

**LIVING WITH THE US FINANCIAL SYSTEM:
THE EXPERIENCES OF GENERAL ELECTRIC AND WESTINGHOUSE ELECTRIC IN
THE LAST CENTURY**

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ABSTRACT

To understand the relationship between finance and growth, scholars have suggested a greater focus on the firms that raise funds from the financial system. In this article, I analyse the role of the US financial system in providing funds to two prominent firms in American business history, GE and Westinghouse, over the last century. The financial system was important for both companies but there were important differences across company, 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 these patterns. These findings suggest clear hypotheses about the determinants of the demand for corporate finance that can be tested in further financial histories. They also highlight the importance of working, as much as fixed, capital in studies of enterprises' relationship with the financial system, as well as an emphasis on the money that flows out of, as well as into, companies.

INTRODUCTION

At the beginning of the 21st century, the United States had one of the largest and most sophisticated financial systems in the 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, for some scholars, the economic benefits of a highly-developed financial system go much further since they regard it as playing a crucial role in facilitating the development of the rest of the economy. Others are more sceptical of the beneficial impact of sophisticated financial systems, arguing that financial activity has a neutral, and even detrimental, relationship to the real economy.

In recent times, the dramatic growth in the importance of the financial sector around the world has given new momentum to the question of how finance matters to the creation and distribution of economic resources. A growing number of studies suggest that there is an important relationship between financial development and economic performance at the national level. However, the methodology employed to generate these results has attracted a good deal of criticism for its limitations in establishing a causal relationship between financial systems and economic performance. To get around this problem, a number of scholars have suggested that we pay closer attention to the firms that rely on the financial system to raise funds in order to better understand the mechanisms through which it might influence the economy.

Historical research seems useful, even necessary, for exploring the implications for firms of living with financial systems. Contemporary financial systems in countries like the United States have been a long time in the making; they evolve substantially over

time along paths that have an important impact on their eventual scale and characteristics. Firms also evolve over time, with their financial positions and investment needs changing in ways that affect their demand for external finance.

As a result, business history would seem to be well-positioned to make an important contribution to our understanding of the economic role of financial systems. However, when we look at the literature, there has been relatively limited attention to the financial histories of leading enterprises. In this article, I contribute to filling this gap with a detailed analysis of the role that the US financial system played in providing funds to two prominent firms in American business history: General Electric (GE) and Westinghouse Electric.

I show that the financial system played an important role in supplying both of these firms with funds over the course of their histories. GE and Westinghouse were particularly dependent on the financial system during the early period of their development from the turn of the century through the 1920s. They became less financially dependent from the 1930s until the early 1970s, although both of them occasionally raised external finance during this time. In the final third of the century, their fortunes diverged with Westinghouse becoming heavily reliant on external finance once again while GE paid down its debt and repurchased massive quantities of its own stock.

I show that two explanations are important in accounting for these companies' historical patterns of financial dependence and autonomy. First, high commitments to investment in working capital by both companies were crucial for driving their financial dependence early in the century. As the century progressed, they were generally able,

although not consistently so, to reduce their working capital requirements which allowed them to limit their financial dependence. However, Westinghouse's investments in working capital were higher than those of GE for most of the 20th century, which largely explains why it was more dependent on the financial system for funds. This difference between the two companies seems to reflect GE's greater capacity to economise on its investments in working capital.

Second, the companies' dividend policies played an important role in shaping their financial dependence and autonomy. These policies muted the impact of the substantial and consistent gap in profitability on their internal sources of funds and, relatedly, their demand for external finance. For both companies, the dividend policies that they initially established can be traced to the requirements of the financial markets, as well as their own financial capacity to satisfy them, during the early period of their development. Even as these historical circumstances changed, their dividend policies continued to bear their imprint since they used historical dividend payments as benchmarks for future dividend payments.

These findings are of relevance to further historical research on corporate finance, suggesting clear hypotheses about the determinants of the demand for external finance that can be tested based on financial histories of other firms. In addition, they have implications for research on the relationship between enterprises and the financial system. The importance of investments in working capital confirms the need for a greater focus on working, as well as fixed, capital in studies of the relationship between capital formation and financial systems. Moreover, the importance of working capital as a determinant of firms' demand for external finance, and the possibility that high

investments in working capital are a symptom of poor organization or management, raises the possibility that the financial system may support lemons rather than leaders. Finally, the role of dividend policy in influencing patterns of financial dependence highlights the need to go 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 greater 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. A variety of empirical studies have been undertaken to explore the relationship between finance and growth most of which rely on cross-country regressions of indicators of financial development and economic growth. Taken together, they suggest that there is an important, positive relationship between finance and growth. However, the methodology used to generate these results has been criticized for its limitations in establishing that this relationship is a causal one.

One way around this problem is to shift from a macroeconomic focus to study the channels through which financial systems affect national economies. As Ross Levine put it: “more microeconomic-based studies that explore the possible channels through which finance influences growth will foster a keener understanding of the finance-growth nexus (Levine, 2003, p. 31; see also Rajan and Zingales, 1998; Zingales, 2003).” Since the financial system’s economic importance is usually attributed to its role in allocating

resources to fund enterprise investments, we need to focus on enterprises that rely on the financial system for funds and the reasons for, and implications of, their financial dependence.

A historical approach to these questions could, and perhaps ought to, play an important role in advancing this research agenda for at least two reasons: the financial characteristics and requirements of enterprises change considerably over time and financial systems also evolve in ways that affect the extent to which, and the way in which, they allocate funds to enterprises. Nevertheless, when we look to the literature on business history for evidence on these interactions we find it is limited. Even if we focus on the US, with its large and sophisticated financial system, it is striking how limited a place is accorded to the financial system in the historical development of leading US firms (see, for example, Chandler, 1977).

There are, of course, a number of excellent histories of the US financial system and the institutions of which it is comprised. In addition, there is a substantial literature on historical patterns of financing for the US corporate economy as a whole (see, for example, Goldsmith, 1955; Dobrovolsky, 1955; Taggart, 1985; Ciccolo and Baum, 1985). However, business historians have had relatively little to say about the role of the financial system in the development of particular enterprises.

Perhaps the most important exception to this rule is the excellent book, [A History of Corporate Finance](#), by Jonathan Baskin and Paul Miranti (Baskin and Miranti, 1997). The book is extremely ambitious in its historical scope, beginning with corporate finance in the medieval period and tracing its development to the end of the 20th century. As such, it serves as a foundational resource for any scholar interested in the topic. However,

as one reviewer pointed out, the book has naturally had to sacrifice some depth to achieve its broad historical sweep and, in particular, “there is no room for more detailed case studies that the reader is often left wanting (Harrison, 1998).” Nor, with some notable exceptions (see, for example, Dewing, 1914; Chandler, 1954; Davis, 1960; Doyle, 1991; Lamoreaux, 1994; Seltzer, 1928), are financial histories of enterprises to be found in abundance elsewhere. Therefore, if we want to use business history to better understand the channels through which financial systems influence economic performance, much of the research remains to be done.

