

The Value of Bank Capital and the Structure of the Banking Industry

Franklin Allen

University of Pennsylvania

Paolo Fulghieri

University of North Carolina-Chapel Hill

Hamid Mehran

Federal Reserve Bank of New York

The critical role played by financial institutions in the recent financial crises has generated renewed interest on the corporate finance of the banking firm and the impact of the banking sector on the real economy. This paper introduces the special issue of the *Review of Financial Studies* dedicated to “The Value of Bank Capital and the Structure of the Banking Industry.” The special issue combines papers presented at the conference on “Corporate Finance of Financial Intermediaries” in September 2006, which was jointly organized by the Federal Reserve Bank of New York, the Wharton Financial Institutions Center of the University of Pennsylvania, and the *Review of Financial Studies*, with other related papers. (JEL G21)

This special issue combines papers presented at a conference in September 2006 that was organized jointly by the Federal Reserve Bank of New York, Wharton Financial Institutions Center of the University of Pennsylvania, and the *Review of Financial Studies* together with other related papers. The original call for papers for the conference was concerned with the Corporate Finance of Financial Institutions, but relatively few papers were submitted on this topic. While there has been a growing literature on various corporate decisions by nonfinancial firms and the nature of corporate policies when influenced by financial institutions, how intermediaries decide their own investment, financing, dividends, and many other internal policies has not received much attention. This is surprising given the importance of intermediaries in the growth of economies as well as their vital role, particularly banks, in the payment system and as liquidity providers in times of crisis. Only the first two papers in the

Send correspondence to Paolo Fulghieri, Kenan Flagler Business School, University of North Carolina, Chapel Hill, NC 27599; telephone: (919) 962-3202. E-mail: Paolo.Fulghieri@unc.edu.

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special issue are concerned with the corporate finance of financial institutions. They focus on the role of bank equity. The remaining papers are concerned with the structure of the banking industry. The third and fourth investigate the effect of bank mergers on customers. The next two consider relationship banking, the seventh the role of trade credit, the eighth the legal advantages of securitization, and the final two contagion and crises.

Bank Capital

How much equity should banks use in their capital structure? The amount of equity used by banks has varied substantially over time. During the nineteenth century, capital ratios were much higher than in recent times. [Berger, Herring, and Szego \(1995\)](#) report that in the 1840s and 1850s banks in the U.S. had capital ratios of around 40 to 50 percent. After that they fell until they reached the 6-percent to 8-percent range in the 1940s, where they stayed until the end of the 1980s. In the 1980s regulation of bank capital became more important as other kinds of bank regulation were reduced. [Flannery and Rangan \(2008\)](#) document that in the 1990s, large banks in the U.S. increased their capital well above the regulatory minimum. Why they did this is a puzzle. It is widely assumed in the banking literature that equity is a costly form of finance for banks and other financial institutions. This suggests that banks should minimize the amount of capital they use, and if there is a regulatory minimum, this should be binding. In practice, this is not the case.

In the first paper, Allen, Carletti, and Marquez develop a model of a competitive credit market where equity capital is costly but banks may nevertheless choose a level that is above the minimum regulated amount. Their model is thus consistent with what is observed. The market failure they focus on is an agency problem within the firm between the shareholders and managers. Banks can help solve this agency problem by monitoring the firm. The authors model this agency problem by assuming that the greater the amount of bank monitoring, the greater the probability the firm's investment is successful. Bank monitoring thus has two effects. The first is that it increases the probability that the firm's loan is repaid. This provides an incentive for the bank to monitor. The second is that the firm's owners are also better off as a result of the monitoring. Bank loans may therefore be desirable from the firm owner's point of view. A higher loan rate gives the bank a greater incentive to monitor because it receives a higher payoff on average. This is not, however, the only way to provide banks with an incentive to monitor. In addition, the amount of equity capital the bank has affects its incentive to monitor in the usual way. The more capital there is, the greater the loss the bank's owners will face if the loan is not repaid, and so the greater their incentive to monitor. Thus, incentives for the bank to monitor are provided by the loan rate and the amount of capital.

