

Mary A. O'Sullivan

Living with the U.S. Financial System: The Experiences of General Electric and Westinghouse Electric in the Last Century

Scholars have recommended taking a closer look at firms that raise funds from the financial system as a way of understanding the relation between finance and growth. This article explores the role of the U.S. financial system in providing funds to two prominent American firms, General Electric and Westinghouse Electric, over the course of the last century. The financial system's support was important for both companies, but there were important differences, as well as changes over time, in their patterns of financial dependence and autonomy. Two factors—investments in working capital and dividend policies—are important for explaining the financing patterns of both firms, suggesting clear hypotheses about the determinants of demand for corporate finance that can be tested in further financial histories. The findings also highlight the importance of looking at working, as well as fixed, capital in studies of enterprises' relations with the financial system, and of examining the money that flows out of companies as well as the funds that flow into them.

At the beginning of the twenty-first century, the United States has one of the largest and most sophisticated financial systems in the

MARY A. O'SULLIVAN is associate professor at the Wharton School of the University of Pennsylvania.

The author would like to thank Professor Kazuo Wada at the Faculty of Economics, University of Tokyo for generously making copies of GE's annual reports available to her. I am grateful for a wide range of useful comments provided by participants in a variety of conference sessions and seminars at which this paper, in different versions, was presented. In particular, I would like to acknowledge the insightful observations and suggestions of Bill Lazonick at the Business History Conference, Margaret Blair at a seminar at Georgetown University Law Center, Naomi Lamoreaux and Jean-Laurent Rosenthal at the UCLA Economic History Seminar, David Weiman and Michael Edelstein at the Columbia Economic History Seminar, and all the participants in the Penn Economic History Seminar organized by Dan Raff and Walter Licht. The comments of two anonymous reviewers were also very useful in helping to sharpen my argument and to shorten the article.

Business History Review 80 (Winter 2006): 621–655. © 2006 by The President and Fellows of Harvard College.

world. Clearly, significant economic benefits accrue to the country as a result: the financial system, like any other sector of the economy, provides employment and generates output. However, some scholars point out that a highly developed financial system also plays a crucial role in facilitating the development of the rest of the economy.

A growing number of empirical studies suggest that there is an important relationship between financial development and economic performance at the national level. However, the methodology employed to generate such results has been criticized for its limitations in establishing a causal relation between these two factors. To circumvent this problem, some scholars have suggested taking a closer look at the firms that rely on the financial system to raise funds, in order to clarify the mechanisms of the system's influence on the economy.

Historical research is a useful, even necessary, avenue for exploring the implications for firms of living with financial systems. Contemporary financial systems in countries like the United States have evolved over a long period, and the paths they have followed have had a considerable impact on their eventual scale and characteristics. Firms also develop over time, and their financial positions and investment requirements change in ways that affect their demand for external finance.

As a result, business history is well positioned to elucidate the economic role of financial systems. However, the literature reveals that relatively limited attention has been paid to the financial histories of leading enterprises. In this article, I take a step toward filling this gap with a detailed analysis of the role that the U.S. financial system played in providing funds to two firms that have had a prominent role in American business history: General Electric (GE) and Westinghouse Electric (WHS).

The financial system has supplied both firms with funds over the years. General Electric and Westinghouse were particularly dependent on the financial system during the early period of their development, which lasted from the turn of the century through the 1920s. They were less financially dependent from the 1930s until the early 1970s, although both occasionally raised external finance during this time. In the final third of the century, their fortunes diverged, and Westinghouse became heavily reliant on external finance once again, while GE paid down its debt and repurchased massive quantities of its own stock.

I will show that there are two explanations for these companies' historical patterns of financial dependence and autonomy. First, high commitments to investment in working capital were crucial in pushing them toward financial dependence early in the century. As the century progressed, both generally succeeded, although not consistently, in reducing their working-capital requirements, which allowed them to limit their financial dependence. However, Westinghouse maintained higher

investments in working capital for most of the twentieth century, which explains its greater dependence on the financial system for funds. This difference between the two companies reflects GE's greater capacity to economize on its investments in working capital.

Second, the companies' dividend policies helped to shape both their financial dependence and their autonomy. Their effect was to reduce the impact of the substantial and persistent gap in profitability between them on their internal sources of funds and bring their demand for external finance closer together. Both companies' initial dividend policies can be traced to the requirements of the financial markets as well as to their own financial capacity to cover payouts to stockholders during the early period of their development. Even as these historical circumstances changed, their dividend policies continued to bear the imprint of the past, since both firms used historical dividend payments as benchmarks for calculating future distributions.

These findings are relevant to historical research on corporate finance, as they suggest clear hypotheses about the determinants of demand for external finance that can be tested by comparing the financial histories of other firms. This study also has implications for the broader literature on finance and development. Its emphasis on investments in working capital echoes the work of economic historians such as Sidney Pollard and Kenneth Sokoloff, who have stressed the importance of working, as well as fixed, capital in their studies of the relation between capital formation and financial systems. Moreover, the significance of working capital as a determinant of firms' demand for external finance—and the suggestion that substantial investments in working capital are a symptom of poor organization or management—raise the prospect that the financial system may support lemons, rather than leaders. Finally, the role of dividend policy in influencing patterns of financial dependence indicates the need to look beyond the current focus on the money that flows into companies from the financial system to take account of the money that flows in the opposite direction. In other words, we should pay attention to the costs, as well as the benefits, to companies of using the financial system.

Analyzing Business History to Understand Financial Systems

In recent years, there has been a resurgence of interest among social scientists in the role that financial systems play in national economies. Various empirical studies have explored the relation between finance and growth. Most rely on cross-country regressions of indicators of financial development and economic growth that, taken together, suggest

an important, positive relation between finance and growth. However, criticism of the methodology used to generate these results undermines the claim that this relation is a causal one.

One way around the problem is to shift from a macroeconomic focus in order to trace the channels through which financial systems affect national economies. As Ross Levine states, "More microeconomic-based studies that explore the possible channels through which finance influences growth will foster a keener understanding of the finance-growth nexus."¹ Since the economic importance of the financial system is usually attributed to its role in allocating resources to fund enterprise investments, we need to examine enterprises that rely on the financial system for funds and explore the reasons for, and implications of, their financial dependence.

A historical approach to these questions ought to advance this research agenda for at least two reasons. On the one hand, the financial characteristics and requirements of enterprises change considerably over time. In addition, financial systems themselves evolve in ways that affect the extent and manner of their allocation of funds to enterprises. Nevertheless, when we look to the field of business history for evidence of the historical interactions between enterprises and financial systems, we find that its literature is surprisingly limited. Even for the United States, with its large and sophisticated financial system, there are few accounts of the historical impact of the financial system in the development of leading U.S. firms.²

There are, of course, a number of excellent histories of the U.S. financial system and the institutions that comprise it. In addition, there is a substantial literature on historical patterns of financing for the U.S. corporate economy as a whole.³ However, business historians have had relatively little to say about the role of the financial system in the development of particular enterprises.

An important exception to this rule is the excellent book *A History of Corporate Finance*, by Jonathan Baskin and Paul Miranti.⁴ This

¹ Ross Levine, "More on Finance and Growth: More Finance, More Growth?" *Federal Reserve of St. Louis Review* (July–Aug. 2003): 31–46; see also Raghuram Rajan and Luigi Zingales, "Financial Dependence and Growth," *American Economic Review* 88 (1998): 559–86; Luigi Zingales, "Commentary on More Finance, More Growth," *Federal Reserve of St. Louis Review* (July–Aug. 2003): 47–52.

² See, for example, Alfred D. Chandler Jr., *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, Mass., 1977).

³ See, for example, Raymond W. Goldsmith, *Financial Intermediaries in the American Economy since 1900* (Princeton, N.J., 1958); Robert Taggart, "Secular Patterns in the Financing of U.S. Corporations," in *Corporate Capital Structures in the United States*, ed. Benjamin Friedman (Chicago, 1985); Sergei Dobrovolsky, "Capital Formation and Financing Trends in Manufacturing and Mining, 1900–1953," *Journal of Finance* 10 (1955): 250–65.

⁴ Jonathan Baskin and Paul Miranti Jr., *A History of Corporate Finance* (Cambridge, U.K., 1997).

book, which is extremely ambitious in its historical scope, begins with a discussion of corporate finance in the medieval period and traces its development to the end of the twentieth century. Thus, it serves as a foundational resource for any scholar interested in the topic. However, as one reviewer pointed out, the authors naturally had to sacrifice some depth in order to achieve a broad historical sweep. The reviewer noted, "There is no room for more detailed case studies that the reader is often left wanting."⁵ Since few financial histories of U.S. enterprises have been written, much historical research remains to be done on how financial systems influence economic performance.⁶

In this article, I examine the financial histories of General Electric and Westinghouse Electric from the late nineteenth century until the end of the twentieth century. Both GE and WHS were founded in the late nineteenth century to compete in the electrical equipment industry, one of the most technologically sophisticated industries of the time. The firms traced their origins to the efforts of three of the greatest American inventors of the day: Thomas Edison, Elihu Thomson, and George Westinghouse.

GE was formed in 1892 from the merger of Edison General Electric, which was established in 1889 to integrate Thomas Edison's various manufacturing interests in the electrical industry, with the Thomson-Houston companies, which were established in 1883 for the commercial exploitation of the electrical inventions of Elihu Thomson.⁷ The merger was the last in a series of combinations that consolidated the electrical industry, and by the early 1890s, GE faced only one significant competitor, WHS, which was founded by George Westinghouse in 1885.⁸

Both companies went through three major transitions in the scope of their business activities: in the 1920s, they diversified into electrical

⁵ Paul Harrison, "Review of Jonathan Barron Baskin and Paul J. Miranti Jr., *A History of Corporate Finance*," *EH.Net*, H-Net Reviews (1998).