In this article, I study the financial histories of General Electric and Westinghouse Electric (hereafter GE and WHS) from the late 19th century until the end of the 20th century. Both GE and WHS were founded in the late 19th century to compete in the electrical equipment industry, one of the most technologically sophisticated industries of its time, and they 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 1892¹ from the merger of Edison General Electric, which was established by 1878 by Thomas Edison, with the Thomson-Houston companies, which were founded by Elihu Thomson in 1883. The merger was the last in a series of combinations that consolidated the electrical industry from one with fifteen competitors in the late 1870s to a business in which GE faced only one significant competitor, WHS, by the early 1890s. WHS was founded by George Westinghouse in 1885.²

¹ GE was incorporated on April 15, 1892 under the laws of New York, and it began trading in June of the same year.

² 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

Both companies went through three major transitions in the scope of their business activities: they diversified into electrical appliances in the 1920s, they transformed themselves into industrial conglomerates in the 1950s and 1960s and, finally, they moved into financial services in the 1980s. Both companies survived as independent companies until the end of the 20th century until WHS was acquired and absorbed by Viacom, the media conglomerate, in 2000.

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 also important differences between GE and WHS, especially in terms of their performance, with GE earning consistently and substantially more than its competitor, which 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 us with useful insights on the determinants and implications of their relationship with the US financial system.

The prominence of these two companies and the industries that they dominated 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 go beyond understanding these histories. First, I want to show how business historians can analyse publicly-available data from a variety of sources³ to generate a systematic and

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.

³ Neither company maintains its own archives. However, some company records are maintained for GE at the Schenectady Research Library and for WHS at the Historical Society of Western Pennsylvania.

comprehensive historical account of enterprises' evolving interactions with the financial system. Second, I seek to use the findings from my study of GE and WHS to suggest some hypotheses about the channels through which the financial system affects economic activity and performance that can be explored in further research.

SOURCES OF EVIDENCE ON THE FINANCIAL HISTORIES OF GE & WHS

I have been able to develop a comprehensive record of both companies' financial histories by relying largely on public sources of information. The annual reports of GE and WHS served as the basic sources for my analysis of their historical interactions with the financial system. Flow-of-funds accounts provide direct measures of enterprises' sources and uses of funds but they have only been required of US companies since 1971.⁴ Nevertheless, from the mid-1940s, GE and WHS provided some summary information on 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 balance sheet.

However, the GE records provide limited information on the issues that are addressed in this article. The WHS records are currently being processed and organized by their archivists and will only be accessible to researchers from the end of 2006 at the earliest.

⁴ From 1971 US companies were required by Accounting Principles Board (APB) 19 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, FASB changed these disclosure requirements when it issued SFAS 95 which mandated that companies present a "statement of cash flow" which focussed more narrowly on changes in a company's cash and cash equivalents.

The standards of disclosure for US public companies improved dramatically from the early 1930s 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 these statements. Moreover, prior to 1934, much less information was provided in the annual reports, especially by WHS, and its objectivity was more questionable.

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 as well as articles from the Wall Street Journal, the New York Times and Barron's. For the period from 1934 on, prospectuses required of companies by the SEC proved to be a valuable source of additional detail on external finance. Prior to 1934, I consulted the Commercial and Financial Chronicle, the leading financial journal of the time, for all references that it contained to GE and WHS. I also relied on several articles and books that cover the histories of GE, WHS and some of their financiers (see, in particular, Dewing, 1914; Carpenter, 1916a and b).

Based on these sources, it was possible to compile a comprehensive body of historical evidence for both companies on their 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

working⁵ and fixed capital as well as the returns that they provided to financial interests in the form of interest and dividend payments. These data served as the primary basis for the analysis described in the paper.

The most important weakness of my data is found in the time series on fixed investment for WHS. Prior to 1936, in contrast to GE, WHS did not provide estimates of its capital expenditures nor of its accumulated depreciation. Therefore, I had to improvise in the construction of this series by estimating capital expenditures for a particular year as the sum of the change in the net book value of fixed assets and the depreciation charged during the year. There are two factors that may make this estimate substantially different from direct estimates of capital expenditures. The first is a change in the valuation of fixed assets which leads to over- or under-estimates of investment depending on whether values are written up or down. The second is an acquisition which makes fixed investment look 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 from 1971, when they did report these expenditures, they often combined acquisitions with disposals to give net expenditures on acquisitions. The use of this series complicates the analysis of sources and uses of funds when both acquisitions and disposals are high, as

⁵ 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, of course, some cash is needed for operating purposes. Nevertheless, for prosperous companies like GE that maintain large cash reserves, it gives a more accurate picture than total working capital of the liquid resources that they really need to run their businesses.

they were for WHS in the 1990s. Therefore, I exclude data on net acquisitions from my time series for investment and, instead, discuss the role of acquisitions in driving financial demand in the text.

Finally, I would like to highlight an important decision that I have made with respect to the treatment of the two companies' financial services business. From 1988, 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 that they showed up as line items in the income statement and balance sheet.

In 1987 GE made the following statement with respect to the pending consolidation: “[t]hese financial services companies are so different from the other GE companies that, in the opinion of GE management, GE’s financial statements are more understandable if financial services affiliates’ statements are shown separately (GE, 1987).” This statement is certainly true of the company’s financing activities. GE Capital Services was a major issuer of debt as part of its ongoing business. Using consolidated data would make the period from 1988 incomparable with the previous 89 years, so I have based my analysis on the annual accounts for GE without the consolidation of GECS. WHS was also required to consolidate its financial services business from 1988 until 1992 when it disposed of that business. I have also endeavoured to use data for WHS that treat the financial services business on an equity basis although this was somewhat harder than for GE given WHS’s lower level of disclosure.

HISTORICAL PATTERNS OF FINANCIAL DEPENDENCE & AUTONOMY FOR GE & WHS

As I noted earlier, the financial system's importance in the economy is usually attributed to its role in funding enterprise investment so I take it as my central focus in the analysis that follows. As Figure 1 shows, GE and WHS went through three distinct stages in their dependence on, and autonomy of, the US financial system. I describe the characteristics and evolution of these stages in detail in the following sections but they can be summarized in the following terms.

Figure 1 Long-Term Finance raised by GE and WHS, 1896-2000, as a percentage of their respective sales

During the first period from the companies' establishment through the 1920s, the financial system assumed its greatest importance in terms of the volume and frequency of the external finance it provided. WHS was more reliant than GE on the financial system, even in absolute terms, raising a total of 2000 \$4.0 billion in gross terms from 1890 to 1929 compared to 2000 \$3.4 billion for GE for the period from 1892 to 1929. Relative to its size, with sales of only half those of GE, WHS was much more dependent on the financial system during this period; external finance accounted for about 12.9 per cent of its cumulative sales for the period compared with 5.9 per cent for GE.

