MERGER FOR MONOPOLY: THE FORMATION OF U.S. STEEL

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Scholars have posited three reasons as to why U.S. Steel Corporation was formed: to swindle the public, to monopolize the steel industry, or to become a more efficient firm. The evidence from a stock market event study shows that from its inception, U.S. Steel was viewed as a monopolistic competitor. The stock prices of component and competing firms reacted positively to the announcement of the company's formation. This is consistent with the theory that U.S. Steel was formed to monopolize the domestic steel industry, inconsistent with the theory that U.S. Steel was formed to become a more efficient firm, and inconsistent with the theory that U.S. Steel was formed in order to sell overpriced stock to an unsuspecting public. These results confirm Stigler's conclusions in his classic paper "The Dominant Firm and the Inverted Umbrella," despite that paper's empirical flaws. Further, this conclusion is supported by much of the recent literature on U.S. Steel.

In 1901 the United States Steel Corporation (U.S. Steel) became the first billion-dollar corporation in the United States, controlling 60 percent of the nation's primary steel capacity. It represented the culmination of the first great merger wave and the height of J. P. Morgan's influence over the American economy. U.S. Steel was capitalized at $1.4 billion at a time when the total capitalization of American manufacturing was $9 billion. This $1.4 billion was larger than the national debt and over three times the size of the federal budget.

It has been well established by Strouse, Krass, Parsons and Ray, McCraw and Reinhardt, Mullin, Mullin and Mullin and others, that in the early part of the twentieth century U.S. Steel exerted market power over the steel industry.[1] However, the question remains whether it was formed with the expectation or with the intention that it would become a monopolist. This is the first paper since Stigler[2] to specifically address this issue,

and attempts to resolve the issue of why U.S. Steel was formed. Examining the stock price reactions of several constituencies to the announcement of the formation of U.S. Steel refines Stigler's analysis and supports his conclusions. U.S. Steel was formed with the expectation that it would exert pricing power in the steel industry. The catalyst that sparked its formation appears to be Andrew Carnegie's intentions in 1900 to expand Carnegie Steel into the finished good markets, specifically steel tubes, and to compete directly with several J.P. Morgan-controlled steel firms.[3]

There have been three hypotheses for the reasons behind the formation of U.S. Steel: to swindle the public, to create a monopoly, or to create efficiency. Each of these hypotheses has distinct implications for the reactions in the prices of securities of the various affected constituencies, and can be tested through an event study, an examination of the reactions of securities to new information. Given the assumption that markets react rationally and that prices incorporate new information rapidly, then any change in the value of a security that cannot be explained by changes in overall market conditions reflects new information about that security. It should be possible to answer the question of why U.S. Steel was formed by examining the stock price reactions of the securities of firms which were affected by the formation of U.S. Steel.

The swindle hypothesis posited that U.S. Steel was formed in order to sell overpriced securities to an unsuspecting public. Contemporary accounts emphasize U.S. Steel's $1.4 billion capitalization compared with the $700 million capitalization of its component firms prior to the consolidation. Stigler reports that Arthur Stone Dewing made the most influential statement on this hypothesis in the fourth edition of his *Financial Policy of Corporations.* Dewing compares the merger movement to a "virus," continuing:

> It was the harvest-time of promoters.... During 1900 and 1901, the movement continued, but the new promotions were fewer in number, owing to the fact that most of the opportunities for the formation of "trusts" had already been fully exploited by bankers and promoters. Accordingly, the ground was combed over again. The trusts themselves were consolidated. A pyramid was built of pyramids. The United States Steel Corporation, capitalized at over 1,300 millions of dollars, was built up out of half a dozen smaller trusts, themselves, in several cases, the combination of smaller combinations. By 1902 signs were apparent that many of the trusts had not justified the predictions of their promoters.[4]

This increase in net equity, or net worth, from $700 million to $1.4 billion in capitalization was used as a "classic example of watered stock" in finance texts.[5, 6] Under this hypothesis, there was no business or economic reason for the steel firms to consolidate. The sole purpose of the consolidation was to sell overpriced stock to an unsuspecting public. Furthermore, the merger would have had no impact on any of the firms. With no economic basis for the merger, the component firms' expected future cash flows would not have changed. Since there was no change in the economic fundamentals of the component firms, then the economic fundamentals of competitors and customers would not have changed. With no change in the underlying economic characteristics of

any of the firms, there was no new information conveyed and there should be no stock price reaction to the announcement of the consolidation.[7] Given the overwhelming empirical and theoretical evidence favoring market efficiency, today it is difficult to take

