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Did J. P. Morgan's Men Add Liquidity? Corporate Investment, Cash Flow, and Financial Structure at the Turn of the Twentieth Century

CARLOS D. RAMIREZ*

ABSTRACT

This article presents evidence suggesting that the relationship that existed between the partnership of J. P. Morgan and its client firms partially resolved the latter's external financing problems by diminishing the principal-agent and asymmetric information problems. I estimate and compare investment regression equations for a sample of Morgan-affiliated companies and a control group of nonaffiliated companies. The econometric results seem to indicate that companies not affiliated to the House of Morgan were liquidity constrained.

THROUGHOUT THE LAST QUARTER of the 19th and the first quarter of the 20th century, the partnership of J. P. Morgan & Co. dominated corporate finance. It was the largest and the most active of the few private banking houses, with special expertise first in railroads and later in industrials as well.

The banking and financial services that J. P. Morgan & Co. offered to its clients were not provided at an "arm's-length," impersonal contract basis. Informal ties and quid pro quo types of obligations abounded. For example, an affiliation to the J. P. Morgan partnership usually entailed the presence of a Morgan man among the directors of the corporation. Morgan's corporate clients were expected to allow the Morgan partners to approve or disapprove their executive appointments, and to raise funds only through the Morgan partnership. De Long (1991) maintains that this type of association facilitates the assessment of firm managers' performance and the careful evaluation of projects. It partially resolved the information and incentives problems between shareholders and managers by having J. P. Morgan act as an intermediary. To support this argument, De Long presents evidence suggesting that having a Morgan man on the board of directors added about 30 percent to the value of a firm's common stock equity.

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If De Long's interpretation is correct, the impact of adding a Morgan man to a firm's board should have real effects on corporate performance. In particular, there is now a large theoretical and empirical literature indicating that information and incentive problems increase the cost of external finance.¹ This, in turn, induces firms to cut back on investment when they do not have the internal funds to finance the investment. By lowering information and monitoring costs, the Morgan relationship should lower the cost of external finance and relax liquidity constraints.

The empirical starting point for my analysis is the work of Fazzari, Hubbard, and Peterson (1988) and Hoshi, Kashyap, and Scharfstein (1990, 1991) on the effect of liquidity on corporate investment. These articles find that firms that would appear to face the greatest problems raising capital externally tend to cut investment most in response to cash flow shortfalls.

The papers closest to this one are Hoshi, Kashyap, and Scharfstein (1990, 1991), which show that investment expenditures of Japanese companies affiliated to a bank (i.e., a member of a *keiretsu*) display almost no sensitivity to cash flows in contrast to the investment expenditures of firms that are not so affiliated. This finding supports the hypothesis that companies not affiliated to a bank tend to be more liquidity constrained (and face a larger gap between external and internal costs of funds) than those that are affiliated.

This article takes a similar approach by comparing Morgan-related companies to companies not affiliated to the House of Morgan. I find that the investment of Morgan-related firms was less sensitive to cash flow than that of non-Morgan-related companies.

In looking at the *keiretsu* firms, Hoshi, Kashyap, and Scharfstein (1990, 1991) point out that the longstanding relationship between banks and firms mitigated information and incentive problems. It is possible to introduce a similar argument, since according to Carosso (1970, 1987) Morgan affiliations were not temporary: once Morgan was invited to reorganize a failed firm, the affiliation was kept indefinitely. It was only after the enactment of the Clayton Act of 1914 (which prohibits the interlocking of directorates) that these ties slowly began to disappear. This is discussed in more detail in Sections III and IV below.

Although this article adopts the same methodology as Hoshi, Kashyap, and Scharfstein (1990, 1991), it differs slightly in its interpretation. Whereas they look at a group of independent firms as the control sample, the control sample in this article includes firms that are affiliated to other investment banking houses. Thus, the fact that Morgan-affiliated firms display little sensitivity of investment to cash flow could be indicative that other banks were liquidity constrained relative to Morgan.

If Morgan's financing and monitoring techniques were different, then companies requesting affiliation were those in greatest need of his services.

¹ Meyer and Kuh (1957) is one of the earliest empirical works that study liquidity effects on investment expenditures. The theoretical works of Jensen and Meckling (1976) and Myers and Majluf (1984) provide the analytical framework that explains this empirical finding.

These were typically poor performers in search of financial and managerial supervision, or companies undergoing a reorganization, or companies anxious to develop a good reputation. This proposition is consistent with Diamond's (1991) stylized model of bank loan demand and affiliation.

According to Carosso (1987), Morgan was a selective banker; he did not finance all projects that were proposed to him. It is possible, therefore, that his decisions could have been used as a signal to other investors that chosen projects had good prospects, at least in the short run. From this point of view, it could be argued that Morgan served more as a signal to investors. I address this issue in more detail in Section IV, where partial evidence from case studies seems to suggest that Morgan was often invited to join the company and actually did provide new financing.

