Where do merger gains come from? Bank mergers from the perspective of insiders and outsiders[☆]

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Abstract

Traditional studies fail to find conclusive evidence that bank mergers create value. We analyze a sample of the largest bank mergers between 1985 and 1996. For a subset of this sample, we obtain management estimates of projected cost savings and revenue enhancements. We find that recent mergers appear to result in positive revaluations of the combined value of bidder and target stocks. Although not as large as the present value of management's estimates, with the bulk of the revaluation being attributable to estimated cost savings rather than projected revenue enhancements. © 2001 Elsevier Science S.A. All rights reserved.

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1. Introduction

The academic literature on the value gains from bank mergers creates a troubling paradox. Empirical studies examining the stock market reaction to merger announcements find little evidence of wealth creation, with shareholders of the acquired firm gaining at the expense of shareholders of the acquiring firm (see, e.g., Houston and Ryngaert, 1994). Similarly, there appears to be little or no improvement in the post-acquisition operating performance of merged banks relative to industry peers (see, e.g., Piloff, 1994; Berger et al., 1999). The lack of econometric evidence of efficiency gains is quite surprising given that bank mergers continue at a rapid pace and that an important impetus for consolidation has been the removal of geographic and product market entry restrictions that are generally believed to impede operating efficiency and bank profitability.

One interpretation of this paradox is that the current wave of bank acquisitions reflects either managerial hubris and/or a massive corporate control problem that results in value destruction for acquiring firm shareholders. For example, Ryan (1999) argues that most bank acquisitions are not in shareholders' interests. Gorton and Rosen (1995) argue that the primary motive for bank mergers is empire building by managers who are insulated from the market for corporate control. For a general discussion of the role of managerial hubris in acquisitions, see Roll (1986). An alternative interpretation is that consolidation has improved the operating efficiency of the banking industry, but the corresponding benefits have not been fully captured in previous large sample studies.

In this paper, we try to sort out these issues by taking a closer look at the sources of merger-related gains in banking. Our analysis differs from previous studies of bank acquisitions in two ways. First, we analyze only large bank mergers over a longer time period that includes more recent mergers. By using only large acquisitions, our sample allows us to detect valuation consequences more readily than a sample including smaller transactions. By analyzing transactions over a period of 12 years (1985–1996), we are able to investigate whether the rationales and wealth consequences of large bank mergers have changed over this time period.

Second, for 41 acquisitions we obtain management's projections of the merger's estimated cost savings and revenue enhancements. These projections allow us to identify management's primary rationale for these acquisitions and also enable us to quantify the likely valuation consequences of the acquisitions. While it is often treacherous to "take management's word for it" on a given matter, we try to verify the credibility of management's claims. In the spirit of recent work by Kaplan and Ruback (1995) and Gilson et al. (2000), we estimate the present value of the incremental earnings that management expects from the merger. We then investigate the relation between these estimated gains and the change in the market value of the stock of the bidder and the target. This

analysis indicates the extent to which investors agree with management's projections of cost savings and revenue enhancements, which in turn provides important insights into what the market is looking for when it values bank mergers. To further gauge the credibility of management's projections, we also examine stock analysts' reports shortly after announced mergers to see if analysts concur with management. Finally, we examine post-merger performance to determine if it is consistent with managerial forecasts.

Like previous studies, we find that the market value of the acquiring bank declines and the market value of the acquired bank increases on the announcement of a merger. For the entire sample of 64 mergers, the combined market value of the bidder and target on average increases slightly on the announcement of the transaction. Consistent with Becher (1999), we find that a shift has occurred over time. Compared to the 1980s, average abnormal returns have been higher for both bidders and targets in the 1990s. The higher returns have been accompanied by an increased frequency of "in-market" mergers in the 1990s. Interestingly, there has also been a significant increase in the 1990s in the numbers of deals in which management makes an explicit forecast of expected cost savings and/or revenue enhancements.

Focusing on the sub sample of 41 mergers that include managerial projections, we find that the primary source of management's expected merger-related gains is cost savings. Revenue enhancements are far less important. Indeed, our valuation of estimated revenue gains account for, on average, only 7% (the median is zero) of the total valuation gains implied by management's estimates. The total implied valuation gains are generally quite large, although the estimated gains are sensitive to the assumptions used with respect to the duration of incremental earnings and the rate used to discount those earnings. Under optimistic assumptions that incremental merger-related earnings are perpetual and grow at the inflation rate, we estimate that the average sample merger should increase the combined value of the bidder and target by 13%.

Looking at the market's reaction to merger announcements, we find that management's projected merger gains explain roughly 60% of the cross-sectional variation in the combined bidder and target stock returns. Interestingly, while valuation estimates of projected cost savings are positively related to the combined stock market returns of the bidder and target, the valuation estimates of projected revenue increases are negatively related to these same stock market returns. Thus, our results suggest that cost savings represent the primary source of gains in the large majority of recent bank mergers and that managerial cost savings projections have significant capital market credibility.

While stock market valuation changes are highly correlated with the valuations we place on management's estimated merger benefits, we are limited in what we can say about whether the magnitude of stock market changes is commensurate with the magnitude of revaluations implied by managerial forecasts. Under the most "optimistic" valuations of management forecasts, stock

market value changes appear "too small." When one considers potential errors in the valuation of incremental earnings gains, anticipation of likely takeover deals, and information conveyed by the merger announcement unrelated to merger gains, it is difficult to assess whether the market is fully valuing managerial claims or is heavily discounting them as overoptimistic.