If either of the other two hypotheses are correct, then the announcement of the consolidation would have affected other firms. Under the monopoly hypothesis advocated by Stigler, the component firms became part of a monopolistic dominant firm that can set prices and quantity in order to generate higher profits. Stigler states that U.S. Steel was "...formed for the monopoly power that it achieved."[8] Strouse, Krass, Parsons and Ray, along with Mullin, Mullin and Mullin, confirm Stigler's conclusions that U.S. Steel was a monopolist but shed little or no light on whether monopolization was the primary reason for U.S. Steel's formation.[9] As fringe firms, the competitors could free ride on U.S. Steel's pricing power and earn abnormal profits. In fact, these firms should have been more profitable than U.S. Steel, since they did not have to enforce the restrictions on industry output. Therefore the component firms and the competitor firms would have exhibited positive reactions to the announcement of the consolidation, with the competitors having larger positive abnormal returns than the component firms due to their higher levels of expected profitability. Customers of a monopolistic industry would have been negatively impacted since their input costs rose. Therefore, the customers' stocks should experience negative abnormal returns.

Under the efficiency hypothesis, the component firms would be part of a more efficient entity, which would not have any pricing power, and would enjoy lower costs and increased profits. Burton[10] advocated this hypothesis in an unpublished dissertation, although he did not reject the possibility that U.S. Steel was both more efficient and a monopoly. The competitor firms would have been hurt by having to face the more efficient U.S. Steel. The component firms should have reacted positively and the competitor firms should have reacted negatively. The efficiency hypothesis also prescribes a positive reaction by the customer firms. A more efficient U.S. Steel would have lowered steel prices and its customers would have benefited by having lower input prices for their goods. These stock price reactions under the three hypotheses are summarized in Table 1.

Table 1. Stock Price Reactions to Announcement of U.S. Steel Formation

Hypothesis	Component Reaction	Competitor Reaction	Customer Reaction
Swindle Public	0	0	0
Monopoly	+ (< Competitor Firms)	+ (> Component Firms)	–
Efficiency	+	–	+

The efficiency and monopoly hypotheses are not mutually exclusive. There is no reason that U.S. Steel could not have been formed in order to become a monopolist that was more efficient than the sum of its parts.

At the turn of the century, the steel industry could have been categorized into two broad groups. Some firms, for example primary goods producers, produced primary products such as steel bars and pig iron. The most important of these firms were Carnegie Steel,

Federal Steel, National Steel, and Republic Steel and Iron. Other firms, such as finished goods producers, used these primary goods as inputs in order to produce finished products such as plate, wire nails, tubes, rails, hoops, etc. Many of these finished goods producers were the result of horizontal mergers beginning in the later 1890s and resulting in monopolies in their narrow niches.[11] Initially most firms were either primary goods producers or finished goods producers, but in 1900 that began to change. Firms at either end of the spectrum began to explore vertical integration. J.P. Morgan, who controlled some of the finished goods firms, along with Federal Steel, the second largest primary steel manufacturer, was not happy about this alteration in the balance of power. Morgan did not believe in unbridled competition, preferring cartel or monopoly behavior with him at the center.

According to Krass, the summer of 1900 saw a flat market for steel. Carnegie Steel, which was then the largest producer in the United States, was in the middle of a difficult situation: it was losing customers. J. P. Morgan and William H. Moore, who had independently consolidated many of the finished goods producers and had monopolized numerous niches, began to reduce their purchases from Carnegie. Furthermore, Carnegie was facing rising costs, as John D. Rockefeller, who controlled shipping on the Great Lakes, threatened to raise rates. Also, the new president of the Pennsylvania Railroad refused to honor Carnegie's past rebate deals. Andrew Carnegie wrote an article that appeared in the May 1900 issue of Century Magazine in which he criticized trusts and vowed to fight them. In June, Carnegie wrote a letter to his cousin and business partner George Lauder in which he said that every pool agreement was up for review. In another letter that June, this time to Charles Schwab, Carnegie implied that he was willing to cut prices to maintain or increase market share.[12] Since Carnegie Steel was the low cost producer at the time, this threat was credible.

