Financing Industry: The Crédit Mobilier in France 1860-1875

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It has been widely argued that the influence exerted by banks on industry was substantial in a number of European countries in the nineteenth century, including France and Germany. The role played by the so-called 'Great Banks' or Großbanken in Germany in monitoring and supervising corporate management was an accepted part of German finance theory in the years before the First World War. This article examines the role of banks in the financing of enterprises in France in the period 1860-75. In particular, the Crédit Mobilier's role is analysed. This bank was founded by the Pereire brothers in 1852, and contributed substantially to French industrialisation from 1852 to 1867, before going bankrupt.

The Crédit Mobilier provides an important case study for two reasons. First, its organisation was similar to that of the Großbanken. A comparison between these institutions provides important comparative evidence on the German case. Secondly, as the Crédit Mobilier went bankrupt, it is interesting to analyse the impact of its failure on the firms affiliated to it. If a real monitoring role were exerted by the Crédit Mobilier, affiliated firms should have faced difficulties when the bankruptcy occurred. The effect of an association with this French bank on investment policy will be measured and compared to the Großbanken. This article, then, tests the proposition that the Crédit Mobilier acted like a German-style Universalbank by examining the effects of affiliation with the Crédit Mobilier on the investment behaviour of French firms.

II

Economic theory stresses the notion of effort to explain the monitoring influence of banks and stockholders on the managers of firms. The main argument of the literature is based on the notion of 'capital scarcity'. Capital has been regarded as scarce in Germany and some other European countries because in the late nineteenth century the adoption of up-to-date technology required large capital outlays, while the failure to participate in the earlier stages of industrialisation meant a lack of accumulated funds that could be used to finance these outlays. Gerschenkron studied this notion of 'capital scarcity' and applied it in the German context over the industrialisation period from 1850-1914. He observed the prominence of German banks in providing liquidity for heavy industry with large capital requirements. In his view the role of banks was critical because firms' retained earning were insufficient to finance desired investment[1].

At this point, Gerschenkron's argument raises two questions. First, why should an insufficiency of internal finance be seen as characteristic for a situation of 'economic backwardness'? Second, why should the large-scale provision of external finance to industry require the intervention of banks or government?

The first question really concerns the role of internal finance in an industrially advanced country. It is clear that, in the second half of the nineteenth century, certain advanced technologies required large-scale investments. It is also clear that firms in the more 'backward' countries had not had the time to accumulate the funds required for such investments. However, it is not so clear why firms in the industrially more advanced countries should have retained earnings to such an extent that further industrialisation could be financed without much recourse to external finance.

Gerschenkron's interpretation is that the involvement of banks or government was needed to provide external finance to industry on a large scale. External finance from the anonymous markets of our

[1] A. Gerschenkron, *Economic Backwardness in Historical Perspective* (Cambridge, MA, 1962).

theoretical models is not seen as an alternative. Bank finance here is not necessarily just loan finance. During certain periods, especially prior to 1873, German companies obtained substantial amounts of equity finance. However, the shares would be held by banks or by clients of banks acting on the banks' advice, so in many respects banks were as much involved in equity finance as in loan finance. While share markets were organised, they were certainly not anonymous and free for all. The question is to what extent bank involvement in equity and loan finance was actually necessary. The Gerschenkronian argument means that bank finance could do something that anonymous organised markets could not have done. So it is necessary to discuss what exactly was the comparative advantage of bank finance.

The discussion of the advantages of bank finance over market finance implies that financial systems are institutions which reduce or eliminate problems of moral hazard or asymmetric information between firms and financiers. Financiers typically have less information about firms than entrepreneurs or managers. Moreover, investors are subject to various types of moral hazard: moral hazard concerning managerial effort, moral hazard concerning the riskiness of the firms' strategies and moral hazard concerning reported return realisation *ex post*. These problems of moral hazard and asymmetric information cause difficulties for the provision of finance to industry[2]. Intermediaries are driven to reduce these difficulties by engaging in monitoring and control activities.

Diamond presents an explicit example in which intermediation successfully reduces the agency costs of outside finance under moral hazard. In his analysis, the feasibility of financial intermediation rests on two key propositions. First, that the monitoring and control of a firm involve natural scale economies: a single intermediary can monitor and control the firm at least as effectively as thousand of shareholders - but much more cheaply. Secondly, if the intermediary has a well-diversified portfolio of firms that he finances, then relations between

[2] M. C. Jensen and W.C. Meckling, 'The Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure', *Journal of Financial Economics*, Vol. 3 (1976), pp. 305-360.

himself and his own financiers - the final investors - are not much affected by moral hazard and asymmetric information because his own return is approximately riskless, so for him, fixed-interest debt finance is feasible and does not involve any moral hazard. On the basis of these two propositions, Diamond shows that under certain circumstances incentive-efficient allocations cannot be made without intermediation[3].

Diamond's notion of financial intermediation as delegated monitoring (or delegated control) is closely related to Gerschenkron's account of bank involvement in firms at the early stage of industrial development, although this is not explicit in Gerschenkron's work. As emphasised by Mayer, bank initiative and bank participation in entrepreneurial planning may be a way to obtain enough information and control to reduce the moral and informational hazards of finance to a tolerable level. It can, therefore, be regarded as the imperfect-information approach to financial intermediation as the theoretical basis for Gerschenkron's view that banks and bank involvement with firms were needed to provide outside finance during the early stages of industrialisation in Germany when capital was 'scarce and diffuse' and 'the distrust of industrial activities... considerable'. In Diamond's terminology, Gerschenkron's presumption must have been that the sum of the monitoring costs of the banks and direct agency costs of bank deposits was less than the agency costs of direct finance, perhaps even that the agency costs of direct finance were so high that this was not a genuine alternative at all.