⁶ See, for example, Arthur Dewing, *Corporate Promotions and Reorganizations* (Cambridge, Mass., 1914); Lance Davis, "The New England Textile Mills and the Capital Markets: A Study of Industrial Borrowing, 1840–1860," *Journal of Economic History* 20 (1960): 1–30; William M. Doyle, "The Evolution of Financial Practices and Financial Structures among American Manufacturers, 1875–1905: Case Studies of the Sugar Refining and Meat Packing Industries," Ph.D. diss., University of Tennessee, 1991; Naomi Lamoreaux, *Insider Lending: Banks, Personal Connections, and Economic Development in Industrial New England* (Cambridge, U.K., 1994); Lawrence Seltzer, *A Financial History of the American Automobile Industry* (Boston, 1928).

⁷ GE was incorporated on April 15, 1892 under the laws of New York, and it began trading in June of the same year.

⁸ WHS was incorporated in Pennsylvania as the Westinghouse Electric Company on January 8, 1886. A few years later, in 1889, the company took over an old charter granted to Chartiers Improvement Company by the state of Pennsylvania on April 9, 1872, and changed the name on the charter to its own. In 1890, a new name, the Westinghouse Electric and Manufacturing Company, was adopted.

appliances; in the 1950s and 1960s, they transformed themselves into industrial conglomerates; and, finally, in the 1980s, they moved into financial services. Both companies survived as independent companies until the end of the twentieth century, when WHS was acquired and absorbed by the media conglomerate Viacom.

The similarities between the two companies, not only in their origins but also in their subsequent development, limit the degree of structural variation that might be expected to influence their financial histories. However, there were important differences between GE and WHS, especially in terms of their historical performances. The fact that GE consistently earned substantially more than its competitor might be expected to generate variations in their demand for external finance. Thus, comparing and contrasting these two cases over a long period of time should provide useful insights into the determinants and implications of their relationship with the U.S. financial system.

The prominence of these two companies and the industries in which they competed in the history of American business renders the details of their financial histories interesting in and of themselves. However, my objectives in undertaking this study are not just to understand these histories but also to indicate topics for future research. First, I want to show how publicly available data from a variety of sources can be analyzed to generate a systematic and comprehensive historical account of enterprises' evolving interactions with the financial system. Second, I intend to use the findings from my study of GE and WHS to suggest some general hypotheses about the determinants of enterprises' demand for external funds, and about the channels through which the financial system affects economic activity and performance.

Sources of Evidence on the Financial Histories of GE and WHS

I have relied largely on public sources of information in developing a comprehensive record of both companies' historical interactions with the U.S. financial system.⁹ The annual reports of GE and WHS served

⁹I also consulted archival records for GE at the Schenectady Museum Archives, Schenectady, New York, and for WHS at the Library and Archives Division, Historical Society of Western Pennsylvania, Pittsburgh, Pennsylvania. Although the GE collections contain a number of sources that refer to the issues of financing, investment, and dividends covered in this article, notably the minutes of the meetings of the company's board of directors from 1892 to 1984, most of the information contained therein is brief, and even perfunctory, and could almost always be gleaned from publicly available material (see note 21 for an example). The WHS collection is rich in material on technology, research and development, and engineering, but less relevant for an analysis of the company's financial history. However, there was some useful information on the company's organizational structure that was helpful for thinking about the relation between organization and capital utilization.

as the basic sources for my analysis of their financial histories. Flow-of-funds accounts provide direct measures of enterprises' sources and uses of funds, but they have only been required of U.S. companies since 1971.¹⁰ Nevertheless, from the mid-1940s on, GE and WHS provided summary information on their sources and uses of funds. When these statements were incomplete, or absent, as they were prior to the 1940s, I was usually able to estimate sources and uses of funds from a combination of data provided in the income statement and the balance sheet.

Prior to 1934, information provided in the annual reports, especially those issued by WHS, was scanty, and its objectivity was questionable. After that year, the standards of disclosure for U.S. public companies improved dramatically with the passage of federal securities regulation and the formation of the Securities and Exchange Commission (SEC). From then on, the amount of information available in the annual reports of GE and WHS was substantial, and its quality was relatively high. However, even then, important details, especially on external financing, were often omitted from the statements.

To supplement the gaps in the information provided in annual reports, I systematically consulted several other sources. I was able to obtain valuable information on financing, investment, and dividend policies from *Moody's Industrial Manual* and articles in the *Wall Street Journal*, the *New York Times*, and *Barron's*. Prospectuses required of companies by the SEC from 1934 on proved to be valuable sources of additional detail on external finance. For the years prior to 1934, I consulted the *Commercial and Financial Chronicle*, the leading financial journal of the time, for all its references pertaining to GE and WHS. I also relied on several articles and books on the histories of GE, WHS, and some of their financiers.¹¹

By referring to these documents, I was able to compile a comprehensive body of historical evidence on the two companies' sources and uses of funds. Specifically, for the period from 1901 to 2000, I was able to generate systematic data on the basic characteristics of their internal and external sources of finance, their investments in working and fixed

¹⁰ Beginning in 1971, U.S. companies were required by the Accounting Principles Board (APB) to disclose a "statement of changes in financial position," which reported changes in a company's working capital position, as part of their audited financial statements. In 1987, the Financial Accounting Standards Board changed these disclosure requirements when it issued SFAS 95, which mandated that companies present a "statement of cash flow" that focuses more narrowly on changes in a company's cash and cash equivalents.

¹¹ See, in particular, Dewing, *Corporate Promotions*; Niles Carpenter Jr., "The Westinghouse Electric & Manufacturing Company, the General Electric Company, and the Panic of 1907, Part 1," *Journal of Political Economy* 24 (1916): 230–53; and "The Westinghouse Electric & Manufacturing Company, the General Electric Company, and the Panic of 1907, Part 2," *Journal of Political Economy* 24 (1916): 382–99.

capital, and the returns they provided to financial stakeholders in the form of interest and dividend payments.¹² These data formed the primary basis for my analysis. Since my main focus is on the role played by the U.S. financial system in the histories of these companies, I exclude the financing of their overseas operations from my analysis.

The most important weakness in my data occurs in the time series on fixed investment for WHS. Prior to 1936, in contrast to GE, WHS did not provide estimates of either its capital expenditures or its accumulated depreciation. Therefore, in constructing this series, I had to improvise by estimating capital expenditures for a particular year as the sum of the changes in the net book value of fixed assets and the depreciation charged during the year. Two factors may cause this estimate to differ substantially from direct estimates of capital expenditures. The first is a change in the valuation of fixed assets that leads to over- or underestimates of investment, depending on whether values are written up or down. The second is an acquisition that makes fixed investment appear higher than a direct estimate of capital expenditures would suggest.

While expenditures on acquisitions may be important uses of capital, I was unable to build a time series for them from the data reported by these two companies. Even after 1971, when they did report these expenditures, they often combined acquisitions with disposals to give net expenditures on acquisitions. The use of this series would complicate the analysis of sources and uses of funds when both acquisitions and disposals are high, as they were for WHS in the 1990s. Therefore, I exclude data on net acquisitions from my time series for investment. Instead, I discuss the role of acquisitions in advancing financial demand in the text.

Finally, I would like to highlight an important decision that I have made regarding the treatment of the two companies' financial-services business. From 1988 on, GE was required to present consolidated accounts that incorporated its financial-services affiliates, notably General Electric Financial Services (GEFS). Until then, the financial results of GEFS were included on an equity basis, so they showed up as line items in the income statement and balance sheet.

In 1987 GE issued the following statement about its pending consolidation: "These financial services companies are so different from the other GE companies that, in the opinion of GE management, GE's

¹² Throughout the paper, when I speak of working capital I use the term to refer to what might more precisely be called "operating working capital." It excludes the predominantly financial components of working capital, notably cash and short-term debt. As a result, it slightly understates the working capital required for operations, since some cash is obviously needed for operating purposes. Nevertheless, for prosperous companies like GE that maintain large cash reserves, operating working capital gives a more accurate picture of the liquid resources they really need to run their businesses than is supplied by total working capital.

financial statements are more understandable if financial services affiliates' statements are shown separately."¹³ This statement certainly applies to the company's financing activities. The financial-services business was a major issuer of debt as part of its normal operations. The use of consolidated data would make it impossible to compare the period from 1988 on with the previous eighty-nine years, so I have based my analysis on the annual accounts for GE, omitting the consolidation of GEFS. WHS was also required to consolidate its financial-services business from 1988 until 1992, when it disposed of that division. I have endeavored to use data for WHS that treat the financial-services business on an equity basis, although this was a more difficult task because WHS disclosed less information than GE.

Historical Patterns of Financial Dependence and Autonomy

Over the course of their histories, GE and WHS went through three distinct stages of dependence on the U.S. financial system, which are described in detail in the following sections.

During the first period, beginning with the companies' establishment and continuing through the 1920s, the financial system provided the most critical support in terms of volume and frequency of external finance. From 1890 to 1929, WHS raised a total of \$(2000)3.6 billion in gross long-term finance, compared with \$(2000)3.4 billion for GE.¹⁴ Given its smaller size, WHS was much more dependent than GE on the financial system. External finance accounted for about 11.7 percent of its cumulative real sales for the period, compared with 6.1 percent for GE.

The frequency of external financing declined markedly for both companies from the 1930s through the early 1970s; overall, the proceeds that they raised during this period were lower as a percentage of cumulative sales than previously. However, in both cases, the period was punctuated by several large external financing transactions. Again, WHS raised more funds during this period than its competitor, in both absolute and relative terms. It reached total gross proceeds of \$(2000)8.2 billion, which amounted to 1.9 percent of its cumulative sales, compared with \$(2000)7.1 billion and 0.7 percent, respectively, for GE.

