically integrated and centrally managed.

Standard Oil passed rapidly through type C to become an extreme form of type D competition. In most other industries the process did not go quite so far or so fast even though the underlying principles driving consolidation were similar. In the railroad industry, after the failure of pools and other consolidations, individual trunklines built vast, "self-sustaining" systems with feeder tracks reaching into the hinterland. Like Standard Oil, the railroads strove to create autonomous entities that could be profitably operated without the need for collusion. Unlike Standard, they failed. There were simply too many railroads for the available traffic. Thus, the final configuration of the industry stood approximately halfway between type C and type D competition, with some overlay of type B provided by the Interstate Commerce Commission.

The way in which this evolution occurred is indicative once more of the dynamism of industrial capitalism: the evolving technology of an industry, interacting with a shifting macroeconomic environment, sometimes compels a decisive change in the industry's competitive structure. In the case of railroads the general economic downturn of the 1870s, and the much more serious depression of the 1890s, drove one company after another into bankruptcy. Yet for the industry as a whole the bankruptcy of an important railroad usually did not end the drama but instead signalled the start of a new phase. As soon as a road declared bankruptcy it became, by definition, free of some of its capital obligations. It could then charge lower rates for its services. Thus railroads often emerged from bankruptcy courts as far stronger competitors than when they entered.

As the railroads went through their financial agonies the center of attention naturally shifted from operating offices to Wall Street. During the 1890s investment bankers, representing both creditors and railroad corporations,

stepped in to "reorganize" (refinance and consolidate) competing lines. Of these financiers the most capable and trusted reorganizer turned out to be J. Pierpont Morgan. Troubled railroad systems appealed again and again to the great financier and so common did his ministrations become that the word "Morganization" appeared in the financial lexicon of the period. For a railroad to be Morganized meant to be recapitalized, pared down, and sent forth in a healthier financial condition to carry freight and passengers. Most important, it meant some protection from unfettered competition of either type A or type C. Morgan was able to work out "communities of interest" that partook, on a limited basis, of type B. In other words, they exhibited some elements of cartelization. Within the communities of interest, however, ample room remained for competition in price and quality of service. So they became acceptable within the American political economy and they represent a soft form of what I have called here type D competition.

As for Morgan himself, the more he thought about this whole situation the more it seemed to him that railroads were not the only candidates for Morganization. Thus his attention turned to other fields. Often the initiative came not from Morgan but from distressed executives stymied by failing cartels in their own industries and frustrated with the violent cycles of macroeconomic boom and bust. So Morgan tried his hand in other fields as well. Sometimes his magic worked, as in very large type D mergers involving electrical machinery (General Electric) and farm equipment (International Harvester). Sometimes it didn't, as with ocean transportation (International Mercantile Marine), which was not really a capital-intensive industry in the way these others were.

The Morganization of steel began in the 1890s and even in historical retrospect it is difficult to say whether it succeeded or not, without some clear definition of "success." On the negative side, the resulting price stabilizations at relatively high levels undoubtedly reduced allocative efficiency within the overall American economy. On the other hand, the American dominance of world steel production during the decades following the U. S. Steel merger cannot easily be gainsaid. In any case, we should now take a closer look at what actually happened in the years before and after the 1901 merger.

From about 1850 to 1900 the iron and steel industry underwent a drastic transformation. At the beginning of this period facilities were small and production was fragmented among many different specialized companies. Yet by the end of the century the minimum efficient scale of iron and steel plants had become very large. Many such plants were owned by a relatively small number of vertically integrated companies and the production facilities of these companies were concentrated in carefully laid-out "works"-- groupings of furnaces, mills, and transportation facilities all designed to maximize the continuous flow of the product from one stage to the next [23].