According to this approach, supervision seems to be profitable for both the bank and the shareholders, which are guaranteed to obtain higher profit by reducing the agency costs. It is often considered that financial intermediation with a close relationship between the bank and the firm constitutes a mechanism of commitment. For the period of this study there were a number of sounder financial institutions than the Crédit Mobilier, which had an enormously swollen industrial

[3] D.Diamond, 'Financial Intermediation and Delegate Monitoring', *Review of Economic Studies*, Vol. 51(1984), pp. 393-414.

portfolio greatly exceeding its capital, and which was dependent on favourable developments on the stock exchange for continuation of its activities. In particular, the Großbanken in Germany and J.P. Morgan in the United States established the closest possible relations with industrial enterprises. Universal banks accompanied an industrial enterprise from the cradle to the grave, from establishment to liquidation through all the vicissitudes of its existence. Through the device of formally short-term, but in reality long-term, current account credits, and from the development of the institutions of the supervisory boards into the position of the most powerful organs within corporate organisations, the banks acquired a formidable degree of power over the industrial enterprises, which extended far beyond the sphere of financial control into that of entrepreneurial and managerial decisions. This argument is strongly supported by evidence presented by de Long and Becht, Ramirez and Becht and Ramirez. The association with the Morgan company or with one of the Großbanken appears to have added value to the enterprises. The bank, therefore, took an active part in the decisions related to choosing a project in order to defend its reputation in financial markets[4].

Some rather striking quantitative evidence on this point is provided by Hoshi *et al*[5]. For a sample of Japanese firms this study found that the cost of financial distress was significantly less for firms that had close relations to a 'main bank' than for firms that did not. To measure it, they evaluated the degree of correlation between investment and cash flow for firms affiliated regularly with a bank and for independent firms. This research suggested that firms that had close banking ties appeared to invest more and perform better than firms that did not have such ties.

[4] De Long and Becht, '"Excess Volatility" and the German Stock Market 1876-1990' Working Paper, *NBER*, n. 4054 (1992) ; C. Ramirez, 'Did J.P. Morgan's Men Add Liquidity ? Corporate Investment, Cash Flow and Financial Structure at the Turn of the Twentieth Century', Working Paper, *Harvard University*, (1992) ; M. Becht and C.Ramirez, 'Finance Capitalism in the pre-World War I Germany: the Role of the Universal Banks in Financing of German Mining Companies 1906-1912' Working Paper *European University Institute* , vol. 26 (1993).

[5] T. Hoshi, A. Kashyap and D. Scharfstein, 'The Role of Banks in Reducing the Costs of Financial Distress in Japan', Working Paper, *Massachusetts Institute of Technology* (1989).

Following the same ideas, Boross and Lindgren reached similar conclusions for Hungary and Sweden[6].

In the Crédit Mobilier's case this argument is problematic for one essential reason: the bank extended its role to that of a shareholder (and often the principal shareholder) by holding more than 51 per cent of assets of its companies. Therefore it suffered the same risk as an ordinary shareholder. The question then arises as to the extent to which a system of corporate finance based on intermediation through a 'main bank' should be regarded as internally stable? Mayer seems to believe that the superior performance of such a system is a guarantee of its persistence over time[7]. In contrast, Gerschenkron regards it as being transitory, with firms depending on outside finance through banks only until they have enough inside finance available[8]. The empirical research reported below will test these assertions in order to clarify the financial role played by the Crédit Mobilier in French industrialisation.

Similar patterns have also been observed in other countries. Thus Hoshi, Kashyap and Scharfstein suggest that in Japan, too, the larger, more profitable companies availed themselves of the newly developing organised markets to become more independent of their banks[9]. In the long term, there is a certain tendency for firms to emancipate themselves from such a relationship, using markets, competition amongst banks and, above all, reliance on internal rather than external finance.

The emancipation of firms from close banking relationships is certainly not costless. Recall the observation of Hoshi, Kashyap and

[6] E.A. Boross and H. Lidgren, 'Bank-Industry Connections in Hungary and Sweden', *Uppsala Papers in Economic History* Working Paper, Report from the Vienna Banking-Industry Symposium , 3(1989)

[7] C. Mayer, 'New issues in Corporate Finance' *European Economic Review*, Vol. 32 (1988), pp. 1167-88.

[8] C. Mayer, 'Corporate Finance'.

[9] T. Hoshi, A. Kashyap and D. Scharfstein, 'Corporate Liquidity, and Investment: Evidence from Japanese Industrial Groups', *Quarterly Journal of Economics*, February (1991), pp. 33-60; T. Hoshi, A. Kashyap and D. Scharfstein, 'Bank Monitoring and Investment: Evidence From the Changing Structure of Japanese Corporate Banking Relationships', in R. Glenn Hubbard (ed.), *Asymmetric Information, Corporate Finance and Investment* (Chicago, 1990).

Scharfstein that the costs of financial distress in Japan are significantly larger for firms without close banking relations than for firms with close banking relations. For firms that are not in financial distress, the authors report a similar observation. Hence the emancipation of a firm from a 'main bank' relation is accompanied by a significant increase in the sensitivity of current investment to fluctuations in current earnings and liquidity. Bank loans are less used and/or available to smooth over fluctuations in earnings.