During the final period, from 1976 to 2000, the financing behavior of the two companies diverged. GE raised a total of \$(2000)8.9 billion in external finance during this period, which represented 0.7 percent of

¹³ GE, *Annual Report*, 1987.

¹⁴ All figures are adjusted for inflation and restated in 2000 U.S. dollars based on the Consumer Price Index. These figures include all long-term issues of equity and debt whatever their purpose.

its cumulative sales. However, its relation to the financial system in the final quarter of the century was dominated not by new financing but by massive debt repayments and stock repurchases. In contrast, WHS relied much more heavily on external financing; in total, it raised \$(2000)18.5 billion in gross finance, or 5.3 percent of cumulative sales, from 1976 to 2000.¹⁵ Like GE, the retirement of existing financial obligations, especially repayments of debt, was also important to WHS, especially in the late 1990s.

Patterns of External Finance, 1890s to 1929. GE assumed the debts as well as the equities of Edison General Electric and Thomson-Houston at the time of their merger. These liabilities were composed of short-term obligations and amounted to almost \$10 million. Shortly after its formation, GE completed two major bond issues to raise \$4 million, which it used to recapitalize some of these obligations, as well as another \$6 million, which it used to increase its investment. Less than a year later, however, the company found itself in the throes of a major financial crisis that threatened to drive it into bankruptcy unless it managed to generate additional external finance.

The financial panic of 1893 brought a sharp decline in GE's business, and the situation was substantially aggravated by a weak financial base that was the legacy of one of its predecessor companies. In its rush to expand, Thomson-Houston had accepted the stocks and bonds of local lighting companies in exchange for the goods and services it supplied to them. Under normal circumstances, these securities were sold to third parties for cash, but the panic left GE with illiquid and, in some cases, worthless paper. As a result, in the summer of 1893, GE found itself overextended, owing \$10 million in immediate debts and with only \$1.3 million on hand to meet them.¹⁶ The company was saved from bankruptcy only by a cash infusion from the financiers who had masterminded its formation: Henry Higginson of Lee, Higginson, the Boston brokerage firm, and J. P. Morgan, the New York banker.¹⁷

At the turn of the century, GE began to grow again, and over the next twenty years it raised substantial amounts of external finance to fund its expansion. In 1902, the company issued new bonds to raise just over \$2 million, which it used in partial payment for Sprague Electric, a company that GE acquired that year.¹⁸ From 1904 to 1907, it raised

¹⁵ These totals exclude the monies that GE and WHS generated from the sale of stock to its employees under stock-option plans. These amounts reached very high levels for GE, especially during the 1990s, therefore distorting the two companies' relative dependence on, and autonomy from, the financial system. See the discussion under the heading "Patterns of External Finance, 1976 to 2000."

¹⁶ John W. Hammond, *Men and Volts: The Story of General Electric* (Philadelphia, 1941), 220–22.

¹⁷ *Wall Street Journal*, 18 Jan. 1894, 4.

¹⁸ GE, *Annual Report*, 1903, 24.

\$21 million in a series of three stock issues, which increased its share capital by more than 50 percent. It contemplated a fourth stock issue in 1907, but given unfavorable conditions in the stock market, it issued ten-year convertible bonds instead in order to raise a further \$13 million.¹⁹ Some of the proceeds of this cluster of transactions were used to pay down or refinance the debt of Sprague Electric, but most were used to fund internal investment. Following this spate of financing, the *Wall Street Journal* concluded: "There are few corporations in the world that are better fortified from the standpoint of working capital per ratio of gross business and capital stock than the General Electric Co."²⁰

It was another five years before GE made further demands on the financial system. In the middle of 1912, the company's board of directors authorized an issue of forty-year debenture bonds worth \$60 million, to be sold from time to time as the company needed funds.²¹ Later the same year, GE took advantage of this new authority when it sold \$10 million of these bonds. The *Wall Street Journal* reported that "proceeds of new bonds are designed exclusively for additional working capital," noting the rapid recent expansion of the company's business as a reason for its increased capital requirements.²²

GE's next calls on external sources of funds were designed to meet temporary financing needs. Partway through 1914, GE needed cash to cover its investment requirements, and it raised \$8 million through the issue of nine-month notes. These obligations were repaid on schedule before the year's end. GE launched a major business expansion during the war, signing contracts for turbine engines and electrical equipment

¹⁹ *Wall Street Journal*, 15 May 1907, 1.

²⁰ *Ibid.* During the period from 1900 to 1911, GE also sought to stabilize its finances by issuing several tranches of stock in exchange for its outstanding debt. In a series of transactions in 1900, 1901, and 1902, the company issued close to \$4 million in common stock to pay down the bonds that were still outstanding from its 1892 issues, as well as its preferred stock (GE, various years). In 1911 the company issued a large tranche of stock, nearly 20 percent of its common stock at the time, in exchange for the majority of its convertible bonds, an amount of just over \$12 million, which it had issued in 1907. The company also issued two large stock dividends in 1902 and 1913 to restore a capital reduction that it had undertaken in 1898 in the wake of its financial crisis.

²¹ Meeting minutes for GE Board of Directors, 192nd Board Meeting, 25 July 1912, 197, Schenectady Museum Archives. The reference in these minutes to the 1912 debenture issue is a good example of the type of information one finds on financing herein. The following statement was made under the heading "Debenture Bonds": "The President expressed the view that if the future business of the Company shall make it necessary to procure additional capital, it should be obtained, in part at least, by the issue and sale of debenture bonds bearing interest at a 5% or lower rate. The Board concurred in this view and upon motion, duly seconded, it was RESOLVED that an issue of 40-year debenture bonds callable at not exceeding 110 in total amount not exceeding \$60,000,000, be and hereby is authorized, to be sold from time to time as required." All of this information was also recorded in GE, *Annual Report*, 1913, 9.

²² *Wall Street Journal*, 21 Sept. 1912, 5.

in 1917. During that year, it raised \$25 million through the sale of medium-term notes, remarking, "It is expected that with the return of normal business conditions, sufficient cash will be released by a reduction in inventories and customers' notes and accounts to provide for the two note issues."²³ The company returned to the financial markets once again in 1918 to raise \$10 million in a public sale of its common stock, so that it could meet the capital requirements associated with the fulfillment of military contracts.²⁴

GE successfully paid down some of its medium-term notes immediately after the war, but growing financial pressures eventually forced it to undertake another series of long-term financing transactions in 1920.²⁵ It issued \$15 million in twenty-year debentures and used the proceeds to pay off the rest of its notes, but it also concluded a series of financing transactions to raise cash for new investment. In particular, the company issued stock in two tranches in order to raise nearly \$45 million; it sold forty-year bonds for \$5.1 million; and it issued investment bonds to employees to raise a further \$2.6 million.²⁶ In the annual report for that year, the company explained its reliance on external finance as follows: "The demands for capital during the year 1920 to provide for greatly enlarged inventories, for increases in accounts and notes receivable, for additional investments, and for more than \$31,000,000 expended on plants, were unprecedented in the history of the Company."²⁷

In terms of financing, 1920 turned out to be GE's most active year since its foundation. It was also to be the last year, for more than a quarter of a century, that GE turned to the financial system for money. Even more striking is the fact that it was the last time in the twentieth century that the company raised money in a public stock issue.

Whereas GE managed to set itself on a steady upward trajectory in the wake of its early financial crisis, WHS's first decades were shaky. The company's initial growth was dramatic, but it had difficulty sustaining the momentum, despite having recourse to large amounts of external finance. Major financial crises, which were triggered by growth that exceeded the company's capacity to finance it, threatened WHS's survival on two occasions. In both cases, WHS had a hard time convincing stockholders to put up the funds required to bail the company out of trouble.

²³ GE, *Annual Report*, 1918, 8.

²⁴ See description of these requirements by Charles A. Coffin, chairman of the board, in GE, *Annual Report*, 1918, 5.

²⁵ GE, *Annual Report*, 1921, 8; *Commercial and Financial Chronicle*, 14 Feb. 1920, 663.

²⁶ The second of these issues was announced in November 1920, and most of the proceeds were actually paid in during 1921. However, part of this stock issue was reserved for GE employees, and the proceeds from this issue, \$4.7 million in total, were received during 1923 and 1924.

²⁷ GE, *Annual Report*, 1921, 8.

The first crisis occurred in 1891. In the preceding year, WHS had attempted to strengthen its capital base with a major stock issue that would have doubled its outstanding equity from \$5 million to \$10 million. However, stockholders were reluctant to take up the issue, and its proceeds fell far short of what was required to meet the company's capital needs. WHS then turned to local bankers for a cash injection, but they agreed to invest only \$500,000. By the beginning of 1891 it was clear that a reorganization of the company's financial claims was necessary.²⁸

The first phase of the reorganization involved a restructuring of the company's capital stock. Stockholders agreed to give up 40 percent of their shares for conversion into different classes of stock that the company could subsequently reissue. However, problems arose during the second phase of the plan, which was designed to raise money through the public sale of preferred stock. The difficulties began when the bankers involved in the reorganization agreed to underwrite only \$1 million of the \$3 million issue. Investors then became reluctant to put money into the company, and it even became difficult to sell the underwritten stock. In the end, the reorganization was completed only because merchandise creditors agreed to accept \$2 million in WHS stock in liquidation of their claims.²⁹

Following its reorganization, WHS resumed its rapid expansion, growing even through the economic crisis of 1893, which almost laid GE low. The company turned to outside investors on several occasions in the late 1890s and early 1900s to raise large amounts of external finance. It conducted several stock and bond issues during this period, but it also raised large amounts of funds in the form of short-term bank debt.³⁰ Early in 1906, it extended the maturity on its debt by issuing \$15 million in twenty-five-year convertible bonds to replace some of its short-term obligations.³¹ However, this recapitalization transaction did not reduce the company's debt levels and, as Arthur Dewing, a prominent early commentator on U.S. corporate finance, put it, "During 1906 and 1907, the affairs of the Company moved rapidly toward a crisis. Its loans were obtained with increasing cost and increasing effort."³² In May 1907, the company tried to raise \$7.5 million in a stock issue to fund working capital requirements, but only a third of the offering was taken up.³³ The issue's failure put the company under further financing pressure.

