Investment Banking: Past, Present, and Future

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Investment banks are changing fast. Forty years ago the industry was dominated by a few small partnerships that made the bulk of their income from the commissions they earned floating securities on behalf of their clients. Today's investment banks are huge full-service firms that make a substantial proportion of their revenues in technical trading businesses that started to attain their current prominence only in the 1980s. The CPI-adjusted capitalization of the top ten investment banks soared from $1 billion in 1960 to $194 billion in 2000. Between 1979 and 2000, the number of professionals[1] employed by the top five investment banks (ranked by capitalization) rose from 56,000 to 205,000.[2]

The enormous upheavals documented in the previous paragraph raise a number of difficult questions. What have the investment banks of today got in common with their predecessors? Is it possible to draw any meaningful parallels between businesses that today call themselves investment banks and the investment banks of 20, 40, or even 100 years ago? What is the source of the recent changes to the investment banking landscape, and can we say anything about the likely future direction of the industry?

These questions point to a more fundamental one: namely, if investment banks did not exist, would we need to invent them? In other words, what are investment banks *for*? A sufficiently general answer to this question should explain the past evolution of the investment bank, shed some light upon investment banking policy debates, and help us to understand the forces currently shaping the investment banking industry and their likely impact.

Surprisingly, although a wealth of academic and policy work analyzes specific lines of business within investment banks, very little has been written to explain the economic purpose of the investment banking institution. In a recent book we attempt to fill this gap.[3] We argue that investment banks have traditionally added value in transactions involving assets over which it is extremely hard to establish property rights. Since their inception, investment banks have facilitated complex deals by creating a marketplace in which informal property rights over these assets could be created and enforced. Over the past 200 years a series of technological advances has altered the economic situations that require informal property rights, and investment banks have changed their focus accordingly. The immediate antecedents of the modern investment bank concentrated upon the commodities of the North Atlantic trade; since the early 19th century, however, the critical asset has been the information that underpins security market trades.

In this article, we outline our theory and go on to show how it relates to investment banking history. As we note above and discuss in greater depth below, large-scale capitalism is underpinned not only by contracts between capitalists and the businesses and individuals in which they invest, but also between the sellers and buyers of valuable information. Investment banks have always been located at the nexus of these contracts, and their position has left them particularly exposed to political interference. We show how the prospect of such interference relates to our theory, and we point to some relevant 20th-century examples. Finally, we discuss recent changes to the investment banking landscape and try to identify some of the trends that will influence the future development of the industry.

Investment Banking and Property Rights

Nineteenth-century security markets were dominated by a few small partnership firms. The pre-eminent players in the first half of the century were the Rothschilds, the Barings, and the Browns. All of these firms had their origins in the Atlantic trade of the 18th century, importing commodities that European, and particularly English, manufacturers required, and exporting their finished products.

English and American commercial law in the 18th century still largely reflected the agrarian and hierarchical societies for which it had been developed. Juries were free to make rather arbitrary judgments in mercantile disputes, and merchants tended where possible to rely instead upon private arbitration. It was particularly hard for creditors to pursue their debtors through the courts.

The Atlantic traders who operated in this environment were pioneers. Their legal difficulties were compounded by

1. That is, the total number of employees, excluding administrative staff.
2. The data in this paragraph are taken from the SIA, the Securities Industry Databank, and Factbook.
3. See A. D. Morrison and W. J. Wilhelm, Jr., (2007), *Investment Banking: Institutions, Politics and Law*, Oxford: Oxford University Press.

the fact that they were dealing in multiple jurisdictions. At the same time it was impossible for a merchant based in one country to exercise close control over his operations in another: trans-Atlantic communications travelled only as quickly as the sailing boats that conveyed them. If these merchants had had to rely upon the court-enforced arm's-length contracts of today's economics text books, they would have been unable to operate. They therefore had to find alternative ways to make and to enforce binding agreements.

So Atlantic traders relied upon extra-legal modes of contracting and contract enforcement. Academic economists and lawyers have become increasingly aware of the importance to economic life of institutions that support this type of arrangement. For example, recent research has demonstrated that trading arrangements in medieval Europe were designed to support private enforcement,[4] and many trade agreements in the modern diamond and cotton industries are also made outside the formal legal system.[5]

The institutions that support such "private" law-making have a number of features in common. In particular, all are based upon close long-term relationships between the parties involved. These relationships foster trust and, more importantly, they ensure that cooperation is in the best interests of the counterparties to a trade. A counterparty who reneges upon an extra-legal agreement will not be pursued through the courts, but he will impair the relationship upon which the agreement rests. In relationships that are both long-term and profitable, the short-term profits from cheating are insufficient to compensate for the damage caused to the relationship, and private agreements are honored. For example, although short sales of securities were legally unenforceable when the New York Stock Exchange was founded, the Exchange used the threat of exclusion to ensure that its members honored these contracts.[6]

Given the impossibility of relying upon the formal, "black letter" law, 18th-century Atlantic traders were forced to rely upon private agreements that were sustained through long-term profitable dealing. Hence a cotton grower who relied upon his relationship with a merchant to transport and to sell his goods could be trusted honestly to report the quality of his merchandise to the merchant, even though there were few formal legal penalties for misrepresentation. At the same time, the merchants to whom he sold his goods resisted the temptation to rip him off because of the effect the ensuing reputational damage would have had upon their dealing with him and with other merchants.

Hence, in pursuit of their commodity business, the larger Atlantic traders developed close relationships and valuable reputations. In so doing, they acquired a great deal of information about their counterparties and about the markets in which they operated. In a world where loan agreements were hard to enforce, it was natural that they should use their relationships and their superior information to start to lend money to their counterparts. At the end of the 19th century most of the larger traders were making a high proportion of their profits advancing funds to commercial enterprises, and trading on the currency exchanges.

The Atlantic traders who became financial market specialists did so for several reasons. Advances in the theory and practice of commercial law diminished the need for extra-legal contracting in the trade of goods. At the same time, communications between Europe and America improved in the early 19th century, thereby undermining some of the informational advantages of close relationships and networks. Atlantic traders aiming to use their reputations and relationships to generate profits were therefore forced to search for alternative markets. These markets were financial.

Industrial advances and the 19th-century expansion of state expenditure both created a need for large-scale finance. Modern corporate finance teaches us that information is of critical importance when a company raises capital: capitalists will be prepared to invest in a new venture only if they have sufficient knowledge of its commercial potential and of the ability and integrity of the entrepreneurs managing it. *Informational assets* are therefore essential to the development of important innovations. However, while assets like land, iron ore, and computers can be bought and sold in a textbook marketplace, informational assets cannot. It is probably impossible to prove in court that a particular person generated the information that underpinned a transaction; it is likewise impossible to prevent that person from selling the information several times and so reducing its value to any of the purchasers. And without an arena in which he can sell his informational assets, no investor will be prepared to create them.