Carnegie began to develop a plan to compete with J. P. Morgan's National Tube. National Tube was increasing its purchases of steel from the Morgan-controlled Federal Steel and Carnegie was losing business. But Morgan was not the only customer that Carnegie was losing. John "Bet-a-Million" Gates' American Steel and Wire reduced its purchases of Carnegie steel from 14,000 tons of billets per month to zero. William Moore's American Steel Hoop reduced its purchases from 15,000-20,000 tons to 3,000 tons per month.

Throughout that summer, Carnegie wrote letters to his board of directors and to Charles Schwab indicating that he was girding for a price war with other steel firms. In one letter to Schwab, dated June 22, 1900 and read at a Carnegie Steel board meeting on July 9, Carnegie wrote: "are we to decide that we will take the business at the best price possible and run the works full, independent of all other concerns, managing our business in our own way, or are we to take percentages of the business with these and try to maintain prices?"[13] In a later letter, Carnegie instructed his managers to "spend freely for finishing mills, railroads, boat lines...."[14] None of this endeared Carnegie to Morgan. Despising competition, Morgan berated Carnegie "as someone who would 'demoralize' the industry with price cuts rather than do the smart, gentlemanly thing: join a cartel."[15]

While this activity by Carnegie over the summer of 1900 may have set the stage for a consolidation in order to forestall a price war, the trigger is generally accepted to have been a dinner held in New York on December 12, 1900. Carnegie proposed a dinner in order

to introduce Schwab to the New York business elite. It was to be a black-tie affair at Manhattan's University Club and was hosted by bankers J. Edward Simmons and Charles Stewart Smith. The attendees were Morgan, E.H. Harriman, James Stillman, Chauncey Depew, William Vanderbilt, Jacob Schiff, and H.H. Rogers. Despite his having scheduled the event, Carnegie had another engagement that evening and made only a brief appearance. Carnegie's absence enabled Schwab to take center stage.

Schwab spoke for twenty minutes on the future of the steel industry, painting a picture of consolidation and stability—a vision of a steel industry dominated by a vertically integrated firm that would effectively eliminate competition. After the dinner Morgan and Schwab talked for a while.

In January 1901, Morgan arranged to "accidentally" meet with Schwab on neutral territory in Philadelphia. They began to work out the details of the U.S. Steel consolidation. To this day it is not known whether Schwab was operating independently of Carnegie or whether Carnegie had orchestrated the entire affair.[16] Regardless, by February 3, Morgan and Carnegie had agreed upon a price, for on that date Carnegie informed his board of the deal with Morgan.

Ultimately, the combination included Carnegie Steel and the Morgan-controlled firms of Federal Steel and National Tube, along with National Steel, American Steel and Wire, American Sheet Steel, American Hoop Steel, American Tinplate, and American Bridge Company. Table 2 summarizes these firms. On February 1, 1901, rumors of a gigantic combination in the steel industry began appearing in newspapers and by April 4, 1901, the combination was essentially complete. Most of the firms were acquired in stock swaps with U.S. Steel, although Carnegie, who would have no managerial role in the new firm, exchanged his holdings in Carnegie Steel for $300 million in U.S. Steel bonds.

Table 2. Components of U.S. Steel

Company	Date Organized	Tangible Assets April 1, 1901 ($Millions)	Primary Business	Market Share	Controlled by
Carnegie Steel	March 1900	198	Semifinished steel	18%	Carnegie
Federal Steel	September 1898	81	Semifinished steel	15%	Morgan
National Steel	February 1899	34	Semifinished steel	12%	Moore
Amer. Steel and Wire	January 1899	53	Wire		Gates
National Tube	June 1899	67	Wrought-tube	90%	Morgan
American Tin Plate	December 1898	25	Tinplate	90%	Moore
American Steel Hoop	April 1899	16	Bars, hoops, cotton ties		Moore
American Sheet Steel	February 1900	18	Sheet making	70%	Moore
American Bridge	May 1900	35	Bridge building	90%	Morgan
Shelby Steel Tube	February 1900	3	Seamless tube	90%	
Lake Superior Cons. Mines	1893	31	Iron mines		Rockefeller
Bessemer Steamship			Steamships		Rockefeller
Pittsburgh Steamship			Steamships		Carnegie
Oliver Mining					Carnegie

Sources: Bureau of Corporations, *Report of the Commissioner of Corporations on the Steel Industry*, Washington, DC: Government Printing Office, 1911; *The Financial Review*, New York: William B. Dana Company, February 1902.