For most of their analysis, Allen, Carletti, and Marquez consider the case where banks operate in a perfectly competitive loan market so that borrower

surplus is maximized. They first consider the case where there is no deposit insurance. Since depositors do not receive anything if banks' projects are unsuccessful, they require a premium in non-default states in order to be willing to deposit their funds. By encouraging monitoring, bank capital reduces the premium that needs to be offered to depositors. This rationale for holding capital acts through the bank's liabilities. In addition, there is also an asset-side incentive to hold capital, since the market equilibrium entails a combination of capital and loan rate that maximizes borrower surplus. The loan rate is set at the lowest level consistent with bank participation, and the remaining incentives for monitoring loans are provided by banks holding positive amounts of capital. Thus, competition in the loan market induces banks to voluntarily hold positive levels of capital as a way to commit to greater monitoring, and these positive levels may be above actual regulatory minimums. When deposits are insured, the degree of monitoring no longer affects a bank's cost of deposits. Nevertheless, as in the case without deposit insurance, the market solution entails a positive amount of capital as a result of the competitive pressure in the credit market.

In the second paper, Mehran and Thakor address a classic question—whether there is an optimal capital structure for each bank, and if so, what this implies about how bank capital and value are related in the cross-section—within a new context of bank mergers and acquisitions. Their focus on acquisitions, particularly those involving purchase accounting, offers several advantages. First, since acquisitions using purchase accounting separate out goodwill from the rest of the purchase price, they are able to empirically examine the impact of bank capital separately on the portion of the bank value that represents the stand-alone values of the bank's assets and liabilities and the portion that represents the synergies between them. Indeed, it is difficult to imagine how one could reliably separate synergies from stand-alone values outside an acquisitions setting. Second, because the bank's assets and liabilities are marked to market in order to compute fair market value, accounting distortions in the measurement of the stand-alone values of the bank's assets and liabilities are minimized. Such marking of all assets and liabilities (as well as off-balance sheet items) occurs *only* in an acquisition involving purchase accounting. Finally, by examining the impact of the target bank's capital on goodwill, the effects of accounting distortions inherent in the book-value measurement of synergies are minimized.

This explicit focus on mergers is in contrast to the standard approach in empirical capital structure studies, which usually sees acquisition as an empirical hassle, rather than an opportunity. Acquisitions are a very special kind of investment, and the way that they are financed may then have capital structure connotations that do not reflect the acquiring firm's equilibrium capital structure and lead to misleading results. However, rather than focusing on the acquiring firm's capital structure, the authors focus on the *pre-acquisition* capital choice of the *target* and how it affects the different components of the

target's value. In this sense, mergers that use purchase accounting provide the ideal data because of the financial-reporting requirement to decompose the total price paid in the acquisition into components with interesting economic interpretations. This makes it possible to gain a deeper understanding of the link between bank capital and value than would be possible by only examining the usual capital structure question.

The main result of their model is that there is an optimal capital structure for each bank, and it is such that, in the cross-section of banks, value is *increasing* in capital, regardless of how value is measured. This is counter to what is popularly believed, that bank value is decreasing in capital. In fact, bank capital seems to positively affect total bank value as well as the components of this value in the cross-section of banks, at least within an acquisitions context. These results, which are both statistically and economically significant, are robust even after the authors use a host of exogenous control variables like acquirer size, acquirer stock returns, acquirer capital, acquirer risk, market power, the banking sector's stock index returns, target stock returns, the size of the target relative to that of the acquirer, and the location of the target relative to the acquirer. They thus provide the first empirical test of Miller's (1995) assertion that the M&M leverage indifference theorem holds for banks, and conclude that it does not hold. However, Mehran and Thakor state that their analysis does not account for any potential externalities or other social welfare considerations in a general equilibrium context that may affect regulatory decisions about where to set capital requirements. Therefore, their analysis is not meant to be prescriptive in terms of regulatory policy.