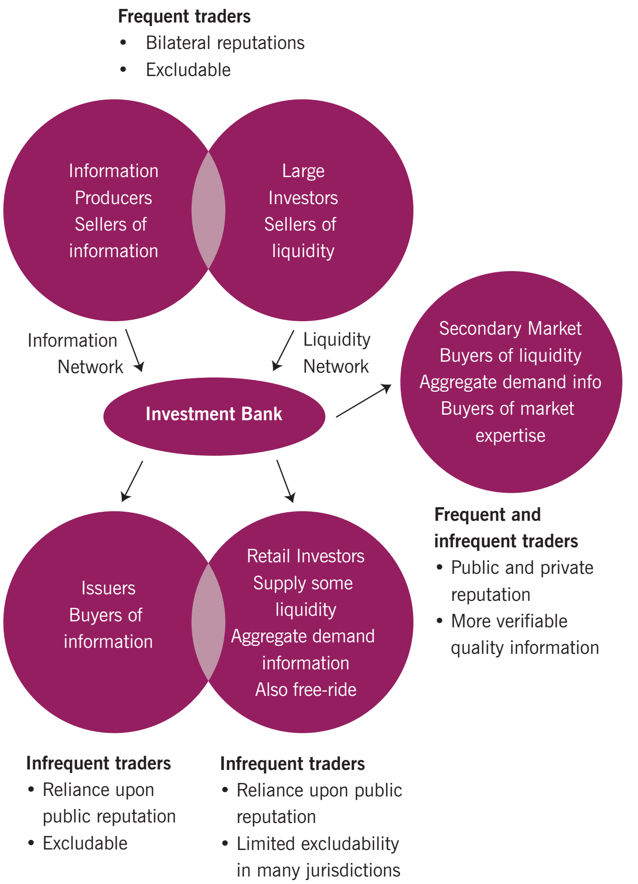
In the absence of formal laws governing the exchange of price-relevant informational assets, it is necessary to fall back upon the type of private self-enforcing laws that we described above. It was therefore natural that many Atlantic traders should respond to increasing 19th-century demands upon America and Europe's dispersed investors by deploying

4. P. R. Milgrom, D. C. North and B. R. Weingast (1990) "The Role of Institutions in the Revival of Trade: The Law Merchant, Private Judges, and the Champagn Fairs," *Economics and Politics* 2: 1-23; A. Greif, P. Milgrom, and B. R. Weingast (1994) "Coordination, Commitment and Enforcement: The Case of the Merchant Guild," *Journal of Political Economy* 102: 912-50; A. Greif (1993) "Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition," *American Economic Review* 83: 525-48.

5. L. Bernstein, "Opting Out of the Legal System: Extralegal Contractual Relations in the Diamond Industry," *Journal of Legal Studies* 21:115-27; L. Bernstein, "Private Commercial Law in the Cotton Industry: Creating Cooperation through Rules, Norms and Institutions," *Michigan Law Review* 99: 1724-90.

6. The NYSE's early role as a private law-making body is described by S. Banner (1998) *Anglo-American Securities Regulation: Cultural and Political Roots, 1690-1860*, Cambridge, UK: Cambridge University Press.

Figure 1 **The Investment Bank's Information Marketplace**



their relationships and their information-gathering abilities to create private informational marketplaces. By the middle of the century many of the so-called "merchant bankers" had decided to become specialist financiers.

The fund-raising operations of the nascent investment banks were remarkably similar to those of today. Then, as now, potential investors in new securities issues required reassurance that the issues were of high quality, and that they were fairly priced. Even if they could not establish this for themselves, the investment banks usually knew someone who could. Formal contracts over this information were impossible, so investment banks used the threat of exclusion from valuable long-term relationships to provide their contacts with incentives to produce and to reveal information. And because the investment bank risked its reputation every time it priced a new issue, it had little incentive to misrepresent the information it acquired.

Although the earliest investment banks operated in a very different technological, legal, and political environment, the mechanisms just described are very close to those that underpin modern security offerings. In both cases, investment banks lever off their relationships to provide incentives for information production and dissemination, and they are trusted because they risk their reputational capital every time they underwrite a fresh deal.[7]

In short, we argue in our book that financial markets cannot function effectively if agents with valuable information are unable to sell it to those who require it. This problem is particularly acute when new securities are issued, but it is also important at other times—when one firm purchases another, for example, or when loans to distressed corporations have to be renegotiated. Investment banks add value in these situations by designing an environment within which information will be produced, enforcing the private laws that govern its exchange, and acting as intermediaries between the investors and analysts who sell this information, and the investors and corporate security issuers who purchase it. Hence we argue that *investment banks exist because they maintain an information marketplace that facilitates information-sensitive security transactions.*

This discussion suggests a way of thinking about change in the investment banking market. Technological, legal, and political changes may alter the type of contracts that can be written, and they may equally affect the markets where substitutes for formal contracts are most needed. Like every other business, investment banks follow the money, and they will alter their operations and their business lines in response to this type of change. We will later use this observation to analyze current trends in investment banking. But first we examine the ways in which investment banks manage and have managed their information networks.

Relationships, Reputations, and Skills in Investment Banking

We have already noted that investment banks use the threat of exclusion from a valuable long-term relationship to ensure that legally unenforceable agreements are honored. Their relationships are therefore central to their mission of creating and disseminating price-relevant information in situations where, as in an initial public offering, arm's-length markets cannot provide the necessary incentives. In this section we ask which relationships are important to investment banks, and how they are maintained.

7. We survey the related literature in detail in chapter three of our book. For a brief review of the literature, see L. M. Benveniste and W.J. Wilhelm (1997) "Initial Public Offerings: Going by the Book," *Journal of Applied Corporate Finance*. For formal development of the ideas in this article, see in particular L. M. Benveniste and P. A. Spindt (1989) "How Investment Bankers Determine the Offer Price and Allocation of New Issues," *Journal of Financial Economics* 24: 343-61; L. M. Benveniste, W. Y. Busaba and W. J. Wilhelm (2002) "Information Externalities and the Role of Underwriters in Primary Equity Markets," *Journal of Financial Intermediation* 11:66-86; A. E. Sherman and S. Titman (2002) "Building the IPO Order Book: Underpricing and Participation Limits with Costly Information," *Journal of Financial Economics* 65: 3-29.

Figure 1, which is taken from our book, illustrates the investment bank's relationships, and its position at the center of the information marketplace. Investment banks need relationships with counterparties who can price their issues, and who can provide sufficient liquidity for the bank to be sure that it will place its issues. We refer to these counterparties as the bank's *information network* and *liquidity network*, respectively. As illustrated in the figure, some members of the liquidity network may also produce price-relevant information.

Some banks maintain a large retail investor network. Retail investors provide an alternative source of liquidity and, although individually they need not be well-informed about the value of a new issue, their aggregate demand information can be valuable to the bank that acquires it.

Banks also have a presence in the secondary market, which is valuable for several reasons. First, it provides primary market investors with an exit route and hence lowers the costs of the liquidity network. Second, it is a source of information about market sentiment, which assists with the bank's primary market work. Third, by putting their capital to work in the secondary markets, investment banks can earn an additional return on their information network. Finally, investment banks increasingly bundle secondary market services like derivatives trading with their new issues work.

Finally, issuers of new securities participate in the information marketplace as buyers of information that will help them to sell their securities.