The frequency of external financing declined markedly for both companies from the 1930s through the early 1970s and, 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 the period than its competitor, both in absolute and relative terms, with total gross proceeds of 2000 \$11.1 billion, which amounted to 2.6 per cent of its cumulative sales, compared to 2000 \$8 billion and 0.8 per cent respectively for GE.

The final period from 1976 to 2000 was marked by a divergence in financing behaviour for the two companies. GE raised a total of \$8.9 billion in external finance during this period which represented 0.7 per cent of its cumulative sales. However, its relationship 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. For WHS, in contrast, the period was one of much heavier external financing; in total, it raised 2000 \$17.5 billion in gross finance or 5.0 per cent of cumulative sales from 1976 to 2000. Like GE, the retirement of existing financial obligations, especially repayments of debt, was also important 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 comprised entirely of short-term obligations and amounted to close to \$10 million. Shortly after its formation, GE completed two major bond issues to raise \$4 million which it used to re-capitalise some of these obligations as well as another \$6 million which it employed to expand its capital stock. Less than a year later, however, the company found itself in the

throes of a major financial crisis with bankruptcy threatening if it failed to generate additional external finance.

The financial panic of 1893 brought a sharp decline in the company'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 on to third parties for cash but the panic meant that GE was left with illiquid and, in some cases, worthless paper. As a result, in the summer of 1893, GE found itself overextended with \$10 million in immediate debts and only \$1.3 million on hand to meet them (Hammond, 1941, pp. 220-2). The company was saved from bankruptcy only by a cash infusion from the financiers who had masterminded the formation of GE: Henry Higginson of Lee, Higginson, the Boston brokerage and J.P. Morgan, the New York banker (Wall Street Journal, January 18, 1894, p. 4).

GE began to grow again from the turn of the century and over the next twenty years it raised substantial amounts of external finance to fund its expansion in three clusters of transactions. From 1904 to 1907, it raised \$21 million in a series of three stock issues, which increased its share capital by more than 50 per cent. It contemplated a fourth stock issue in 1907 but, given unfavourable conditions in the stock market, it issued 10-year convertible bonds instead to raise a further \$13 million (Wall Street Journal, May 15, 1907, p. 1). Following this spate of financing, the Wall Street Journal deemed that: “[t]here 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. (Wall Street Journal, May 15, 1907, p. 1).”

It was another decade before GE made further demands on the financial system for funds. When it did, it was largely concerned with funding temporary financial requirements made necessary by the exigencies of wartime. In 1917 it raised \$25 million in new funds through the sale of medium-term notes noting that “[i]t 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 aggregating \$25,000,000 (GE, 1918, p. 8).” In addition, it returned to the financial markets in 1918 to raise \$10 million in a public sale of its common stock to help the company meet the capital requirements associated with its direct involvement in the US government’s war effort (see Coffin’s description of these requirements in GE, 1918, p. 5).

GE’s successfully paid down some of its medium-term notes immediately after the war but it was soon faced with growing financing pressures which ultimately led it to undertake a final cluster of financing transactions in 1920 (GE, 1921, p. 8; Chronicle, February 14, 1920, p. 663). The company issued stock in two tranches to raise a total of \$40 million, it sold 40-year bonds for \$5.1 million and it issued investment bonds to employees to raise a further \$2.6 million. Overall, 1920 turned out to be GE’s most active year in terms of financing since its foundation. It also proved to be the last year, for more than a quarter of a century, in which GE turned to the financial system for money. Even more striking is the fact that it was the last time in the 20th 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 initial decades proved to be much shakier. The company's initial growth was dramatic but it ran into trouble sustaining it despite its recourse to large amounts of external finance. Major financial crises, brought on by growth beyond the company's capacity to finance it, threatened WHS's survival on two occasions. In both cases, it had a hard time convincing stockholders to put up the funds required to bail it out of trouble (Dewing, 1914, p. 168)."

The first of WHS's crises occurred in 1891. The year before, the company 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 proved 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 \$0.5 million. By the beginning of 1891 it was clear that a reorganization of the company's financial claims was necessary (Dewing, 1914, pp. 168-9, 173).

The first phase of the reorganization involved a restructuring of the company's capital stock with stockholders agreeing to give up 40 per cent of their stock for conversion into different classes of stock that the company could subsequently re-issue. However, problems arose with the second phase of the plan which was designed to raise money through the public sale of preferred stock. They began when the bankers involved in the reorganization agreed to underwrite only \$1 million of the \$3 million issue. Investors then proved reluctant to invest in the company and even the sale of the underwritten stock proved difficult. In the end the reorganization was completed only

because merchandise creditors agreed to accept \$2 million in WHS stock in liquidation of their claims (Dewing, 1914, p. 171).

Following its reorganization, WHS resumed its rapid expansion, growing even through the economic crisis of 1891 which almost laid GE low. The company turned to the financial markets on several occasions in the late 1890s and the early 1900s, raising large amounts of external finance, most of it in the form of short-term debt, to fund its rapid growth. In contrast to the company's previous experience, investors proved enthusiastic in taking up WHS's debt issues; in 1906 when the company sought to extend the maturity on its short-term loans by issuing 25-year convertible bonds, total subscriptions amounted to more than \$60 million for the \$15 million issue (Wall Street Journal, April 26, 1907, p. 2).

WHS's honeymoon with the financial markets came to an abrupt end as the company's rising debt levels caused widespread concern when the panic of 1907 hit. In May 1907, the company tried to raise \$7.5 million in a stock issue but only a third of the offering was taken up (Wall Street Journal, May 16, 1907, p. 7). The issue's failure put the company under considerable financing pressure. Eventually, unable to meet the claims of its creditors, the company filed for bankruptcy in October 1907 (Dewing, 1914, p. 182).

Once again the company's financial reorganization depended on the recapitalization of existing claims and the raising of new money. And, once again, it almost came asunder given stockholders' reluctance to replenish the company's coffers. Eventually, in response to pleading and even threatening communiqués from the

company to its stockholders, the necessary funds were forthcoming and WHS could carry on (Dewing, 1914, p. 192).

One of the conditions of participation by trade creditors, bankers and other investors in the reorganisation was 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” (Dewing, 1914, p. 198).” To ensure this, they insisted that control of the company be taken away from the stockholders, notably George Westinghouse, who had controlled the business until then. A new board of directors was appointed and it was dominated by representatives of WHS’s banks and stockholders (Dewing, 1914, pp. 198-199). In December 1908, the company was taken out of the hands of its receivers and resumed normal operations.

For the next ten years, the company was run in a much more financially conservative fashion with its growth largely constrained by the internal funds at its disposal. Although the company entered the financial markets on several occasions, it did so to re-capitalise its existing obligations rather than to raise new monies for expansion. It was only in 1917 that WHS sought growth finance in an issue of common stock that raised \$15 million, claiming that it was “taxed to capacity to manufacture regular products and much profitable business has had to be declined (quoted in Wall Street Journal, December 13, 1916, p. 7).” It also took on short-term debt as a source of additional funds and went back again for more of the same in the following year.