If the early history of the steel industry were to be written in the form of biography, the subject would be easy to choose: Andrew Carnegie.[1] Similarly, if it were told as a company history, the focus would be Carnegie Steel. If it were set forth as the contributions of individual innovators, these would come mostly from the managers and consultants employed by Carnegie Steel. In fact, a quick overview of Carnegie's team of executives will clarify not only some of the reasons for the firm's success but also the nature of the evolving technology of steel production. The key players in this drama were: Alexander Holley, the engineering genius who designed practically all of the early Bessemer plants in America and who, in the 1870s, planned the layout of Carnegie's famous Edgar Thomson Works, the most modern plant in the world at the time; the Civil War veteran Captain William (Billy) Jones, a brilliant manager whom Holley hired away from the Cambria Bessemer plant, the industry leader at the time, and who in turn brought with him most of Cambria's best executives; William P. Shinn, the first general manager of the ET Works, a colorless individual who lacked the genius of either Holley or Jones but who brought an accountant's sharp pencil to Carnegie's top executive team and as general manager symbolized the almost fanatical concern with which Carnegie Steel regarded the subject of costs; and Henry Clay Frick, a drill-sergeant type who owned huge tracts of Pennsylvania coal fields and, by 1880, some one thousand coke ovens. When Carnegie bought into Frick's firm while simultaneously making Frick a partner in his own company, Carnegie Steel achieved at one stroke an important backward integration. Frick Coke Company had been a major supplier for Carnegie Steel. A little later Frick pushed a reluctant Carnegie to buy up extensive ore lands and supported Carnegie's drive to acquire, at distress prices, two nearby Pennsylvania steelworks to go along with the ET. These were Homestead and Duquesne, both of which were brand new and, in their process technology, even more modern than ET. In bringing Henry Frick into the company Carnegie acquired not only a capable specialist like Holley, Jones, and Shinn, but also the general manager he had been looking for. Now, with three extraordinary plants at their disposal, Carnegie and Frick pursued a competitive war against their rivals. In the process they promoted a rigorous rationalization of the American steel industry.

Much of the explanation for Carnegie Steel's success lay in the strategies mentioned above: recruitment of topflight executives, construction and acquisition of modern plants, backward integration, and continuous rationalization of process technology. Yet these strategies might apply generally to almost any manufacturing company. What set the Carnegie enterprise distinctly apart was a willingness to "scrap and build"--that is, to raze existing plant and equipment, however new and profitable, as soon as a decisively superior technology appeared, and to build very large state-of-the-art plants rooted in this new technology. Such a business strategy, based on decisions to

[1]This section on Carnegie Steel owes a great deal to [3, 15, 26].

invest large amounts of capital before such investment appears to be necessary, goes against some fundamental incentives of capitalism and it is not easily explained by existing economic theory. The other counter-intuitive practice pushed strongly by Andrew Carnegie and supported by Frick and most of the rest of the executive team was "hard driving," which originated with the first new blast furnace Carnegie built. Called the "Lucy" (after his brother Tom's wife), this facility went into operation in 1872 and within a few years became famous as the industry leader. The operators of the Lucy furnace experimented repeatedly with different ways to get more iron out of a given ton of ore, and above all, with ways to speed up throughput. The term "hard driving" came to mean pushing the furnace ever farther beyond its rated capacity, through hotter blast, greater volume, and relentless pressure to get greater output. It was much like what a twentieth-century test pilot does with a jet airplane: see how fast and how high it might be made to fly, regardless of what the designers of the aircraft had predicted.

Hard driving turned out to be a controversial policy within the industry. Old-school ironmasters regarded Carnegie's practices as an almost sinful abuse of equipment. And hard driving did indeed wear out the linings of the Lucy and other Carnegie furnaces far more rapidly than did traditional "coddling" of equipment. One English observer, Sir Lowthian Bell, in a conversation with a Carnegie superintendent, denounced the "reckless rapid rate ... so that the interior of each furnace was wrecked and had to be replaced every three years." Carnegie's superintendent responded: "What do we care about the lining? We think a lining is good for so much iron and the sooner it makes it the better" [Quoted in 3, pp. 81-82].

Carnegie himself knew full well what he was doing. Because of his sophisticated system of accounting he was able to calculate with precision the costs and benefits of hard driving: to measure the returns from increased output against the wear and tear on the capital equipment. Like the railroad men who had trained him years before, he especially knew how to use cost accounting comparatively-- to measure the performance of one furnace or one crew against that of another.

On Carnegie's behalf Captain Jones and his staff continuously scoured Europe for new technology. In a speech to the British Iron and Steel Institute in 1882 Jones acknowledged that the Americans were soaking up new metallurgical knowledge as fast as possible: "We have swallowed the information ... and have selfishly devoted ourselves to beating you in output" [15, p. 114]. Most important of all, Carnegie again and again stood ready to act quickly on any innovative technology. He knew that it was only a matter of time before such methods spread to other companies. He wanted always to be first-- to capture, in economists' terms, the economic rent available from new technology.