We saw in the previous section that the threat of exclusion from a profitable relationship is an important enforcement mechanism for the type of private laws that support the information-gathering that precedes an initial public offering. For this threat to have teeth, the investment bank must ensure that its counterparties earn sufficient profits from their relationships to care about losing them, and it must have sufficient alternative relationships to add credibility to its threat to break one of them. The former requirement places a lower bound upon the frequency and the profitability of each of its counterparty's trades; the latter places a lower bound on the number of counterparties. Investment banks therefore cannot maintain their relationships, and the services upon which they rest, without an adequate deal flow.

Successful information and liquidity networks require more than a minimum deal flow, however. These networks are effective only if their members can be sure of an adequate return on their investment in information. Information leakage is therefore damaging: a trader who is not bound by the rules of the information marketplace will trade on leaked information and, in so doing, will diminish or possibly destroy its value to the members of the investment bank's network. Hence investment banks will naturally attempt to avoid excessive overlap between their networks. We argue in our book that one explanation for investment bank syndicates is that they combine information networks, and hence force them to internalize the effects of the leaks that may be inevitable in large transactions.

The Power of Networks

Investment banks maintain networks of frequent traders, who provide them with the information and the liquidity necessary to float new securities. Careful attention to the composition of these networks ensures that their members have the right incentives. At the same time, investment banks influence the behavior of their network members by investing directly in information production. Most investment banks manage large research departments working on problems similar to those faced by the network members. These departments provide the bank with a bargaining chip in its negotiations with network members, although they seem hard to justify on a stand-alone basis.

Of course, contracting problems within the information network are two-fold: the bank must be confident of the information that its network members supply, but the relationship will not work unless the bank's counterparties believe that it will honor its promises to provide profitable deals in exchange for their data. Why do the investment bank's counterparties trust it to keep promises to which it is not legally bound? The answer lies at the heart of investment banking: the parties to these promises rely upon their *reputations*. Counterparties will only trust an investment bank that has in the past kept its promises. Investment banks that renege upon agreements cannot expect to be trusted in the future, and so will lose their ability to make extra-legal contractual agreements. These agreements are at the heart of the investment bank's business, and so it will do whatever is necessary to protect its reputation.

Reputations are valuable precisely because they can be risked in trade. The danger that they will be impaired provides the investment banker with a credible reason to honor his agreements. Investment bankers therefore design their deals and their networks so as to create a sufficiently large reputational cost of dishonoring a commitment. This is easy when dealing with the frequent traders of the information and liquidity networks, because the loss of any of these counterparties would have a significant effect upon the investment bank. It is harder when dealing with retail investors and security issuers, many of whom deal infrequently; the profit from ripping off one of these counterparties may greatly outweigh the loss of expected profits from future business with it. In this case the investment bank can credibly commit to keep its promises only if failing to do so would impair its ability to deal with many other counterparties. It achieves this by creating a *public* reputation: security issuers and retail investors will refuse to deal with an institution with a weak reputation, and the fear of reputational loss should be enough to underwrite the investment bank's promises.

Banks' Early Challenges

We have deliberately avoided a detailed discussion of the mechanics of investment banking in this section. Indeed, as we noted in our introduction, the things that investment banks do change over time. What has remained constant is the investment banker's mission: to enforce private laws that support the exchange of critical information. This section identifies network and reputation management as the two core competencies that support this mission. These are complex skills. Thus while we can identify the institutional structure that supports network and reputation management, we cannot hope in a short article to explain precisely what it is that investment bankers do all day. Indeed, we think that this is a technological feature of many investment banking skills: while you can learn the technical details of derivative pricing or company valuation from a book or in the classroom, you can learn how to be an investment banker only through on-the-job training and close contact with experts. That is to say, investment banking is a tacit, rather than a codifiable, skill.[8]

Networks, reputation, and tacit skills were important in the earliest investment banks, and they remain so today. Massive communications problems and undeveloped legal systems made network creation and maintenance difficult for the earliest banks. Many of them relied upon family members whom they could trust to manage distant businesses. Brown Brothers, the Rothschilds, and the Barings were all family businesses. Later market entrants, such as the House of Morgan, Kuhn, Loeb & Co., Lehman Brothers, and Goldman Sachs continued to draw their partners, and often their wives, from a close-knit social circle. Investment bankers served long apprenticeships during which they acquired the tacit skills upon which they would later rely.

As the 19th-century investment banks formed closer repeat-dealing relationships with security issuers, their reputations became increasingly tied up in the success of their clients. Investment bankers who wished to maintain their reputational capital therefore assumed an active oversight role in their corporate counterparties. By the end of the century, all of the leading investment banks were active board participants. For example, Brad De Long finds that between 1910 and 1912, the presence of a member of the J.P. Morgan partnership on a company's board added about 30% to the value of its common stock.[9] Corporations were naturally eager that the investment banker should add luster to their stock issues in this way.[10]

Turn-of-the-century investment banker activism had significant consequences for the structure of corporate America in the 20th century. Between 1895 and 1904, 1,800 firms merged. U.S. Steel, DuPont, International Harvester, Pittsburgh Plate Glass, General Electric, and Procter and Gamble were all formed at this time.[11] J.P. Morgan played a leading role in these consolidations, along with a number of other investment banks.

The late 19th and early 20th centuries also saw a significant role for investment bankers as private law-makers in the bankruptcy courts. Between 1870 and 1900 a third of all U.S. railroad companies defaulted on their debt. Liquidating their assets was almost an impossibility, so it was necessary to reorganize their finances so that they could continue as going concerns. Bankruptcy law was extremely undeveloped at this time, and it was almost non-existent for large corporations. The investment banks had organized the sale of railroad securities, and a botched reorganization would have damaged their reputations. They therefore stepped into the breach and effectively invented, with the cooperation of the courts, a body of reorganization law that became known as the equity receivership. The equity receivership was based on a body of case law with which the investment banks were intimately familiar. It proved to be a very successful procedure, which lasted until the 1938 Chandler Act drove the investment banks, along with their close client relationships and their reputational concerns, out of corporate reorganizations.[12]

American corporate law became increasingly sophisticated throughout the 19th century, but there was still a significant role in large and complex transactions for informal agreements that were honored for reputational reasons. Investment banks could intermediate these agreements, and at the start of the 20th century they were central institutions in America's economy. According to Fritz Redlich, not more than six firms were responsible for managing the organization of the large-scale sector of the U.S. economy in the first decade of the 20th century, and not more than 12 men.[13] Investment banks would never again exert the same

8. Tacit skill was christened by M. Polanyi (1966) *The Tacit Dimension*, Garden City, NY: Doubleday.

9. J. B. De Long (1991) "Did J.P. Morgan's Men Add Value? An Economist's Perspective on Financial Capitalism," in P. Temin (ed) *Inside the Business Enterprise: Historical Perspectives on the Use of Information*, Chicago: University of Chicago Press, pp. 205 – 36.

10. See p. 70 of V. P. Carosso (1970) *Investment Banking in America: A History*, Cambridge, Mass.: Harvard University Press.

11. The first merger wave is documented by N. R. Lamoreaux (1985) *The Great Merger Movement in American Business, 1895–1904,* Cambridge, UK: Cambridge University Press.

12. Equity receiverships and the involvement of investment banks in contemporary corporate reorganizations are studied by D. A. Skeel, Jr. (2001) *Debt's Dominion*, Princeton: Princeton University Press, and by P. Tufano (1997) "Business Failure, Judicial Intervention, and Financial Innovation: Restructuring U.S. Railroads in the Nineteenth Century," *Business History Review* 71: 1–40.