To shed more light on the credibility of managerial forecasts, we examine analysts' reports for our subset of 41 mergers. For the most part, analysts seem to buy into management's cost savings projections. To the extent that cost savings projections are questioned, the analysts are as likely to suggest that the estimates are too conservative as they are to claim them to be too optimistic. Consistent with observed stock market reactions, however, analysts appear to be skeptical about revenue projections. In some cases, analysts also suggest that cost savings are likely to lead to revenue losses that management does not discuss. There are also cases in which management is including cost savings in their forecasts that could be achieved in the absence of the merger. Again, however, it is not clear that this is evidence of managerial hubris. For example, numerous press articles provide examples in which management teams expect some loss of revenue in a merger. Not discussing these likely losses could merely indicate an attempt to downplay merger negatives.

To obtain a final gauge of the credibility of management forecasts, we examine merged banks' post-merger performance by looking at managerial disclosures and press accounts. In the majority of transactions, management claims to have met its cost-cutting targets. Following mergers, we also find increases in merged bank operating performance measures that are correlated with management cost savings estimates.

The remainder of the paper is divided into four sections. Section 2 reviews the previous literature on the gains from bank acquisitions and discusses why the techniques used in large sample studies of bank acquisitions fail to uncover merger gains. Section 3 describes our sample and methodology. Section 4 presents our empirical results and Section 5 summarizes our findings and offers conclusions.

2. Finding value enhancing mergers in banking: review of previous literature

2.1. Rationales for bank mergers

Bank mergers can increase value by reducing costs and/or increasing revenues. Cost reductions can be achieved by eliminating redundant managerial positions, closing overlapping bank branches, vacating redundant headquarters facilities, and consolidating back office functions like check clearing. Cost-cutting potential may be greater when merging banks have geographic overlap. Bank executives frequently claim that mergers with considerable operations

overlap can result in cost savings equal to 30% of the target's non interest expenses. Revenue enhancements can come from a variety of sources. The most frequently cited source is cross-selling of bank services. For instance, one reason for First Union's acquisition of First Fidelity Bancorp was to market its brokerage and mutual fund services to First Fidelity's customers. The ability to raise fees and lower interest rates on deposit accounts (and hence raise net interest revenue) is also cited as a motivation for acquisitions. John McCoy of Banc One argued in the 1980s that many banks mistakenly followed strategies such as meeting competitors' fees. McCoy believed that many bank products were price inelastic and that customers would agree to pay more for high-quality, promptly delivered services (see The American Banker, October 20, 1987, p.1).

In spite of these opportunities to create value, implementing these actions is not problem-free. Conflicts over "who is in charge" can delay cost-cutting efforts, and reluctance to lay off staff can eliminate large cost-cutting opportunities. The integration process can also result in losses of bank customers and significant "restructuring costs" such as severance payments and lease buyouts. Customer run off and integration costs can be magnified when computer glitches slow down the integration process and cause disruption in customer service. Additionally, promised revenue enhancements might not materialize if customers rebel against fee increases or are not interested in the new services offered by an acquiring bank (see *The American Banker,* December 9, 1997, p. 25).

2.2. Review of the past literature

Academic studies of merger-related gains in banking generally follow one of two approaches; see Berger et al. (1999) for an excellent literature review on gains from bank mergers. The first approach examines changes in the merged banks' post-merger accounting profits (ROA or ROE) or operating costs, measured by operating costs per employee or the bank's efficiency ratio (where the efficiency ratio is noninterest expense divided by the sum of net interest income and noninterest income) relative to the pre-merger pro forma performance of the merging banks. The merger is assumed to generate improved performance if the changes in accounting-based performance are superior to the changes in the performance of comparable banks that were not involved in merger activity. The results of these studies are mixed. For example, Cornett and Tehranian (1992) and Spindt and Tarhan (1992) find increases in post-merger operating performance, while Berger and Humphrey (1992), Piloff (1996) and Berger (1997) do not.

The mixed conclusions are not surprising given the numerous empirical difficulties associated with these studies. For example, even if mergers improve performance, accounting-based studies can fail to detect it because the lags between the completion of mergers and the realization of operating

improvements can be long and varied. Indeed, restructuring and consolidation costs can lead to deterioration in short-term performance even though long-term performance is expected to improve. This problem is compounded by the fact that many banks make multiple acquisitions over a short span of years. To partially combat this problem, studies such as Piloff (1996) restrict the sample of analyzed mergers to banks with limited acquisition activity around each usable observation. Similar restrictions are placed on the industry benchmark firms.

Unfortunately, the above solution raises the problem of selection bias. Focusing on infrequent acquirers can overweight a sample with mergers that were poorly implemented, because failed acquirers will tend to abstain from future acquisitions while successful acquirers will tend to seek new and bigger deals. The selection bias problem also extends to industry benchmarks. It is difficult to construct benchmarks of non acquiring banks in a rapidly consolidating industry. Those that do not acquire at all might have some peculiarities that can bias test results. Selection bias problems also go to the question of the timing of acquisitions. Houston and Ryngaert (1997) find that most acquiring banks issue stock to finance their mergers. Banks might be willing to make stock-financed acquisitions only when they are at an earnings peak and foresee future profit declines. In a non banking context, Loughran and Ritter (1997) find that equity issuers experience a drop in profitability after an equity issue.

Another problem with using accounting data arises from the accounting rules governing mergers. As Kwan and Wilcox (1999) point out, in mergers involving the use of purchase accounting, the cost basis for the acquired bank's assets is written up to the current market value. As a result, accounting expenses associated with depreciated assets (such as property and equipment) can increase even though the transaction creates real efficiencies. Discretion accorded managers in expensing restructuring charges and loan charge-offs can also cause accounting-based measures to provide a distorted picture of merger-related gains.