²⁸ Dewing, *Corporate Promotions*, 168–69, 173.

²⁹ *Ibid.*, 171.

³⁰ *Commercial and Financial Chronicle*: 6 July 1895, 25; 11 Apr. 1896, 689; 13 Aug. 1898, 324; 26 Nov. 1898, 1112; 30 Sept. 1899, 705; 3 Feb. 1901, 395; Dewing, *Corporate Promotions*, 176–7.

³¹ *Wall Street Journal*, 16 Feb. 1906, 5.

³² Dewing, *Corporate Promotions*, 179.

³³ *Wall Street Journal*, 16 May 1907, 7.

Eventually, unable to meet the claims of its creditors, the company filed for receivership in October 1907.³⁴

Once again, the company's financial reorganization depended on its ability to recapitalize existing claims and to raise new money. And once again it almost foundered on the stockholders' reluctance to replenish the company's coffers. Eventually, in response to pleading, and even threatening, letters from the company, the stockholders agreed to release the necessary funds, and WHS was able to carry on.³⁵

As one of the conditions of their participation in the reorganization, trade creditors, bankers, and other investors insisted that "the errors in financial judgement and the recklessness in the declaration of dividends which had brought disaster to the Westinghouse Company were not to be repeated in the future."³⁶ To ensure compliance, they insisted that control of the company be removed from the stockholders, notably George Westinghouse, who had dominated the business until then. A new board of directors was appointed, consisting largely of the representatives of WHS's banks and stockholders.³⁷ In December 1908, the company was taken out of receivership and resumed normal operations.

For the next ten years, the company was run in a much more financially conservative fashion, and its growth was largely constrained by the internal funds at its disposal. Although the company entered the financial markets on several occasions, it did so to recapitalize existing obligations, rather than to raise new monies for expansion. As part of that process, in 1915 WHS converted the remaining \$17.4 million in convertible bonds that were outstanding from its 1906 issue, thus freeing itself of a covenant that had restricted its stock issues.

At the time, the company claimed that its existing capital was more than adequate to cover its investment requirements and that its bid to obtain greater financing flexibility was only precautionary.³⁸ However, in late 1916, it announced that it would take advantage of its newly flexible situation by issuing common stock in order to raise \$15 million in growth finance, claiming that it was "taxed to capacity to manufacture regular products and much profitable business has had to be declined."³⁹ It also took on short-term debt as a source of additional funds and returned for more of the same in the following year.

WHS sought new capital again on several occasions in the early 1920s. It raised \$30 million from an issue of ten-year bonds in 1921, as

³⁴ Dewing, *Corporate Promotions*, 182.

³⁵ *Ibid.*, 192.

³⁶ *Ibid.*, 198.

³⁷ *Ibid.*, 198–99.

³⁸ WHS, *Annual Report*, 1916, 7.

³⁹ Quoted in *Wall Street Journal*, 13 Dec. 1916, 7.

well as \$15 million in 1923, and a further \$18 million in 1924, in two common-stock offerings.⁴⁰ The company also undertook a bond issue in 1927 and a stock issue in 1929, using the proceeds of both to recapitalize existing long-term obligations.

Patterns of External Finance, 1930 to 1975. GE navigated the turbulent years of the Great Depression and World War II without turning to the financial system for funds. Indeed, in 1935 it paid off its outstanding debt obligations and preferred stock. From then until 1945, its balance sheet remained free of fixed obligations.

The picture changed dramatically in 1946, when the company raised a huge amount of debt finance. It conducted two private placements of \$200 million, which, in real terms, was more money than the total proceeds of GE's previous debt issues combined.⁴¹ The company explained "that the additional cash [was] needed to take care of increasing business, the losses resulting from the nine-week strike in the first quarter of this year and plant modernization and expansion."⁴² However, these new debt obligations did not remain long on the company's balance sheet, despite the fact that the larger of the issues had a maturity of twenty years. By the end of 1950, GE had managed to pay them off, and the company was again debt free until the mid-1950s.

In 1956, GE raised another \$300 million in a public offering of twenty-year debentures. Approximately \$125 million of this amount was earmarked for capital expenditures, and the remainder was required to pay off \$174 million in short-term bank loans that the company had taken out earlier in the year. The transaction was the company's first public offering of securities since 1920. It was also one of the two largest public issues of debt securities underwritten in the United States until that time.⁴³

GE turned to the financial system again in the late 1960s, initially raising short-term debt to cover its financial needs. Then, in 1967, almost a decade after its previous public debt offering, the company sold twenty-five-year debentures to raise \$200 million. GE's short-term obligations continued to accumulate rapidly, and the company raised more long-term debt, in three further debenture issues, to extend the maturity on these obligations. After the mid-1970s, however, GE was able to reduce its debt to very low levels and to keep it down for the next ten years.

GE's external financing activity during this entire period entailed the issue of debt finance only. The company did sell stock for cash in a series

⁴⁰ WHS, *Annual Report*, 1921, 1923, 1924.

⁴¹ GE, *Annual Report*, 1946, 7.

⁴² *New York Times*, 12 Nov. 1946, 55; see also GE, *Annual Report*, 1946, 7.

⁴³ *New York Times*, 15 May 1956, 55; *Wall Street Journal*, 3 Apr. 1956, 21.

of small issues that began in 1954 and took place every year through the mid-1970s. However, these transactions were not motivated by the company's financing needs. Rather, they were a mechanical reflection of the company's compensation policy, since they represented sales of stock to employees under the company's stock-option plans.

Compared with GE, WHS was more dependent on the financial system from the Great Depression to the end of World War II. It had lower cash reserves than GE at the end of the 1920s and was hit harder by the depression than its competitor. Nevertheless, not until the recession of 1937 was it forced into the short-term debt markets to raise the funds it needed to bolster its diminished cash position. In 1941 it turned to the capital markets once again, raising nearly \$60 million through the sale of both shares and bonds.

The company claimed that the new financing would cover all expected needs but noted that it would raise additional finance "if unexpected demands for cash [arose] because of further business expansions or war requirements."⁴⁴ In fact, in 1943, WHS did seek further external finance when it borrowed \$30 million in loans guaranteed by the U.S. government from a number of banks.⁴⁵ Although the loans were intended to be short term, the company was forced to refinance them in 1946, due to the combined pressures of a strike that shut down production at WHS, heavy investments associated with postwar conversion, and the increase in working capital required for an expansion of the business.⁴⁶ It used \$30 million from the proceeds of a new \$80 million bank loan for this purpose, but applied the remainder to fund new investments in working and fixed capital.⁴⁷

Later, in 1946, WHS laid out a major financing program to raise nearly \$100 million in external finance to meet its capital needs through the issue of a combination of common stock, preferred stock, and debentures. The firm raised \$50 million through the sale of preferred stock, which it used to redeem some of its outstanding bank loans, and it brought in a further \$30 million through the sale of twenty-five-year debentures. However, it withdrew a planned issue of common stock, which would have raised \$40 million, because of unfavorable market conditions.⁴⁸ The company increased its bank loans again in the years that followed, extending the maturity on these obligations for a while but then recapitalizing them, using the proceeds from the 1948 sale of twenty-five-year convertible debentures. Over the next two years, WHS

⁴⁴ WHS, *Annual Report*, 1941, 4.

⁴⁵ *Ibid.*, 1942, 10.

⁴⁶ *Ibid.*, 1946.

⁴⁷ *Ibid.*, 7.

⁴⁸ *Wall Street Journal*, 21 Nov. 1946, 16.

was able to pay off a large proportion of its debt and preferred stock from internal sources.

Then, in 1950, the company announced a major expansion program to increase its production capacity by 50 percent for an estimated investment of \$300 million. It planned to finance this investment through the issue of debt.⁴⁹ Over the period from 1951 to 1953, WHS sold thirty-year debentures to institutional investors, in three tranches, to raise \$300 million.⁵⁰

From 1953 until the late 1960s, the company made no further calls on the financial system for external finance, focusing instead on paying off the debt it had accumulated. However, in 1967, WHS resumed its external financing activity with the sale of twenty-five-year debentures to raise \$200 million for general investment requirements. The company's short-term debt also began to rise in the late 1960s, and, in August 1970, D. C. Burnham, the chairman of WHS, expressed concern about the trend. Shortly afterward, the company sold twenty-five-year debentures to raise \$200 million and used the proceeds to repay some of its short-term debt.

However, by the end of the year, its current debt was still higher than it had been a year earlier, and, in 1971, WHS took another step to reduce its short-term obligations, using the proceeds of \$162 million from a major stock issue to reduce its short-term bank loans.⁵¹ In real terms, it was the largest stock offering that WHS had undertaken until that point, and it was also the first public stock offering the company had completed in twenty years. Like GE, the company also sold stock to employees during this twenty-year period as part of its stock-purchase plan, which was introduced in 1948, and its employee stock-option plans, which were initiated in 1952.

Patterns of External Finance, 1976 to 2000. Both companies began the final quarter of the twentieth century in similar financial positions, but during the last quarter of the century, their fortunes diverged. GE took on a large amount of debt in the mid-1980s to fund its acquisition of RCA, raising a total of \$5.4 billion through the issue of long-term and short-term debt. From then on, GE became increasingly independent of the financial system as it used its internal funds to fund the repurchase of vast quantities of its own stock and to pay down its outstanding debt.