Carnegie was able to make these repeated reinvestments primarily because he owned his firm. For most of its life Carnegie Steel was not a corporation but

a partnership with Carnegie himself owning a majority of shares. Even though corporate status might have enhanced Carnegie's ability to raise capital he preferred to keep personal control. He was generous in his partnership, rewarding Frick, Schwab, and others with new shares. But he wished to keep his own tight hand on the tiller.

Repeatedly, Carnegie resisted pressures from his colleagues and relatives to adopt a more liberal dividend policy. Fixated with the idea of constant production at ever-lower unit costs, he plowed back his profits at every opportunity. In sum, he pursued a single-minded strategy of increased market share. He insisted on operating his facilities full and steady no matter what was happening on the demand side. "Run the mills full," he urged, even in situations of economic recession. Reasoning that as the low-cost producer he could snap up whatever orders there were, he insisted that "the policy today is what it has always been in poor seasons: 'scoop the market,' prices secondary; work to keep our mills running [is] the essential thing" [15, pp. 117, 170; 20, p. 59].

Clearly, Andrew Carnegie was one of the fiercest and most merciless competitors in American business history. Yet he also accelerated the drive of the American steel industry toward oligopoly. In the process many firms perished and, with this smaller number of firms now operating, the industry theoretically might have become less "competitive." Did it?

Not necessarily. The story of Carnegie Steel represents an example of what I have called type C competition. Yet it is important to remember that Carnegie's firm evolved through a dynamic process that began as A, passed through a phase of B, and changed with the technology of iron and steel production into C. In the early years of the iron industry only a small capital investment was required, many backyard smelters fed the operations of innumerable blacksmiths, and type A competition reigned as it had for decades. With the substitution of coal for charcoal, and especially with the coming of the Bessemer converter, substantial capital requirements drove most runners out of the race. They could not afford type C competition. For those who could three choices now presented themselves: first, to harvest profits by getting the most money out of the operation as fast as possible with little thought to the long run; second, to invoke type B competition and collude with each other to limit output, maintain high prices, and maximize profits; and third, to look exclusively to the long term through reinvestment of profits, hard driving, and an overall scrap-and-build strategy. As we have seen, Carnegie Steel almost perfectly embodied this third option under type C competition. But the other two remained important as well. A few operators chose the first option; they took the money and ran. Many companies tried the second route: they exerted mighty efforts to collude, forming the Bessemer Association and similar cartels. Carnegie himself sometimes joined such groups but usually stayed only long enough to learn what he could about his competitors' costs. As soon as he had this information he slashed his prices and broke the cartel. Needless to say, this policy did not sit altogether well with his fellow

industrialists. Yet experience in the steel industry and many others suggests that within the American legal and economic context, where contracts to cartelize were unenforceable and where swings in the business cycle were unusually violent, cartel-breaking was endemic. It was certain to occur sooner or later. So, in the steel industry, if Carnegie hadn't done it someone else probably would have.

In the early years, from about the 1870s to the 1890s, the structure of the American steel industry was shaped primarily by three forces: first, the technology, which led to significant economies of scale and a movement toward continuous-process production; second, external market circumstances, the most important of which was a rapidly growing macroeconomy and a mushrooming demand for steel; and third, the legal environment, principally the distinctive American prohibition against loose horizontal combinations. Until the passage of state antitrust legislation and the federal Sherman Act of 1890 this American policy was primarily passive in its effect. The law forbade the enforcement of contractual articles of cartelization and therefore made collusive business agreements unenforceable. In such a setting the managers of steel companies came to behave in a more autonomous and inward-looking manner than they would otherwise have done. This behavior, in turn, encouraged the emergence of large companies and a rapid rationalization of the industry, primarily through the Carnegie-style scrap-and-build strategy.