The overall results are consistent with the interpretative studies of Navin and Sears (1955), Davis (1966), Carosso (1970), and Sylla (1982) who argue that the financial organization that existed in the United States before the Glass-Steagall Act enabled companies to raise external funds necessary to fuel the rapid growth that the United States experienced at the turn of the century. Moreover, the work of Kroszner and Rajan (1994) suggests that the Glass-Steagall legislation was intended to correct a problem of conflict of interest that did not even exist—that commercial banks exploited their roles by systematically fooling investors into buying securities of poor quality.

This article complements the results that exist for present day Japan (Hoshi, Kashyap, and Scharfstein, 1990, 1991) and pre-World War I Germany (Becht and Ramirez, 1993). The econometric evidence for both Germany and Japan indicates that this type of financial organization between banks and corporations enables affiliated firms to depend less on internal measures of liquidity to finance investment expenditures.

The remainder of this article is organized as follows. The following section overviews the historical development of the investment banking industry in the United States. Section II discusses the data, while Section III discusses the main regression results. Section IV further examines Morgan's influence in case studies of two railroad companies. Section V concludes.

I. Concentration in the Investment Banking Industry at the Beginning of the 20th Century

Including a partner among the directors of a corporation was a common practice adopted by bankers and their client firms during the last decade of the 19th and the first two decades of the 20th century. Carosso (1970) argues that this association between bank partners and corporations was mutually beneficial. The investment banker's reputation depended significantly on his ability to buy and sell large amounts of securities in a short period of time.²

² Carosso (1970), p. 27.

In times of precarious financial conditions such as the panics of 1861, 1873, and 1893, prestigious investment banking firms were very much in demand for representation and financial advice. During economic downturns, when the rate of railroad and commercial failures increased, reorganizations and necessary mergers were more easily performed by a financial expert who was "inside" the corporation.³

Carosso (1970) and David (1966) also argue that the rise of the modern industrial corporation during the last quarter of the 19th century required this type of affiliation between bankers and companies to make the rapid industrial growth of that period feasible. Chandler (1977) describes the spectacular growth of "mass production" with "mass distribution"⁴ that took place during the 1890s and the first decade of the 20th century. This process "...required huge outlays of capital...more than any single bank could command or risk..." (Carosso (1970) p. 51.) David (1966) argues that financial market imperfections were an important determinant of the increased concentration of financial services. Though he acknowledges that new technologies and greater economies of scale put pressure on capital markets to respond quickly, his basic argument for explaining the rise of such a small number of powerful investment banking houses rests on the proposition that financial markets in the United States were poorly developed and thus not as competitive as those in the United Kingdom.⁵ The increased concentration in the investment banking industry can therefore be attributed to both financial market imperfections (supply conditions) and generally rapid, though variable, economic growth (demand forces).

Redlich (1968), Carosso (1970, 1987), and De Long (1991) argue that J. P. Morgan & Co. enjoyed a comparative advantage over other investment banking houses in obtaining funds from London and Paris, the largest and most important providers of long term capital at the turn of the century. Redlich also argues that Morgan-affiliated banks purchased a significant amount of the securities Morgan syndicates underwrote. In addition, unlike other investment banking houses, Morgan partners fully exercised their power when they gained an important say in their client firm's internal decision-making process. For example, corporations requesting Morgan affiliation were subject to the restructuring of assets and replacement of management. Companies not prepared to accept this kind of influence chose other investment banking houses, such as Kuhn, Loeb & Co., that usually limited themselves to the formation of syndicates for security flotations.⁶

The sparse qualitative evidence that exists tends to support this:

³ See Navin and Sears (1955).

⁴ Chandler (1977), p. 285.

⁵ Davis (1966), p. 269.

⁶ Carosso (1970), p. 27.

J. P. Morgan & Co. had 23 directorates in 13 banks and trust companies... George F. Baker's First National Bank, which had gone hand in hand with the House of Morgan since the 1870s and on whose board Morgan sat, had directorships... in 14 banking enterprises. Finally, the National City Bank, which under the guidance of James Stillman was by 1910 also cooperating with Morgan, had 32 directorships in 16 banks and trust companies... [T]aken together, [they] held 118 directorships in 34 banks and trust companies with total resources of \$2,679,000,000.

The Pujo Committee reports that J. P. Morgan & Co. "directly procured the public marketing of security issues of corporations amounting in round numbers to \$1,950,000,000, including only issues of interstate corporations,"⁷ during the ten-year period 1902 to 1912. This figure does not include the quantity of securities privately issued, nor what they purchased with other banks. In comparison, for Kuhn, Loeb & Co., the Pujo Investigation reports, for the period from 1897 to 1912 inclusive, purchase of securities of corporations amounting to \$1,526,066,708 including what they had purchased with other bankers. Kidder, Peabody and Lee, Higginson, mostly with the cooperation of other bankers, are reported to have purchased or underwritten about \$1.1 billion each from 1907 to 1912.