13. F. Redlich (1968) *The Molding of American Banking: Men and Ideas*, New York, NY: Johnson Reprint Corporation.

degree of influence; the following century would see them buffeted by political winds, and challenged by technological advances. We examine each of these effects in turn.

The Political Economy of Investment Banking[14]

Investment banks create and enforce extra-legal contracts, but they operate in the shadow of the formal law. For example, because the black-letter law provides an outside option to the counterparties to an informal agreement, it affects the way that they bargain.[15] Formal law therefore affects the nature of the informal laws that investment banks create.

Informal legal institutions, such as investment banks, also affect the formal law. Investment banks at the start of the 20th century sat at the center of a web of informal contracts that allocated capital and so organized much of American production. For a legislator looking to make his mark, this degree of influence, concentrated in so few hands, was a very attractive target. Legislation that brought investment banking out of the extra-legal sector and into the purview of the formal law would have transferred much of the investment banker's powers to the state. And, because it was backed by the courts, the state would have been far less constrained by reputational considerations than the investment banks.

Legislators could seek this type of influence for all sorts of reasons. They might have a simple desire to feather their own nests, and those of their friends.[16] They might equally be driven by a genuine wish to improve the well-being of the polity by reforming an institution—in this case the investment bank—they regard as corrupt or inefficient.

Irrespective of their motivation, the political climate at the start of the 20th century favored legislators of an interventionist stripe. American society was changed by the industrial advances of the 19th century. Some traditional industries were displaced and a new middle class emerged, employed by large corporations over which low- and middle-ranking employees had little, if any, influence. Those who believed themselves to be losers in the new system were understandably hostile towards the corporations and the bankers who were believed to have created the system. At the same time many members of the middle class, while prosperous, felt disenfranchised by an economic system in which they believed that "somewhere, by someone, the development of industry is being controlled."[17] These sentiments gave rise first to the Populism of the late 19th century, and then to the Progressive movement of the early part of the 20th. Their wider consequence was to legitimize an interventionist view of industry after a half century in which *laissez-faire* ideas had largely held sway. The activist state manifested itself initially in hostility towards big business and monopoly power and, after the 1930s, in a belief in at least partial direction of the economy.

The state was perceived in the 19th century as fulfilling a passive, enabling role. The shift in the early 20th century to a purposive view of the state had, and continues to have, profound implications for investment banks. The changed relationship between bankers, on the one hand, and regulators, bureaucrats, and legislators, on the other, was signalled when in 1905 the New York Superintendent of Insurance recommended the "elimination of Wall Street control." For the following half century Wall Street, and the investment banks in particular, were subjected to the close scrutiny of a number of Congressional committees.

The evidence suggests that the committees were not disinterested seekers of the truth. The Pujo Committee of 1912 was formed to investigate the "concentration of money and credit," popularly referred to as the "money trust." Its counsel was Samuel Untermeyer, a millionaire corporate lawyer who brought to his task a progressivist conviction that the investment banks were too big and that there was insufficient competition between financiers. Ferdinand Pecora, who was appointed after Franklin D. Roosevelt's election as counsel for an investigation into stock market practices, was likewise a "wholesale subscriber to the bigness-is-badness thesis."[18] William Leuchtenburg quotes Morgan as saying that "Pecora has the manner and the manners of a prosecuting attorney who is trying to convict a horse thief."[19]

The Pujo and Pecora committees, like the other investigations of the pre-World War II years, did not allow investment bankers to call their own witnesses, present their own evidence, or cross-examine other witnesses. Notwithstanding this bias, the investigations had a profound effect both upon public conceptions of investment banks, and upon law-makers. Fourteen months before the Pujo committee opened, the Kansas state legislature passed a law to regulate security market activities. By 1933 every state except Nevada had a securities law; most laws were modelled upon the Kansas legislation.[20]

The new security laws may have expressed a popular discontent with the securities industry, but they were poorly

14. This section draws heavily upon Chapter 7 of our book, "Leviathan and the Investment Banks."

15. We discuss this point in Chapter 2 of our book. See also G. Baker, R. Gibbons and K. J. Murphy (2002) "Relational Contracts and the Theory of the Firm," *Quarterly Journal of Economics* 117: 39–84.

16. See for example G. Tullock (1967) "The Welfare Costs of Tariffs, Monopolies, and Theft," *Western Economic Journal* 5: 224—232 and F. S. McChesney (1987) "Rent Extraction and Rent Creation in the Economic Theory of Regulation," *Journal of Legal Studies* 16:101—118.

17. The quotation is due to Woodrow Wilson. The political events that we outline in this paragraph are discussed at length by Richard Hofstadter in *The Age of Reform, from Bryan to F.D.R.*, London (UK: Jonathan Cape, 1962).

18. The Pecora committee is discussed by J. Seligman (1982) *The Transformation of Wall Street: A History of the Securities and Exchange Commission and Modern Corporate Finance*, Boston, Mass: Houghton Mifflin Company. The quotation appears on page 21.

19. W. E. Leuchtenburg (1963) *Franklin Roosevelt and the New Deal, 1932–1940*, New York, NY: Harper and Row.

20. The laws were known as "Blue Sky Laws," as they were designed to prevent promoters from selling "building lots in the blue sky."

drafted and badly administered. Although New York was regarded as having the most effective laws, NYSE officials estimated in 1932 that approximately half of the billion dollars of fraudulent securities pedalled annually in the United States were sold in the State. In contrast, private regulation fared well. The NYSE, whose survival depended upon its reputation for probity, successfully enforced detailed pre-listing disclosure requirements.

But, as suggested at the start of this section, the NYSE's private arrangements could become the focus of legislative attention. This is precisely what happened during the New Deal.

The New Dealers were a broad church. Some exhibited a progressive distrust of large businesses; others favored close intervention in day-to-day economic life.[21] However, they could all agree on their antipathy towards Wall Street. The effect of some of the New Deal legislation upon investment banks was short-lived, but other laws had lasting and significant consequences. The Glass-Steagall Act of June 1933 separated investment banking from commercial banking; it remained a source of controversy until its repeal 66 years later. The Securities Exchange Act of 1934 created the Securities and Exchange Commission, which acquired extensive powers to enforce new Federal securities laws. The 1938 Chandler Bill excluded investment banks from the design of corporate reorganizations; they did not return until the passage of the 1978 bankruptcy code.

Some legal innovations of the New Deal, like the disclosure requirements of the 1933 Securities Act, have been received positively by academic commentators, although even this Act has been criticized for anti-competitive clauses in its conduct-of-business rules.[22] Other laws, like the Chandler Bill and the Glass-Steagall Act, have been less enthusiastically received. But irrespective of their social utility, we suggest that the reasoning behind these Acts reflected a profound misunderstanding of the nature of the investment banking industry.