The second approach to analyzing merger gains examines the stock price performance of the bidder and the target firm around the announcement of an acquisition (see, e.g., Houston and Ryngaert, 1994; James and Weir, 1987; DeLong, 1998). A merger is assumed to create value if the combined value of the bidder and the target increases on the announcement of the merger. Most studies find negligible evidence of value creation and instead document what appears to be wealth redistribution. The value of the target increases about 15% in the five days around the merger announcement and the value of the bidder decreases about 2% percent. The two effects roughly cancel each other out in terms of revaluation of the joint firms because targets are smaller than bidders.

There are several reasons why stock return evidence fails to find gains from acquisitions even if they exist. First, merger announcements mix information concerning the proposed acquisition with information about the financing of the acquisition. Bank acquisitions tend to be financed by stock issuance. Stock

offerings are generally interpreted as signals of the issuer's "overvaluation." Hence, the negative announcement returns to bidding firms could be partly attributable to negative signaling unrelated to the value created by the merger. Consistent with this view, Houston and Ryngaert (1997) find that the returns to bidders are significantly greater in bank mergers financed with cash than mergers financed with stock.

A second shortcoming of abnormal return studies is that, in the midst of a consolidation wave, acquisitions are largely anticipated. Consequently, the positive merger effects on bank value do not appear in announcement-date stock returns. This problem is particularly acute for likely acquisition targets. For example, the Dow Jones News Service of July 17, 1995 highlights a report in Barron's that five bank stocks "thought most likely to be acquired, are starting to look fully valued." Four of these five banks were acquired in the next year. Lehman Brothers and Salomon Brothers in their quarterly bank industry reports frequently provide a list of potential targets (as well as the bidders that are likely to create the greatest value). For example, see the Salomon Brothers industry report "Shop Til You Drop" (August 1997) or the Lehman Brothers industry report "Bank Franchise Value Model" (September 1995). In addition the *American Banker* periodically evaluates the top U.S. bank holding companies and provides an analysis of the range of potential purchase prices for banks that are potential targets in acquisitions, (e.g., see *American Banker*, March 24, 1998, p. 10). On the acquirer side, many banks in the late 1980s and 1990s had well-known strategies of growth through acquisitions. For example, when Banc One announced its acquisition of Valley National in 1992, it had ten other acquisitions pending.

Capitalization of expected merger gains before the announcement will create an attenuation bias that can shrink positive returns into insignificant average returns for the combined banks on the announcement day. It is not clear how to correct this bias. An approach that we use, also used by Houston and Ryngaert (1994), is to measure announcement returns from the date a bank is identified as a likely target (or bidder) in an acquisition. However, this adjustment accounts only for the pre-announcement leakage associated with a specific transaction and not for the fact that a bank can have an ongoing acquisition program or that a bank is perceived as an ongoing potential target. Another approach, employed by Becher (1999), is to expand the event window. When the window is expanded to 30 days before the first takeover announcement, Becher finds improved bidder returns. This could, however, be picking up improvements in the bidder's stock price that motivate the bidder to make a stock-based bid.

A final problem is that the negative announcement return of bidding firms can reflect disappointment that the bidding firm is less likely to be acquired in the future. This clearly has been a factor in several acquisitions in our sample. For example, PNC's acquisition of Meridian Bancorp was criticized by some

analysts as destroying value because it lessened the likelihood that PNC would be a takeover candidate. Similar criticisms were made of First Chicago's merger with NBD and Bank of Boston's merger with Bay Banks.

These problems suggest that the combined stock returns of the bidder and target on the announcement of an acquisition can understate any value gains associated with a merger. However, even if there is no attenuation bias in announcement returns, the insignificant returns to the combined banks do not necessarily imply that there are no efficiency gains from bank acquisitions. As Calomiris and Karceski (1999) point out, efficiency gains from acquisitions can flow to bank customers. So, small positive returns to the combined banks can simply reflect the fact that the merged bank captures only a small fraction of the gains. Failure to enact efficiency-enhancing mergers, however, could render the bank less competitive in future years.

While past studies find little significant increase in the combined value of merging banks, there are important cross-sectional differences in abnormal stock returns. For example, Houston and Ryngaert (1997) find that the abnormal returns to the combined bank are positively related to the degree of branch overlap between the two banks, the percent of the acquisition financed with cash or conditional stock, and the profitability of the bidder prior to the acquisition.[1] Likewise, DeLong (1998) finds that focusing mergers (those that increase either geographic or product focus) increase value, whereas diversifying mergers destroy value. Hence, there is information content in bank merger announcements. We try to exploit this in our analysis by examining the extent to which managerial projections of merger-related gains are incorporated into bank stock prices.

3. Sample and experimental design

3.1. Sample selection

Our sample consists of large bank acquisitions announced during the period 1985–1996. To construct our sample, we obtain from Mergestat and SNL Securities a list of all mergers with a stated deal value (the amount paid for the target's shares) in excess of $400 million in 1985 inflation-adjusted dollars.[2] We include a transaction in our sample if the target's assets are at least 10% of the

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[1] Conditional stock offers involve financing the acquisition with common stock, but the number of shares issued is a function of the bidder's future stock price; such offers are a way for bidders to communicate that good news may be revealed before the deal is closed (or of warranting that bad news will not be revealed).

[2] Inflation measures are based on the Consumer Price Index obtained from the Federal Reserve Bulletin.

bidder's assets in the year preceding the merger. This leaves us with a sample of 64 mergers. A list of the mergers in our sample is provided in the appendix.

We focus on large bank acquisitions for three reasons. First, these are the most important in terms of explaining the bank consolidation process of the 1980s and 1990s. Second, because of their size, it is easier to observe the impact of larger acquisitions on performance. Third, large transactions are more likely to draw analyst and press attention and are therefore more likely to have detailed disclosures associated with them.

We obtain detailed information on the terms of the merger and expected merger-related gains from 8 K filings, proxy statements, press releases, annual reports, news stories, and analyst research reports. News stories are obtained from a search of all sources available on the Dow Jones News Retrieval Service for a time period beginning one year prior to the announcement and ending two years after the transaction is competed.