Anecdotes and case studies also support this view. One of the most direct examples is the Morgan acquisition of A.T.&T. in 1907 to 1908. The Baker-Morgan association with A.T.&T. started in 1902 just after F. P. Fish, then president of A.T.&T., purchased the Erie Telephone, Telegraph, and Cable Co., which controlled the communications industry in the Midwest. A.T.&T. had issued bonds through Kidder, Peabody & Co. to finance this purchase. By then, however, A.T.&T. had dramatically increased its size and Kidder, Peabody decided to form a syndicate with George F. Baker to secure more funds for the company and diversify risk. Soon after this, Baker was elected to the board of directors and Morgan obtained access to 20,000 shares of the company. These events took place during the beginning of the century when A.T.&T. lost its monopoly power as the patents it owned expired and more companies entered this fast growing and profitable industry. Consequently, as Theodore N. Vail, once a member of the board of directors, and F. P. Fish himself observed, A.T.&T. needed more capital to improve its efficiency and services.⁸ But Robert Winsor, acting head of Kidder, Peabody, was "[a]ware that Boston's major houses of issue lacked both the capital resources and the placement capacity to satisfy A.T.&T.'s needs"⁹ and recommended that new issues of securities be placed with one of the big New York financiers. In February of 1906, J. P. Morgan & Co. was heading, for the first time, an offering of \$150 million of corporate bonds with the largest Boston

⁷ Pujo Investigation (1913a), p. 57.

⁸ See Danielan (1939).

⁹ Carosso (1987), p. 494.

banking houses serving as co-managers in the syndicate.¹⁰ It was not long after in 1908 that A.T.&T. appointed a Morgan partner to its board of directors.

Non-Morgan companies also had important financiers on their board of directors. Studebaker, Sears, Roebuck & Co., and F. W. Woolworth had Henry Goldman and Philip Lehman as members of their boards. But Carosso (1970) argues that these financiers were still very small and relatively inexperienced. In 1906, for example, when the houses of Goldman, Sachs and Lehman Brothers served as Sears' financial connections to external capital markets, an offering of \$9 million preferred stock required the formation of a major syndicate among many bankers, an issue that J. P. Morgan & Co. could have financed single-handedly.¹¹ That these other houses were not in the same league as Morgan in terms of prestige, power, and resources serves as my *a priori* motivation for the existence of a tighter liquidity constraint among non-Morgan firms.

II. The Data

The concentration of investment and financial services in the hands of a few investment bankers became the source of a bitter political debate that culminated in a congressional investigation of the so-called "Money Trust." Progressives such as Arsène Pujo, a Louisiana Representative who chaired the Money Trust Investigation, together with Samuel Untermyer (chief counsel of the committee), and Louis D. Brandeis, a very influential and ambitious Boston lawyer (who would later become Supreme Court Justice) questioned the influence and power that these few investment banking houses had over a large sector of the economy. The committee cross-examined members of the largest investment banking houses and their client firms during the hearings. Although they never accomplished it, their intention was to show the existence of trusts that controlled a substantial share of capital and abused their strategic position.

The list of Morgan-affiliated companies comes from the report of the Pujo Investigation of 1912. This was a congressional investigation of the power held by the large investment banking houses. As reported in De Long (1991), there were a total of 21 Morgan affiliates. Like De Long, I add to these firms 39 non-Morgan companies of roughly the same size as the Morgan firms to serve as control firms. To ensure compatibility, I chose the same companies and constructed a panel data set for all the companies from 1908 to 1912. For each firm, I obtained all investment and cash flow information from the corporation balance sheets and income statement published in the *Poor's Manuals of Industrials, Public Utilities and Railroads*.¹² These manuals, in turn, obtained the figures from the annual reports published by each corpora-

¹⁰ Ibid., pp. 493–494.

¹¹ Emmet and Jeuck (1950), pp. 56–57.

¹² I also checked the *Moody's Manual* to verify the accuracy of the figures.

tion. Investment was seldom reported directly by the firm so it was calculated as the change in the gross value of capital stock. Cash flow was calculated from the income statements. It is defined as after-tax profit plus depreciation allowance. The stock of liquid assets is the amount of cash and short term marketable securities available for financing investment expenditures. For railroad companies, this item in the balance sheets also included cash and securities in the hands of trustees. A proxy for Tobin's q was calculated as the average market value of common equity stock plus the book value of debt divided by the book value of total assets. Sales (or gross earnings) were directly reported in the income statements. All variables were normalized by the stock of depreciable assets at the beginning of the period.

A list of the Morgan-affiliated companies and the control group is presented in Table I. The four largest Morgan firms and the five smallest non-Morgan firms were deleted from the sample in order to guarantee comparability of average capital stock between the two types of firms.¹³ Also deleted from the Morgan sample was the Philadelphia Rapid Transit, which adopted a new accounting method in 1910 after Edward T. Stotesbury, a Morgan partner, became a member of the board of directors. For General Electric (a Morgan firm), the five-year sample was taken from 1907 to 1911 as it underwent a major reorganization in 1912, when the U.S. Supreme Court ordered the dissolution of the National Electric Lamp Company (N.E.L.C.). since most of the N.E.L.C. shares were owned by General Electric, the figures for that year reflect abnormally high additions to its capital stock.¹⁴ From the non-Morgan sample, four companies were deleted due to insufficient and/or deficient data.