From the perspective of Jensen and Meckling one might argue that internal finance has priority because the agency costs of inside finance are lower than the agency costs of outside bank or market finance[10]. This is also the explanation given by Myers and Majluf in the context of a model of asymmetric information and signalling[11]. Internal finance is taken to have no agency costs because it represents the use of funds available to the firm itself. Outside finance has no agency costs (signalling costs, simple inefficiencies) because information asymmetries and externalities preclude the attainment of a first best allocation in the arrangement between the firm and its outside financiers.

From this perspective, the Hoshi, Kashyap and Scharfstein's observation of investment sensitivity to current earnings should be seen as evidence of the agency costs of outside finance. Investment projects that are expected to be profitable under internal finance are deemed to be unprofitable under external finance when the agency costs of outside finance are added to the mere opportunity costs of funds. The inefficiency in the allocation of funds across the firms that results when investment opportunities are less than perfectly correlated with earnings is nothing but an element in the overall agency cost of outside finance.

After having discussed theoretical views on the role of financial institutions in the investment decision of firms, the case of the Crédit

[10] Hoshi, Kashyap and Scharfstein, 'The Role of Banks'.

[11] S. Myers and N. Majlhuf, 'Corporate Financing and Investment Decisions when Firms have Information that Investors do not have', *Journal of Financial Economics*, 13 (1984), pp. 187-221.

Mobilier will be discussed in order to evaluate the efficiency of a close relation between banks and firms.

III

The aim of this section is to analyse the relationship between investment and cash flows between 1860-80. Two samples are considered. The first one consists of corporations that were affiliated to the Crédit Mobilier, while the second one includes companies which had to rely on other sources of finance. The focus of this exercise is on contrasting the financing of the Crédit Mobilier's affiliated enterprises with those who, for one reason or another, did not form part of the nexus. The chronological limits of this study are imposed by the data sources: after 1880, no records are available for the three parameters considered. The sample is made up of 15 companies: 7 were affiliated with the Crédit Mobilier and 8 with the Crédit Lyonnais[12].

As all the sample companies were affiliated with either the Crédit Mobilier or the Crédit Lyonnais, some words of explanation are necessary to understand the importance of this close relationship for financing. When the banks opened credit for business firms during these years, industrial enterprises were rarely involved because they had been warned by experience. Important liquidity provided by merchant banks went especially to railways (c.f. the Crédit Mobilier) shipping companies and urban transport, but industrial enterprises received little. As far as we are concerned with public utilities, the bank's affiliation was omnipresent. This suggests that it may be difficult to deduce the effect of affiliation with a big bank by comparing Crédit Mobilier's affiliated companies to non-affiliated companies. However it should be noted that the degree of affiliation was totally different between the two banks. In the Crédit Mobilier's case, the bank was

[12] The companies affiliated to the Crédit Mobilier were the railways firms: Compagnie de l'Est, PLM, Compagnie du Midi, Orleans, Compagnie de l'Ouest, Compagnie du Nord to which the Compagnie Immobilière must be added. The non-affiliated companies were: Chatillon, Marine, Fourchambault, Firminy, Mine Saint Etienne, Mines Grand Combes, Mines Montrambert la Beraudière.

substantially the principal shareholder of the firm. In the other case, an affiliation only meant that the Crédit Lyonnais was a privileged financial partner of the firm. A useful approach is to compare the effect of the bankruptcy of the Crédit Mobilier on Crédit Mobilier's affiliated and Crédit Lyonnais' affiliated companies. For a better understanding some explanations could be given to describe the importance of these firms in the economic performance for the studied period. As a whole railways and steel industry represented between 1860-80 more than 50 per cent of the investment in transport. Considering the huge amount of liquidity necessary to undertake the productive projects, the source of financing was a crucial question. This shows the problem of liquidity constraints for firms which were unable to find regular flows of money to pursue their investment.

The principal source for data underlying the statistical analysis comes from the General Assembly's reports and some studies by Jean Denuc[13] and Bertrand Gille[14]. In his work, Gille has reproduced a great number of balance sheets for companies, particularly for the steel companies; these figures enable the value of cash flows, investment and book value to be calculated. On the other hand, the research of Denuc enables the calculations to be made for the remaining companies. This set of companies represents the firms involved with the Crédit Lyonnais. As regards the Crédit Mobilier's part, most of their clients were railway companies; their investment represents more than 60 per cent of the total amount[15]. The data relative to these companies were reported separately. The different indices proposed by Jean Denuc enable us to deduce the book value and the cash flows for the different companies[16]. The investment factor was given by an article of the Institut National de la Statistique which reported on the economic situation of France between 1850 and 1914 . In this work, the

[13] J. Denuc, 'Dividendes, Valeurs Boursières et taux de Capitalisation', *Bulletin de la Statistique*, vol. 23 (1934), pp.691-767.
[14] B. Gille, *La Sidérurgie Française au XIXème siècle* (Genèva, 1968).
[15] E. Paulet, 'The Monitoring Role of Banks towards Firms: Evidence from the Crédit Mobilier Case' (unpublished Ph.D., European University Institute, 1995).
[16] Denuc, 'Dividendes'.

correlation between cash flows (CF), common equity (Q) and investment (I) is evaluated. The regression specification was directly taken from Hoshi, Kashyap, and Scharfstein[17] and was also used in Ramirez[18].