While the methodology of event studies is well established, the formation of U.S. Steel presents some challenges. The lack of securities regulations meant that public disclosure might not have been immediate or complete, creating a potential problem in conducting an event study since there may not have been a clearly defined announcement date. Furthermore, announcements were confounded by rumors and possibly by deliberate misinformation. In the case of U.S. Steel, although rumors of a "gigantic" combination in the steel industry first appeared in newspapers on February 1, 1901, it was not until the end of that month that the general public knew the form of the merger, the companies involved, the exchange ratios, and whether any premium over the market price would be paid. Moreover, in 1900, insider trading on non-public information was legal.

The dinner of December 12, 1900, was a widely cited milestone in U.S. Steel's creation, although it was not mentioned contemporaneously in either The Wall Street Journal or The Iron Age, an industry publication. Since insider trading was permissible, concern that the December 12 meeting may have led to some pre-announcement trading led the author to examine the stock returns for the U.S. Steel component and competitor firms for the weeks ending December 13, 1900 through January 29, 1901. While there was some evidence of unusually high trading volume in Federal Steel common stock, there were no unusual price movements in any of the component firms' stocks, leading to the conclusion that there was no insider trading or leakage of the meeting's information. This is consistent with the findings of Banerjee and Eckard, who found that insider trading during the First Great Merger Wave (1897-1903) was no more prevalent than today.[17] Having established that there was no pre-announcement run-up, the event window began in the week ending on February 1, 1901, which was the date *The Wall Street Journal* printed its first story about a rumor of a combination in the steel industry.

The Wall Street Journal, the *New York Times*, and *The Iron Age* established a chronology of the consolidation. Table 3 summarizes this chronology.

The author obtained each Friday's stock prices from the Commercial and Financial Chronicle, the leading financial publication of the day, which published a mixture of daily and weekly stock prices. But unlike modern newspapers, instead of reporting closing prices, the Chronicle reported the day's high and low prices. These two were averaged to obtain the quote. When there was no trading, the Chronicle reported the bid and ask prices, and these were averaged. If only the bid or the ask price was reported, that was used. Finally, if there was nothing available for that day, the week's most recent price was used. If no prices were reported that week, the entire observation was excluded from the data. The Chronicle also reported dividends, which were included in the stock returns.[18] Usually, the ex-dividend date was not reported, so it was assumed to be the day after the firm's books closed, consistent with the discussion in Meeker.[19]

A standard market model was used to estimate abnormal returns, as described below. Furthermore, as a test of the robustness of the conclusions, the regressions were estimated using a mean-adjusted model specification (Figure 1). The results of both models were qualitatively the same.

Individual securities were used to create four portfolios: components, competitors, non-railroad customers, and railroad customers. The component portfolio comprises those firms who became part of U.S. Steel and who were publicly traded at the beginning

Table 3. Chronology

Week Ending	Event Week	
December 12,1900		Dinner at University Club
February 1, 1901	1	Rumors of "gigantic steel combination"
February 8, 1901	2	"Semi-official" announcement that Carnegie will sell out to Morgan
March 1, 1901	5	Federal government may object to merger Public announcement of firms and exchange ratios All companies accept terms
March 22, 1901	8	>60% of stocks turned in U.S. Steel syndicate has $200 million on call to support stock prices
March 29, 1901	9	U.S. Steel to pay $40 million for Lake Superior Consolidated U.S. Steel will control >75% of iron ores Rockefeller said to be largest U.S. Steel shareholder
April 4, 1901	10	97% of stock tendered

Source: *The Wall Street Journal, The Iron Age,* and *New York Times*; various issues.

of 1900. Unfortunately, the largest component of U.S. Steel, Carnegie Steel, was privately held and could not be included in the analysis. This portfolio was value-weighted based on the market values as of December 1900. The competitor and customer portfolios were equally weighted (see appendix for details). The competitors were companies who did not become components of U.S. Steel and who were engaged in primary steel production, not finished goods.[20] The non-railroad customers were steel companies that produced finished goods that, likewise, did not become part of U.S. Steel. Many of these firms purchased their steel from U.S. components or competitors, although some were self-sufficient. The railroad customers are a sample of some of the leading railroads of the day. At the time, railroads were the largest consumers of steel, and steel was a significant portion of their costs. The appendix lists the companies used to form these portfolios and the weights used. To further test the results, the author used a mean-adjusted regression model. The formula used to estimate the regression equation is:

Figure 1: The mean-adjusted regression model.