We obtain full-page analyst research reports from INVESTEXT, an online service that provides research reports authored by investment analysts from approximately 320 investment banks, brokerage houses, and research firms. For each of the banks in our sample, we conduct an online search for analyst research reports on the company from the date of the announcement of the acquisition to nine months after the completion of the acquisition.[3] For firms without INVESTEXT reports, we also utilize stock analysts' reports from CIRR microfiche for the years 1985–1989. Between the two sources, we obtain analyst research reports for 59 of the 64 mergers in our sample.

Stock price information for the bidder and target firms in our sample is from the Center for Research on Securities Prices (CRSP). Accounting information is from banks' annual reports and 10Ks.

In our empirical analysis we examine the relation between projected merger gains and the degree of geographical market overlap between the target and the bidder. Previous research by Houston and Ryngaert (1994) and Hawawini and Itzhak (1990) finds that the stock price reaction is greater for mergers with greater overlap. These studies conjecture that mergers with significant overlapping operations have a greater potential to realize cost savings because of greater opportunities to close redundant or less-efficient local branches. We measure geographic overlap using the approach developed by Houston and Ryngaert (1994). The overlap measure is constructed by first identifying each

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[3] This search provides the table of contents for all research reports. Due to the expense associated with obtaining reports ($1.50 per page), we review the table of contents and obtain reports in which the analyst seem to provide some detailed analysis of the merger transaction. When there is more than one company report from the same analyst during this time window, we obtain the report that follows most closely the announcement of the acquisition. The maximum number of research reports for a given merger is five (Wells Fargo and First Interstate in 1996 and Chemical Bank and Chase Manhattan 1995) and the average number is 2.41.

bank subsidiary of the target and bidder. Next, using the *McNally and Thomson Bank Directory*, we identify the number of branch offices of each firm in a given city. Using this information, the overlap variable is defined as

$$Overlap = \frac{\sum_{i=1}^{n} \min(T_i, B_i)}{\sum_{i=1}^{n} (T_i + B_i)}, \tag{1}$$

where n is the total number of cities in which either bank has an office while T_i and B_i are the total number of offices the target and bidder have in city i. This measure of overlap can take on a maximum value of 0.5 when there is complete overlap between the two firms' operations and a minimum value of zero where there is no overlap. Overlap can be thought of as a crude measure of the percentage of offices of the two banks that could be closed as a result of the merger. To obtain a useful classification of merger types for data analysis purposes, we also classify any merger in which the number of overlapping branches is less than 4% of the target's total branches as a market-expansion merger. We choose this cutoff because it appears to correspond to the cutoff used by SNL Securities when classifying mergers. Specifically, SNL appears to roughly classify mergers as out-of-market when the overlap is less than 0.04. Unfortunately, SNL Securities classifies mergers only after 1989.

   The best sources of information on management's estimates of merger-related cost savings and revenue enhancements are press releases, proxy statements pertaining to merger votes, 8 K filings, and analyst reports. Analysts often receive projections from management and pass these on in their reports, and proxy statements often provide estimates to justify the transaction to shareholders. In many cases, management estimates of merger-related gains are very specific, with information on the timing and details of cost savings and revenue gains. For example, the Comerica and Manufacturers National merger proxy in early 1992 predicts that the merger will result in pre-tax costs savings of $45 million in the first year after completion, $119 million in the second year, and $145 million in the third year. The proxy also notes that the firm anticipates taking a pre-tax charge of $110 million to cover merger and integration costs such as severance payments, investment banking fees, lease buyouts, and write-downs of redundant software. The after-tax charge is estimated at $76 million.

   Unfortunately, not all proxies are as detailed. For instance, many merger proxies will merely state that the firm anticipates saving a certain amount in annual noninterest expenses within the first two years. Lacking any additional information in estimating merger gains, we simply assume that the cost savings are spread equally throughout the consolidation process. So, for instance, when MNC Financial estimated $83 million in cost savings over two years in its acquisition of Equitable Bancorporation, we assume savings of $41.5 million in the first year and $83 million in the second year. In most cases, the cost savings are given as pre-tax figures. In these cases, we estimate after-tax savings by

assuming that the tax rate is three percentage points above the federal corporate tax rate. This assumption reflects the fact that most banks face a state tax as well as a federal tax. We apply the same rules to estimate after-tax revenue gains.

An additional problem with the forecasts is their tendency to change in the early periods after merger announcements. In some cases, management will give a number early on that might be based on saving a certain percentage of expenses, but the expense number might be based on last year's expenses as opposed to an updated number published in a proxy statement that is based on expenses going two years forward. Hence, many proxy estimates are somewhat higher (usually no more than 10–15% higher) than estimates given at press time.

3.2. Valuation of merger benefits

To examine whether management estimates of merger gains are reflected in the stock market's valuation of the merger benefits, we estimate the present value of the after-tax cost savings and revenue gains from the merger. Our estimate of the value of the merger gains follows procedures similar to those employed by Kaplan and Ruback (1995) and Gilson et al. (2000). In particular, for 41 mergers, we have after-tax cost savings and revenue estimates going out two to four years. Cost savings and revenue projections are only used if the projections appear to be complete, are explicit in terms of cost and revenue breakdown, and provide a time to completion on the projections. For horizons shorter than four years, we extend the forecast by assuming that the cost savings or revenue gains will grow at the rate of expected inflation. The inflation forecasts are based on the Federal Reserve Bank of Philadelphia Blue Chip Indicator Series predictions of ten-year horizon inflation rates. The present value of merger gains equals the present discounted value of the incremental cash flows arising from the acquisition.