After antitrust became a more active policy the threat of prosecution lay heavily on the minds of steel executives and affected their business decisions in several ways. For one thing the merger that in 1901 enveloped Carnegie Steel and other major companies into the new United States Steel Corporation-- a transaction of $1.4 billion, which was so large a sum as to be almost unimaginable to contemporaries-- might not have occurred at all had there been no antitrust laws. In many different industries the American prohibition against loose horizontal cartels often encouraged this sort of tight legal merger of competing companies into one giant enterprise; and this may well have been true for the process that led to the creation of U.S. Steel. (During the 1890s, a series of mergers of about 180 companies produced nine major combinations, and these were merged in 1901 under one immense holding company.)[2] Further, and perhaps more important, the behavior of U.S. Steel over approximately the next 25 years, a strategic pattern far different from the relentless rationalizations of the Carnegie period, was shaped in part by constant concern about popular agitation against U.S. Steel and by the related threat of antitrust prosecution.

This fear was no figment of imagination. In 1911 U.S. Steel's nightmare became a reality when the Justice Department brought a wide-ranging suit designed to break up the company. After a long trial the government lost its case

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[2]That the antitrust laws had some role in the merger waves seems undeniable, but the extent of that role remains debatable. See [2, 11, 17].

in 1915 in Federal District Court. The government appealed, but lost again in a landmark U.S. Supreme Court decision of 1920. This 1920 case was especially interesting because the majority opinion (with the nine justices splitting 4-3, two recusing themselves) held, among other things, that the law did not make giant size an offense in itself. This laid to rest an issue that had been seriously debated throughout the United States for thirty years.

In view of this peculiar sequence of events from 1901 to 1925-- which included a close examination of the company by the Bureau of Corporations, a very intensive congressional inquiry, the prolonged antitrust case (which the government tried unsuccessfully to reopen even after 1920), and a thorough investigation by the Federal Trade Commission between 1921 and 1924-- it would be curious if the top management of U.S. Steel remained unaffected in their thinking about the company's strategy toward its competitors. They lived in a glass house, they knew it, and they behaved accordingly. Instead of pursuing an ongoing strategy of rationalization and price-cutting they behaved in what came to be called a "statesmanlike" manner. Best embodied in the philosophy and behavior of Elbert Gary, a lawyer who served as the company's chairman for almost 25 years, their statesmanship in fact amounted to the maintenance by the dominant firm (U.S. Steel) of a price umbrella spread over the entire industry. This strategy of Gary's made sense in part as a means to pursue monopoly profits, but even more so, I think, as an insurance policy against public interventions that might destroy the company. In retrospect the strategy is intelligible only in a context of persistent vulnerability to legal attack, either by the government or by competitors whom U.S. Steel might displace through superior productive efficiencies. So Gary pursued and publicly articulated a strategy of live and let live; and this is the primary reason why the company was able to win the 1920 lawsuit and to fight successfully against the government's efforts to reopen the suit thereafter.

The Meanings of "Competition" Under Carnegie and Gary

Buried in the multitudinous volumes of testimony taken by the Bureau of Corporations, the Stanley Committee of the House of Representatives, and the antitrust case against U.S. Steel is a vast collection of comments on competition by lawyers, economists, and executives of steel companies. Throughout the antitrust proceedings in particular, the word "competition" and its cognates occur thousands of times. As might be expected, the meaning of the words wanders all over the lot. Yet, taken together, these comments provide a detailed picture not only of different conceptions of "competition" but also of what was happening within the industry. The following is a brief sampler from the testimony in the antitrust case (1912-1915).

President of Cambria Steel, questioned by attorneys:
Q. "Has the [U.S.] Steel Corporation any such advantage owing either to its size, the extent of its integration, or any other circumstance, as would enable it to put its competitors out of business, did it choose to do so?"
A. "No, sir. It would be impossible for it to do so without committing suicide. ... if they would make prices so low that we could make no profit on it, there would be nothing left for the Steel Corporation; and, if they would undertake to put us out of business by selling below our cost, they would be selling below their cost, so that I cannot see how it would be possible for them to put a well-managed concern out of business ... I do not fear the Steel Corporation as much as I fear other competition" [24, pp. 71-74].

President of Gulf States Steel Company: "Their competition is strictly fair" [24, p. 78].

Vice-President of Standard Steel Company: "I have always regarded the competition of the Steel Company's subsidiaries [which continued to operate in their own name for decades after the formation of the holding company] as the fairest competition that we have" [24, p. 78].

President of Pacific Coast Steel Company: "I have always found the competition of the United States Steel Company and it subsidiaries fair; its existence has been beneficial to the steel and iron trade of the country" [24, p. 78].