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \sum_{j=1}^{10} \delta_{j,t} D_t + \varepsilon_{i,t}$$

where,

$R_{i,t}$ is the return on the ith portfolio in week t

$R_{m,t}$ is the return on the market in week t

D_1 =1 during the week ending 2/1/1901, 0 otherwise

D_2 =1 during the week ending 2/8/1901, 0 otherwise

...

D_{10} =1 during the week ending 4/4/1901, 0 otherwise

$?_{i,t}$ is an error term with mean zero and constant variance.

For the market index, the author used the data from Schwert, who computed daily returns for a combination of the DJIA and the Dow Jones Railroad Average and then incorporated an estimated dividend yield.[21] The relative weight of each index was based on the number of stocks it contained: twelve for the Industrials and twenty for the Railroads.

The regressions were estimated over the sixty-two-week period from the week ending January 5, 1900 to the week ending April 4, 1901, with the event period, dummy variables D_1 through D_{10}, extending from the week ending February 1, 1901, to the week ending April 4, 1901. The results are summarized in Table 4.

Table 4. Regression Results

	Components		Competitors		Customers (Non-RR)		Customers (RR)	
Week Ending	Abnormal Return	t-stat	Abnormal Return	t-stat	Abnormal Return	t-stat	Abnormal Return	t-stat
2/1	.004	0.24	-.019	-0.86	.002	0.08	.0040	0.29
2/8	.062	3.33**	.035	1.63	-.003	-0.13	-.0025	-0.18
2/15	.004	0.20	.011	0.52	-.025	-1.02	-.0046	-0.33
2/21	.005	0.26	-.003	-0.13	.006	0.22	-.0009	-0.06
3/1	-.022	-1.17	.025	1.14	.001	0.06	.0025	-0.18
3/8	.003	0.14	.050	2.31*	.028	1.14	.0188	1.36
3/15	-.004	-0.24	.015	0.70	-.006	-0.24	.0117	0.84
3/22	.090	4.82**	.011	0.52	.085	3.38**	.0120	0.86
3/29	.024	1.29	.048	2.21*	.000	0.00	-.0065	-0.47
4/4	.001	0.08	.064	2.91**	-.008	-0.32	.0190	1.35
CAAR	.166	2.61*	.238	3.17**	.080	0.92	.0536	1.13
	F(11,53)=14.48		F(11,50)=15.23		F(11,44)=4.87		F(11,55)=14.49	
	Adj R^2 = .698		Adj R^2 = .720		Adj R^2 = .436		Adj R^2 = .692	

** Significant at the 1 percent level
* Significant at the 5 percent level

For the ten-week event period, both the components and competitors exhibit statistically significant positive abnormal returns. The components had a cumulative aggregate abnormal return (CAAR) of 16.6 percent (t = 2.61), significant at the 5 percent level, while the competitors had a CAAR of 23.8 percent, (t = 3.17), significant at the 1 percent level. Furthermore, as Table 5 demonstrates, the competitors' CAAR did not result from outliers. Of the nine competitor securities, eight had positive ten-week cumulative abnormal returns (CAR), and for five of the eight, the CAR was statistically significant. Only Tennessee Coal, Iron & Railroad had a negative CAR, and it was statistically insignificant (t=0.21).

The abnormal returns on the two customer portfolios convey little information regarding the rationale for the consolidation, as they were not statistically significant over the ten-week event period. The non-railroad customers' CAAR was 8.0 percent (t= 0.92) while the railroad customers' CAAR was 5.4 percent (t= 1.13).

The results clearly support the hypothesis that U.S. Steel was formed in order to monopolize the steel industry. The period from the announcement to the completion of the formation of U.S. Steel saw positive CAARs for the components and for the

competitors, the other primary steel producers. While either monopoly or efficiency could explain the components' positive CAAR, only monopoly is consistent with the competitors earning a positive CAAR. If U.S. Steel had only been a more efficient competitor, then the competitors' stock prices would have reacted negatively as the more-efficient U.S. Steel captured some of their business, which would have reduced their profits. The competitors' profits increased only when a monopolistic U.S. Steel was able to increase the price of steel by controlling the market.