GE initiated a program of stock repurchases in 1978, but they remained modest in size until 1987, when the company entered the stock

⁴⁹ *Ibid.*, 27 Sept. 1951, 5; 15 Dec. 1951, 8.

⁵⁰ WHS, *Annual Report*, 1951, 3-4; 1953, 3.

⁵¹ WHS, *Annual Report*, 1972.

market on a large scale to bolster its stock price in the wake of the crash. The company's repurchases fell to lower levels in 1988 and 1989, but in November 1989 GE signaled a systematic change in policy with the announcement of a five-year program to repurchase up to \$10 billion of its common stock. In the first half of the 1990s, the company spent more than \$1 billion a year on repurchases; in the second half of the decade, its annual expenditures reached several times that amount as it funded even larger stock-buyback programs.

The company also sold large quantities of its stock to employees as part of its stock-option plans during this period. In the 1990s, and especially in the second half of the decade, these sales of stock rose to extremely high levels. Besides these transactions, GE conducted no other stock issues for cash during this period. As for incurring debt, the company raised short-term debt several times during the 1990s, largely to achieve its targets for stock repurchases.⁵² However, in the last decade of the twentieth century, GE took steps to reduce its leverage, with the result that, by 2000, the company's total debt amounted to only 1.8 percent of its total assets.

WHS, in contrast, allowed its debt levels to rise during this period, which eventually brought the company to the brink of bankruptcy once again. The company raised large amounts of debt from the late 1970s and continued to do so through the 1980s. Most of the obligations it took on were short-term debts, heavily weighted toward the commercial paper market.

In 1991, in response to investors' growing concern about its rising debt levels, the company conducted a large stock offering and used the proceeds to pay down some of its short-term debt. Nevertheless, Moody's and Standard and Poor's downgraded its credit rating, thus raising the costs of servicing existing debt and making it harder to raise more funds in the debt markets.⁵³ Unfortunately for WHS, this blow to its credit rating coincided with a huge cash shortfall generated by problems in its financial-services subsidiary. To meet its financial needs, WHS sought an alternative source of debt from a syndicate of banks in the form of a revolving-credit facility, which came with a range of restrictive conditions attached.⁵⁴

Its financial situation deteriorated further in 1992 with another downgrading of its credit rating, and the company discontinued its use of commercial paper to rely entirely on its revolving funds.⁵⁵ With bankruptcy threatening, WHS sold off its financial-services subsidiary

⁵² GE, *Annual Report*, 1990, 38.

⁵³ WHS, *Annual Report*, 1991, 21.

⁵⁴ *Ibid.*, 16.

⁵⁵ WHS, *Annual Report*, 1992, 17.

and several other businesses in order to shore up its financial position. It also conducted several major issues of stock and long-term debt to pay off or recapitalize its short-term debt obligations. Eventually the company managed to ward off financial collapse, and in the mid-1990s, it embarked on a new strategy for expansion.

Beginning in 1995, once it had acquired the CBS Corporation, WHS bought a portfolio of media companies. Initially the firm raised debt to finance these acquisitions but quickly paid it down with the proceeds gained from selling some of its industrial businesses. In the process, the company changed its name to CBS Corporation to reflect its new identity as a media conglomerate, sold off all the industrial businesses previously associated with the Westinghouse name, and managed to reduce its debt levels from a peak of 49 percent of total assets in the 1990s to 11 percent by 1999. In 2000, the company ceased to exist as an independent entity when it was acquired and absorbed by Viacom, another media conglomerate.

Like GE, WHS also repurchased some of its stock in the late twentieth century, but on a much smaller scale and according to a more sporadic pattern. The company initiated a major stock-repurchase program in 1984 and spent nearly \$2 billion on repurchases in 1985 and 1986. However, repurchases returned to low levels thereafter and ceased altogether from 1990 to 1997 as the company worked through its financial crisis. In 1998, in tandem with its decision to suspend dividends on its common stock, WHS initiated a new plan to repurchase up to \$1 billion of its common stock. By the time the company was acquired by Viacom, WHS had reached almost 60 percent of this target.

Explaining the Financial Dependence and Autonomy of GE and WHS

There are many reasons for trying to understand the historical patterns of financial dependence and autonomy that I have described for GE and WHS. For example, the degree to which a company must rely on outside sources for funds affects the ability of its financial actors to influence the company's governance. However, because the financial system's importance in the economy is usually attributed to its role in funding enterprise investment, I will take that as the central focus of my analysis. This means eliminating all refinancing transactions in which equity or debt is issued for the purpose of repaying existing long-term obligations. In Figure 1, therefore, I show only the long-term issues of finance undertaken by GE and WHS to raise cash, to purchase assets, or to refinance short-term debt.

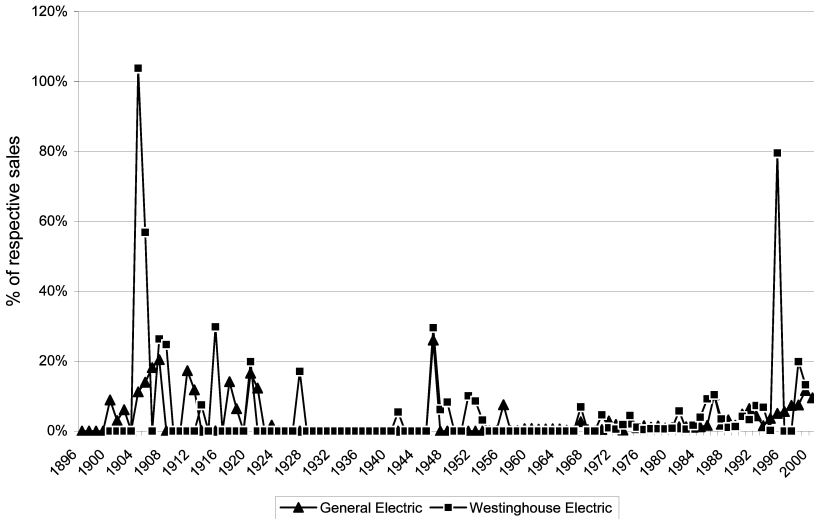


Figure 1. Long-term finance raised by GE and WHS, 1896–2000, as a percentage of their respective sales (includes only long-term financing transactions undertaken to raise cash, in exchange for assets and to recapitalize short-term obligations). (Sources: author's analysis based on data from GE, *Annual Reports*, various years; WHS, *Annual Reports*, various years; and newspaper articles from the *Commercial and Financial Chronicle*, the *Wall Street Journal*, the *New York Times*, and *Barron's*.)

Now the challenge becomes to explain the two companies' historical patterns of financing. A good place to start is with a long-standing and widely accepted proposition in corporate finance: firms seek external funds only when they have exhausted their internal resources.⁵⁶ According to this thesis, a firm's financing deficits and surpluses—the shortfall or excess of its internal funds or retentions with respect to its investments—will largely determine its demand for outside finance.

In fact, in the cases of both GE and WHS, I do find a close relation between their financing deficits and surpluses and their patterns of external financing. There is one exception to this rule. There were instances in which deficits occurred without any corresponding external financing activity, but these can be explained by the companies' use of surplus resources—the cash and marketable securities that they held on their balance sheets—to fund financing deficits. GE consistently surpassed

⁵⁶ Gordon Donaldson, *Corporate Debt Capacity: A Study of Corporate Debt Policy and the Determination of Corporate Debt Capacity* (Cambridge, Mass., 1961), and *Strategy for Financial Mobility* (Cambridge, Mass., 1969); Stewart C. Myers and Nicholas S. Majluf, "Corporate Financing and Investment Decisions When Firms Have Information that Investors Do Not Have," *Journal of Financial Economics* 13 (1984): 187–221.

WHS in its ability to accumulate liquid resources from large surpluses generated in successful years, and these resources served the important function of giving the company greater autonomy from the financial system in deficit years.

Once I take account of this exception, I find that the financing deficits and surpluses of the two companies fully account for the historical patterns they display in their use of the financial system. In their first periods of development, both companies ran extremely large financing deficits, which explains their heavy resort to external finance at the time. From the 1930s through the early 1970s, both companies continued to generate financing deficits, but on a much smaller scale, a fact that explains the relatively lower levels of external finance that they raised. In both periods, WHS tended to run larger deficits than its competitor, which accounts for its greater dependence on the financial system for funds. The main exception to this pattern occurred in 1946, when GE recorded the largest deficit in its history, which generated its huge appetite for external finance in that year.

The final period of the century, from the mid-1970s to 2000, was marked by a more striking divergence in the patterns of financing deficits and surpluses recorded by both companies. For GE, the period was characterized by large and growing financing surpluses, which explains its ability to pay off most of its debt at the same time that it was conducting massive stock repurchases. The only exception to this trend was the appearance of a large appetite for external finance in 1986, when the company acquired RCA. WHS generated some deficits in the 1980s, but not until the 1990s did it record the huge shortfalls in funds that accounted for the company's heavy dependence on financial markets and banks for external funds at that time.

To find that both companies' financial dependence and autonomy was determined by their financing deficits and surpluses is a useful start, but it only raises another question: what determined these deficits and surpluses? Why did GE and WHS record large deficits early in their development? Why did their propensity to generate deficits change over the course of the century? And what accounts for the fact that WHS tended to run higher deficits than GE? These questions lead, in turn, to an analysis of the determinants of their deficits and surpluses, that is, to the historical patterns in their investments and retentions. (See Figure 2.)