Manager of Sharon Steel Company: "I liked the competition [from U.S. Steel]. If you are bound to have competition, theirs was good competition" [24, p. 144].

President of Youngstown Sheet & Tube Company: "My experience is that it is the best competition we have; that they are open and above board in all of their dealings. ... In depressed times, when there is not nearly enough business to keep all of the mills operating to their full capacity, their prices are usually higher than the independents. In good times, when the mills are all working to capacity, their prices are usually lower than the independents. The independents will accept bonuses and do things of that kind that I do not think the [U.S. Steel] corporation will do. So that I think the general effect is for the steadying of prices and making them better for the country at large, and of course in dull times, it is a great protection to the smaller manufacturers to have them keep their prices up, when business is slack, than it would be if they went out like Carnegie Steel Company did in the early days and took all the business and shut the other people down" [24, pp. 78-79].

President Charles Schwab of Bethlehem Steel (former President of U.S. Steel):
Q. "Have you ever known or heard of a case where the [U.S. Steel] corporation has sold at a less price in a particular market to drive out a competitor?"
A. "Never" [24, p. 80].

The District Court's own summation of this testimony once more suggests the ambiguity in popular conceptions of "competition" and recalls the mixture of rivalry and cooperation derived from the Latin root of the word:

> No one can read these volumes of testimony and fail to be satisfied that this great body of business men, scattered over all parts of the country, in keen competition with each other in their several lines, is alert in seeing that competitive conditions exist between the manufacturers of basic steel products from whom they buy. And the sworn testimony of these men, who are vitally interested in the maintenance of real competition between the Steel Corporation and its manufacturing competitors that such real competition does exist and has existed during the past ten years, cannot but carry a conviction that such is the case. A study of the testimony of these men, who are close to and vitally interested observers of the prices of these products, shows that a single large concern, by lowering the price of any substantial steel product it sells, can depress the obtainable price. It further shows that the converse is the case-- that no single large concern, by raising or even maintaining the price of any substantial steel product, can raise the obtainable price. It further shows that the prices at which actual sales were made during this time in the steel trade depends 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 ... the 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. The proofs also show [volume 26, p. 11096] the same conditions and results prevail in the European steel market [24, pp. 88-89].

During the trial, Elbert Gary himself was called to the stand, and he had this to say about pricing policies:

> Prices generally are controlled very much by the business conditions of the country. The ordinary laws of trade and supply and demand fix the general prices of commodities, but 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 [24, p. 90].

However self-serving, Gary's testimony was repeatedly corroborated by U.S. Steel's customers. Here is how an agricultural implement manufacturer, a purchaser of bars and plates from U.S. Steel's Carnegie subsidiary, described the Corporation's practices: "Our experience has been that, on advancing markets, the Carnegie Company were as low and frequently lower than competitors, while on declining markets they were generally a little higher" [24, p. 90]. A leading southern manufacturer described the same policy in this way: "I think, if I had been a stockholder in the Steel Corporation, I would have felt several times that it was failing to earn the money for me that it ought to have done by advancing prices" [24, pp. 90-91].

The policies of the old system were contrasted sharply in the testimony by witness after witness, including Elbert Gary:

> 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 [24, p. 95].

Ultimately, the Court itself pronounced the old competition bad, the new better:

> ... No testimony has been produced in 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 the present business methods and ethics are more to be desired [24, p. 95].

A concurring opinion put the matter in broader compass:

> The testimony abundantly shows that the power of the corporation to control prices was efficient only when in co-operation with its competitors. It has never raised and maintained prices by its own action. It has done it only by joint action, 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 [Here the reference is to the 1911 cases against Standard Oil and American Tobacco.] [24, pp. 165, 172].

This comment, incidentally, is a good deal more significant than might otherwise appear because the concurring opinion took a much less sympathetic view of U.S. Steel's behavior than did the main opinion. The concurring judges held that the 1901 merger was really for horizontal not vertical reasons and that a monopoly was intended but not achieved. Later, in 1920, when the Supreme Court upheld the lower court ruling it followed the lead of this concurring opinion. Yet all opinions at both levels exhibit a consistent ambiguity in the minds of the judges toward the idea of "competition."[3]

The Evolution of Competitive Types

There remains a great deal more to say about the U.S. Steel experience as an exemplar of a certain kind of competition. (This essay, in fact, is part of an ongoing inquiry of my own.) The questions raised may be explored using many topics and units of analysis: the individual manager (Carnegie versus Gary); the firm and its strategy (U.S. Steel's deliberate relinquishment of market share) [4, pp. 67-97; 6; 10; 14; 27]; the concentration of buyer power (by the 1930s, 100 customers took 42 percent of American steel output) [25, p. 127]; the rise of important rival companies such as Bethlehem and National [1, 19, 21]; even the nation-state (American steel companies exposed after the 1950s to pressing import competition).