The next time WHS raised capital was in the 1920s which, with five major security issues, turned out to be an active decade for external financing. Two of these issues -- stock issues conducted in 1923 and 1924 -- were used to fund new investment.

The proceeds of the other three issues were used initially to re-capitalise, and then to repay, existing obligations so that by the end of 1929 WHS had a balance sheet that was free of debt.

Patterns of External Finance, 1930 to 1975

GE navigated the turbulent period from the Depression through World War 2 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 all 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 all of GE's previous debt issues combined (GE, 1946, p. 7). However, these obligations did not spend long on the company's balance sheet despite the fact that the larger of the issues had a maturity of 20 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 20-year debentures. 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 ever underwritten in the United States until that time (New York Times, May 15, 1956, p. 55; Wall Street Journal, April 3, 1956, p. 21)

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 25-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. From the mid-1970s, however, GE was able to reduce its debt to very low levels over a period of ten years.

All of GE's external financing activity during this period involved the issue of debt finance. The company did sell stock for cash in a series 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 implication of the company's compensation policy since they represented sales of stock to employees under the company's stock option plans.

Turning now to the case of WHS, I find that it was more dependent than GE on the financial system from the Depression through to the end of World War 2. It had lower cash reserves than GE at the end of the 1920s and the Depression hit it much harder than its competitor. Nevertheless, it was not until the recession of 1937 that it was forced into the short-term debt markets to raise funds to bolster its diminished cash position. In 1941 it turned to the capital markets once again, this time for long-term finance, raising nearly \$60 million through the sale of shares and a bond issue.

The company claimed that it expected that the new financing would cover all expected needs but that it would raise additional finance "if unexpected demands for cash arise because of further business expansions or war requirements (WHS, 1941, p. 4)." In fact, in 1943, WHS did seek further external finance when it borrowed \$30m in loans guaranteed by the US government from a number of banks (WHS, 1942, p. 10). Although

the loan was intended to be a short-term one, the combination of a strike that shut down production at WHS, heavy investments associated with post-war conversion, as well as increased working capital requirements due to an expansion of the business, forced the company to re-finance the loan in 1946 (WHS, 1946). It took out a medium-term bank loan to do so but it also used some of the proceeds from this loan, an amount of \$50 million, to fund new investments in working and fixed capital (WHS, 1946, p. 7).”

In the same year, WHS laid out a long-term financing programme to raise nearly \$100m in external finance through the issue of a combination of common stock, preferred stock and debentures. It proceeded with its plan over the next couple of years and raised \$50 million through the sale of preferred stock, which was used to redeem some of its outstanding bank loans, as well as a further \$30 million through the sale of 25-year debentures. However, it withdrew its planned issue of common stock, which would have raised \$40 million, because of unfavourable market conditions (Wall Street Journal, November 21, 1946, p. 16). Nevertheless, over the next few years, the company was able to generate enough funds from internal funds and through the successful completion of a common stock offering for \$40 million in 1951 to pay off a large proportion of its fixed obligations.

In 1950 the company announced a major expansion programme to increase its production capacity by 50 per cent for an estimated investment of \$300m. It planned to finance this investment through the issue of debt (Wall Street Journal, September 27, 1951, p. 5; December 15, 1951, p. 8). Over the period from 1951 to 1953 WHS sold 30-year debentures to institutional investors in three tranches to raise \$300 million (WHS, 1951, pp. 3-4; WHS, 1953, p. 3).

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 25-year debentures to raise \$200m for general investment requirements. The company's short-term debt also rose from the late 1960s and, in August 1970, D. C. Burnham, WHS's chairman, expressed concern about the trend. Shortly afterwards, the company sold 25-year debentures to raise \$200m 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 before and, in 1971, WHS took another step to reduce its short-term obligations when it used the proceeds of a major stock issue to reduce its short-term bank loans (WHS, 1972). In real terms, it was the largest stock offering that WHS had undertaken until that point as well as the first public stock offering that the company had completed in twenty years. Like GE, the company also sold stock to employees during this 20-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 20th century in fairly similar financial positions but the final quarter of the century was characterized by a growing divergence in their fortunes. GE took on a huge 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 autonomous 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 most of its outstanding debt.

GE initiated a programme of stock repurchases in 1978 but they were rather modest in size until 1987 when the company entered the stock 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 5-year programme 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 and, in the second half of the decade, its expenditures reached several times that amount on an annual basis as it funded, even larger, stock buyback programmes.

The company also sold large quantities of its stock to employees as part of stock option plans during this period. In the 1990s, and especially in the second half of the 1990s, these sales of stock rose to extremely high levels. Besides these transactions, GE conducted no other stock issues for cash during this period. As far as debt is concerned, the company raised short-term debt several times during the 1990s, largely to achieve its targets for stock repurchases (GE, 1990, p. 38). However, GE's overall tendency in the last decade of the 20th century was to reduce its leverage and, by 2000, the company's total debt amounted to only 1.8 per cent of its total assets.

WHS, in contrast, exhibited rising debt levels for most of 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 debt with a particularly heavy reliance on the commercial paper market.

In 1991, in reaction to 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 its existing debt and making it harder to raise more funds in the debt markets (WHS, 1991, p. 21). Unfortunately for WHS, this action coincided with a huge cash shortfall generated by problems in its financial services subsidiary. To meet its financial needs, it 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 (WHS, 1991, p. 16).

However, its financial situation worsened in 1992, with a further downgrading of its credit ratings, and the company discontinued its use of commercial paper to rely entirely on its revolver for funds (WHS, 1992, p. 17). At this point, with bankruptcy threatening, WHS sold off its financial services subsidiary, as well as several other businesses, to shore up its financial position. It also conducted several major issues of stock and long-term debt to pay off or re-capitalise its short-term debt obligations. In the end, the company successfully warded off financial collapse and, from the mid-1990s, it embarked on a new strategy for expansion.

From 1995, beginning with the acquisition of the media company, the CBS Corporation, WHS bought a portfolio of media businesses. It initially raised debt to finance these acquisitions but quickly paid it down with the proceeds from the disposals of WHS's stable of industrial businesses. In the process, the company changed its name

to CBS Corporation to reflect its new identity as a media conglomerate, it sold off all of the industrial businesses previously associated with the Westinghouse name, and it managed to reduce its debt levels from a peak of 49 per cent of total assets in the 1990s to 11 per cent 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 20th century but on a much smaller scale and according to a more sporadic pattern. The company initiated a major stock repurchase programme 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. From 1998, in combination with the company's decision to suspend dividends on its common stock, WHS initiated a new repurchase plan to buy back up to \$1 billion of its common stock. By the time the company was acquired, it had reached about 60 per cent of this target.

EXPLAINING THE FINANCIAL DEPENDENCE & AUTONOMY OF GE AND WHS

In seeking to explain the historical patterns of financial dependence and autonomy that I have described for GE and WHS, a good place to start is with a long-standing and widely-accepted proposition in corporate finance: that firms seek external funds only when they have exhausted their internal resources (Donaldson, 1961; 1969; Myers and Majluf, 1984). It suggests that a firm's financing deficits and surpluses – the shortfall or excess of its internal funds or retentions with respect to its investments – will be the key determinant of its financial dependence or autonomy. In fact, for both GE and WHS, I do

find a close correlation between their financing deficits and surpluses and their patterns of external financing.