Historical Patterns of Investment. As Figure 2 shows, variations in the level and volatility of total investment over time and across companies played a crucial role in explaining the two companies' patterns of financial dependence. A breakdown of total investments into resources committed to fixed and working capital shows that working-capital requirements played a dominant role in generating the investment peaks

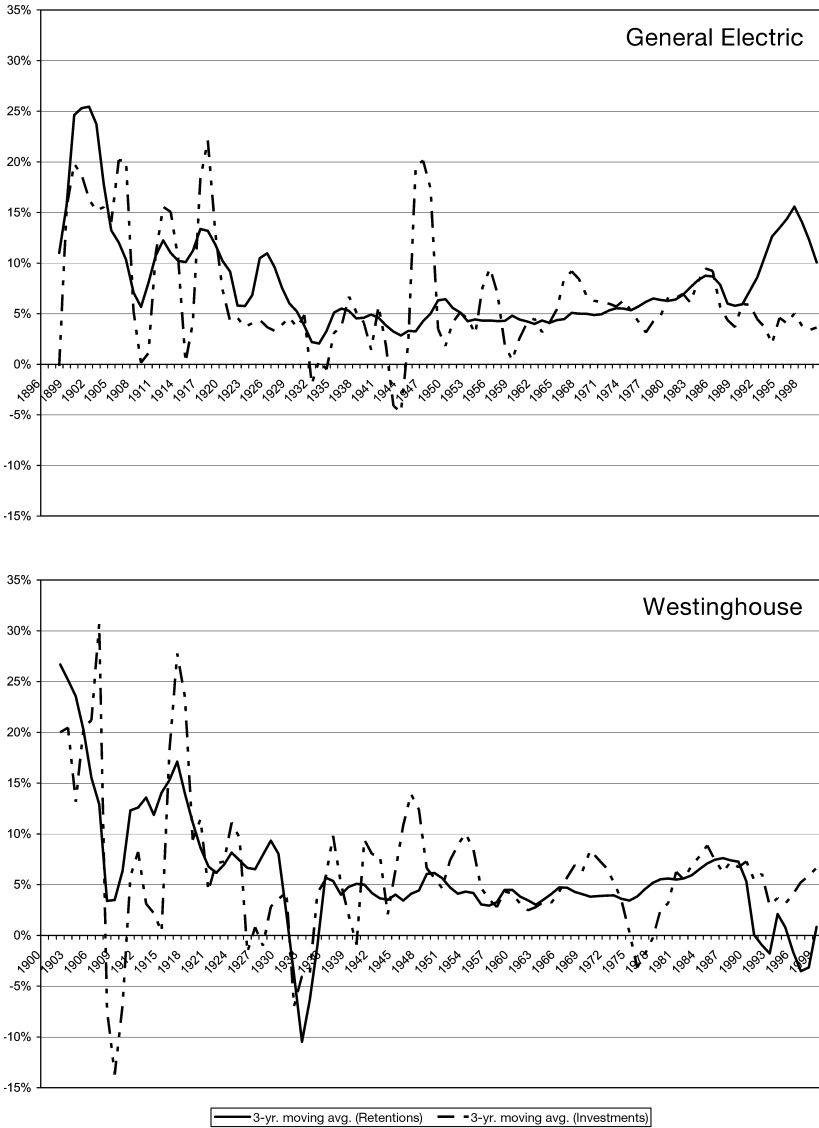


Figure 2. Retentions and investments for General Electric and Westinghouse as a percentage of respective sales, three-year moving averages. (Sources: author's analysis based on data from GE and WHS, *Annual Reports*, various years.)

that created financing deficits for these companies. In contrast, investments in fixed capital were much more stable over the course of the century and were important factors in creating financial deficits only in certain years.

Early in the twentieth century, in particular, both companies had to commit considerable resources in order to increase their working capital, and these commitments involved much larger amounts of money than their fixed investments. At this time, GE and WHS had resources amounting to somewhere between 60 percent and 80 percent of their sales tied up in operating working capital. A comparison of prominent U.S. companies at the time shows that GE and WHS were distinctive for the scale of these commitments: during the period from 1914 to 1916, for example, investments in working capital, including cash and short-term debt, amounted to only 38 percent for Ford, 30 percent for General Motors, 48 percent for U.S. Steel, and 29 percent for American Telegraph and Telephone Company, compared with 74 percent for GE and 70 percent for WHS.⁵⁷

Working-capital requirements were important in determining the financial demands of GE and WHS at this time, not only because they were so high but also because they were so volatile. From one year to the next, they could move up or down by 10 percent or more of total sales. For example, between 1911 and 1912, GE's operating working capital increased from \$42.6 million to \$62.6 million, a change of \$20 million, which amounted to 22.4 percent of its total sales of \$89.2 million in 1912. WHS's operating working capital also expanded from \$21.6 million to \$26.9 million between 1911 and 1912, an increase that amounted to 13.3 percent of its 1912 sales.

These patterns in the level and volatility of working capital made it an important factor in determining the two companies' financial dependence early in the twentieth century. At that time, WHS tended to display higher levels and more volatility in its working-capital requirements than GE. However, these patterns changed significantly over the course of the century, with important implications for both companies' financial dependence. Overall, both companies saw a marked decline in their levels of working capital, which, by the end of the century, had fallen to less than 20 percent, and, in some years, to below 10 percent of sales. Over the same period, both companies experienced a decrease in the volatility of their working-capital investments. However, in both companies, these general trends set in at different times and progressed at different rates, punctuated by intervals that were characterized by relatively high levels and considerable volatility of investments in working capital.

⁵⁷ Seltzer, *A Financial History*, 132.

For GE the importance of working capital as a use of funds diminished after 1918, and this trend contributed to a reduction in the company's dependence on the financial system for funds. A similar development set in somewhat later at WHS, in the early 1920s. However, in the 1930s, and especially in the 1940s and 1950s, both companies once again began to make significant investments in working capital. Although these investments were lower than those recorded earlier in the century, they played an important role in driving up the deficits incurred by both companies at this time. Once again, WHS's investments in working capital were higher than those of GE, which explains its greater financial dependence. A notable exception to this pattern occurred in 1946, however, when GE had to commit enormous resources to replenish its working capital, with the result that it ran a record deficit that year.

For GE, from the mid-1950s until the end of the twentieth century, investment in working capital became, on average, a small net use or source of funds. Only in the mid- to late-1960s did it soak up substantial resources, contributing to the financial deficits that GE recorded at this time. Working capital was also an important use of funds for WHS in the late 1960s, generating a demand for external finance. In the early 1970s, WHS rapidly disinvested in its working capital, releasing funds for other purposes as it did so. Yet, in the last two decades of the twentieth century, WHS's investments in working capital once again rivaled its fixed investments in importance and were mainly responsible for the large deficits that WHS generated at that time.

Overall, therefore, the role of investment in driving the financial dependence of GE and WHS is largely a story of investments in working capital. Fixed investment was not central to the explanation of their overall patterns of financial dependence and autonomy. Of course, there were a few years when peaks in fixed investment exposed both companies to financial pressure. In general, though, their investments in fixed capital conformed to historical trends and were more stable than their investments in working capital.

The importance of investments in working capital in determining these companies' dependence on the financial system begs the question of what determined these investments. In particular, why were they so high early in the century? And why did they decline as the twentieth century unfolded?

Two explanations seem to account for the electrical equipment companies' relatively high early commitments to working capital, although a full determination of the reasons requires further research. First, the electrical equipment industry mainly manufactured its specialized equipment in batches, a method that took time to complete and required keep-

ing large quantities of processed materials and components on hand. As a result, their inventories were large and valuable relative to their sales. Second, the terms on which GE and WHS provided trade credit had to be generous in order to encourage their poorly capitalized utility customers to purchase their large-ticket items.

Over the course of the twentieth century, a long-term decline in inventories and accounts receivable relative to sales contributed to a marked reduction in the scale of investments in working capital for both GE and WHS. First, improvements in the measurement and control of inventories allowed these companies to reduce the inventory levels they needed to support a given level of sales. The financing challenges that GE faced in 1920, not least because of inventories that were running at 43 percent of sales, apparently led the company to target its inventory levels for a major reduction. Certainly throughout the 1920s GE was consistently successful in driving these levels down; by 1930, its inventories had fallen to 16 percent of sales. Although they rose with the depression and again at the end of World War II, in general they remained far below the levels that the business required early in the century.

WHS had even higher inventory levels than GE early in the century. It too began to gain control over them in the 1920s, but it started from a less favorable position, with inventories of 54 percent of sales in 1920. It managed to drive them down to 25 percent of sales by 1930, but this was still nearly 10 points higher than GE's ratio. For much of the rest of the century, this relationship persisted, and WHS continued to run higher inventories than GE, often by a margin of 10 percent or more of sales.

Both companies experienced a general decline in accounts receivable as a share of sales from the beginning of the twentieth century until World War II. This came about as the utilities strengthened their capital structures, allowing the electrical equipment companies to tighten the credit terms that they extended to them as customers. Through these tactics, they shifted some of the burden of their working-capital requirements off their own balance sheets and onto those of their buyers.

The high levels of accounts receivable that were generated early in the century resulted from the utilities' limited capacity to finance purchases of electrical equipment. The electrical companies adopted a number of strategies to get around this problem, including accepting the utilities' securities for their products. Eventually public-utility management or holding companies emerged as the preferred solution.⁵⁸ GE spear-

⁵⁸ Norman Buchanan, "The Origin and Development of the Public Utility Holding Company," *Journal of Political Economy* 44 (1936): 1, 31–53; Thomas Hughes, "The Electrification of America: The System Builders," *Technology and Culture* 20 (1979): 124–61.

headed this development with the establishment of Electric Bond and Share in 1905 to manage its portfolio of securities in utility companies, which resulted in improved financing and management of the utility companies. GE's strategy was widely imitated, and a large number of holding companies were established. As early as 1907, the success of its initiative was made clear when GE introduced what the *Wall Street Journal* called "a radical revision of its entire system of credits on goods sold." This step substantially reduced the period over which the company was paid and allowed GE to increase its business by 15 percent to 20 percent without having to increase its working-capital investment.⁵⁹ Over the long run, GE managed to reduce its accounts receivable from 38 percent of sales in 1905 to 13 percent by the late 1920s.