Table I also indicates the year Morgan companies became affiliated. It is interesting to note that affiliation seems to have occurred in waves, precisely after financial crises. The first and largest group joined Morgan after the Panic of 1893 to 94 (Adams Express; Erie Railroad; General Electric; Lehigh Valley; New York, New Haven & Hartford; Northern Pacific; New York Central; Pullman; Reading; and Southern Railways). The second became affiliated after the Panic of 1901 to 1902 (Atchison, Topeka & Santa Fe; International Mercantile and Marine Co.; International Harvester; and United States Steel). The last group joined Morgan after the Panic of 1907 (A.T. & T.; Baldwin Locomotive Works; Chicago Great Western; Pere Marquette; Philadelphia Rapid Transit; Public Corporation of New Jersey; and Westinghouse). This suggests, not surprisingly, that the demand for Morgan affiliation was higher during periods when access to external capital markets was relatively more costly, or after bankruptcy or financial distress (i.e., most railroad companies). This is consistent with the hypothesis that Morgan did reduce the cost of external financing.

¹³ Keeping these firms in the sample did not affect the main results. A longer version of the paper, which includes this and other regression specifications, is available upon request.

¹⁴ Another possibility was to delete General Electric altogether from the sample. Omitting it reduced the degrees of freedom significantly but did not change the quality of the results.

Table I
Sample Companies

This table lists the companies included in the sample. Numbers in parentheses indicate the year the company was "Morganized." An asterisk (*) indicates that the company is not included in the sample due to insufficient or incomplete data. Sources: Pujo Investigation (1913a, 1913b), *Poor's Manual of Railroads* (1903, 1907, 1909 to 1912), and *Poor's Manual of Industrials* (1910 to 1913).

Companies Under Morgan Influence	Control Sample
Adams Express Co. (1898)	Amalgamated Copper Co.*
A.T.&T. (1907–1908)	American Agricultural Chemical Co.*
Atchison, Topeka & Santa Fe (1903)	American Can Co.
Baldwin Locomotive Works (1908–1909)*	American Express
Chicago Great Western Railroad (1907–1908)	American Locomotives
Erie Railroad (1896)	Atlantic Coast Line Railroad
General Electric Co. (1895)	Bethlehem Steel
International Mercantile Marine Co. (1902)	Boston Elevated Railways
International Harvester Co. (1902)	Brooklyn Union Gas
Lehigh Valley Railroad (1898)	Canadian Pacific Railways
New York, New Haven, & Hartford (1896)	Colorado Fuel & Iron Co.
Northern Pacific Railway (1896)	Consolidated Gas of New York
New York Central Railroad (1898)	Delaware & Hudson Railroad
Pere Marquette Railroad (1907)	Delaware, Lackawanna, & Western Railroad
Philadelphia Rapid Transit (1909)*	Denver & Rio Grande Railroad
Public Service Corp. of New Jersey (1909)	Distillers Securities Co.
Pullman Co. (1898)	F. W. Woolworth Co.
Reading Co. (1896)	Lackawanna Steel
Southern Railway (1895)	Massachusetts Gas Companies
United States Steel Co. (1901–1902)	Mergenthaler Linotype Co.
Westinghouse Electric & Manufacturing (1908)	Minneapolis & St. Louis Railroad
	Missouri Pacific Railway
	National Biscuit Co.
	National Lead Co.
	People's Gas, Light, & Coke Co.
	Republic Iron & Steel Co.
	Seaboard Airline Railway
	Sears Roebuck Co.
	Southern Pacific Railroad
	St. Louis & San Francisco Railroad
	Studebaker Co.
	Texas & Pacific Railway
	Toledo, St. Louis, & Western Railroad
	Underwood Typewriters
	United Shoe Machinery Co.
	United States Rubber Co.
	Virginia-Carolina Chemical Co.
	Wisconsin Central Railway

Table II presents summary statistics for the sample. The two groups of firms have a similar set of characteristics overall. Morgan firms, while reporting slightly lower average investment expenditures, tended to have higher (but much more volatile) cash flows (proportional to initial capital

Table II
Summary Statistics Comparing Morgan and Non-Morgan Firms

This table presents descriptive statistics for the following variables. The figures represent averages and standard deviations (in parentheses). Averages are calculated for all firms and all years. Number of firms is the total number of firms included in the sample. Gross capital (K) and gross investment (I) are for depreciable assets. I/K : gross investment as a proportion of initial capital stock; $Cash/K$: free cash flow as a proportion of initial capital stock; $Sales/K$: gross sales as a proportion of initial capital stock; q : market value of equity stock plus book value of debt divided by book value of total assets; $Liquid/K$: stock of liquid assets as a proportion of initial capital stock; and $Debt/K$: book value of short-term and long-term obligations as a proportion of initial capital stock.