We have argued that investment banks are important because they help to create and enforce informal extra-legal contracts over price-relevant information. This mission can only be accomplished by institutions that have long-term profitable relationships with investors and clients, and strong reputations. In other words, the very features of the investment banking industry to which the New Dealers and their progressive predecessors objected were in fact the principal contributions that the banks made to the workings of the economic system. The fact that investors had long-term repeat dealings with their investment bank was probably evidence of a successful relationship, and not of monopolistic tendencies in the market. If, as the Armstrong committee of 1905 noted, insurance companies participated in unprofitable as well as profitable new issues, they could simply have been fulfilling their side of the bargain in a liquidity network. When investment banks participated in one another's issues, they could have been building and maintaining reputations that were essential to the flotation of large issues. And the difficulties experienced by new entrants to the investment banking market could have reflected the importance of an established reputation in attracting clients, rather than the erection by existing banks of barriers to entry.

We argue in our book that a failure to appreciate these arguments can lead even well-intentioned legislators into ill-conceived regulations. This observation remains valid today: it may be hard to distinguish between socially valuable extra-legal contracting and socially damaging anti-competitive behavior, but without an appreciation of the importance to the security markets of informal agreements, regulators are likely to make the wrong choices. Arguably, this is what happened when in October 1947 the Justice Department filed a suit against 17 investment banks, accusing them of a conspiracy dating back to 1915 to suppress investment banking competition. The trial lasted from November 1950 to May 1953, and it was a disaster for the government. For the first time in the century, the investment banks could call their own witnesses, and interrogate those called by the Justice Department. The Justice Department was unable to prove any of its allegations. Indeed, in dismissing their case with prejudice the trial judge, Harold R. Medina, stated that "The government case depends entirely upon circumstantial evidence."[23]

The failure of the anti-trust case ushered in a period of relatively light government involvement in the investment banking industry. Changes to investment banking in the subsequent years largely reflected, and continue to reflect, technological imperatives. It is to these that we turn in the next section.

Technological Change and Investment Banking

The informal laws that investment banks create reflect the needs of the business world, and the technological impossibility of recording certain types of information for use in court. Technological change alters the areas in which entrepreneurs and capitalists demand informal laws, and hence changes the shape and the composition of the investment banking market. The effects of technological change upon the investment banking world have been particularly profound in the last 40 years.

21. For example, James Landis, the second chairman of the SEC and later Dean of the Harvard Law School, suggested that regulatory agencies should "combine in a single regulatory body the functions historically embodied by the Constitution's three conceptually separate branches of government."

22. See P. G. Mahoney (2001) "The Political Economy of the Securities Act," *Journal of Legal Studies* 30: 1—31.

23. H. R. Medina (1954 [1975]) *Corrected Opinion of Harold R. Medina*, New York, NY: Arno Press, p. 9.

Although he would have noted their exit from the lending market and the corporate reorganization business, John Pierpont Morgan would have found the investment banks of the early 1960s reasonably familiar. Investment banks at this time were not particularly well-capitalized. They were still organized as partnerships, and some of the partnerships were still dominated by members of the founding family. Investment bankers still tended to spend their entire career in one firm, and much of their energy was devoted to creating and maintaining close relationships with investors and with security issuers. Most clerical work was performed by hand since computers were still virtually unheard-of on the Wall Street of 1960.

Of course, the markets had changed in significant ways since J.P. Morgan's time. Turn-of-the-century investment banks had largely sold securities to wealthy individuals and institutions. While the most aristocratic of investment banks continued to concentrate upon a few large investors, another retail-oriented business had sprung up alongside them. Firms like Merrill Lynch, Dean Witter, Eastman Dillon, and Paine Webber had widespread networks of offices pedalling shares to small investors. Commissions on security transactions accounted for about 70% of Merrill Lynch's $192 million revenue in 1960, with traditional investment banking representing only five percent of the total.

Until 1971 the rules of the New York Stock Exchange precluded public quotation for member firms. When the rules changed, they did so in response to demands from member firms, many of which were investment banks. These demands had not arisen any time in the previous century. Why then had the partnership form been so appropriate for investment banks for so long?

In a recent article in the *American Economic Review*, we analyzed the operation of partnership firms.[24] Partnerships are prevalent in businesses which, like investment banking, law and management consulting, rely heavily on *tacit* skill. Recall that tacit skill is the kind that can be acquired only through close on-the-job contact with an expert mentor. Managing the information networks upon which security issuance relies is a tacit skill; so too is the ability to provide advisory services to merging or restructuring firms. Tacit skill has therefore made an important contribution to the efficient structuring of corporate America over the last two centuries. It has considerable social value and should be transferred from one generation to the next.

The problem for investment banks is the impossibility of exhibiting tacit skill in a courtroom. How then can senior and junior employees enforce a mentoring agreement that enhances the junior agent's tacit skill level, but which is costly to and binding on the senior employee? We argue that the partnership form emerged as a solution to this contracting problem.

Partnerships provide services that rely heavily on tacit skill. Precisely because it is hard to prove the possession of tacit skills, partnerships depend on their reputations to attract customers and command high fees for their services. Because their financial capital is tied up in their firm, the partners have a strong incentive to protect its reputational capital. Promoting an unskilled agent to the partnership would ultimately damage its reputation and so lower the value of the senior partners' stake. Hence we argue that partners will mentor junior employees to protect their partnership's reputation and to preserve the value of their partnership stake.

The partnership form is therefore consonant with the heavy historic reliance within investment banks upon tacit skill. Why then was it eclipsed in the last 30 years by the joint stock corporate form? We argue that two factors were at work: first, an increasing need within investment banks for financial capital; and second, advances in computerization and financial engineering that diminished the importance to investment banking of tacit skill. [25]

If a manager shirks his mentoring obligations, he avoids the personal costs of mentoring, while the reputational damage to the partnership is shared by all of the partners. This places an upper bound on the size of the partnership, and hence upon its financial capitalization. Historically investment banks had little financial capital, and so were not greatly affected by this constraint. But matters started to change with the advent in 1959 of mainframe computers based upon transistor (rather than valve) technology. The result was an immediate jump in computing power, which was followed through the remainder of the decade by steady drops in the cost of computer hardware.[26]

The computers of the 1960s were well suited to batch processing—that is, to pre-planned runs of standardized computer tasks, frequently on an overnight basis. The real-time interrogation of computer systems that we take for granted today was still some way in the future. Hence the most natural application for batch processing was in the retail investment banks which, as we have already observed, spent a substantial proportion of their revenues on settlement. However, although computerized batch processing had the potential to revolutionize settlement activity, it was cost-effective only on a very large scale. Highly capitalized retail investment banks that could take advantage of the new technology therefore had a substantial advantage over their smaller competitors.

24. A. D. Morrison and W. J. Wilhelm, Jr. (2004) "Partnership Firms, Reputation, and Human Capital," *American Economic Review* 48: 1682—1692.

25. See A. D. Morrison and W. J. Wilhelm, Jr. (2007) "The Demise of Investment-Banking Partnerships: Theory and Evidence," *Journal of Finance*, forthcoming.

26. Changes to the speed and the power of computing are analyzed by W. D. Nordhaus (2001) *The Progress of Computing*, Department of Economics Working Paper, Yale University.