Hoshi, Kashyap and Scharfstein's methodology used four parameters to construct their regression which are the gross investment (I), the gross value of shares (K), the free cash flow (CF) and (Q) measured as the market value of common equity divided by its book value. K constitutes a problem in the French context. It corresponds to the gross value of assets whose translation in French will be 'le capital brut'. In the balance sheets of the companies taken into consideration in the sample, this factor seems to be particularly stable over the period. The question is whether this variable covers the same notion in the work presented by Hoshi *et al.* as in the French situation . This question is difficult to answer.

The entrepreneurs between 1860 and 1880, did not use sophisticated accounting and management techniques. What counted was the overall state of receipts and expenses seen in a concrete manner in the cash flow of the business. The next step of sophistication was the establishment of an annual budget, which was important because it allowed an assessment of net profit. But accounting rules were not imposed . Every entrepreneur had his own accounting conventions, to some degree, which makes it difficult to understand and to compare these balance sheets. In order to avoid any ambiguity, this parameter will be called in the rest of the article Cb which should represent for the French case the gross value of shares.

All variables, the market prices of common equity, the cash flows CF and the investment I, are normalised by the stock of depreciable assets at the beginning of the period. Some summary statistics comparing Crédit Mobilier's firms and non-Crédit Mobilier firms are presented. As the Crédit Mobilier went bankrupt in 1867, the mean value is calculated in constant terms in regression considering three samples. 1861-67 describes the situation before the bankruptcy of the Crédit Mobilier, 1868-75 gives an

[17] Ibid.
[18] Ibid.

idea of the transformation after its failure, 1861-75 provides the reader with general information.

Table 1 shows the differences in the means for Tobin's Q, investment/share value and cash flows/ share value. Although some means are different, the standard errors would seem to suggest that no difference existed. In addition the figures obtained for Q are quite low. An examination of the accounting rules over the period seems necessary. Financial reporting at the beginning of the nineteenth century was characterised by the odd, scrappy profit calculation and balance sheet which contained assets valued in a wide variety of different ways. In fact the main aim of the published balance sheet was to provide creditors and shareholders with a statement of company solvency and to reassure them that dividends had not been paid out of capital. There was no requirement for the publication of a profit statement, nor were there any minimum disclosures regarding the content of the balance sheet. During the nineteenth century the calculation of profit became the first stage in the preparation of the final accounts. The new approach to profit was the use of profits as the basis for dividend declarations. This adoption of the matching concept reduced the scope for management to manipulate profit; with valuations, not only is there the need to make estimates, there is also the need to decide on the

TABLE 1: Summary statistic comparing crédit Mobilier and non-crédit mobilier firms[a]

	Crédit Mobilier's Firms	Non-Crédit Mobilier's Firms
Average Q 1861-75	0.266	0.091
	(0.235)	(0.084)
Average Q 1861-67	0.316	0.164
	(0.165)	(0.302)
Average Q 1868-75	0.216	0.190
	(0.222)	(0.217)

Notes: [a] Averages are calculated for all firms and all years. Standard errors are in parentheses. The sample for the Crédit Mobilier firms is constituted of 7 firms, for non affiliated firms 8.

Source: Archives d'Entreprises Privées, Archives Nationales Paris, J. Denuc, 'Dividendes, Valeurs Boursières et taux de Capitalisation ' *Bulletin de la Statistique*, vol. 23 (1934), p. 691-767, B. Gille, *La sidérurgie française au XIXème siècle*, (Genève. 1968)

appropriate method of valuation from options available which include 'present value', 'selling price' and 'replacement cost'. This last parameter is of such importance that we should refer to James Tobin's q theory. This theory of investment can be summarised as follows: the rate of investment - the speed at which investors wish to increase the capital stock - should be related, if to anything, to q the value of capital relative to its replacement cost[19].

Over the period, replacement accounting delayed the recognition of capital consumption until expenditures were made for renewals. Furthermore, since periodic renewals would require substantial sums, there would be a bias against renewals as costs because reserves for replacement were not generally maintained. On the one hand, a firm might not have been able to charge substantial renewals to expenses without creating a deficit. On the other hand, without sufficient internal funds available, it would be necessary to finance replacement expenditures with sources external to the firm. This discussion suggests that the application of replacement accounting tends to create serious liquidity problems and that renewals might have been deferred or treated as additions in many cases.

A suspicion between banker and industrialist existed over these years: bankers were cautious when dealing with industrialists because the former feared long-term commitments which were not thought profitable on a short-term basis, while the industrialists considered the bankers too rapacious. Hence the debt factor took the form of advances on capital and were not reported as such in the balance sheets. On this basis it is hard, if not impossible, to approximate debt as such.

As the Q value was quite low because of the absence of replacement cost, the data set has been modified in order to obey accounting rules. The first transformation will be to introduce a depreciation rate in the evaluation of Cb and therefore Q in order to be consistent with James Tobin's q theory, as defined above[20]. Feldenkirchen explains that over

[19] J. Tobin, 'A general Equilibrium Approach to Monetary Theory', in J. Tobin *Essays in Economics: Macroeconomics*, Vol. 1, (Chicago 1971), p.330 .
[20] Tobin, 'A general Equilibrium Approach', *loc.cit.*

the period this replacement cost was not always reported[21]. For German companies a depreciation rate was introduced only when the firms were making a profit. The same procedure occurred in France. Over the last century depreciation involved no specific outlay of funds and can be ignored in the short-term; even when recorded, many accountants apparently regarded depreciation as a segregation of profits rather than expenses. This means that depreciation reserves, a subject that occasioned considerable confusion in the nineteenth century, were viewed as a kind of surplus account. The purpose of the depreciation charge today is to spread the net cost of a fixed-asset (original cost minus sales proceeds) over its estimated useful life. The aim is to ensure that the revenue arising during each accounting period bears a fair share of the total costs incurred.