The Effects of Bank Mergers

In the third paper, Erel untangles the effects of bank mergers on borrowers by examining the resulting loan spreads, volume, and composition. As the author points out, there are two opposing predictions for how the interest rates of a newly merged bank should change—rates could be lower if the benefits of increased efficiency of the merged institution are passed on to borrowers, or rates could be higher if the merged bank exercises its additional monopoly power. A host of factors could potentially influence the direction of the change, including the relative size of the acquirer, the realization of economies of scope and scale, the existing geographic overlap of the markets of the acquirer and the target, as well as overlap in the services provided.

The author finds that in fact that loan price spreads do decline after a merger takes place, which implies that the effects of the increased efficiency and productivity of the new bank outweigh potential monopolistic considerations. The findings support the theory that while some market overlap between the acquiring bank and the target provides the opportunity for reoptimization and reorganization to take advantage of potential synergies, large market overlap predicts increased market power and monopolistic behavior. These results

remain robust to a battery of significance tests, as well as the utilization of intrastrate branching deregulation as an instrument to address concerns about the potential endogeneity of the merger timing decision. Previous literature has considered the different lending paradigms of small and large banks—a priori, there is an expectation that large banks may use quantitative, information-based loans as compared to the qualitative, relationship-based loans of small banks. The findings of this paper suggest that credit availability for small businesses post-merger may be affected by the competition of the banking market, as well as bank-specific preferences.

The fourth paper, by Degryse, Masschelein, and Mitchell, uses Belgian data to investigate in detail the effects of bank mergers on small firms. While in the U.S., new small-bank entrants tend to fill the void after a bank merger, this is not the case in Europe, so Belgium provides a good setting for investigating this question. Their data set provides sufficient detail that they are able to provide evidence that bank mergers do result in lower credit availability and harm to some small firms. Their analysis focuses on the “staying,” “switching,” or “dropping” of bank-firm relationships following bank mergers. They distinguish between borrowers with single and multiple banking relationships. Banks with a single relationship presumably do better with a switch than a drop, while a switch or a drop is less important for multiple relationship banks because they can satisfy their needs with their other banks fairly easily. The authors are able to track firm performance for three years following a stay, switch, or drop. This allows them to measure the differing impacts of the alternatives. It also allows them to check that targets are not taken over because they are failing to drop borrowers that are not creditworthy by using as a benchmark what would have happened econometrically in a non-merging bank.

Among single-relationship borrowers, Degryse, Masschelein, and Mitchell find that the performance of merger-induced target droppers is significantly better than the performance of droppers from nonmerging or acquiring banks. These results imply that some firms do appear to have been harmed by the merger of their bank. Among firms with multiple relationships, target bank borrowers have a higher discontinuation rate than similar nonmerging bank borrowers, while acquiring bank borrowers have a lower discontinuation rate. Firms that have a relationship with both the target and the acquirer have the lowest discontinuation rate.

Relationship Banking

Bharath, Dahiya, Saunders, and Srinivasan extend our understanding of the importance of lending relationships between financial intermediaries and firms by examining the impact of past association with a bank for publicly listed, widely held firms. Theories of relationship lending argue that borrower-lender information frictions caused by adverse selection and moral hazard can be mitigated if the lending is done by a single private lender such as a bank (Diamond

1984; Ramakrishnan and Thakor 1984). These risk mitigation benefits are further magnified in relationship lending where repeated interactions allow for production of borrower-specific durable and reusable information (Boot 2000). A number of studies of small, privately held borrowers have provided support for the benefits of relationship lending. However, while it seems plausible that the advantages of information production and monitoring relationships would be very small for large, publicly listed firms, the authors find that relationship lending continues to provide economically and statistically significant reductions in loan spreads. This reduction is most pronounced for informationally opaque borrowers, which is consistent with relationships mitigating information asymmetry. These results provide empirical support for information-based theories of financial intermediation even for this class of borrowers.

In light of this initial finding, the authors attempt to estimate the boundary between relationship and transactional lending. To the best of their knowledge, this is the first paper to estimate the point beyond which relationship lending becomes indistinguishable from transactional lending in that there are no apparent loan yield/spread benefits to the borrower from past lending relationships. The results remain consistent with the intuition that banks can provide valuable monitoring in cases where the market cannot—size is a critical factor in determining the importance of relationships, as well as whether the firm has a public debt rating or is part of the S&P 500 index.