Statistic	Morgan Firms	Non-Morgan Firms
Number of firms	16	30
I/K	0.034 (0.071)	0.042 (0.080)
$CASH/K$	0.082 (0.090)	0.033 (0.076)
$SALES/K$	0.768 (0.728)	0.435 (0.384)
q	1.036 (0.289)	0.910 (0.721)
$LIQUID/K$	0.160 (0.182)	0.206 (0.176)
Debt/Total Assets	0.406 (0.240)	0.369 (0.259)
K	\$104,613,600 (90,287,800)	\$101,575,700 (138,766,800)

stock.) This is mostly attributable to A.T.&T. and General Electric, two Morgan companies that enjoyed high surpluses during the sample period.¹⁵

For each dollar of plant and equipment, Morgan companies reported 77 cents of sales (gross earnings). This is almost twice as much as the figure for the non-Morgan companies.¹⁶ There are many hypotheses that can explain this difference in earnings. For example, De Long (1991) points out that this is consistent with the view that the monitoring Morgan provided for his firms was very productive. In fact, De Long also finds that the average common

¹⁵ When these companies were deleted from the sample, the mean cash flow-capital stock ratio dropped to 0.06 and its standard deviation to 0.07, and the mean liquid assets-capital stock ratio declined to 0.10 with a standard deviation of 0.12; the other summary statistics remained almost the same. Omitting them from the sample did not change the qualitative results presented in the next section, although it did reduce statistical significance due to lower degrees of freedom.

¹⁶ The difference is also statistically significant at the 5 percent level.

stock q is greater for Morgan corporations, as Table II also indicates. The summary statistics also reveal that the average debt-total assets ratio for the two samples are quite similar.¹⁷

The stock of short-term (liquid) securities is considerably higher for the non-Morgan sample. This is consistent with the hypothesis of this study, since a liquidity-constrained firm is more likely to accumulate surpluses to finance investment expenditures.

III. Empirical Results

A. Regression Specification

The regression specification is taken from the work of Hoshi, Kashyap, and Scharfstein (1990, 1991). Gross investment (normalized by the stock of capital at the beginning of the period) is regressed on several liquidity variables, as well as q and gross earnings, all measured at the beginning of the period. Although the motivation for this regression is set out in Hoshi, Kashyap, and Scharfstein (1990, 1991), I shall briefly review the general idea behind it.

The regression specification takes the following form:

$$\frac{I_t}{K_{t-1}} = a_0 + a_1 \frac{CASH_t}{K_{t-1}} + a_2 \frac{LIQUID_{t-1}}{K_{t-1}} + a_3 q_{t-1} + a_4 \frac{SALES_{t-1}}{K_{t-1}} + \varepsilon_t \quad (1)$$

The dependent variable is investment (I_t) as a proportion of initial capital stock (K_{t-1}). The independent variables are: cash flow ($Cash_t$) relative to initial capital stock; the stock of liquid assets ($Liquid_{t-1}$) relative to initial capital stock; average Tobin's q (q_{t-1});¹⁸ and lastly, gross sales ($Sales_{t-1}$), also normalized by initial capital stock.

Since this reduced-form equation is borrowed from Hoshi, Kashyap, and Scharfstein (1990, 1991), it inherits the strengths as well as the weaknesses of their methodology. Hence, one must be very careful in interpreting the effect of free cash flow on investment expenditures. As Hoshi, Kashyap, and Scharfstein (1990, 1991) point out, cash flow variables may be proxying for other factors, in particular, expected future profitability. For this reason, Tobin's q must also be included in the regression to control for any information that the cash flow variable may be carrying about future profitability. One potential problem is mismeasurement of q . However, the point of this regression is to compare the cash flow coefficients of the two sets of firms. This difference should be unbiased as long as the mismeasurement is the same for both sets. This issue is implicitly addressed below, when the same regressions are estimated for different industries.

¹⁷ Debt includes the book value of all liabilities that do not form part of equity, i.e., it includes both short-term and long-term obligations as stated in the balance sheets. This broad measure of debt was adopted in view of the fact that many corporations did not offer enough detailed information about their obligations in their financial statements.

¹⁸ Tobin's q is estimated at the beginning of the period.

The variable, gross sales, is also included in the regression to control for accelerator effects on investment, and to eliminate the possibility that cash flow might be proxying for higher sales in the Morgan sample. Similarly, Hoshi, Kashyap, and Scharfstein (1990, 1991) argue that some investment is financed by exchanging liquid assets such as cash and marketable securities. To allow for this possibility, I also include as an independent variable the stock of liquid assets normalized by the stock of depreciable assets at the beginning of the period. These are the securities that can be exchanged for cash to finance investment expenditures.

I estimate a fixed effects model that is appropriate for (balanced) panel data sets. The regressions are estimated with a dummy variable for each firm and for each year of data included in the sample. By estimating equation (1) separately for the sample of independent firms and the sample of affiliated firms, I allow for different slope coefficients for the Morgan and non-Morgan firms. These are the most liberal assumptions I can allow without running into serious problems of degrees of freedom.¹⁹

B. Regression Results

The main results are presented in Table III. The first and second columns report the baseline results for the Morgan and non-Morgan firms respectively. The coefficient of cash flow for the Morgan firms is positive but statistically insignificant, while it is much larger and statistically significant for the non-Morgan firms. More importantly, the difference in the coefficient is statistically significant at the 5 percent level. There is no statistically significant difference in the coefficients for liquid assets. Regressions (C) and (D) reveal that the results do not change when the gross sales variable is omitted from the regression. This shows that the results are not being driven by gross sales.