There were two exceptions to this rule. First, there were years in which GE and WHS raised external finance without incurring financing deficits. These situations occurred when equity or debt was issued to re-capitalise existing obligations rather than to raise new money. Second, there were instances in which deficits occurred without any corresponding external financing activity. They 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 was consistently more successful than WHS at accumulating liquid resources from the large surpluses that it generated in successful years and they proved important in giving it greater autonomy from the financial system in deficit years.

Once I take account of these exceptions, I find that the financing deficits and surpluses of the two companies fully account for their financial dependence and autonomy. In the first period of their development both companies ran extremely large financing deficits which explain 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 than previously, a fact which explains the relatively lower levels of external finance that they raised. In both of these 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 explain its ability to pay off most of its debt and to conduct massive stock repurchases at the same time. The only exception to this trend was its large deficit in 1986 which resulted from the company's acquisition of RCA. WHS generated some deficits in the 1980s but it was not until the 1990s that it recorded huge shortfalls in funds which explain the company's heavy dependence on financial markets and banks for external funds at that time.

Of course, to say that both companies' financial dependence and autonomy was determined by their financing deficits and surpluses only begs the further question of 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 evolve 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 investments and retentions that are shown in Figure 2.

Figure 2 Retentions and Investments for GE and WHS, as a percentage of respective sales, 3-year moving averages

Historical Patterns of Investment

Variations in the level and volatility of total investment over time and across company played a crucial role in explaining patterns of financial dependence for GE and WHS. When I de-compose total investment into its major constituent elements – investments in fixed and working capital – I find that investments in working capital played a major role in generating the investment peaks that created financing deficits. Investments in fixed capital were much more stable over the course of the century and were important for creating financial deficits only in certain years.

Figure 3 Decomposition of Total Investment into Fixed and Working Capital Components, as a percentage of respective sales, annual data

Early in the 20th century both companies made very large commitments of resources to investments in working capital, much higher as a share of sales than their investments in fixed capital, with WHS's commitments tending to run higher than those of GE. For GE, investments in working capital became a much smaller user of investment funds and, in some cases, a net source of funds from the late teens thus freeing it of its dependence on the financial system for funds. A similar development occurred at WHS from the early 1920s.

In the 1930s, and especially in the 1940s and 1950s, investments in working capital once again became significant for both companies. Although these investments were lower than those recorded earlier in the century, they played an important role in driving the deficits that both companies incurred at this time. Once again WHS's

investments in working capital were higher than those of GE, which largely explains its greater financial dependence. A notable exception to this pattern was 1946 when GE had to commit massive resources to replenish its working capital which resulted in the record deficit that it ran that year.

For GE, from the mid-1950s until the end of the 20th 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 dis-invested at a rapid rate in its working capital, throwing off funds for other purposes as it did so. Yet, in the last two decades of the 20th century, WHS's investments in working capital once again rivalled its fixed investments in their importance and were largely responsible for the large deficits that WHS generated at that time.

Overall, the role of investment in driving the financial dependence of GE and WHS is largely a story of investments in working capital. Early in the century, GE and WHS had resources of as much as 80 per cent of their sales tied up in working capital and, for WHS, even more than that on several occasions. By the end of the century, in contrast, working capital had fallen to less than 20 per cent, and in some years below 10 per cent, of sales. However, investments in working capital were important in driving financial dependence not only because their levels were high but also because they were volatile. Of particular importance is the fact that they were especially volatile early in the century when they accounted for their highest proportion of total investment.

Neither for GE nor WHS was fixed investment central for explaining their overall patterns of financial dependence and autonomy. Investments in fixed capital conformed to historical trends that, for both companies, were more stable than for investments in working capital. Having said this, there were a few years for both companies when peaks in fixed investment did contribute to the creation of financial deficits and, therefore, to a demand for external funds.

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? If we compare the working capital of prominent US companies at the time, it turns out that GE and WHS stand out for the scale of their commitments: during the period from 1914 to 1916, for example, investment in working capital (total, rather than operating, working capital) amounted to only 38 per cent for Ford, 29.5 per cent for General Motors, 47.5 per cent for US Steel and 29 per cent for American Telegraph and Telephone Company compared with 74 per cent for GE and 70 per cent for WHS (Seltzer, 1928, p. 132).

Three explanations seem important in accounting for the electrical equipment companies' relatively high commitments to working capital early in the 20th century. First, its production process was largely characterized by the batch production of specialized equipment which required that large quantities of processed materials and components be kept on hand. As a result, their inventories were large and valuable relative to their sales. Second, their accounts payable were low relative to the scale of their activity because the small scale and limited resources of their suppliers made it difficult for them to extract favourable credit terms in sourcing. Finally, the terms on

which they provided trade credit had to be generous to encourage the poorly-capitalized utilities that were their customers to purchase the large-ticket items they GE and WHS were trying to sell them.

Over the course of the 20th century, there were important developments in the structure and operation of the electrical companies' business that explains the long-term decline in their investments in working capital. First, there was a major change in the mix of these businesses and, in particular, a diversification into businesses such as consumer appliances and electronics in which, as mass production industries, inventories tended to be lower. Second, improvements in inventory management, in the measurement and control of inventories, allowed these companies to generate efficiencies. In addition, changes in the management of buyers and suppliers led to a reduction in accounts receivable and an increase in accounts payable relative to sales. In other words, they shifted some of the burden of working capital requirements off their own balance sheets and onto their buyers and suppliers.

These developments contributed to the long-term decline in the scale of investments in working capital for both GE and WHS. However, WHS's commitments to working capital declined more slowly than those of GE and they increased again in the late 20th century. There were differences in the composition of their increasingly diversified businesses that play some role in accounting for the gap between the two companies but the main reason seems to be that WHS was less successful than GE at organizing itself to economize on its investments in working capital.

Certainly, an important distinction between the two companies in this regard was apparent early in the 20th century. For both companies, the crucial problem in generating

demand for their products at the time was the utilities' limited capacity to finance purchases of electrical equipment. There were a variety of attempts by the electrical companies to get around this problem, including the acceptance of utilities' securities for their products, until the preferred solution was found with the introduction of public utility management or holding companies (Buchanan, 1936; Hughes, 1979).

GE played a pioneering role in this development with the establishment of Electric Bond and Share in 1905 to manage its portfolio of securities in utility companies. The company proved highly successful in improving the financing and management of utility companies and its strategy was imitated by the large number of holding companies that were established thereafter. 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" which substantially reduced the period over which the company was paid and allowed GE to increase its business by 15 to 20 per cent without any increase in working capital investment (Wall Street Journal, October 12, 1907, p. 8). WHS did not play this type of pioneering role and, as a result, it was only able to reap the benefits of the innovations introduced by Electric Bond and Share once they diffused through the utilities industry.