In early accounting texts, the term 'depreciation' was often used to describe the difference between fixed-asset valuations at two different dates. Depreciation, when charged, was principally viewed as a means of earmarking, for retention, resources which could be set aside to finance replacement, rather than as a *bona fide* cost of production. The data we have for Cb fits these considerations. Moreover, as early in the development of railroads as 1852, it was evident that very few people had a good conception of the relationship between deprecation and net income. The methods used over the period for reflecting depreciation in the accounts seemed to receive little support in railroad circles. An annual revaluation of properties was one of these; setting aside an annual sum which would accumulate to the desired sum by the time replacement became necessary was another. This explain the flat series for Cb. How can the data be transformed and what will be the definition of the new parameter ? The first value of Cb is taken in 1861; it is deflated by a constant depreciation rate ∂, chosen so that the series is slightly increasing. The whole series is then calculated by deflating the preceding value of Cb by the constant factor $(1-\partial)$ and by adding the investment level at that time. This new variable is called Cb_1.

[21] W. Feldenkirchen, *Die Eisen und Stahlindustrie des Ruhrgebiets 1879-1914: Wachstum, Finanzierung und Struktur ihrer Grohunternehmen* (Wiesbaden, 1982) p. 269-303.

Some explanations are necessary to justify the choice of the base year of this calculation. Bouvier's research indicates that a lack of information has been noted for the preceding period. A change in the origin (1860 or 1862) does not have a significant influence on the data[22]. The new values obtained for Q (defined by the market value of common equity divided by its book value) are called Q1. Table 2 provides some descriptive statistics to analyse the modifications produced by this alteration of the data.

If these numbers are compared with the ones obtained in the preceding section , it can be noted that they remain low. The problem is then to examine if this decrease is realistic or not. To complete this analysis, explanations are therefore given on the modification implied in the data set if a depreciation rate ∂ greater and smaller than 5 per cent is considered. As a whole the figures remain low but fit the theory (i.e. they are smaller and decreasing when ∂ decreases). Hence, an additional transformation is made in order to express all the factors in real terms. This means that the investment I_t is divided by P_t the general price level which give you Bk_{t+1} in real terms. The new series is then calculated by deflating the preceding value of Cb expressed in real term by the constant factor (1- ∂) and by adding the real investment level at that time. Q is then computed by dividing the value of shares and

TABLE 2: Summary statistics comparing Crédit Mobilier and non Crédit Mobilier firms when a depreciation rate is introduced[a]

	Crédit Mobilier's Firms	Non-Crédit Mobilier's Firms
Average Q1 Sample 1861-75	0.0380	0.0382
	(0.420)	(0.345)
Average Q1 Sample 1861-67	0.0450	0.0391
	(0.989)	(0.359)
Average Q1 Sample 1868-75	0.0323	0.0310
	(0.479)	(0.106)

Notes: [a] Averages are calculated for all firms and all years. Standard errors are in parentheses. The sample for the Crédit Mobilier firms is constituted of 7 firms, for non affiliated firms 8.

Source: Archives d'Entreprises Privées. AN, Denuc, 'Dividendes' Gille, *La sidérurgie française*

[22] See in that purpose Paulet, 'The monitoring role'.

the general price level P_t times Bk_t .Table 3 provides a description of the new data.

If the figures in table 3 are compared with the preceding ones, it can be noted that they do not conform that much to what could be expected[23]. Taking them as correct, the investment regressions are evaluated. The correlation between investment on one hand and cash flows and the Q parameter on the other hand is measured. The regression equations are evaluated by introducing year dummy and firm dummy variables. In other words, investment is determined for every year except for one separately and for every firm except one separately. Three samples are considered : the whole sample 1860-75, the sub-sample 1860-67 before the bankruptcy, the sub-sample 1868-75 after the failure. The regressions are run for affiliated companies, non-affiliated companies and all firms.

The results from these estimations are given by tables 4, 5, 6 and 7

Some comments can be made on tables 4, 5, 6 and 7. As regards the

TABLE 3: Summary statistics for Crédit Mobilier and independent Firms in real terms[a]

	Crédit Mobilier's Firms	Non-Crédit Mobilier's Firms
Average Q2 Sample 1861-75	0.114	0.104
	(0.741)	(0.632)
Average Q2 Sample 1861-67	0.136	0.101
	(0.850)	(0.627)
Average Q2 Sample 1868-75	x	0.105
		(0.638)

Notes: [a] Averages are calculated for all firms and all years. Standard errors are in parentheses. The sample for the Crédit Mobilier firms is constituted of 7 firms, for non affiliated firms 8.