C. Industry Effects

Hoshi, Kashyap, and Scharfstein (1990, 1991) suggest that industry effects may be an important factor behind the main results if the distribution of firms is different across the two groups. The same criticism could be raised here. If the distribution of Morgan and non-Morgan companies tends to be different, *ceteris paribus* conditions will not hold, and this could undermine the findings of the previous section. I find no strong evidence suggesting this to be the case, however. Table IV presents the distribution of both samples. It indicates that there is no tendency for a particular industry to be overrepresented.

As a further step, I split the sample between railroad and industrial companies, and estimate the same regression for each broad industry category. This will indirectly test the alternative hypothesis that Morgan was selecting industries where financing and investment needs were minimal.

¹⁹ See, for example, Hsiao (1986) and Johnston (1984) for a comprehensive discussion.

Table III
Investment Regression Equations

The dependent variable is gross investment relative to capital stock at the beginning of the period. Cash flow, liquid securities and gross sales are also normalized by the stock of capital at the beginning of the period. The regressions include yearly dummies and firm dummies. Standard errors are included in parentheses. $CASH_t/K_{t-1}$: free cash flow as a proportion of initial capital stock; $SALES_{t-1}/K_{t-1}$: beginning of the period gross sales as a proportion of initial capital stock; q_{t-1} : beginning of the period market value of equity stock plus book value of debt divided by book value of total assets; and $LIQUID_{t-1}/K_{t-1}$: beginning of the period stock of liquid assets as a proportion of initial capital stock.

	(A) Morgan Firms	(B) Non-Morgan Firms	(C) Morgan Firms	(D) Non-Morgan Firms
$CASH_t/K_{t-1}$	0.176 (0.200)	0.793 ^a (0.210)	-0.057 (0.183)	0.805 ^a (0.185)
$LIQUID_{t-1}/K_{t-1}$	0.107 (0.087)	0.011 (0.160)	0.026 (0.084)	0.005 (0.064)
q_{t-1}	0.013 (0.132)	-0.028 (0.048)	0.016 (0.140)	0.009 (0.038)
$SALES_{t-1}/K_{t-1}$	0.147 ^b (0.064)	0.004 (0.090)		
Adjusted R^2	0.512	0.535	0.451	0.486
Degrees of freedom	34	71	35	72

^a Significant at the 1 percent level.

^b Significant at the 5 percent level.

Table IV
Distribution of Morgan and Non-Morgan Firms by Broad Industry Category

This table presents the number and percentage of firms included in each industry category for the Morgan and the non-Morgan sample. Sources: *Poor's Manual of Railroads* (1903, 1907, 1909 to 1912) and *Poor's Manual of Industrials* (1910 to 1913).

Industry	Morgan Firms	Non-Morgan Firms
Railroads	7 41%	13 43%
Utilities and Communications	2 12%	4 13%
Manufacturer of heavy equipment	3 18%	5 17%
Manufacturing	2 12%	4 13%
Other (including Retail, other transport)	2 13%	4 13%
Total	16	30

Table V
Investment Regression Equations for Railroads and Industrial Companies

The dependent variable is gross investment relative to capital stock at the beginning of the period. Cash flow, liquid securities, and gross sales are also normalized by the stock of capital at the beginning of the period. The regressions include yearly dummies and firm dummies. Standard errors are included in parentheses. $CASH_t/K_{t-1}$: free cash flow as a proportion of initial capital stock; $SALES_{t-1}/K_{t-1}$: beginning of the period gross sales as a proportion of initial capital stock; q_{t-1} : beginning of the period market value of equity stock plus book value of debt divided by book value of total assets; and $LIQUID_{t-1}/K_{t-1}$: beginning of the period stock of liquid assets as a proportion of initial capital stock.

	(A) Morgan Firms (Railroads)	(B) Non-Morgan Firms (Railroads) ^a	(C) Morgan Firms (Industrials)	(D) Non-Morgan Firms (Industrials)
$CASH_t/K_{t-1}$	-0.560 (0.980)	1.046 ^b (0.500)	0.133 (0.191)	0.243 ^b (0.105)
$LIQUID_{t-1}/K_{t-1}$	0.143 (0.310)	0.190 (0.316)	-0.001 (0.090)	0.100 (0.027)
q_{t-1}	0.817 ^b (0.441)	0.018 (0.032)	-0.022 (0.122)	0.057 (0.054)
$SALES_{t-1}/K_{t-1}$	0.985 ^b (0.488)	-0.262 (0.339)	0.098 (0.061)	0.098 (0.051)
Adjusted R^2	0.498	0.312	0.491	0.415
Degrees of freedom	11	31	18	49

^a Results after deleting two outlier railroad companies which underwent a merger during the sample period.

^b Significant at the 5 percent level.