Table 5. Competitor Firms' Cumulative Abnormal Returns Week Ending Feb 1, 1901 - Week Ending April 4, 1901

	CAR	t-stat
Portfolio Average	0.2375	3.17**
Cambria Steel Common	0.0231	0.19
Colorado Fuel and Iron Common	0.2472	2.01*
Colorado Fuel and Iron Preferred	0.0698	0.98
Diamond Steel Common	0.5967	2.54*
Republic Iron and Steel Common	0.2384	1.20
Republic Iron and Steel Preferred	0.2179	2.57*
Sloss-Sheffield Steel Common	0.5206	2.82**
Sloss-Sheffield Steel Preferred	0.2281	3.66**
Tennessee Coal, Iron and Railroad Common	-0.0306	-0.21

** Significant at the 1 percent level
* Significant at the 5 percent level

One cannot discount the possibility that U.S. Steel was a more efficient firm than the sum of its components, but it clearly was able to exert some degree of market power. But from the competitors' perspective, the increase in profits from a monopolistic market outweighed any decline in profits as a result of facing a more-efficient competitor. Had the customers reacted negatively, as they would have if they faced the prospect of higher steel prices, then this would lend further support to this theory of merger for monopoly. However, the customers' reactions were inconclusive, neither confirming nor contradicting the conclusion that U.S. Steel was formed in order to monopolize the steel market.

This conclusion is consistent with most, but not all, of the recent literature. Among those scholars who have studied U.S. Steel, specifically, Krass, Strouse, and Mullin, Mullin and Mullin, U.S. Steel was a monopolistic competitor and it could have been formed for a combination of monopolistic and efficiency reasons. However, Eckard and Bannerjee, who examined the formation of many of the consolidations of the "First Great Merger Wave," concluded that these combinations were created in order to increase efficiency, not to monopolize their industries.[22] One contrary example should not be taken as a repudiation of their entire study, but U.S. Steel was the largest of these consolidations. If its primary purpose was monopolization, then perhaps some of the other consolidations merit closer scrutiny.

Finally, this quantitative evidence is consistent with the qualitative and anecdotal evidence: Andrew Carnegie's writings and actions over the summer of 1900. Surely these threats had some causative effect. Also, monopoly is more consistent with U.S. Steel's operating structure than is efficiency. U.S.S. was organized as a decentralized holding company, without much centralized decision-making.

Appendix

Table A-1. Composition of Portfolios Used in Regressions

Components
- Federal Steel Preferred (15.08%)
- Federal Steel Common (9.01%)
- American Steel and Wire Preferred (12.79%)
- American Steel and Wire Common (8.02%)
- National Tube Preferred (15.10%)
- National Tube Common (9.00%)
- National Steel Preferred (9.23%)
- National Steel Common (4.51%)
- American Tin Plate Preferred (6.05%)
- American Steel Hoop Preferred (4.02%)
- American Steel Hoop Common (2.11%)

Competitors
- Cambria Steel Common
- Colorado Fuel and Iron Preferred
- Colorado Fuel and Iron Common
- Diamond Steel Common
- Republic Iron and Steel Preferred
- Republic Iron and Steel Common
- Sloss-Sheffield Steel Preferred
- Sloss-Sheffield Steel Common
- Tennessee Coal, Iron and Railroad Common

Customers (Non-railroad)
- American Car and Foundry Preferred
- American Car and Foundry Common
- US Cast Iron and Pipe Preferred
- Pressed Steel Car Preferred

Customers (Railroad)
- Atchison, Topeka & Santa Fe Common
- Baltimore & Ohio Voting Trust Certificate
- Brooklyn Rapid Transit Common
- Chesapeake & Ohio Common
- Chicago, Burlington & Quincy Common
- Chicago, Milwaukee & St. Paul Common
- Chicago, Rock Island & Pacific Common
- Delaware & Hudson Common
- Erie Common
- Louisville & Nashville Common