For cost savings, incremental cash flows represent cost savings estimates (net of taxes). For projected revenue gains, the incremental cash flows should equal the revenue gains less any increase in operating costs resulting from enhanced revenues (net of taxes). In practice, however, given how management reports revenue gains, no adjustment appears necessary. A good deal of the anticipated revenue gains comes from repricing products (e.g., increased net interest income arising from paying lower rates on deposits). Revenue gains due to repricing should have no impact on operating costs, so no adjustment is necessary. For other sources of revenue gains (e.g., gains from cross-selling products), any increase in operating expenses appear to be incorporated into the cost figures management provides. For example, First Union's acquisition of First Fidelity Bancorp introduced First Union products such as brokerage service to First Fidelity customers. Arguably, any revenue increase would create some offsetting costs. Nevertheless, when First Union projected the impact of the merger in its 8 K filing, all costs and revenue changes are listed and flow through to the

bottom line in the earnings projections. In addition, none of the stock analyst reports that we review make an allowance for extra costs due to extra revenue in their bottom line projections. Hence, it seems reasonable to assume that any such costs must serve to reduce cost savings associated with the merger. Fortunately, as we later report, revenue increases tend to make up a small portion of merger-related gains, hence any error in estimating the magnitude of net-of-cost revenue enhancements is likely to be small.

Using these after-tax cost savings and revenue estimates going out four years, we estimate the present value of these earnings increments as follows:

$$\text{Estimated Present value of merger} = \sum_{t=1}^{3} \frac{CS_t + \text{Rev}_t}{(1+K)^t} + \frac{CS_4 + \text{Rev}_4}{(K-I)(1+K)^3} - RC,$$

(2)

where CS_t is the after-tax cost savings estimate in year t after the merger, Rev_t the after-tax revenue estimate in year t after the merger, K the discount rate (defined below), I the the long-run inflation forecast from the Philadelphia Federal Reserve Bank and RC the after-tax restructuring charge associated with the merger.

The above formula assumes that cost savings and revenue gains increase in perpetuity at a rate equal to the long-term inflation forecast and uses an equity discount rate that is based on the capital asset pricing model. The risk-free component of the rate is the ten-year Treasury bond yield to maturity at the time of the merger announcement. Beta is the Value Line beta of the acquirer. Value Line calculates betas using weekly data over five years and allows for mean reversion of beta toward one. In mergers reported as "mergers of equals" (where the bidder and target are approximately the same size), we average the beta of the two banks to get the firm beta. The beta is then multiplied by an assumed market risk premium of 7% and added to the ten-year T-bond yield to get the discount rate.[4] The average discount rate for the 41 firms in our sample is 15.05%.

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[4] The 7% risk premium is the approximate arithmetic mean risk premium relative to T-bonds recommended by Ibbotson and Associates (1999). This discount rate has two appealing aspects. It accounts for the fact that CAPM tests frequently find that the intercept term is too high and the risk premium too low for fitted data when the risk-free rate is assumed to be a short-term T-bill. Secondly, it accounts for long-term inflation forecasts built into the ten-year Treasury bond. In a prior draft of this paper, we use a smaller market risk premium suggested by Copeland et al. (1995) based on the historical geometric average risk premium relative to T-bonds. This results in lower discount rates and roughly 20% higher present values of incremental merger gains. A troubling aspect of the discount rate used is that it reflects the cost of equity financing and thus assumes no debt financing associated with the merger. The discount rate also assumes that cost savings and revenue estimates are of similar risk to the average cash flows of the firm. Arguably, cost savings are less risky.

The last component of the equation is an estimate of the after-tax restructuring costs associated with the merger. Management generally conveys some estimate of merger integration costs in the form of a merger restructuring charge. The charge is generally an undiscounted estimate of future severance payments, lease buyouts, and write-downs of assets deemed obsolete due to the merger, although most of these costs will be incurred shortly after the merger is completed. However, different banks report their restructuring costs in different ways. For instance, there are cases in which management includes loan loss provisions as part of the restructuring cost. We exclude this item from the charge. It is alleged that some firms aggressively estimate all possible integration costs and use the merger reserve to make future earnings look better. There is little we can do about this. A couple of firms only report costs as they are incurred and do not give a detailed breakdown of how integration costs affect subsequent-year earnings. In the few cases in which management does not take a charge or does not provide an estimate of the charge, we treat the actual merger expense (or charge) reported by the firm in the annual report at the end of the merger year as if it were an ex ante estimate.

4. Empirical results

4.1. Changes in the bank acquisition market: evidence from the full sample of mergers

Table 1 provides descriptive statistics for the entire sample of bank mergers. Since we are interested in whether recent merger activity differs from mergers in the 1980s, we also report descriptive statistics for mergers in two time periods: 1985–1990 and 1991–1996. The financial characteristics of the bidder and target banks indicate no significant differences in the relative size or profitability of bidder or target banks for mergers in the 1980s and 1990s. During both periods, the target assets average about 40% of the bidder's assets. Bidders are, on average, slightly more profitable (as measured by ROA) than targets for the entire sample period and each of the subperiods.