Even though it results in a severe loss of degrees of freedom, this approach is useful if only to observe an expected qualitative change between the samples for each industry. Table V presents the main regression results. The basic finding of Table III remains unchanged: for either group of firms, the Morgan companies reflect a lesser tendency to rely on cash flows to finance investment expenditures while the non-Morgan ones exhibit a much greater sensitivity to cash flows. Regressions (A) and (B) in Table V examine the relationship for the railroad sample only. While there is a significant difference in the importance and magnitude of the cash flow variable, the results are much less precisely estimated, even after deleting two outlier non-Morgan railroad companies that more than doubled their assets within a year by merging several local railway companies.²⁰ Note that the standard errors increase

²⁰ These were the Missouri Pacific Railway Co. and the Minneapolis and St. Louis Railway Co., both controlled by Gould interests. In January 1910, the railroads and properties of ten railroad companies were consolidated into the Missouri Pacific Railway Co. In 1911, the Minneapolis and St. Louis Railroad Corporation acquired the properties of a railroad company of roughly the same size, the Ohio Valley Railroad Co.

significantly in these regressions. This is attributable to the loss of degrees of freedom in the railroad sample. As a result, the t -statistic of the difference in the cash flow coefficients decrease to 1.44, statistically significant at the 10 percent level.

Regressions (C) and (D) in Table V present the results for the nonrailroad sample. The basic finding also prevails in this sample although with much less statistical accuracy. The cash flow coefficient is almost twice as large for the non-Morgan sample, but the difference is not statistically significant. This is attributable to the loss of degrees of freedom after reducing the sample size.²¹

IV. Two Case Studies

Was Morgan good at picking companies? And, as a result, did this serve as a signal to other investors? As suggested above, it is possible that Morgan associated with firms that had valuable investment opportunities. If so, this could help explain why Morgan companies enjoyed higher market value and lower costs of borrowing than their rivals in the short run. Unfortunately, it would be difficult to single out this alternative hypothesis using econometric evidence if Morgan had access to inside information not available to the investor or statistician. Nevertheless, partial evidence suggesting that this was not the case can be ascertained by examining case studies. There are several advantages in doing this. First, it is possible to determine with a fair amount of certainty how the affiliation was formed. In most cases, Morgan was invited to join the company. This would imply that only companies in financial or managerial trouble would want to seek affiliation. Indeed, this seems to be the case. According to De Long (1991), many railroad companies sought affiliation to the House of Morgan after they were declared insolvent during the Panic of 1893.

Second, through case studies it is possible to examine the direct contribution of the Morgan partner to his client corporation. Was the Morgan partner an active monitor of the management and a provider of external finance? The two case studies below seem to suggest that this was the case. It would not be fair to criticize these case studies on the grounds that they were successful reorganizations. After all, the evidence presented in De Long (1991) suggests that the typical Morgan company was a success.

While these case studies suggest that Morgan was invited to the company and that actual financing was made, they raise an important issue alluded to above. It is very possible that Morgan firms were in search of a large amount of financing that other investment bankers could not provide. Clearly, these companies would exhibit a low sensitivity of investment to cash flow, because they were firms with little cash relative to their investment. Of course, the fact that they chose Morgan to be affiliated with in the first place is an

²¹ When gross sales is omitted from the regressions, the difference in cash flow coefficients becomes statistically significant at the 15 percent level, using a one-tailed test.

indication that other investment banking houses were liquidity constrained relative to Morgan. This interpretation is consistent with the stories that Carosso (1970, 1987), De Long (1991), and others have discussed.

A. Atchison, Topeka, and Santa Fe

The Atchison, Topeka, and Santa Fe railroad company was one of the five largest railroads in the country in the 1890s. After its reorganization at the end of 1895, it was also one of the top performers in the industry. Its gross earnings per mile of road grew at a healthy annual rate of 8 percent in real terms from 1898 to 1902.²² However, Atchison's board members with connections to external financial markets (Victor Morawetz, from the National Bank of Commerce; Edward J. Berwind, from Girard Trust; and George G. Haven, from Strong, Sturgis & Co., a small investment banking firm in New York) were not able to raise enough funds for needed investment expenditures. On October 25, 1903, *The New York Times* reported that "Atchison surprised the financial community . . . when, in January, 1902, it appeared on the scene, hat in hand, asking for a modest \$30,000,000²³ to aid its putting through sundry improvements and . . . adding efficiency to the system . . . [E]quipment was to be purchased, as this was needed for the accommodation of the company's growing traffic, in addition to the regular renewal of equipment made from earnings." Edward P. Ripley, then president of the company, explained the physical and financial conditions of his road in a letter to J. P. Morgan & Co. dated January 9, 1902.²⁴ Morgan agreed to help finance the company and later that year, Charles Steele, the Morgan partner railroad expert, joined the board of directors to supervise the expenditures needed for railroad cars and equipment. Financial markets reacted very positively to Ripley's decision to invite Morgan as a member of the board; the common equity q increased by 30 percent,²⁵ which is right about what De Long (1991) estimates.