Recall that the need to induce mentoring places an upper bound on the size of the partnership. In the 1960s, this was below the size necessary to exploit the new batch processing technology. Investment banks therefore faced a trade-off: they could either maintain their partnership form and, with it, their tacit skills; or they could embrace joint stock ownership, which would lower their settlement costs while at the same time impairing their ability to pass on tacit skill. Large wholesale institutions like Morgan Stanley relied on largely tacit skills in underwriting, advisory work, and trading; in the absence of a retail client network, their settlement work was relatively simple. Hence for these firms the trade-off was simple: they remained partnerships.

But, at the beginning of the 1960s, retail houses like Merrill Lynch may have found the decision harder to make. The rapid increase in trading volumes during the 1960s forced their hands. NYSE member firms that depended on manual back office procedures were unable to cope with the transaction volume that faced them. Between 1967 and 1970, member firms faced a back-office crisis that ultimately forced the NYSE to close on Wednesdays to allow member firms to clear settlement backlogs. Many retail firms without computerized back offices went to the wall.

The back-office crisis showed that the retail banks had to embrace computers if they were to survive. Hence by the end of the 1960s, there was a great deal of pent-up demand by retail investment banks for capital to finance expansion to a scale where computerization was feasible. When in 1971 the NYSE accepted the inevitable and allowed its members to be publicly owned, 16 retail-oriented investment banks went public in rapid succession.

Wholesale-oriented investment banks were largely untouched by these changes. Their underwriting, advisory, and trading businesses still depended largely on relationships and tacit skill, and they had little need for the mainframe computers that drove the retail-oriented firms into public ownership. For wholesale investment banks, it was the advent of cheap, distributed desktop computers that tipped the balance against the partnership form and in favor of flotation. These computers facilitated the introduction of the formal modelling techniques of financial economics into corporate finance and, in particular, into securities valuation and trading.

The introduction of formal economic models into wholesale investment banks had a profound effect. Advances like the Black-Scholes option pricing model were introduced to business school syllabuses, and activities like option trading and valuation that were once learned through lengthy on-the-job apprenticeships could suddenly be acquired at arm's length in the classroom. Computerization and the 1970s revolution in financial economics combined to expunge, or at least greatly to reduce, the tacit dimension from investment banking.

Capital Markets

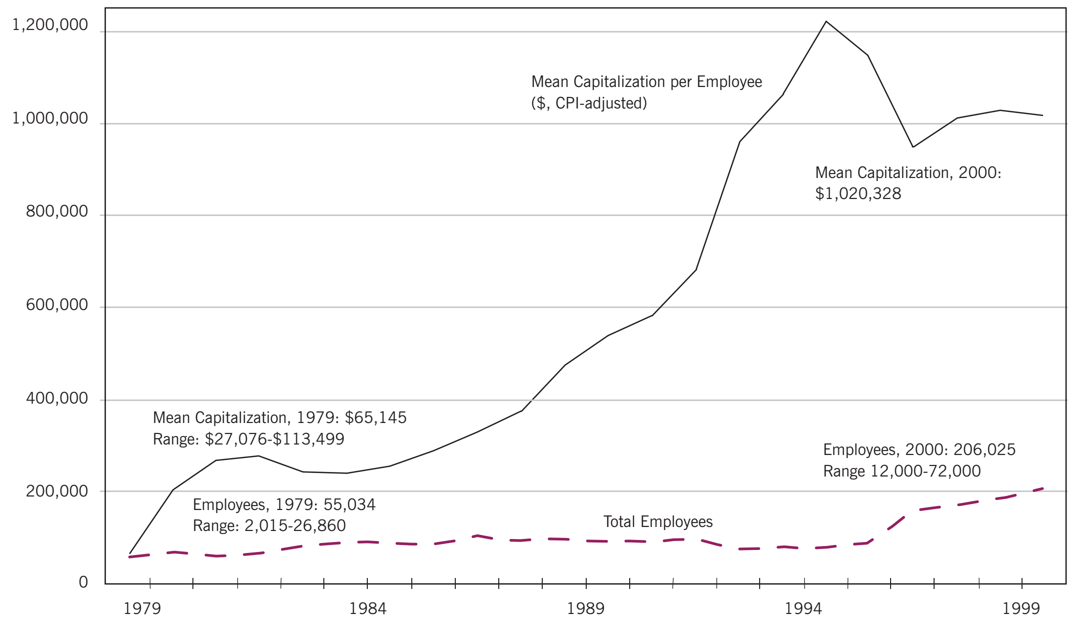
These developments directly undermined the partnership form, with its emphasis upon tacit skill and mentoring. But they had further ramifications. The codification of trading, portfolio management, and performance assessment greatly increased the skill base in these areas. At the same time, it facilitated formal contracting on banker performance, which had previously been impossible. The value of investment banker reputation plummeted in many businesses and, for the first time in a century, many investment banking activities became highly contestable. Spreads in many trading businesses were driven down, and the minimum efficient scale increased. Wholesale banks that did not expand sufficiently would be unable to compete in securities markets, and they needed capital to finance their expansion.

These trends pushed the wholesale banks into the capital markets. They started to go public in 1978, when White, Weld was acquired by Merrill Lynch. The early movers in this flotation wave were heavily involved in the securities markets. The holdouts were firms that generated a substantial proportion of their revenues from advisory work, where tacit skill was still essential and financial capital was of less importance. The only remaining substantial privately owned wholesale houses in 1987 were Goldman Sachs and Lazard Freres, both of which were then focused upon advisory activities. Goldman floated in 1999 and Lazard in 2005.

Figure 2, which also comes from our book, illustrates the trends we have just described. As formerly tacit knowledge began to be codified in the 1970s, individual investment bankers could achieve greater economies of scale from their skills. Hence, as shown in the figure, there was a sharp rise in the amount of financial capital per employee in the top five investment banks. The number of employees in these banks increased fourfold between 1979 and 2000, as they sought the economies of scale at which their trading activities would be viable. At the same time, there was a steady drop in this period in the share of the total industry capitalization accounted for by smaller banks: the combined capitalization of the top 11 to 25 investment banks fell from 81% of the top ten in 1954, to 39% in 1979, and to just 10% in 2000.

Investment banks are still wrestling with the problems thrown up by the move to joint stock form. One of the most significant has been a massive increase in labor market mobility. Partnership stakes were generally very illiquid, so that partners tended to stay with the same firm for their entire career. Partnerships also fostered opacity, so that it was extremely hard for outsiders to determine the quality of the junior staff in other firms, and so to hire them away. This opacity ensured that the partnership had the pick of their best employees; and in negotiations over new admissions to the partnership, it ensured that

Figure 2 **Investment Bank Employees and Capitalization, 1979-2000 (Top Five Banks by Capitalization)**



the existing partners had the whip hand. The demise of the investment banking partnership reversed both of these mechanisms: senior employees were no longer tied to the organization, and outside shareholders would not tolerate the opaque reporting that had made it hard for juniors to switch employers. Commentators in the early 1970s noted the sudden increase in job-hopping,[27] and it has gathered pace ever since.

Labor mobility presents difficulties for a relationship-based industry like investment banking. If employers expect to be held to ransom by a skilled worker who has several good outside options, they will be less willing to invest in training. This is not a concern when skills are codifiable, since workers can in this case pay for their own training in professional schools. But it presents a problem when some key skills are tacit and can only be acquired through instruction by the employer. The partnership form had given investment banks some *de facto* property rights over their employee's human capital: once they jettisoned it, investment banks turned instead to the formal law.