In terms of deal characteristics, there are several significant differences between mergers in the 1980s and 1990s. As shown in Panel B of Table 1, mergers in the 1980s are more likely to be market expansion mergers with less geographical overlap between bidders and targets. Cost savings are also reported more frequently in the 1990s, with 94.5% of the acquirers reporting cost saving estimates in the 1990s versus only 22.2% in the 1980s. The more frequent reporting of cost savings coincides with a reduction in the frequency of market expansion transactions in the 1990s. If one believes that geographic overlap is essential to generate significant cost savings, this could be construed as evidence that acquirers are less likely to make projections for mergers that will not

Table 1
Descriptive statistics for 64 bank mergers announced during the period 1985–1996

The sample consists of large bank acquisitions in which the market value of the target exceeds $400 million in 1985 dollars and the target's assets equal at least 10% of the bidder's assets. Descriptive statistics are reported for the entire sample as well as for mergers in the l980s and mergers in the 1990s to show changes in merger characteristics over time. Asset size is measured by the book value of assets for the year preceding the merger announcement. The market value of equity is measured five days before any news announcement identifying the firm as being involved in merger activity and equals the number of shares outstanding times the price per share of common stock. ROA is return on assets computed as net income divided by average total assets for the year preceding the merger announcement. Market overlap is a measure of the degree to which the operations of the bidder and target overlap geographically. The maximum value of overlap is 0.5 and the minimum value is zero. Overlap is defined as

$$Overlap = \frac{\sum_{i=1}^{n} \min(T_i, B_i)}{\sum_{i=1}^{n} (T_i + B_i)},$$

where n is the total number of cities in which either bank has offices and T_i and B_i are the total number of officers the target and bidder have in city i. Market expansion mergers involve mergers in which the amount of branch overlap divided by total target bank offices is less than 0.04. Mergers with cost savings estimates are acquisitions in which the acquiring bank's management provides a cost savings estimate in either the press release, the proxy statement, the 8k filing, or an analyst meeting. Cost savings estimates are only used if the forecasts are explicit about the level of savings and define a time frame for achievement.

	Overall		1985–1990		1991–1996	
	Mean	Median	Mean	Median	Mean	Median
A. Financial characteristics						
Bidder asset size ($millions)	$35,000	$22,100	$18,400	$15,200	$47,200	$29,300
Target asset size ($millions)	$14,900	$6,980	$7,390	$5,132	$20,300	$9,710
Target assets/bidder assets	0.434	0.351	0.455	0.382	0.419	0.267
Target market value of equity/bidder market value equity	0.387	0.342	0.396	0.346	0.381	0.308
Bidder ROA	0.0107	0.0106	0.0105	0.0107	0.0109	0.0104
Target ROA	0.0087	0.0100	0.0086	0.0095	0.0089	0.0104
Number of observations	64		27		37	
B. Deal characteristics						
Market overlap	0.066	0.028	0.040	0.00	0.084	0.060
Percent market expansion	45.3%		62.1%		30.4%	
Percent using purchase accounting	11%		8%		14%	
Percent with firm cost savings estimates	64%		22.2%		94.5%	

generate much in the way of tangible earnings increases. However, as discussed below, managerial estimates of a merger's impact on costs and/or revenues are much more frequent even for market expansion transactions in the 1990s. Consequently, it is difficult to determine whether more frequent reporting of

Table 2
Announcement-period abnormal returns and combined valuation changes for 64 large bank acquisitions announced during the period 1985–1996

Abnormal returns are net-of-market returns compounded daily over a window running from four days before the target (bidder) is identified in the financial press as being involved in merger activity related to the eventual acquisition until one day after the merger agreement is announced. Market returns are the return on the CRSP value-weighted market portfolio. Combined abnormal returns are computed as a weighted average of bidder and target returns. The weights are the market value of each firm's equity five days before the target (bidder) is identified as being involved in merger activity related to the eventual acquisition. The valuation change is computed by taking the abnormal return to the target multiplied by the target's market value five days before the first merger news for the target and adding it to the abnormal return to the bidder multiplied by the bidder's market value five days before the first merger news for the bidder.

	All deals	1985–1990	1991–1996
Number	64	27	37
Combined abnormal returns	1.86%	0.14%	3.11%*
t-statistic	2.17	0.17	2.35%
Valuation change (millions)	$165.90	$2.27	$285.31*
Bidder abnormal returns	− 3.47%	− 4.64%	− 2.61%
t-statistic	− 3.87	− 5.82	− 1.83
Target abnormal returns	20.80%	15.58%	24.60%*
t-statistic	9.13	5.19	7.77

*Significantly greater than the corresponding figure for the 1980s at the 10% level.

estimates reflects an increased sensitivity of senior management to justify their deals or whether technological and regulatory changes enhanced the opportunity for cost savings and have made the numbers worth reporting.

Table 2 provides the abnormal stock returns for bidders and targets as well as the combined market value change associated with the mergers. Abnormal returns for the bidder and the target are calculated over a period beginning four days before the so-called "leak date" and ending on the day after the agreement is announced. The leak date is the first date that the target (bidder) is cited as being potentially involved in takeover activity (e.g., being in takeover talks or putting the bank up for sale). This includes specific rumors that are not denied by the parties involved, but excludes generic articles that the bank might make a good takeover target (bidder). Note that the target leak date often precedes any bidder leak date, because the target may be identified as being in acquisition talks, but the bidder is not identified. When there is no leak date, the leak date is set equal to the announcement date.

To calculate merger event abnormal returns over the announcement window of interest, each day the bank's return less the CRSP value-weighted market index return is calculated. These daily net-of-market returns are then

compounded over the window period. To measure the combined-firm merger-related revaluation for each transaction, we multiply the abnormal returns for the target and the abnormal returns for the bidder by the respective market value of each bank five days prior to the leak date. We then sum the bidder and target revaluation. To compute the combined return, we divide the combined revaluation of the target and bidder by the combined market value of their common stock (five days before each bank's "leak date").

Like previous studies, we find a negative and statistically significant abnormal return to acquiring banks and a positive and statistically significant return to acquired banks. However, in contrast with a number of prior studies, we find that the average combined return to the bidder and target is not only positive (1.85%) but significantly different from zero at the 5% level. The average combined return for bidders and targets results in an average $165 million increase in the combined value of the bidder and target. Comparing deals in the 1980s to deals in the 1990s, there is a significant increase in the abnormal returns of the combined banks. Indeed, the combined return for bidders and targets is positive and statistically significant only for the deals in the 1990s. The superior performance in the 1990s is due to increased returns for both the bidder and target banks.