The authors next turn to the syndicated loan market to examine in closer detail how past lending relationships are related to observed loan characteristics across different lending syndicates. When a loan is shared among multiple lenders, there is an additional element of moral hazard between the lead lender, who is expected to be the primary monitor of the loan (Holmstrom and Tirole 1997), and the other members of the syndicate. Syndicate members differ in their ability to screen and monitor the loan, resulting in a moral hazard for the lead bank. The lead lender bears all the costs of monitoring the loan, but its share of the loan is less than one hundred percent. Past relationships, which lower the cost of future monitoring, can be seen as a commitment to monitor and can mitigate this syndicate moral hazard problem. The authors categorize loans into groups based on their potential for this syndicate moral hazard problem. The results—the lead bank's past relationships are associated with lower spreads in high moral hazard syndicates—underscore the important role financial intermediaries play as monitors of firms.

In the sixth paper, Dass and Massa point out that while it is widely accepted that bank loans may potentially improve overall capital allocation because of the special monitoring made possible by the inside information that comes with lending, banks may also exploit their informational advantage in the equity market and effectively become an insider. This dual effect on the borrower makes the banking lending relationship special. More broadly, this setting highlights the tradeoff between governance and liquidity, which is similar to the monitoring-liquidity tradeoff established in the corporate governance

literature (e.g., [Berle and Means 1932](#); [Coffee 1991](#); [Bhide 1993](#)). The paper also addresses the larger debate in financial intermediation on the distinction between bank-based and market-based financial architecture, and the implications of one prevailing over the other (e.g., [Allen and Gale 2000](#)). Although the implications of conflicts of interest due to underwriting or consulting activities of investment banks around M&A deals, IPOs, and bond-issues have been previously explored in the literature (e.g., [Puri 1996](#); [Schenone 2004](#); [Ritter and Zhang 2007](#)), the informational and liquidity implications of the lending activity of the commercial banks have hardly been considered. Not only does this paper provide that link, but it also shows that this impact can be sizeable.

There is anecdotal evidence suggesting that access to inside information enables banks to exploit this information advantage through their trading arms. For instance, a few years ago Barclays was accused of trading on confidential information obtained through its involvement in committees of creditors in distressed firms ([International Herald Tribune 2007](#)), and market participants frequently complain about banks' informational advantage due to lending. Commercial banks are often part of bigger financial conglomerates, with affiliated investment arms, such as investment banks, mutual funds, pension funds, and insurance companies, that can trade on the basis of information acquired through their lending activities ([Acharya and Johnson 2007](#); [Massa and Rehman 2008](#)). Thus, the privileged information of the commercial bank and its potential to influence the borrower's stock price by trading through its asset-management arm may increase information asymmetry and adverse selection for the investors in the borrower's stock. This creates disincentives for other investors to trade in this stock, thus lowering its liquidity.

However, there may be some benefits to a strong bank-firm lending relationship—namely, that it provides the bank with more power to shape the firm's internal corporate governance.

The authors find that a stronger bank-firm relationship increases the borrower's illiquidity, as well as the information asymmetry in the equity market. On the other side of the tradeoff, the paper presents evidence of a beneficial effect of a stronger bank-firm relationship reflected in better firm governance. What is the ultimate effect of the stronger lending relationship on the firm's value? On the one hand, better governance should lead to higher stock prices, but on the other hand, more information asymmetry and lower liquidity will increase the required rate of return on the stock, thus reducing its price. The authors find that, indeed, proxies of the strength of the lending relationship such as closer geographic proximity and greater loan significance have a positive influence on Tobin's Q and profitability, while a greater insider potential is negatively related to these measures of firm value. Overall, the net effect is negative. This implies that the beneficial effects in terms of better governance are more than offset by the negative implications of the lower stock liquidity.