WHS was less successful in reducing its accounts receivable. This may have been because WHS did not play the same type of pioneering role as GE and, as a result, was only able to reap the benefits of the innovations introduced by Electric Bond and Share once they were diffused through the utilities industry. Whatever the precise reason, WHS still had 20 percent of its sales tied up in accounts receivable by the late 1920s, and, in almost all years thereafter, its accounts receivable continued to be higher as a share of sales than those of GE.

The economic historian Alexander Field has suggested that economies generated in the use of working capital are one of the most important results of effective managerial organization. Specifically, he argues that "the introduction and diffusion of what Alfred Chandler called modern business enterprise had a profound capital-saving impact on the American economy . . . principally via increased speed of production and inventory turnover, which spread costs of holding capital over a larger volume of output."⁶⁰ His argument would imply, on the one hand, that these companies' growing capacity to function with lower levels of inventories and accounts receivable reflected improvements in their managerial organization and, on the other hand, that GE's greater ability to do so was a testament to its superior managerial organization relative to WHS.

Certainly, WHS was conscious of a close relation between its organizational structure and the ability to control its capital requirements. In the early 1930s, in discussions about replacing its functional structure with a divisional one, a senior management report, entitled "Unit Divisions for Diverse Products with Centralized Servicing, Coordination, and Control," noted that a general committee charged with coordination

⁵⁹ *Wall Street Journal*, 12 Oct. 1907, 8.

⁶⁰ Alexander Field, "Modern Business Enterprise as a Capital-Saving Innovation," *Journal of Economic History* 47 (1987): 473.

and supervising the divisions “should watch and advise as to activities affecting the financial resources of the Company so that the use of capital will not be out of balance with the financial structure.” The report continues:

That the above is most important is shown by past history—which may repeat itself. Capital used in a business represents money invested by stockholders, and is expected to earn a return. The unit divisions should be educated to assume responsibility for efficiency and economy in use of capital, as well as in operations. No unit division should be allowed to tie up an undue amount of the total capital of the Company.

Additions to inventories create additional costs of storage space, insurance, taxes, handling, obsolescence, spoilage and loss. Extensions to plant mean additional depreciation, maintenance and repairs, insurance, taxes. Add to these the amount which might be earned on the capital if in more liquid form.⁶¹

Nevertheless, there is reason to doubt that organizational structure is the only, or even the crucial, explanation for these companies' capacity to manage their working capital. As I noted above, there were important reductions in working-capital commitments at GE and WHS before they made the transition to a divisional structure. Moreover, GE lagged a few years behind WHS in moving to a divisional structure, but GE performed better in reducing its working-capital commitments.⁶² Finally, even after reorganizations at both companies, WHS continued to lament the fact that it was less efficient than its competitor. In a report in 1958 on its growth in the postwar period, WHS noted:

There is an evident need for strong management control and direction of decentralized operations and a continuous, concerted effort to improve upon the efficiency of operations. For, despite the decided change in management personnel, the reorganization and the present emphasis on new products and cost control, it must be acknowledged that the Westinghouse return on invested capital and the profit margin per dollar of sales has not materially improved and has been considerably and consistently lower than that of its principal competitor.⁶³

⁶¹ WHS, *Applications for Relief under Section 722 of the Internal Revenue Code*, Exhibit III-A-2, 11 Feb. 1952, 3–4, Library and Archives Division, Historical Society of Western Pennsylvania, Westinghouse Electric Corporation Collection, box 7, folder 2.

⁶² Alfred D. Chandler Jr., *Strategy and Structure: Chapters in the History of the Industrial Enterprise* (Cambridge, Mass.), 363–70.

⁶³ WHS, *Growth Report*, 1958, 7–8, Library and Archives Division, Historical Society of Western Pennsylvania, Westinghouse Electric Corporation Collection, box 8, folder 2.

Therefore, although Field's hypothesis seems promising, more research needs to be done to identify the precise relation between these companies' organizational characteristics and their efficiency in the use of working capital, both over time and compared to each other.

Historical Patterns of Retention. Retentions were also important in determining the financial dependence and autonomy of GE and WHS. A company's retentions consist of its funds from operations or internal funds after deducting the cash it pays out to shareholders in the form of dividends. Given that GE was consistently more profitable than WHS, one would expect GE's retentions to be much higher than those of its competitor. In fact, as Table 1 shows, for much of the century, the two companies' average retention levels were more similar than their profitability, even though GE consistently had the edge.

The small gap in their retentions until the late 1960s is explained by the companies' dividend policies. GE consistently paid out higher amounts of cash to shareholders than WHS as a share of its sales, and the gap between them was particularly large in the early and later periods of the century. GE paid out higher dividends, not only because, with higher profits, it could afford to do so, but also because it consistently paid out a higher share of its profits. The dividend policies that GE and WHS pursued muted the difference in profitability between them until the late 1960s. From then until the end of the twentieth century, the divergence in profitability was simply too large to be compensated for, even by the substantial and growing gap in their dividend payments.

The most important implication of the fact that dividends muted profitability differences between GE and WHS is that dividend policy played an important role in influencing these companies' financial dependence and autonomy. If GE had retained all of the funds it gener-

Table 1
Cumulative Retentions, Internal Funds, and Dividends as
a Percent of Cumulative Sales

Period	GE			WHS		
	Retentions (%)	Internal Funds (%)	Dividends (%)	Retentions (%)	Internal Funds (%)	Dividends (%)
1901-1929	9.9	17.1	7.5	10.4	14.4	3.9
1930-1975	4.7	8.5	3.7	3.9	6.2	2.2
1976-2000	9.1	12.5	4.4	4.2	6.3	1.9

Source: Author's analysis based on data from GE, *Annual Reports*, various years and WHS, *Annual Reports*, various years.

ated from internal sources, it would have had to raise hardly any money from the financial system. Conversely, if WHS had paid dividends at the rates that GE paid them, it would have had to raise external finance more frequently and on a larger scale.

This observation, in turn, begs the question of what determined these companies' payout policies. From their origins through the 1920s, both companies targeted a percentage annual return on the par value of their common stock, and they treated this return as much as possible like a fixed charge. This approach to dividend policy was common at the time among U.S. industrial companies. Its prevalence is usually attributed to the efforts of corporations and their financiers to legitimize common stocks as an investment by making them look as much as possible like the bonds that U.S. investors were more accustomed to holding. It meant that companies set fairly high dividend targets in order to make their stocks competitive with bonds, and that they endeavored to maintain these targets once they had committed to them.⁶⁴

Maintaining high dividends during this early period often proved demanding for GE and WHS, given the heavy financing demands that they faced. However, I have found no evidence to suggest that their managers considered reducing the dividend to avoid raising external finance. To the contrary, in contemplating a new issue of stock, GE's managers seem to have worried about whether the company could afford the proportionate increase in the company's dividend payment that, it was assumed, would result from the capital increase, a concern that shows just how fixed they believed the dividend rate to be.⁶⁵

Precisely because the dividend rate was treated as fixed, it was important to settle on a target dividend rate that could be sustained, and GE and WHS experimented with a number of alternatives. Both companies started out with high rates of dividends but ceased dividend payments during the financial crises that tested their viability as going concerns. These experiences made them much more cautious in setting target rates, although it took two crises for that message to sink in at WHS. GE recovered more quickly and, as early as 1901, reached its target of 8 percent, which it sustained through 1925. The new team that took over WHS following its 1907 bankruptcy distributed dividends very cautiously, and its dividend rate reached 8 percent only in 1919, where it remained until 1929.⁶⁶

Toward the end of the 1920s, pressures to change their dividend policies arose in both companies. As their earnings improved, stockholders

⁶⁴ Baskin and Miranti, *A History*, 181

⁶⁵ "Increased Business Reported for the Electric Companies," *Wall Street Journal*, 9 July 1912, 1.

⁶⁶ GE, *Annual Reports*, various years; WHS, *Annual Reports*, various years.

wanted a share of their profits, rather than just a fixed return on their initial investment. Given its greater success, GE faced stronger pressure than WHS, and in the late 1920s it responded by ratcheting up its dividend payments far beyond 8 percent of the par value of its stock. WHS increased its dividend in 1930 but was relieved of further pressure for higher dividends by the onset of the depression.⁶⁷ As a result, the historical pattern that had been established during the early period of the twentieth century remained unchanged: GE paid out more dividends than WHS, partly because of its greater profitability and partly because its consistent success gave it the confidence to pay out a higher share of the larger profits generated by that success.

Both companies struggled to maintain payouts during the Great Depression and its aftermath. When the U.S. economy eventually returned to normality after World War II, the return on the par value of common stock had given way to the payout rate—dividends as a percentage of net profits—as a target for dividend policy in both companies, as well as in other major U.S. corporations. However, the past continued to cast a long shadow over dividend payments, since, in setting their target payout rates, both companies looked to their historical payout rate as a benchmark for future payments.⁶⁸ As a result, the historical pattern, whereby GE paid higher dividends than WHS as a share of sales and profits, was transmitted into the future.

In the final quarter of the twentieth century, there was another shift in dividend policy at both companies as they abandoned their policy of targeting the payout rate and focused instead on achieving target annual growth rates in dividends per share. The new policies were introduced in the mid-1970s as a response to the effects of inflation on dividend payments: both companies had witnessed a major decline in real dividends per share in the previous decade. Once again, they anchored their new policies in previous policies by using the current dividend per share as their starting point.⁶⁹

WHS initially increased dividends at a faster rate than earnings per share, whereas GE adopted the opposite tactic, leading to a reduction in the historical gap between the two companies' payout rates. However, the collapse of WHS's earnings from 1990 forced the firm to reduce its dividend dramatically and finally to eliminate it entirely at the end of the 1990s. In contrast, GE maintained its dividend payouts at levels comparable to those it paid out in the 1970s.