To further investigate the reason for the increase in combined returns, we compare market expansion acquisitions to market overlap transactions. As shown in Table 3, the returns for market overlap transactions are significantly higher than the returns realized for market expansion transactions. This difference is due to the significant increase in the combined returns for market overlap transactions in the 1990s. Notice that the average return increases from 0.89% in the 1980's to 4.77% in the 1990s. In contrast, for market expansion transactions, the combined returns decline slightly in the 1990s relative to the 1980s.

One explanation for the increase in returns for market overlap transactions is that the opportunity for cost savings is greatest for these types of transactions and that the opportunities for cost savings through consolidation of branch operations and backroom operations increased in the 1990s. This view is reflected in several stock analyst reports discussing industry trends (e.g., "Shop till you drop," Salomon Brothers industry report, August 1997) and is also consistent with the idea that in the 1990s there is "overcapacity" in banking in terms of redundant backroom operations and full-service branch offices. Overall, this evidence is consistent with previous empirical work by Houston and Ryngaert (1994) showing that geographically focused mergers offer higher returns than geographically diversifying mergers. While the conjecture is that these increased returns are due to superior cost-cutting opportunities, we investigate this contention by examining management's forecasted merger-related gains for the subsample of 41 mergers.

Table 3
Descriptive statistics for bank mergers grouped by type of merger during the period 1985–1996

Summary statistics concerning announcement period, abnormal stock returns, cost savings esti-mates, and market overlap for a sample of 64 larger bank acquisitions grouped by whether or not the merger acquisition extends the bidder's geographical market. Announcement-period abnormal returns are daily net-of-market returns compounded daily over a window running from four days before the target (bidder) is identified in the financial press as being involved in merger activity related to the eventual acquisition until one day after the merger agreement is announced. Market returns are the return on the CRSP value weighted market portfolio. A merger is defined as a market expansion merger if the number of offices overlapping geographically divided by the total number of target offices is below 0.04. Market overlap is a measure of the degree to which the operations of the bidder and target overlap geographically. The maximum value of overlap is 0.5 and the minimum value is zero. Overlap is defined as

$$Overlap = \frac{\sum_{i=1}^{n} \min(T_i, B_i)}{\sum_{i=1}^{n} (T_i + B_i)},$$

where n is the total number of cities in which either bank has offices and T_i and B_i are the total number of officers the target and bidder have in city i. Combined abnormal returns are the weighted average of bidder and target returns. The weights are the market value of each firm five days before the target (bidder) is identified as being involved in merger-related activity. Cost savings estimates are only used if the forecasts are explicit about the level of savings and define a time frame for achievement.

	Overall sample		1985–1990		1991–1996	
	Mean	Median	Mean	Median	Mean	Median
A. Market expansion						
Number of observations	29		18		11	
Bidder abnormal return (percent)	− 4.40	− 4.68	− 4.23	− 3.76	− 4.93	− 4.89
Target abnormal return (percent)	16.17	12.45	11.43	8.59	23.93*	26.02*
Combined abnormal return	−0.045	− 0.41	0.57	0.44	− 0.82	− 0.94
Percent with management cost savings estimates	37.9%	—	11.1%	—	81.8%	—
Market overlap	0.002	0	0.008	0	0.003	0
B. Market overlap						
Number of observations	35		9		26	
Bidder abnormal return (percent)	− 2.69	− 4.28	− 5.45	− 5.08	− 1.73*	− 2.93
Target abnormal return (percent)	24.62	18.18	23.28	19.28	24.88	15.34
Combined abnormal return (percent)	3.77	1.40	0.89	0.91	4.77*	4.04*
Percent with management cost savings estimates	85.7%	—	44.4%	—	100%	—
Market overlap	0.118	0.115	0.116	0.115	0.119	0.126

*Significantly different from mean (median) for 1980s at the 10% level.

4.2. Management's view of the sources and magnitude of merger related gains

Using the methodology described in Section 3, we estimate the value of merger-related cost savings and revenue gains for a sample of 41 mergers in which management provides contemporaneous estimates of cost savings and revenue gains. Table 4 contains descriptive statistics for the banks in the subsample. As shown in Table 4, the characteristics of the mergers in the subsample are similar to the mergers in the larger sample in terms of the relative size and ROA of the target and the bidder. They differ, however, in that these mergers have greater geographic overlap and the abnormal returns on the stock of the combined bidder and target are significantly higher at 3.15% (ver-sus–0.48% for those not reporting estimates).

The higher returns for this subsample are not all that surprising. For all mergers in the subsample, management provides an estimate of the incremental cost savings and/or revenues the merger is expected to generate. Disclosure of this information could indicate that these mergers are likely to have the largest incremental earnings increases. Alternatively, the acquiring bank's management could face greater shareholder scrutiny and therefore may need to justify the transactions by providing detailed cost and revenue estimates. Indeed, it could be argued that more recent transactions almost always carry estimates because the investment community expects them. Moreover, this heightened scrutiny might force management to be more selective in the types of deals that they pursue.

In Panel B of Table 4, we provide estimates of the present value of incremental earnings expected from the merger. We also break out the present value of net cost savings from the merger (the present value of cost savings less the after-tax restructuring charge) and the present value of revenue enhancements. The average present value of estimated incremental earnings is $765.05 million and is highly skewed with a median value of $369.06 million. Most of the earnings gains arise from expected net cost savings, with estimated net cost savings averaging $711.36 million. The average estimated gains related to revenue enhancements are only $53.69 million, with a median of zero. In fact, only about 7% of the merger-related gains in the average transaction are related to changes in estimated revenue. Moreover, management reports revenue estimates in only 13 of the mergers in our sample.