Trade Credit

While monitoring commitments and relationships are important components in understanding bank-borrower financing, Giannetti, Burkart, and Ellingsen suggest that the industry and product of the borrowing firm also are significant. Though much of the previous literature on borrowing relationships has concentrated on borrower firm characteristics such as size, market share, funding structure, and so forth, the authors suggest that product and buyer characteristics can affect and shape the quantity and quality of monitoring offered by the lending bank. Their paper in this issue examines the trade credit market, an important source of funds for most firms that has usually been considered to be crucial for firms that are running out of bank credit. They show first how trade credit usage is correlated not only with the firm's balance sheet position, but also with the characteristics of the traded product and with the buyer's banking relationship. By relating trade credit to the nature of the inputs and banking relationships, the authors are able to uncover three novel empirical regularities about trade credit use and practice in the United States.

The first empirical regularity is that the use of trade credit is associated with the nature of the transacted good. More specifically, after controlling for debt capacity, suppliers of differentiated products and services have larger accounts receivable than suppliers of standardized goods. Service suppliers also appear to offer cheaper trade credit for longer periods, and do not refuse lending on the basis of the buyer's creditworthiness.

Though many mechanisms may be at work, overall, the empirical evidence lends most support to theories maintaining that suppliers are less concerned about borrower opportunism either because of strong customer relationships or because of the low diversion value of some inputs. Differentiated products and services are difficult to divert for unintended purposes. While standardized products command a market price and can be easily sold, this is not true for differentiated goods and services, which are impossible to resell. These factors help shield suppliers of differentiated goods and services from buyer opportunism.

The second empirical regularity is that firms that receive trade credit obtain financing from relatively uninformed banks. After controlling for a number of factors, firms that use trade credit tend to borrow from a larger number of banks, utilize more distant banks, and have shorter relationships with their banks. In addition, these firms are offered better deals from banks, in particular lower fees for their credit lines. Firms that borrow from numerous and distant banks for short periods are generally considered to have arm's-length relations with their lenders, as these banks can only gather limited information. It seems that firms that are being offered trade credit can secure other funding from financial intermediaries that are less informed about them. This finding challenges the standard notion that firms using trade credit do so because they are unable to access bank credit, and thus that trade credit

is primarily a last funding resort for firms that are running out of bank credit.

The final regularity is that the majority of firms in their sample obtain trade credit at relatively low cost. Contrary to the conventional wisdom, only a minority of firms in the sample are offered early payment discounts. The authors also find evidence that within an industry, firms with larger accounts payable have a lower total cost of inputs. Their other finding is that large firms receive more discounts.

Institutional and Legal Frameworks

As the literature on the corporate finance grows, it remains important to account for the institutional and legal framework of financial intermediaries. No firm exists in a vacuum, and financial intermediaries are no exception—if anything, as highly regulated entities they are subject to even more outside pressures than the average firm. Ayotte and Gaon analyze asset-backed securities within an optimal contracting framework. Prior to the financial crisis, ABS was a critical component of financing for many financial and nonfinancial firms. While previous literature has explored the risk-transference and regulatory arbitrage properties of asset-backed securities, the authors suggest that past work may have overlooked the unique costs and benefits of ABS financing within a broader legal context.

ABS contracts have a defining feature that distinguishes them from other financial contracts: namely, the special protection that securitization gives lenders under U.S. bankruptcy law. The bankruptcy process can be detrimental for the value of any asset—bankruptcy's automatic stay prevents creditors from seizing the debtor's property once bankruptcy has been filed. Though secured creditors are entitled to seniority, courts have held that secured creditors are not entitled to compensation for the lost time value of money. This can be particularly costly for financial assets, whose value is often very time sensitive. Thus, the defining feature of securitization is the ability to transfer assets to a special purpose vehicle (SPV), to create bankruptcy remoteness of the securitized assets from the borrowing firm. This takes securitized assets outside the bankruptcy estate, allowing them to be passed through directly to lenders, even if the borrowing firm enters bankruptcy. This not only enhances the certainty of the promised payment stream to lenders, it also protects their value from dilution.