Source: Archives d'Entreprises Privées, AN; Denuc, 'Dividendes' ; Gille, *La sidérurgie française*

[23] As we have already pointed out : 'Economic logic indicates that a normal equilibrium value for q is 1 for reproducible assets which are in fact being reproduced and less than 1 for others. Values of q above 1 should stimulate investment, in excess of requirements for replacement and normal growth, and values of q below 1 discourage investment." James Tobin and William Brainard (1977) p. 238. J. Tobin and W.R. Brainard, 'Asset Markets and the Cost of the Capital' in B. Balassa and R. Nelson *Economic Progress, Private Values and Public Policy: Essays in Honor of William Fellner*, (Amsterdam, 1977), pp. 235-63.

whole sample and the period between 1861-67, the first observation is that the coefficient on Q2 is larger for affiliated companies and the second that the results obtained when the Compagnie Immobilière is part of the sample are much different from the ones where it is excluded. Considering

TABLE 4: Investment Regression equation for the whole sample and between 1861-67[a]

	Crédit Mobilier's Firms between 1861-75	Crédit Mobilier's Firms without the Cie Immobiliere between 1861-75	Independent companies between 1861-75	Crédit Mobilier's companies between 1861-67	Crédit Mobilier's firms without the Cie Immobiliere between 1861-67	Independent Firms between 1861-67
Constant	0.105	- 0.497	- 0.569	- 0.095	0.244	- 0.111
	(0.110)	(0.224)	(0.812)	(0.138)	(0.153)	(0.029)
CF/Cb2	0.69	0.0034	0.376	1.125	0.115	0.027
	(0.101)	(0.032)	(0.066)	(0.121)	(0.055)	(0.202)
Q2	1.118	0.859	0.847	0.589	0.264	- 0.923
	(0.311)	(0.145)	(0.140)	(0.328)	(0.814)	(0.851)
R-squared	0.782	0.902	0.827	0.905	0.987	0.963

Notes: a Averages are calculated for all firms and all years. Standard errors are in parentheses. Capital (Cb) and Investment (I) are for depreciable assets. Sources and definitions of variables are described in the text. The sample for the Crédit Mobilier firms is constituted of 7 firms, for non affiliated firms 8.

Source: Archives d'Entreprises Privées, AN ; Denuc, 'Dividendes' , Gille, *La sidérurgie française*

TABLE 5: Investment Regression Equation for 1868-75[a]

	Crédit Mobilier's Firms	Indipendent companies
Constant	0.514	-0.730
	(0.273)	(0.917)
CF/Cb2	- 0.038	0.417
	(0.073	(0.091)
Q2	0.047	0.071
	(0.206)	(0.281)
R-squared	0.305	0.857

Notes: [a] Averages are calculated for all firms and all years. Standard errors are in parentheses. Capital (Cb) and Investment (I) are for depreciable assets. Sources and definitions of variables are described in the text. The sample for the Crédit Mobilier firms is constituted of 7 firms, for non affiliated firms 8.

Source: Archives d'Entreprises Privées, *AN*; Denuc, 'Dividendes'; Gille, *La sidérurgie française*

the independent companies, the coefficients are not well explained. This difference appears more pronounced than in the preceding test. One reasonable explanation could be the lack of data: missing values are introduced between 1861-64. If we consider the period after the bankruptcy, the results do not provide us with new information regarding the correlation among the parameters. What seems to be more interesting are the figures relative to all companies. If you compare the whole sample with the years prior to the bankruptcy, you note than the Q2 coefficient is much smaller when the Compagnie Immobiliere is excluded over 1861-67 than when it is part of the sample. It will be then interesting to analyse the influence of the bankruptcy over 1861-75.

For that purpose a new dummy variable called CF.AFFI.67 is introduced. It measures the influence of an affiliation with the Crédit Mobilier after the year of bankruptcy. In addition to the interaction dummy which takes the value 1 times cash flow when the corporation is affiliated to the Crédit Mobilier, another dummy which takes the value 1 after the bankruptcy, 0 otherwise, is added. The regressions are run for the whole

TABLE 6: Investment Regression Equations a For All Firms*

	All Firms 1861-67	All Firms without the Cie Immobiliere 1861-67	All firms 1868-75	All firms without the Cie Immobiliere 1861-75	All firms 1861-75
Constant	0.262	0.481	- 0.825	-0.356	0.229
	(0.448)	(0.522)	(0.091)	(0.793)	(0.527)
CF/Cb2	0.294	0.520	0.423	0.441	0.471
	(0.165)	(0.168)	(0.069)	(0.055)	(0.054)
Dummy.CF	0.263	0.145	- 0.370	0.276	0.301
	(0.179)	(0.261)	(0.150)	(0.094)	(0.095)
Q2	1.205	0.438	0.348	1.205	1.254
	(0.180)	(0.946)	(0.041)	(0.935)	(0.258)
R-squared	0.993	0.863	0.834	0.770	0.941

Notes: * Averages are calculated for all firms and all years. Standard errors are in parentheses. Capital (Cb) and Investment (I) are for depreciable assets. Sources and definitions of variables are described in the text. The sample for the Crédit Mobilier firms is constituted of 7 firms, for non affiliated firms 8.

Source: Archives d'Entreprises Privées, *AN*; Denuc, 'Dividendes' ; Gille, *La sidérurgie française*

sample but the Compagnie Immobilière is not part of the sample. The results are given by table 8.

In order to compare the figures obtained here with the preceding ones a table reporting the coefficients for the cash flows and the Q parameter has been constructed.