NOTES

1. Jean Strouse, *Morgan: American Financier* (New York: HarperCollins Publishers, 1999); Peter Krass, *Carnegie* (Hoboken, NJ: John Wiley & Sons, 2002); Donald O. Parsons and John Edward Ray, "The United States Steel Consolidation: The Creation of Market Control," The Journal of Law & Economics XVIII (April 1975): 181-220; Thomas K. McCraw and Forest Reinhardt, "Losing to Win: U.S. Steel's Pricing, Investment Decisions, and Market Share, 1901-1938," *The Journal of Economic History* XLIX (September 1989): 593-619; George L. Mullin, Joseph C. Mullin and Wallace P. Mullin, "The Competitive Effects of Mergers: Stock Market Evidence from the U. S. Steel Dissolution Suit," *RAND Journal of Economics* 26 (Summer 1995): 314-330.
2. Stigler, "The Dominant Firm" *The Organization of Industry* (Homewood, IL: Richard D. Irwin, 1968): 108.
3. Krass, *Carnegie.*
4. Arthur Stone Dewing, *The Financial Policy of Corporations* II, 4 Ed. (New York: The Ronald Press Company, 1941), 924-925.
5. Stigler, "The Dominant Firm," 108. "Watered stock" seemed to be applied to any security whose market value exceeded the value of its tangible assets. The discounted future value of the firm's earnings stream does not appear to have been considered. It may be interesting to formally investigate the use of this term. It may be that watered stocks were high earnings and/or high growth stocks and did not necessarily represent fraudulent activities by the promoters.
6. Others who cited US Steel for excessive capitalization include Henry R. Seager and Charles A. Gulick, *Trust and Corporation Problems* (New York: Harper & Brothers Publishers, 1929), 224; Herbert N. Casson, *The Romance of Steel* (New York: AS Barnes & Company, 1907), 229-231; and Lewis H. Haney, *Business Organization and Combination* (New York: The MacMillan Company, 1937), 263.
7. Most of the US Steel component companies were acquired via an exchange of US Steel stock for the stock in the component firm; not purchased for cash. Essentially the shareholders exchanged one piece of paper for another. If the market reflected the swindle hypothesis, then even the component firms' shares could have declined upon announcement of the consolidation.
8. Stigler, "The Dominant Firm," 108.
9. Strouse, *Morgan: American Financier* (New York: HarperCollins Publishers, 1999); Krass, *Carnegie* (Hoboken, NJ: John Wiley & Sons, 2002); Parsons and Ray, "The United States Steel Consolidation": 181-220; Mullin, Mullin and Mullin, "The Competitive Effects of Mergers": 314-330.
10. Michael E. Burton, *The 1901 Establishment of the U.S. Steel Corporation: For Monopoly and/or Efficiency?* (Ph.D. Dissertation, University of California at Los Angeles, 1985).
11. American Tin Plate, formed in 1898, controlled 90 percent of tin plate production. National Tube, formed in 1899, controlled 90 percent of the steel tube production. Shelby Steel Tube, formed in early 1900, controlled 70 percent of the seamless steel tube production. American Sheet Steel controlled 70 percent of sheet making. American Steel and Wire, formed in 1899, controlled the steel wire production.

12. Carnegie was spending the summer in Scotland at his castle, Skibo.
13. *Krass, Carnegie*, 398.
14. Ibid.
15. Ron Chernow, "The Deal of the Century," *American Heritage* (July/August 1998): 12.
16. Strouse appears to conclude that Schwab was acting on his own, while Krass implies that Carnegie was working behind the scenes.
17. Ajeyo Banerjee and E. Woodrow Eckard, "Why Regulate Insider Trading? Evidence from the First Great Merger Wave (1897-1903)," *The American Economic Review* 91 (December 2001): 1329-1349.
18. The customer railroad portfolio does not follow this convention. The returns in this portfolio exclude dividends. The customer railroad portfolio is compared to a market index that excludes dividends. Otherwise, the market index is identical to that described below.
19. Edward J. Meeker, *The Work of the Stock Exchange* (New York: The Ronald Press Company, 1922).
20. Many of the finished (steel) goods markets had become monopolized prior to the formation of US Steel.
21. G.William Schwert, "Indexes of United States Stock Prices from 1802 to 1987," *Journal of Business* 63 (July 1990): 399-426.
22. Banerjee and Eckard, "Why Regulate Insider Trading?," 1329-1349.