Ayotte and Gaon exploit the shock of an unexpected legal decision that cast doubt on whether securitization would continue to be eligible for bankruptcy remoteness to identify the effect of bankruptcy remoteness—and through it, the benefits of timely resolution and certainty within the bankruptcy process—on credit spreads in ABS markets. The experimental design makes use of the fact that some firms that borrow in securitization markets were eligible for Chapter 11 if they failed, while others were ineligible and instead would use

FDIC receivership procedures. Receivership rules explicitly protect the unique remoteness properties of securitization; hence, the bankruptcy-ineligible securitizers make a natural control group for those eligible for Chapter 11 and thus vulnerable to the legal shock. The authors find empirical evidence that supports the notion that a substantial part of the appeal of ABS lies in their legal treatment during bankruptcy, value that would be missed if they are examined purely within a financial setting.

Contagion and Crises

The global crisis that started in the summer of 2007 has underlined the importance of contagion in the banking sector. Although there have been many theoretical analyses of contagion, there have been few empirical analyses of this phenomenon. The reason is that in recent years, central banks and governments have used every means at their disposal to prevent contagious collapses. In addition, when collapses do occur, there is usually not detailed data available concerning interbank exposures. Finally, in a crisis there is always the problem of separating the cause of the first bank's failure that may impact other banks and the effects of the contagion. Iyer and Peydró are able to overcome these problems by considering a unique natural experiment. They investigate the failure of a large Indian cooperative bank caused by fraud. The bank was not bailed out because economic circumstances were good and other banks were not affected by the fraud. In addition, the authors were able to obtain detailed data concerning interbank exposures.

They obtain several important results. The first is that higher interbank exposures lead to larger deposit withdrawals. Extensive robustness checks suggest that it is the exposure itself rather than other factors correlated to exposure that are the reason for the result. The second result is that weaker banks suffer from a higher degree of contagion, where weaker is associated with lower levels of capital, smaller size, and classification by the regulator as weak. The third is that interbank linkages further propagate the shock. It is not only banks that withdraw, but also retail depositors. The fourth result is that there are real effects from the contagion. Banks with higher exposure levels experience reductions in loan growth and profitability. Other banks have increases in deposits as a result of these withdrawals, but they hoard the liquidity rather than increasing lending and their profitability is not affected.

Iyer and Peydró's paper thus provides important evidence concerning the effects of contagion. It is indeed damaging, as previous theoretical papers have suggested, but previous empirical work has been unable to convincingly establish this.

A number of studies based on a single country or a few countries have identified a Too-Many-to-Fail effect. This refers to a situation where the weaker the banking system and the greater the number of banks that are in trouble, the less likely the banking regulator or government is to intervene to deal

with failing banks. Such studies suffer from the problem that there are many country-specific factors involved in decisions to intervene and it is therefore difficult to convincingly isolate the Too-Big-to-Fail effect. In the final paper in the issue, Brown and Dinç seek to overcome these difficulties by considering 21 emerging market countries in the 1990s.

One of the major problems in studying bankruptcy, whether it is in the banking sector or in the corporate sector, is to take into account of mergers that were undertaken as a substitute for bankruptcy. This paper develops a novel econometric methodology for dealing with this issue. In a standard hazard model, there is typically only one type of exit, namely in this context, bankruptcy. Brown and Dinç term the methodology they develop to additionally deal with exits due to mergers, *competing risk hazard analysis*. This takes account of the interdependence of the types of exit. They assume that at most only one type of exit can occur in any given instant and that each type-specific hazard function is exponential in form. The hazard function they estimate has an unobserved heterogeneity term that is akin to a “random effects term” as in Han and Hausman (1990) and Sueyoshi (1992). This methodology is an important contribution of the paper.

The authors identify a robust Too-Many-to-Fail effect. The factors that they control for include macroeconomic conditions, financial crises, the Too-Big-to-Fail effect, domestic financial development, the exposure of other banks to the failing bank, and information spillovers. They also find that the Too-Many-to-Fail effect is stronger for larger banks and when there is a larger government deficit. While the study is limited to emerging countries, Brown and Dinç argue that their results are also likely to hold for developed countries.

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