When the Compagnie Immobilière is excluded from the sample, it can be seen that, even if there is an effect (c.f. the last column of the table), the difference is either small (a decrease of 10.6 per cent in the coefficient on cash flow can be noted for a bank whose assets were largely liquidated) or non-existent (Q2 is increasing!) .Moreover, in the second regression, the sign of the dummy variable becomes negative, reflecting the failure of the Crédit Mobilier. This again suggests that the

TABLE 7: Influence of an affiliation with the Crédit Mobilier after the year of the bankruptcy°

Variable	Coefficient
Constant	0.647
	(0.747)
CF/Cb2	0.365
	(0.041)
Q2	1.692
	(0.894)
CF.AFFI.67	-0.245
	(0.054)
R-squared	0.788

Notes °The dependent variable is Investment relative to capital stock at the beginning of the period. The regressions include yearly dummies and firm dummies. CF.AFFI.67 stands for CF times Crédit Mobilier's (CM) affiliation times dummy variable equal 0 before 67, 1 afterwards Standards Errors are in brackets.

Source: Archives d'Entreprises Privées, *AN*; Denuc, 'Dividendes' Gille, *La sidérurgie française*

TABLE 8: Comparison of the Cash Flows and the Q coefficients in the Regressions

	All firms 61-75 with CF.AFFI as a dummy variable	All firms 61-75 with CF.AFFI.67 as a dummy variable	Difference
CF/Cb2	0.471	0.365	-0.106
Q2	1.254	1.692	0.438

failure of the Crédit Mobilier relaxed liquidity constraints for affiliated firms. As a conclusion it can be said that all these figures prove that the Credit Mobilier's firms were more liquidity constrained before the bankruptcy than after.

All these results could appear surprising. What are their meanings from an historical point of view? It could be said that the bank never managed to supervise firms. As long as stock values were appreciating, the Crédit Mobilier found it easy to participate in the stock market while diversifying its activities. The bank participated in railway development in Europe, international banking and French real estate.This multifaceted activity was in part due to the Pereires' very broad view of the goals of the Crédit Mobilier, but it was also a response to the boom in the international capital market that occurred after the mid-1850s. The extraordinary amount of activity of the Crédit Mobilier meant that it operated with few reserves, especially given that it distributed a substantial part of its profit for nearly a decade. The absence of reserves made it impossible for the bank to survive the economic slowdown that followed 1865 and relieved credit constraints for affiliated firms.

IV

When presenting the methodology of the investment regression the sources of finance have been stressed for all companies. On the one hand, half of the companies were involved with the Crédit Mobilier, on the other hand the non-affiliated ones were financially related to the Crédit Lyonnais. The statistical analysis proves that the non-affiliated companies were not dramatically credit-constrained. As both samples were affiliated with *a bank* it will be interesting to compare the finance policy of the two establishments in order to precisely define the policy of Crédit Mobilier as regards investment.

Secondly, as mentioned already in this article, the results demonstrate a strong divergence in the French case and the German case. The aim here is to give some interpretative reasons for this difference. More specifically, the question whether the participation taken by the Großbanken in firms follows the same model as the Crédit Mobilier is examined.

As pointed out in the statistical tests presented in the preceding section, the Crédit Mobilier's main activity was to provide liquidity to firms in order to finance the productive projects during French industrialisation. For the Crédit Lyonnais, two types of activity could be distinguished. First, the participation in productive investment (like the Crédit Mobilier) which represents the ordinary transactions; in other words, the ordinary affairs including allowed debt on current accounts. Secondly, financial participation, such as governmental loans and huge investment for large companies, which represent the 'big affairs' which include advances to foreign government, participations in governmental loans.The financial participation in these 'big deals' which necessitated a huge amount of liquidity, was quite limited. This enabled the Crédit Lyonnais to avoid liquidity problems during the crises in France (1870, 1875). So, despite a small number of companies (15), the hypothesis can be advanced that the Crédit Mobilier's case illustrates the capacity of firms to diversify their financing to avoid liquidity constraint. Bouvier provides evidence that supports this argument: after the bankruptcy the Crédit Lyonnais bought the insurance companies[24]. The Rothschilds who were investors in two railway companies (Nord and Ouest) contacted the Société Générale for providing liquidity for further investment.

But the most significant difference between the two lies in the credit policy. The Crédit Mobilier used to grant credit to companies with whom it was involved without asking for any collateral. It called this practice advances on liquidity. This would appear totally unreasonable if we consider traditional economic theory which states among other things, that the provision of collateral is a good signal for the bank as regards the quality of a project and the reliability of the enterprise which offers it. But this was common practice of merchant banks over the period. Investors and bankers had to accept risks in the short term in order to make profits in the long term.

The policy of the Crédit Lyonnais was totally different. The most significant example was the establishment as early as 1870 (that is, seven years after the foundation of the establishment) of a department in charge

[24] J. Bouvier, *Naissance d'une banque: le Credit Lyonnais* (Paris, 1968).

of the financial study of the different customers of the bank. Its duty was to establish accurate information, brought up to date with regularity, concerning the financial situation of the most important companies in France and abroad. However, it is interesting that the establishment of this department was in 1870, after the bankruptcy and the liquidation of the Crédit Mobilier. Probably, the Crédit Lyonnais took advantage of the experience of this failure to adopt a more prudent policy.