Attempts to create legal rights over investment bank employee skills took two forms. First, investment banks attempted to use the black-letter law to restrict their employees' freedom of movement through the use of Covenants Not to Compete, or CNCs, which restrict the employee's ability to work for a competitor within a specific period after leaving the firm. Although CNCs have become commonplace since investment banks went public, contractual incompleteness and enforcement problems make them an imperfect substitute for the incentives inherent in the partnership form. Investment banks have attempted to reinforce their effect by patenting financial innovations, so that the departure of a skilled employee need not mean the loss of everything that he or she created at the firm. Patenting became commonplace only in the wake of the 1998 Federal Circuit Court of Appeals decision on *State Street Bank v. Signature Financial*, which established definitively that "methods of doing business" were patentable. It is too early to judge the effectiveness or the likely impact of patenting upon investment banks. However, the early evidence suggests that patents are not nearly as effective as the informal partnership-based property rights systems that preceded them. Financial patents are hard to document, patent applications are sometimes of poor quality, and a good deal of uncertainty continues to surround their enforceability.

In summary, investment banking has been revolutionized by the technological changes of the last four decades. Many aspects of investment banking have been codified.

27. See for example "Why Are All These Investment Bankers Changing Jobs," John Thackery, *Institutional Investor*, January 1973.

Investment banking requires more financial capital than ever before, and as a result investment banks have been forced to jettison the partnership form and the extra-legal property rights it gave them over much of the human capital they employed. Attempts to use the law to re-create these rights have met with rather mixed success.

We believe that the biggest challenge currently facing investment banks is reconciling the effects of galloping technological changes with the tacit skills that remain at the heart of much of what they do. The following section examines this conflict.

Scale and Smallness: Investment Banking in the 21st Century

Although investment and commercial banking were separated by the 1933 Glass-Steagall Act, commercial banks started in the 1980s to encroach upon some investment banking activities. The establishment in the late 1980s of so-called Section 20 subsidiaries allowed several major commercial banks to underwrite corporate debt issues, provided this activity accounted for no more that 20% of the banks' gross revenue.

Commercial banks had clear advantages in the debt markets: the securities were similar to corporate loans, which they had already started to trade actively in a burgeoning secondary market;[28] and the commercial banks had the capital and the computer systems necessary to make an impact. Commercial banks also brought their capital to bear in the new derivatives markets by taking controlling stakes in the small trading partnerships that had previously dominated these markets: O'Connor & Associates was acquired by Swiss Bank, CRT by Nations Bank, and Cooper Neff by BNP.

So the commercial banks had a significant toehold in the investment banking market before the 1999 repeal of the Glass-Steagall Act. By 1999 the financial engineering techniques that grew out of early applications of the Black-Scholes model to derivatives trading had achieved a high degree of sophistication. Today's traders rely upon computers to analyze and report the risks of derivatives, as well as to place a value upon them. And it is possible in today's financial markets to parcel up and sell virtually any risk. Commercial banks may have lacked some of the tacit skills of the older investment banking houses, but in place of such skills they were able to substitute financial capital and an investment in financial engineers.

The entry of commercial banks into the investment banking industry in the wake of the Gramm-Leach-Bliley Act provided concrete evidence of the codification of practice. A further development was to provide additional impetus to this codification. The series of serious corporate frauds that was uncovered at the turn of the century in Enron, Global Crossing, WorldCom, and others resulted in popular outrage, and ultimately in legislation intended to curb the perceived excesses of the corporate world. The Sarbanes-Oxley Act imposes rules for company audits, restricts company policies, and requires companies to set up formal and verifiable systems for tracking and checking internal controls. This legislation has therefore worked to undermine the informal and tacit contracting in which investment banks had historically specialized.

In short, the technological shift that started in the 1960s to codify some investment banking activities continued to gather pace through the 1990s and beyond. A combination of formal economic analysis and computerization has reduced the importance of tacit skill in many activities that were once the sole preserve of the skilled human capitalist. Players in the affected businesses are no longer protected by reputational barriers to entry, and they have been forced to expand the scale, and often the scope, of their businesses to compete. Houses like Morgan Stanley, which just 20 years ago were small privately owned firms that catered to America's elite fund-raisers, are today publicly quoted, full-service financial firms offering a wide range of services from retail brokerage to specialized corporate advice.

Is a full-service financial services firm really an investment bank in the sense that J. P. Morgan & Co. was a century ago? At one level this is a trivial question: investment banking is whatever the investment banks do. But it is reasonable to wonder what the costs of expansion have been for the biggest firms. Traditional investment banking is relationship- and reputation-intensive, and the tacit skill that it requires is best incubated in a small firm where informal peer-group monitoring is possible, and where there is relatively little staff turnover. Large full-service businesses have many obvious strengths, but they are forced by both their scale and the exigencies of regulation to use formal and codified reporting lines. It is very difficult in public companies to tie the skilled agent's fortunes to those of the firm in the way that older partnerships did. In short, it is harder for the largest firms to create an environment within which the traditional human capitalist can prosper.

Many tacit human capitalists have little need for the financial resources of a large firm. Indeed, many of them find the culture of such a firm unappealing.[29] Moreover, we have argued throughout this article that tacit skill is most effectively fostered in small, closely-held companies. It is perhaps unsurprising that the emergence of the full-service investment bank coincided with a rapid expansion in the

28. By 1988 $53 billion of loans were outstanding in the secondary loan market. See L. M. Benveniste, M. Singh and W. J. Wilhelm, Jr. (1993) "The Failure of Drexel Burnham Lambert: Evidence on the Implications for Commercial Banks," *Journal of Financial Intermediation* 3: 104—137.

29. We discuss cultural influences upon employee effectiveness in A. D. Morrison and W. J. Wilhelm, Jr. (2005) "Culture, Competence, and the Corporation," Working Paper, Saïd Business School, University of Oxford.

market for small boutique-style firms that sell tacit knowledge. Many of these firms are constituted as partnerships; those that are not are small and closely-held. Hence they can offer the collegiality and the peer-group monitoring that characterized the older investment banking partnerships. Scott Bok, the U.S. co-president of the advisory boutique Greenhill & Co., stated in a recent interview that "We're trying to re-create what existed at the bigger Wall Street firms 20 years ago."[30]

We discuss the work of the boutique investment banking firms in detail in the final chapter of our book. We identify three areas in which such firms are likely to be particularly competitive. The first is advisory work, both in M&A and in corporate restructuring. One of the earliest M&A advisory firms was Wasserstein Perella, whose eponymous founders arguably created the modern M&A market.[31] The 1990s saw a steady rise in the number of boutique M&A advisors, partly because M&A specialists frequently found the boutique firms more appealing places to work than the larger investment banks, and partly because boutique firms are free of the conflicts that could potentially arise in full-service firms.[32]

M&A advice is a relatively recent business line for investment banks, which identified it as a separate business line only in the 1960s. Corporate restructuring advice, on the other hand, has been an important business line for investment banks since the middle of the 19th century. Like M&A advisory work, it relies upon long-term relationships and trust, and therefore sits comfortably in specialist boutique firms like DKW and Houlihan Lokey. These firms experienced an upswing when the dot.com bubble burst at the start of this century.