Throughout this section, I have focused on long-term developments in the investments of both companies. Before concluding, it should be noted that there were also important short-term variations in these investments. Heavy capital needs were sometimes the result of temporary glitches in the planning and implementation of working capital requirements as well as unexpected changes in business conditions.

A good example is GE's enormous working capital investment in 1946. The company failed to anticipate the shortages it encountered in seeking supplies after World War 2 which led to a major imbalance between production requirements and inventories on hand and forced the company to temporarily shutter its factories. Its efforts to overcome the inventory shortage placed huge demands on its resources in 1946 and were largely responsible for the company's record deficit in that year.

Historical Patterns of Retention

Retentions were also important in determining the financial dependence and autonomy of GE and WHS. A company's retentions are comprised of its internal funds -- which are calculated by adding its depreciation back to its profits to arrive at an estimate of the funds generated from its operations -- minus the funds that 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 much more similar than their profitability, even if GE consistently had an edge on WHS. The small gap in their retentions until the late 1960s is explained by the companies' dividend policies. As Table 1 shows, GE consistently paid out much higher amounts of cash to shareholders than WHS as a share of their respective sales with the gap between them being 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; in fact, the company also consistently paid out a higher share of its profits than was the case at WHS.

Table 1 Cumulative Retentions, Internal Funds and Dividends for GE and WHS
as a percentage of cumulative sales

The dividend policies that GE and WHS pursued muted the difference in profitability between them. At least that was true until the late 1960s. From then, until the end of the 20th 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 this observation 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 generated 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 as if it were a fixed charge. This approach to dividend policy was common at the time among US 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 US

investors were more used to holding (Baskin and Miranti, 1997, p. 181). It meant that companies set fairly high dividend targets, to make their stocks competitive with bonds, and that they strove to maintain these targets once they had committed to them.

Maintaining high dividends during this early period often proved difficult 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 seemed 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 which shows just how fixed they believed the dividend rate to be ("Increased Business Reported for the Electric Companies," Wall Street Journal, July 9, 1912, p. 1).

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 went through a teething process in finding that rate. Both companies started out with high rates of dividends but their financial crises led to the cessation of dividend payments when their viability as going concerns was called into question. These experiences made them much more cautious in setting their target rates although it took two of these crises for that message to sink in at WHS. GE recovered from these problems more quickly than WHS and reached its target of 8 per cent as early as 1901 and sustained it through 1925. The new team that took over WHS following its 1907 bankruptcy proved very cautious in the distribution of dividends and its dividend rate reached 8 per cent only in 1919 where it remained until 1929.

Towards the end of the 1920s, there were pressures for change in the dividend policies of both companies. As their earnings improved, investors demanded higher dividends; stockholders wanted a share of their profits rather than just a fixed return on their initial investment. Given its greater success, GE faced stronger pressures than WHS and in the late 1920s it responded by ratcheting up its dividend payments far beyond 8 per cent 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. As a result, there was no change in the historical pattern that had been established during the early period of the 20th century; GE paid out more dividends than WHS due in part to its greater profitability but also to its greater confidence in paying out a higher share of the larger profits that its consistent success generated.

Both companies struggled to maintain payouts during the Great Depression and its aftermath. When the US economy eventually returned to normality after World War 2, 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 other major US corporations. However, the past continued to cast a long shadow on dividend payments since, in setting their target payout rates, both companies looked to their historical payout rate as a benchmark for future payments. As a result, the historical pattern that had been established, with GE paying higher dividends than WHS as a share of sales and profits, was transmitted into the future.

In the final quarter of the 20th 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 on previous policies by using the current dividend per share as their starting point.

WHS initially increased dividends at a faster rate than earnings per share, whereas the opposite was the case for GE, leading to a reduction in the historical gap between the two companies' payout rates. However, the collapse of WHS's earnings from 1990 forced it to dramatically reduce its dividend and finally to eliminate it entirely at the end of the 1990s. In contrast, GE maintained its dividend payouts at levels comparable to those 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 significant phenomenon from the late 1970s, amounting to more than 40 per cent of dividend payments in every year from 1978, and more than 100 per cent 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.

Although many scholars treat repurchases as an instrument of payout policy, stock buybacks seem to have 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 which would otherwise have been caused by the massive and increasing stock issues associated with option plans during this period. There also seems to have been 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 time. 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 & 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 role of investment in influencing firms' interactions with the financial system. There has long been a tendency to focus on investments in fixed capital as the crucial determinant of enterprises' demand for external funds. In economic history, in a famous paper published in 1964, 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 (Pollard, 1964). Kenneth Sokoloff, in a subsequent study of early manufacturing in the US 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 (Sokoloff, 1984).

My analysis covers a later period in US industrial development but it also confirms the importance of a greater emphasis on working capital. However, it diverges from Pollard in the conclusions to be drawn for the relationship between capital formation and financial system. He claimed that investments in working capital posed relatively modest financing challenges on the grounds that they could be financed through networks of trade credit and bank overdrafts. As such, they did 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 claimed, 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 early in 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 Setzler showed, the early automobile industry in the US, in relying on a supplier base that had been built up to serve other industries, was able to economise on its investments in working capital and remain largely autonomous of the financial system for funds.

Industry studies, like those conducted by Sokoloff (1984), which compare investments in working capital across industry, 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. Indeed, as Alexander Field suggested, it may well be that economies generated in the use of

working capital are one of the most important results of effective managerial organization (Field, 1987, p. 473).

To the extent that this is so, there is a further implication for the way we think about the relationship 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 dependence 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 starts, 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 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 that flowed 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 that they needed 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 serious long-term repercussions. Specifically, when they needed more funds, they might have 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 \$96.9 billion in cash dividends from 1897 to 2000 compared with 2000 \$17.0 billion for WHS. In comparison, direct investments by shareholders in GE amounted to a total of only 2000 \$0.9 billion, 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 of 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 US stock market. Although it is true that the company was rewarded by the stock market with a consistently higher valuation of its earnings than was the case for 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 20th century. Nor did it use its stock to facilitate acquisitions by exchanging it for the shares of target companies. It even paid for its acquisition of RCA in cash despite its scale and 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 to 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 aggressive raiders. GE has been almost entirely free of both sources of pressure throughout its existence.

Even if particular companies may forego 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 relationship 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, in highlighting not only that these flows of money out of companies are large but also that they partly determine the money that needs to flow into them, underlines the importance of a more comprehensive analysis of the costs as well as the benefits for companies of living with particular financial systems.

CONCLUSION

In this article, I have used case studies of the financial histories of two prominent US 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.