As regards a comparison between France and Germany, it can be said that the financial commitment of every 'mixed bank' consists in the promotion and the financing of industrial firms (short and long term: the long term corresponding to the renewal of short-term credit and advances). The German financiers were real entrepreneurs, facilitating the defence and the access of these firms to the Stock Exchange. As Tilly mentions, 'the German banks represented and reinforced not only the supply but also the demand for the investment funds'[25]. The development of large firms and cartels was closely linked to the changing role of the banks of the German Empire's industrial system. The large corporate banks, which had appeared in the third quarter of the century, had first played a central role in the financing of industry in the boom of the 1850s and in the years around 1870. However, from the beginning of the 1890s, the co-operation between banks and industrial concerns increased steadily[26]. Long-term credit became the main basis of a bank's relations with industry to the extent that expansions, mergers and conversions from private to joint-stock companies became more important and more frequent than the foundation of new companies[27]. The issue of shares and bonds, which was performed by the large banks for industrial concerns was usually only the second step after co-operation had been established on a long-term basis. The banks sought to monopolise the

[25] R. Tilly, 'Germany 1815-1870', in R. Cameron, *Banking in the Early Stages of Industrialisation* (London, 1986) p. 130.

[26] Becht and Ramirez, 'Finance Capitalism'.

[27] A. Weber, *Die rheinisch-westfälischen Provinzialbanken und die Krisis*, (Leipiz, 1903), p.337. More than half of eighteen industrial corporations of the Rheinland and Westphalia were founded in the years 1896-1900 and quoted on the Berlin stock exchange in 1901, sixteen emerged from the conversion of previously existing private companies and only two were new foundations.

financial arrangement of their industrial concerns and to service them in various way 'from the cradle to the grave' by developing a comprehensive policy towards them and being prepared to accepts short-term financial losses in order to secure their long-term co-operation.

How can we explain the difference between France and Germany? First, as mentioned in the above review of the relations between banks and firms, the main development had occurred in Germany around 1870 and in 1890, that is after the Crédit Mobilier's experience and after the crises that had occurred from 1850 to 1870. Secondly, the role of the central bank was stronger in Germany than in France over the period. In particular, the German central bank imposed strict rules concerning the issue of bank notes and the emission of bonds on the financial markets. On the other hand, the opening of a discount window as a role of a lender of last resort and a favourable policy as regards discount factors avoided liquidity problems for banks[28]. Thirdly, German banks had less liquidity than the French banks[29]. In a normal context, such a situation is an advantage because speculative movements have less power. But, as stressed by the author, this placed the German banks in a position of suspension of payment if any crisis were to occur. Fourthly, the participation of the German banks in the financing of enterprises was totally different from that of the Crédit Mobilier. As the German capital market was less developed than the French one, providing credit had a stronger implication for firms than in a French context. In most cases, the Crédit Mobilier held the major part of the debts. In the German case, the situation was different. In particular, the supervisory board (Aufsichtrat) elected by the annual general meeting of the shareholders (or their representatives) was obligatory by law from 1870 and was strengthened by a law of 1884. Its functions were not limited to the appointment and supervision of the executive board (Vorstand), it could also make or influence the most important strategic decisions (especially investment decisions) in its quarterly or monthly meeting. However, the banks could threaten to withdraw credit without being on the supervisory

[28] Tilly, 'Germany'.

[29] A.E. Sayous, 'Les Banques Allemandes en cas de Crise ou de Guerre', *Revue d'Economie Politique*, 13 (1899), pp. 142-166.

board. In addition, to hold a major part of the equity was a bad signal for a Grobbanken. In such a case, the shareholders' Annual General Meeting played a relatively peripheral role.

If all these arguments seem to stress the prudent and rational attitudes as regards credit policy, one point should be mentioned and concerns the questions of advances to companies. Sayous affirms that the economic development of Germany, in establishing a strict distinction between the issuing banks and the ordinary banks had, as a consequence, facilitated the credit and financial operations; the relationship between banks and industry became stronger and stronger as the activity increased[30]. However, the politics as regards advances was not different at all. The simple loans based on share and bond certificates and assets did not play a crucial role in the relations between trade and industry; more important were the credits granted on current accounts. If the name differed in Germany, there is no doubt that the results were identical. Both were advances granted to industries without any special guarantee.

The success of the Grobbanken may have been due to the fact that they developed around 1870, or twenty years after the mistakes of the first generation of 'crédit mobiliers'.

V

Economic historians have discussed the predominant role played by the Crédit Mobilier in industrial financing in the nineteenth century. Gerschenkron's theory was elaborated into a model of backwardness, in which first banks, and then government - depending on how backward a country was - replaced the entrepreneurship.

The monitoring role of the Crédit Mobilier has been evaluated as regards its investment policy. This study of corporate finance in France concentrates on two samples: companies affiliated with the Crédit Mobilier, non-affiliated ones and both. Three regressions were run covering the entire period 1860-75, and for two sub-sample periods (1860-

[30] A.E. Sayous, *Les banques de dépôts, les banques de crédit et les sociétés financières* (Paris, 1907).

67 and 1868-75) to compare investment policy before and after the bankruptcy. The data set has not provided any evidence that the Crédit Mobilier helped the development of French industry by alleviating the impact of capital imperfections. No significant differences as regards Q and CF/K coefficients can be identified between affiliated and non-affiliated companies. Neither were liquidity-constrained. Moreover, the affiliated companies were more liquidity-constrained before the bankruptcy than after. Hence, the results do not fit the Hoshi, Kashyap and Scharfstein's approach.

Thus, despite the small sample, these results reveal a situation where a bank was not capable of controlling firms. This constitutes probably the central point of this article. The Credit Mobilier is a good illustration of the difficulties a bank can encounter when supervising a firm. Even if the financial literature insists on the fact that a bank can put pressure on firms to force them to behave safely, these techniques are not efficient when the institution stops behaving like a real bank.