The closer one looks at these matters the more evident it becomes that rich research opportunities lie at hand. To take just one example, it seems likely that economists and historians, in focusing so single-mindedly on price, have neglected other aspects of competitive behavior that, in industries such as steel, may be

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[3] A volume contemporary with the controversy over U.S. Steel, which itself encapsulates the remarkable semantic confusion over competition, is [9].

equally important: process and product innovation; the arts of industrial marketing; and, above all, investment decisions-- how much capacity to build, of what kind, and at what location? It is clear, for example, that the post-World War II triumph of the Japanese steel industry had as much to do with relentless modernizations and location of all important mills on tidewater, where ocean-borne transportation of ores and products gave huge advantages, as with price policy per se-- which, overall, was managed in the Gary style. One hypothesis at this stage in our understanding of competition in industries such as steel is that some combination of Andrew Carnegie's investment decisions with Elbert Gary's pricing policies might actually be the route to sustained competitive advantage for a national industry in world markets.

If this is true, then perhaps it might be useful to look a little more closely at the two kinds of what I have called type D competition: the hard kind (Rockefeller) and the soft one (Gary), and to speculate a bit about the way in which one might evolve into the other. Indeed, I think it would be interesting to argue for a sequence something like the following: that all industries, in the absence of external constraints such as the medieval "just price," begin with type A competition. They then evolve at differential rates depending on the nature of the industry. Some remain forever at A, frustrated by all attempts by their members to achieve any sort of market power. Others become frozen in B, as nearly all industries did during the long centuries of ancient and medieval history when a religious ethic of live-and-let-live permeated civilized societies. Some industries still remain at B, though in the United States this usually requires the help of government, as with regulated companies. Many move on to C, given certain industry characteristics (capital intensity, technological complexity, high minimum efficient scale). Within C they typically go through a brutal shakedown in which the resulting oligopoly becomes stable against serious startup challengers. And a few evolve into type D with one clearly dominant firm and industry-wide price leadership.

U.S. Steel under Elbert Gary, as we have seen, represents the embodiment of a soft form of type D competition. Here is Ida M. Tarbell, Gary's biographer, discoursing in 1925 on the wonders of his performance. This is the same Ida Tarbell who in one of the most effective muckraking books ever written had earlier excoriated John D. Rockefeller's ruthlessly competitive behavior in building the Standard Oil Company:

> In 1901, the competitive practices of the steel industry were frankly brutal; its heroes were those who were most successful in putting their weaker fellows out of business. ... Under Judge Gary's leadership the industry has been put on a basis of regulated competition which has revolutionized all its practices and brought it from a condition of chronically drunken prices to where its prices are as stable and, on the whole, as reasonable as those in any industry. ...

> He has demonstrated in practice the soundness of his code. He has made a lasting contribution to our difficult and often baffling problem of substituting in American business balance for instability-- mutual interest for militarism-- cooperation for defiance-- frankness for secrecy-- good will for distrust. No man in contemporary affairs has more honestly earned the high title of Industrial Statesman [22, pp. 343, 355].

The issue of whether a particular business leader should be regarded as a robber baron or an industrial statesman is an old and now bankrupt debate within American business history. But the question of how, when, and why certain kinds of competition actually evolved within different industries remains a serious and difficult challenge. The ironies are rich indeed: John D. Rockefeller and Andrew Carnegie on the one hand, Elbert Gary and J.P. Morgan on the other.

In 1913, when Morgan died, a leader of the socialist party remarked, "We grieve that he could not live longer, to further organize the productive forces of the world, because he proved in practice what we hold in theory, that competition is not essential to trade and development" [quoted in 5, p. 645]. For us to judge the accuracy of this kind of statement-- and for numerous other reasons vital to the writing of good business history-- we are going to have to come to a better understanding of the different meanings attached to the word "competition."

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