As far as hypotheses are concerned, the main question that stems from my study is whether the factors that I have highlighted as central in explaining the financial dependence and autonomy of GE and WHS – notably their investments in working capital and their dividend policies – are important for explaining these patterns for other companies. As far as future studies are concerned, it would seem promising to maintain the focus on the US and compare the relationship between enterprises and the financial system across industries. In addition, the study could be extended to 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 that I have chosen to study are exceptions. Indeed, their very longevity, which was central to my ability to carry out a study of their financial histories over such a long period of time, suggests their distinctiveness. That they are distinctive, of course, does not imply that they are unique. Nor, more importantly, 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 behaviour is often imitated by other companies. And, in the end, whatever the limits to the general conclusions that can be drawn from this study, it is only through further studies along similar lines that they will be revealed. This article will hopefully generate its own critics by facilitating the task of undertaking such studies.

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Figure 1 Long-Term Finance Raised by GE and Westinghouse Electric, 1896-2000, as a percentage of their respective sales

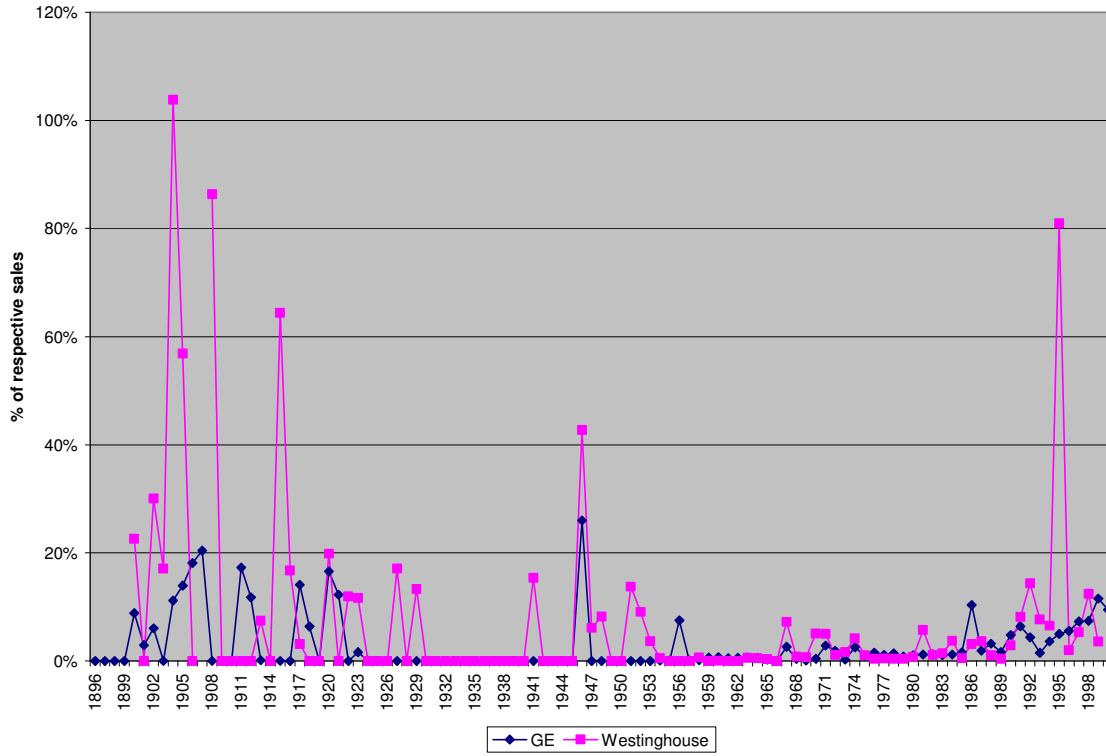
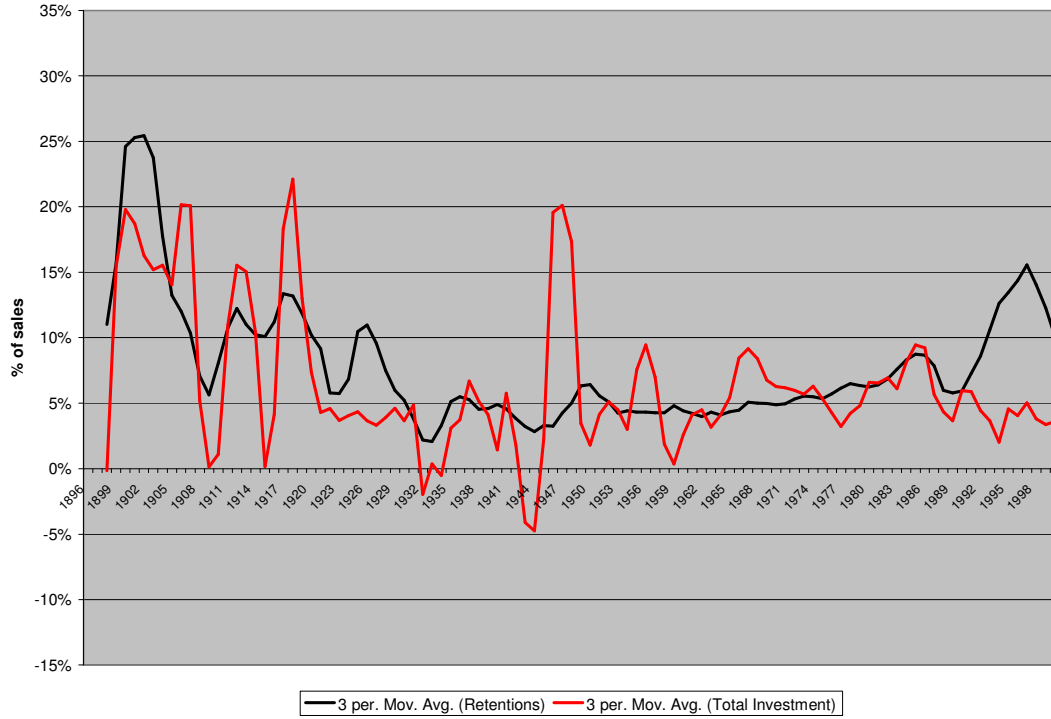


Figure 2b Retentions and Investments for GE and WHS, as a percentage of respective sales, 3-year moving averages