Investment bank boutiques act as principals in two businesses: private equity investment and hedge fund trading. Private equity houses make control investments in unlisted equity. The tacit relationship and analytic skills that are important for advisory businesses are also essential for the activist investment management that the private equity business requires. Indeed, we described earlier the use that J.P. Morgan's 19th-century partners made of their relationships and contacts as board members and active investors. If similar skills are required in the private equity business, it is no surprise that so much private equity investment occurs within boutiques that can support informal reporting, flat reporting lines, and the teamwork upon which they rest.

Finally, we argue that hedge funds can be viewed as investment bank boutiques. The immense scale of the trading operation in the typical full-service investment bank reduces costs and ensures that clients receive the most comprehensive service possible, but it relies upon codified risk-management systems and systematized monitoring of trader activities. These features are hard to reconcile with the most complex and hard-to-codify proprietary trading businesses. Traders working in these businesses are increasingly choosing to work outside the organizational and regulatory constraints of the traditional investment bank. The unregulated and privately owned institutions to which they have moved are known as hedge funds.

In summary, boutique firms emerged because it became increasingly difficult for investment banks to combine their codified large-scale activities with the tacit human capital businesses they had traditionally performed. The compensation structures, career structure, and governance arrangements that work for more codifiable activities are inappropriate for businesses that rely upon the tacit skill that has traditionally been the investment banker's chief selling point. Hence, to the extent that clients still demanded tacit skills, investment banks had to spin off into boutiques.

The growth of boutique businesses could therefore be attributed, at least in part, to the desire of the larger investment banks to outsource businesses for which their size and governance arrangements made them ill-suited. In support of this interpretation of industry dynamics, we can point to the frequency with which the two types of firms work together. Full-service banks often recommend an advisory firm to a client that requires an unbiased "fairness opinion" on their pricing recommendations. And, in another increasingly common arrangement, full-service institutions help clients to resolve governance problems by referring them to private equity firms that can take them private and provide close monitoring. Investment banks are also paying high prices for stakes in hedge funds. We argue that this is happening precisely because hedge fund trading skills cannot be incubated within investment banks. Hence the banks stand at arm's length from the funds, take capital stakes in them, and provide them with the codifiable settlement skills they require.[33]

In short, investment banks are outsourcing their most complex and hard-to-codify trading to organizations that are better able to provide the right incentives and governance structures to the traders.

Overview

To sum up, then, technological and regulatory changes that favor codifiable skills have resulted in a restructuring of the investment banking industry. Large full-service institutions provide capital-intensive and more codifiable services.

30. "Real Simple," Heidi Moore, *The Deal*, 17 February 2006.

31. Wasserstein Perella was sold for $1.4 billion to Dresdner Kleinwort bank in 2001. Perella left the firm in 1993 and went to work at Morgan Stanley; he is currently establishing a new investment bank. Wasserstein is now the chief executive of Lazard.

32. For example, Simon Robertson Associates acts only for one company in each sector, and is paid via an annual retainer, rather than on a deal-by-deal basis. See "Boutiques: Activity surge may test the smaller firms," Lina Saigol, *Financial Times*, 4 October 2005.

33. "Hedge Funds Boost Income," *Financial Times*, 28 November, 2005.

34. For a discussion of outsourcing by hedge firms of settlement tasks see "Why Custody Banks Now Have a Global Glow," Clint Riley, *Wall Street Journal* p. C1, November 2, 2006.

Services that remain tacit are increasingly separated from the large firms, which find it hard to provide the incentive structures upon which tacit human capital businesses depend. Hence, on the one hand, advisory business, private equity investment, and hedge fund trading are often performed in focused boutiques. On the other hand, complex codifiable activities like trade settlement, foreign exchange trading, and custodial services are provided by the financial supermarkets.[34]

If future technological advances further increase the "codifiability" of investment bank skills, they could have equally profound effects. For example, it is increasingly possible to separate the technical and codifiable element of investment analysis from the tacit part. Advances in communications technologies mean that codifiable analysis can be performed anywhere. A good deal of equity analysis is now performed in India[35]—and junior analysts in New York look increasingly like project coordinators.[36]

Improved computer technology is undermining the importance of tacit contracting in related areas, too. Earlier in this article we pointed to the historic role of the NYSE in enforcing extra-legal contracts. In the absence of detailed public information about trades, the Exchange relied upon its reputation, and the concern of member firms for their reputations; and, like the early investment banks, the NYSE could rely upon its reputation to create a barrier to entry that ensured it would earn an economic rent from its activities. Modern communications technology is changing all of that. It is becoming easier, and it will eventually be easy, to create electronic marketplaces for equity trades. Provided the participants in these marketplaces can publicize their actions in a way that puts their reputations at stake, the need for exchanges to guarantee adherence to the rules through the threat of exclusion will be diminished. As evidence of this trend, seven investment banks have recently announced plans to develop a proprietary trading platform to compete with the established European exchanges.[37]

Conclusion

Investment banks emerged as intermediaries in informationally sensitive transactions based on an *informal* contracting process that could not be adjudicated by the courts. The banks established long-term profitable relationships with key information providers and used this information, together with a valuable reputation for probity, to attract security issuers. The traditional investment banker had a largely tacit skill set. He learned his trade during a long on-the-job apprenticeship in a firm that could provide the close relationships, the mentoring, and the peer-group monitoring upon which tacit skills rely.

The information technology revolution of the late 20th century changed everything. Many traditionally tacit skills were codified, and massive economies of scale became possible. Investment bankers jettisoned the partnership form that had fostered their creation and use of tacit skill in favor of joint stock incorporation, which gave them access to the capital required to harness the new economies of scale.

Tacit skill did not become irrelevant in the closing years of the 20th century, but it did become harder and harder to reconcile it with the formal reporting lines and the increased scale of the older investment banks. An industry reorganization was perhaps inevitable. Using new communications technologies, investment banks have started to spin off their most human capital-intensive activities into boutique investment houses, while at the same time retaining the settlement, trading, and analysis tasks that lend themselves most naturally to codification and computerization.

What does the future hold? We do not have a crystal ball, but we think that we can draw some conclusions from the research summarized in these pages. Further technical advances, coupled with an increasingly strident regulatory state, will likely result in more codification, more systematization, and more consolidation in the largest investment banks. This trend will take the biggest players farther from their origins in tacit human capital businesses. But tacit skill and informal contracts based upon reputation will remain central features of informationally intensive security market trades. The challenge facing the largest investment banks is therefore to reconcile their scale and their codification with the tacit skills upon which so many of their rents ultimately depend.

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35. See for example "Wall Street Jumps on the Offshoring Bandwagon," Khozem Merchant and David Wighton, *Financial Times*, 5 December, 2005.

36. This observation was made to us in a personal conversation with Logan Montcrief, at the time an associate with J.P. Morgan Partners – the private equity division of JP Morgan Chase. In August 2006, the professionals from J.P. Morgan Partners, led by Jeffrey Walker, formed CCMP Capital Advisors "to continue the buyout and growth equity investment strategy developed by its professionals as members of J.P. Morgan Partners" (CCMP website).

37. See "Big Deal," Kyle Wingfield, *Wall Street Journal*, p. A14, November 20, 2006.