At the same time, GE initiated a new form of cash payout to its stockholders in the form of stock repurchases. They became a signifi-

⁶⁷ *Ibid.*

⁶⁸ *Ibid.*

⁶⁹ *Ibid.*

cant phenomenon from the late 1970s on, amounting to more than 40 percent of dividend payments in every year beginning in 1978, and more than 100 percent for several years in the 1990s. In contrast, although WHS initiated repurchases in the 1970s, it conducted them on a much smaller scale than GE. They rivaled dividends in scale only in the mid-1980s and at the end of the 1990s.⁷⁰

Although many scholars treat repurchases as an instrument of payout policy, stock buybacks served a different purpose at GE. Specifically, the company's large and growing expenditures on repurchases seem to have been motivated by management's desire to control the dilution of earnings that would otherwise have been caused by the huge and increasing stock issues associated with option plans during this period. There was also apparently a link between repurchases and options at WHS. The company spent no money at all on repurchases for most of the 1990s, but it also issued no stock to employees during this decade. At the end of the 1990s, when it did spend substantial amounts of money on repurchases, it sold similar amounts of stock to employees under option plans.

Lessons from the Financial Histories of GE and WHS

The importance of investments in working capital for determining patterns of financial dependence and autonomy at GE and WHS has significant implications for the way we think about the influence of investment on firms' interactions with the financial system. There has long been a tendency to regard investments in fixed capital as the crucial determinant of enterprises' demand for external funds. In a famous paper published in 1964, economic historian Sidney Pollard challenged that emphasis, at least for the period of early industrialization in Britain, on the grounds that most manufacturing investment at the time was in working, rather than fixed, capital.⁷¹ Kenneth Sokoloff, in a subsequent study of early manufacturing in the United States, showed that there were important differences in the structure of investment across industries but confirmed that, in general, commitments to working capital tended to dominate those to fixed capital.⁷²

My analysis covers a later period in U.S. industrial development, but it also confirms the importance of placing more emphasis on work-

⁷⁰ Ibid.

⁷¹ Sidney Pollard, "Fixed Capital in the Industrial Revolution in Britain," *Journal of Economic History* 24 (1964): 299-314.

⁷² Kenneth Sokoloff, "Investment in Fixed and Working Capital during Early Industrialization: Evidence from U.S. Manufacturing Firms," *Journal of Economic History* 44 (1984): 545-56.

ing capital. However, it diverges from Pollard's in the conclusions to be drawn for the relation between capital formation and financial system. Pollard claims that investments in working capital pose relatively modest challenges, on the grounds that they can be financed through networks of trade credit and bank overdrafts. As such, they do not necessitate the development of financial markets to facilitate the stock and bond issues that would be required to fund investments in fixed capital. It was for this reason, he claims, that early industrialization in Britain could be financed without any disruption of existing financial institutions.

My findings raise questions about Pollard's assumption that investments in working capital will necessarily be financed without recourse to long-term sources of funds. Both GE and WHS relied on stock and bond issues to raise funds for their investments in working capital. This financial policy made sense when increases in working capital were expected to be permanent. Especially during the early years of their histories, for reasons that I have already explained, it was difficult for them to shift the burden of their working-capital requirements to their trade networks. Of course, we ought not to assume, at least without further evidence, that all industries faced these financing challenges. As Lawrence Seltzer shows, the early automobile industry in the United States, by relying on a supplier base that had been built up to serve other industries, was able to economize on its investments in working capital and avoid having to rely on the financial system for funds.⁷³

Industry studies, like that conducted by Sokoloff, which compare investments in working capital across industries, should help to clarify these issues. However, as my study shows, the intensity of working-capital investment and its implications for financial dependence are also affected by the characteristics of specific enterprises. In particular, their internal capacity to manage their working capital seems to be an important factor and ought to be explored in further studies of enterprise financing.

To the extent that this is so, it has a further implication for the way we think about the relation between external finance and economic performance. Readier access to external finance in facilitating greater investment by enterprises is typically assumed to contribute to the productive growth of the economy. Conversely, constraints on external finance, in restricting enterprises' investments, are understood to limit their contribution to economic growth.

The histories of GE and WHS raise questions about these assumptions. GE was more successful than WHS at achieving efficiencies in the use of its working capital and, as a result, its relative financial depen-

⁷³ Seltzer, *A Financial History*.

dence declined. In contrast, WHS's continued financial dependence allowed it to maintain higher investments in working capital rather than increasing the efficiency of its operations. The comparison suggests that, under certain circumstances, the financial system, in making external finance available to firms that demand it, may insulate them from the consequences of their own shortcomings. To the extent that the financial system supports lemons rather than stars, the availability of external finance for enterprise investment may not be an unambiguous boon either to the firms that raise it or to the broader economy.

A second set of implications emerging from my study derives from the importance of dividend policy in shaping firms' dependence on the financial system. The experience of GE and WHS shows that the money flowing out of these companies to shareholders was an important determinant of the money that needed to flow into them from the financial system. This is a surprising finding: given the transaction costs of raising equity or debt finance, it would seem to be more sensible for companies to increase their internal funds, by reducing dividends, than to raise external funds.

However, my earlier discussion of the two companies' dividend policies shows that they did not think of the monies they spent on dividends as fungible. They committed to fixed targets for their dividend payments and worked hard to meet them, even if that meant they had to raise external funds to do so. Initially, by paying dividends at a certain rate, they were seeking to establish the legitimacy of their stocks with investors who were unaccustomed to holding common stock. With this objective in mind, failing to meet their dividend targets could have had serious long-term repercussions. Specifically, when they needed more funds, they might have had difficulties raising them. However, even when they had established legitimacy in the eyes of investors, the historical inertia in both companies' dividend targets meant that they continued to pay dividends at rates that, to some extent, reflected their earlier practices.

In the end, both companies ended up paying out large sums of money to their stockholders over the course of their histories. In absolute terms, GE paid out a total of \$(2000)97 billion in cash dividends from 1897 to 2000, compared with \$(2000)17 billion for WHS. In comparison, direct investments by shareholders in GE amounted to a total of only \$(2000)900 million, or \$(2000)1.6 billion if one includes the stock issued at the time of the company's formation in exchange for the assets of Thomson-Houston and Edison General Electric. In contrast, stockholders in WHS invested a much larger amount, \$(2000)5.3 billion, from 1892 to 2000.

Even if we take account of the time value of money, the cash that flowed out of GE in dividend payments dwarfs the money that flowed

into the company from the financial system. Therefore, it would seem that GE paid an extremely high price for its relationship with the U.S. stock market. Although it is true that the company was rewarded by the stock market with a consistently higher valuation of its earnings than that bestowed on WHS, it is not clear what direct benefits GE derived from this fact. The company raised no funds through the issue of common stock from the early 1920s until the end of the twentieth century. Nor did it use its stock to facilitate acquisitions by exchanging it for the shares of target companies. GE even paid for its acquisition of RCA in cash, despite its scale and notwithstanding the fact that RCA executives expressed a preference for the use of GE stock as consideration.

It may be that there were important indirect benefits of a high stock valuation for GE, such as access to cheaper debt. It is also possible, especially given the role of initial conditions and historical inertia in determining payouts, that GE senior managers took the companies' relationship with the stock market, and the financial system more generally, for granted. As a result, they may never have asked themselves whether the dividend payments that the company made were too high or, more generally, whether its relationship with the stock market was worth it. Although companies do reflect on these issues, and some conclude that they would be better off shrinking their equity base, even to the point of going private, they typically do so only under the pressure of extremely poor results or when aggressive raiders pose a threat. GE has been almost entirely free of both sources of pressure throughout its existence.

Even though particular companies may forgo calculations of the costs and benefits of their relationship with the financial system, the same ought not to be true of scholars who are interested in a systemic evaluation of the relation between finance and growth. Most studies of the economic impact of financial systems focus only on their role in allocating funds for enterprise investment; how much money flows back to these systems is typically not considered. My study underlines the importance of a more comprehensive analysis of the costs, as well as the benefits, to companies of living with particular financial systems.

Conclusion

In this article, I have used case studies of the financial histories of two prominent U.S. companies, GE and WHS, to show how business historians can use publicly available data to understand the evolution of enterprises' interactions with the financial system. In the exploration of these interactions, my study represents only a beginning. Nevertheless, it is one that suggests specific hypotheses that future research might explore, as well as the types of studies that might usefully be undertaken.

The main question that emerges from my study is whether the factors I have highlighted in explaining the financial dependence and autonomy of GE and WHS—notably their investments in working capital and their dividend policies—apply to other companies. One direction for future studies might be to maintain the focus on the United States and compare the relation between enterprises and the financial system across industries. Other new studies might consider whether the factors that influenced the financial dependence of GE and WHS apply to electrical equipment companies in other countries.

Of course, it is possible that the companies I have chosen to study are exceptions. Indeed, their very longevity, which enabled me to carry out a study of their financial histories over an extended period, suggests their distinctiveness. That they are distinctive, of course, does not imply that they are unique. Nor, more critically, does it mean that there are no general lessons to be drawn from their financial histories. Companies as prominent as GE, for example, are capable of influencing systemic patterns precisely because their status as successful outliers means that their behavior is often imitated by other companies. And, in the end, the limits to the general conclusions that can be drawn from this study will only be revealed by undertaking further studies along similar lines. I hope that this article will generate its own critics by facilitating the task of initiating such studies.

Copyright of Business History Review is the property of President & Fellows of Harvard College and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.