2a) General Electric



2b) Westinghouse Electric

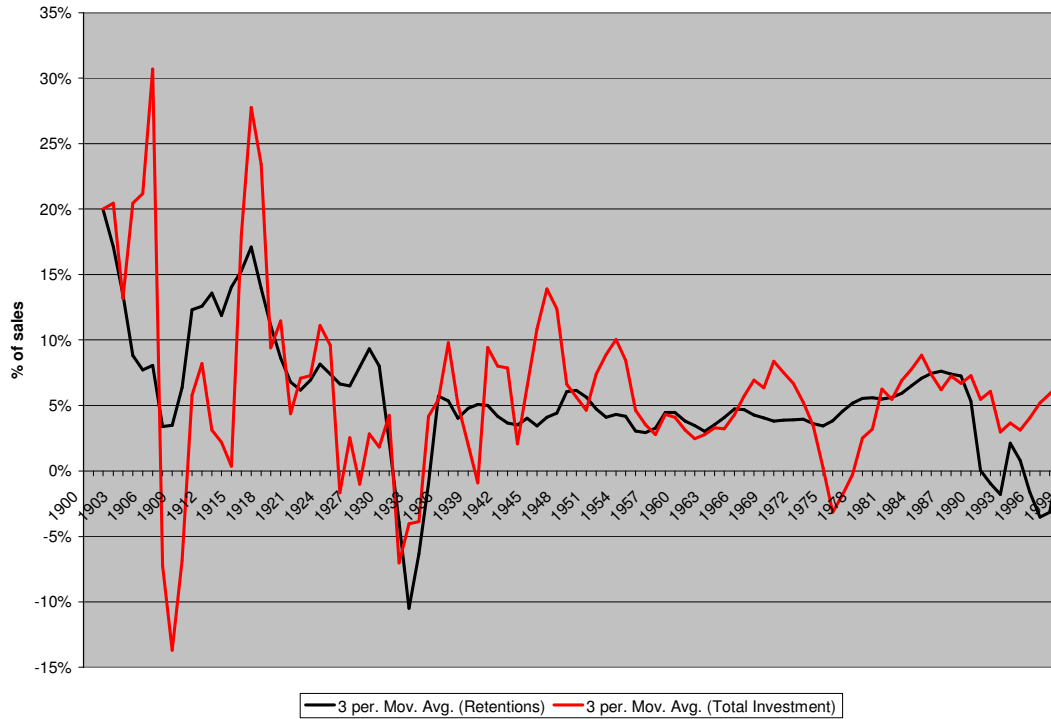
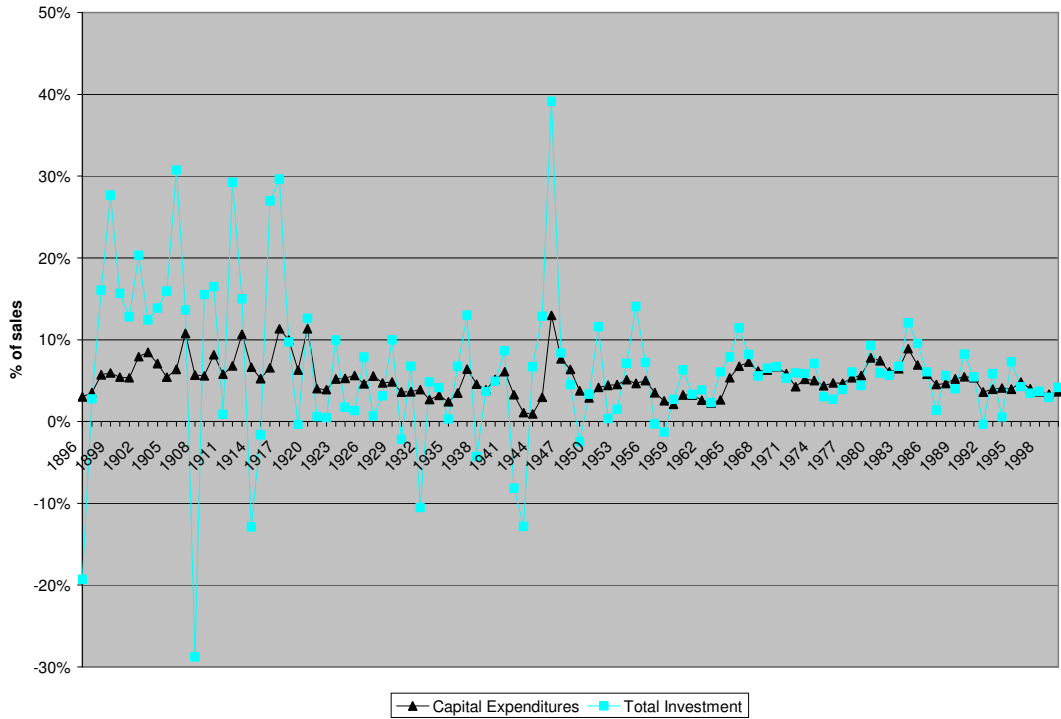


Figure 3 De-Composition of Total Investment into Fixed and Working Capital Components, as a percentage of respective sales, annual data

3a) General Electric



3b) Westinghouse Electric

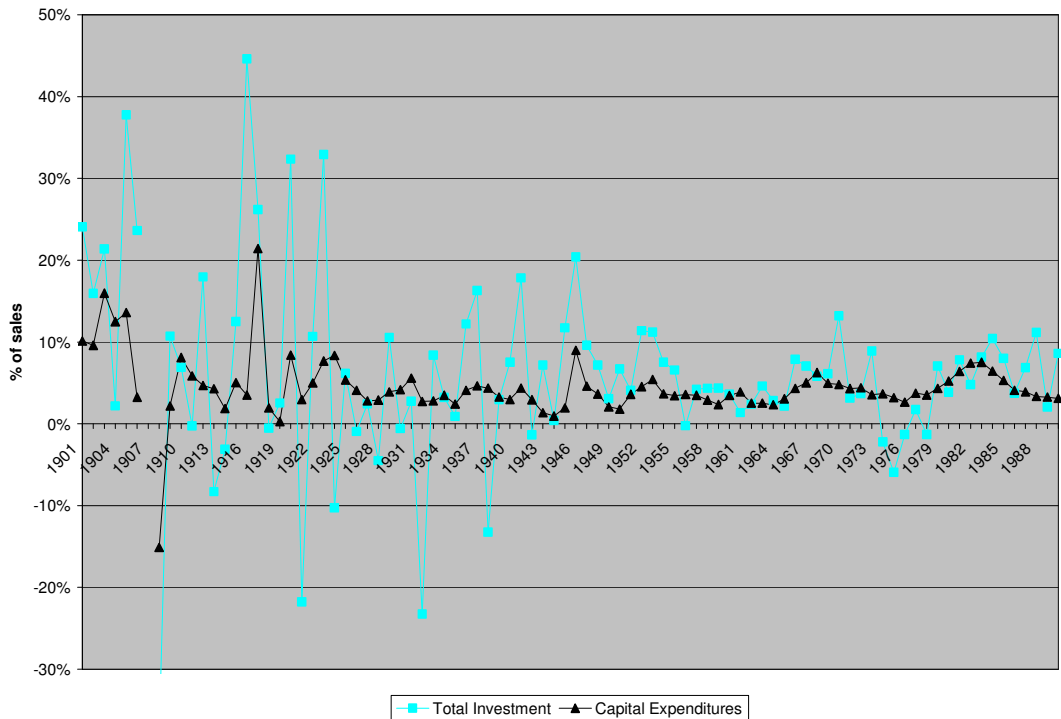


Table 1 Cumulative Retentions, Internal Funds and Dividends as a % of Cumulative Sales

Period	GE			WHS		
	Retentions	Internal Funds	Dividends	Retentions	Internal Funds	Dividends
1901-1929	10.5%	17.9%	7.4%	10.0%	14.6%	4.7%
1930-1975	4.7%	8.4%	3.7%	3.9%	6.1%	2.2%
1976-2000	8.1%	11.9% + dep	4.4%	4.2%	6.0%	1.9%