B. The Chicago Great Western

During the Panic of 1907 to 1908, the percentage of railroad miles under receivership increased from an average of 0.9 percent for the 1903 to 1906 period to an average of 4.5 percent.²⁶ Many railroad companies were forced to default on their interest payments as a result of high leverage and fierce competition. In 1903 to 1905, A. B. Stickney, then president of Chicago Great Western, complained many times about the cutthroat price competition that existed among railroads. In order to stay competitive, he had slashed the road rates over the previous few years. Stickney paid a hefty price for remaining competitive. By lowering prices, the company's earnings suffered quite dra-

²² *Poor's Manual of Railroads* (1903), Financial Statements.

²³ This amount was equivalent to about 1.25 times the road's average net earnings from 1901 to 1902.

²⁴ *The New York Times*, October 25, 1903.

²⁵ The estimated q for 1901 was 0.68; for 1902, 0.91.

²⁶ *Interstate Commerce Commission* (1909 and earlier years), *Statistics Yearbook*.

matically, and the road was unable to keep important surpluses as retained earnings, which were badly needed to finance the already crippled and obsolete locomotive stock. Moreover, for an outside investor the company could not have represented a sound investment because its financial conditions were not bright. For the last few years, all of its statements indicated that the road was breaking even at best. Stickney's road finally collapsed into the hands of receivers, as a result of its inability to raise external funds to finance new and more productive railroad equipment.

Once under receivership, protective committees were formed to represent both stockholders and bondholders. Most of the bondholders were British investors whose interests were represented by William A. Read.²⁷ They invited J. P. Morgan & Co. to participate in the reorganization plans of the road and fund the required expansions and improvements that the company badly needed. After the usual evaluation of the physical condition of the property, Charles Steele, the Morgan partner railroad expert, recommended expenditures on improvements amounting to \$10 million, or about 1.3 times the road's average gross earnings,²⁸ a considerably large amount even by today's standards. The funds, raised through the issuance of new bonds and the collection of assessments, were to be used to replace the entire stock of obsolete locomotives and for improvements in some of the track lines. Morgan also reorganized the road's management. Samuel Felton was appointed president of the company, and Steele remained a member of the board of directors. As in the Atchison, Topeka, & Santa Fe case, the market responded very positively to the new organization and management: common equity q increased by about 20 percent.²⁹ By 1911, only two years after the reorganization was completed, the road was well-equipped with new locomotives.³⁰

V. Concluding Remarks

The main premise of this article is that the form of monitoring that J. P. Morgan & Co. provided for its client corporations alleviated capital market imperfections by curtailing the principal-agent problem and diminishing the informational asymmetries between investors and managers. This hypothesis was examined using the methodology currently employed in the corporate finance literature. The typical Morgan corporation was observed to rely less on internal funds to finance capital expenditures. By contrast, companies not affiliated with Morgan depended more on internal funds to finance their investment expenditures. These results parallel the findings of Hoshi, Kashyap, and Scharfstein (1990, 1991) that the investment behavior of firms with close ties to the present day Japanese *keiretsu* does not depend on liquidity measures like cash flow and liquid securities.

²⁷ *The New York Times*, May 21, 1909.

²⁸ *The New York Times*, June 10, 1909, and *Poor's Railroad Manual*, 1910.

²⁹ The pre-Morgan q was calculated using 1903 to 1905 financial data, three years before the road was declared insolvent.

³⁰ Donovan (1954), p. 274–275.

An obvious question that emerges is: if a Morgan affiliation did indeed diminish a firm's costs of external finance, why did not all companies have a Morgan affiliation? It is possible to argue that only young companies and/or old companies that have not been very successful may have been willing to pay the hefty monitoring fee that Morgan charged to link up with his partners. For these companies, the alternative of raising funds directly in the market may not have been feasible, as the market would have tended to impute a higher risk premium due to their greater asymmetric information problems. This argument is based on a model developed by Diamond (1991).

That informational asymmetries adversely affect the allocation mechanism of funds for investments can be explained theoretically using stylized models such as those in Stiglitz and Weiss (1981). Although these arguments were nonexistent at the turn of the century, however, the intuition behind them prevailed. Morgan himself understood this, as the following passage of the Pujo investigation illustrates:

Is not commercial credit based primarily upon money or property?" asked Untermeyer.

"No, sir," said Morgan; "the first thing is character."

"Before money or property?"

"Before money or anything else. Money cannot buy it. . . . Because a man I do not trust could not get money from me on all the bonds in Christendom."

(Allen, 1949, p. 7)

This study adds more evidence to the growing literature on capital structure and corporate finance suggesting that capital market imperfections play an important role in the financial structure of corporations. It should also be of direct interest for researchers in corporate finance and the regulation of securities markets today. In the United States of late, many have advocated the development of institutions similar to those that existed in this country and in Germany at the turn of the century. It is often suggested that this could improve the financing mechanism of our companies by enabling them to choose among a larger set of alternatives to finance their investment expenditures. Though many issues are being debated today, it is important to remember that there is much to be learned by studying them in the historical context.

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