The qualitative evidence from analyst reports and news accounts (discussed below) suggests that management is often reluctant to report revenue gains or to justify mergers based on revenue enhancement. For example, in a small number of cases in which management does not report revenue estimates, the press accounts and analyst reports suggest that management believes that enhance-ments are possible. Interestingly, analysts frequently compliment managers for showing that a deal "works", usually meaning that the deal is accretive to per-share earnings within one or two years, without assuming any revenue

Table 4

Descriptive statistics for 41 bank mergers with management estimates of cost savings and revenue enhancement during the period 1985–1996

The 41 mergers are from a subset of 64 large bank acquisitions preceding the merger announcement. ROA is return on assets computed as net income divided by average total assets for the year before merger announcement. Market value equals the market value of common stock outstanding five days before the target (bidder) is identified as being involved in merger activity related to the eventual acquisition. Market overlap is a measure of the degree to which the operations of the bidder and target overlap geographically. The maximum value of overlap is 0.5 and the minimum value is zero. Overlap is defined as

$$Overlap = \frac{\sum_{i=1}^{n} \min(T_i, B_i)}{\sum_{i=1}^{n} (T_i + B_i)},$$

where n is the total number of cities in which either bank has offices in and T_i and B_i are the total number of officers the target and bidder have in city i. Combined abnormal returns are a weighted average of bidder and target returns. The weights are the market value of each firm's equity five days before the target (bidder) was identified as being involved in merger activity related to the eventual acquisition. The abnormal returns for each firm are daily net-of-market returns compounded over a window running from four days before the target (bidder) is identified as being involved in merger activity related to the eventual acquisition until one day after the merger announcement. The combined market value change of the target and bidder is computed by taking the abnormal return to the target multiplied by the target's market value five days before the first merger news for the target and adding it to the abnormal return to the bidder multiplied by the bidder's market value five days before the first merger news for the bidder. The estimated present value of merger gains equals the discounted value of management estimated cost savings and revenue gains computed using Eq. (2) in the text. In computing the present value of gains, a perpetual growth rate equal to the expected rate of inflation is used. The inflation estimate is from the Philadelphia Federal Reserve Bank. Merger gains are computed net of restructuring changes. After-tax cash flows are discounted using a CAPM-based discount rate.

	Mean	Median
Panel A: Financial characteristics of bidder and target banks		
Bidder asset size ($millions)	$43,300	$26,700
Target asset sSize ($millions)	$18,700	$7,729
Bidder ROA	1.06%	1.04%
Target ROA	0.88%	1.04%
Panel B: Deal characteristics and valuation changes		
Target market value/bidder market value	0.381	0.307
Market overlap	0.091	0.069
Combined abnormal return	3.15%	0.64%
Bidder abnormal return	− 2.94%	− 4.73%
Target abnormal return	24.73%	19.23%
Combined market value change of target and bidder	$265.46	$36.54
Estimated present value of merger gains ($ millions)	$765.05	$369.06
Estimated present value of net cost savings ($ millions)	$711.36	$367.09
Estimated present value of revenue gains ($ millions)	$53.69	$0
Estimated present value of merger gains/target market value	0.5207	0.3650
(Estimated present value of Merger)/(Combined bidder and target market value)	0.1306	0.0950

enhancements. Hence, it is possible that revenue enhancements are sometimes reported to justify what the investment community feels is a shaky transaction. In either event, the numbers suggest that management views merger gains as arising primarily from cost savings and not from revenue enhancements.

As shown in Table 4, the estimates of merger-related gains are large relative to the premium paid for the target. The average estimated present value of the merger gains as a percentage of the target's pre-merger market value is 52.07%. On the other hand, the average target's value increases only 24.73% over the announcement window. Nevertheless, the average bidder's value falls by 2.94%. The average estimated present value of the merger gains as a percentage of the combined bidder and target's market value is 13.06%, but the average stock market revaluation of the combined bidder and target is only 3.15%. Indeed, in all but two of the 41 mergers, the estimated value of merger gains exceeds the joint revaluation of the bidder and target.

On the basis of the above evidence, it is tempting to speculate that acquiring bank managers are overly optimistic in their assessments of the gains to be created from mergers. Before investigating this conjecture, it is worth recalling our early discussion of the limitations of bank merger event studies. Since these transactions may have been anticipated by capital markets, observed returns could be biased toward zero. Additionally, a bidder can convey negative information whenever it offers to acquire a target with stock. In our sample of 41 transactions with cost estimates, 38 bidders use stock as the sole means of payment. There are also questions regarding the valuation model we employ. It might be overly optimistic to assume that the estimated cost savings and revenue enhancements would never happen without the merger and that real incremental merger gains will last in perpetuity.

Before we address alternative valuation scenarios, the reasonableness of our current estimates can be judged in part by answering two questions. First, are the projected valuation gains explained by factors that should be related to those gains? Second, are the valuation estimates related to the abnormal returns in a manner that is consistent with economic intuition?

We first investigate the determinants of management's estimates of merger-related gains. We attempt to explain the variation in the estimated valuation of total merger-related gains (revenue increases and cost cuts) and in the estimated valuation of net cost savings using a number of variables that are predicted to influence those gains. In each case, the present value estimates are divided by the combined pre-merger market values of the bidder and target. The explanatory variables are the degree of geographical overlap, the size of the target relative to the bidder, the pre-tax ROA for the combined target and bidder prior to the merger (adjusted for special items), and the pre-merger operating efficiency ratio of the merging banks in the year prior to the merger (adjusted for special items). The detailed definitions of the ROA and efficiency ratio are given in Table 5. We

expect the estimated cost savings to be positively related to market overlap, the relative size of the target, and the pre-merger efficiency ratio, and negatively related to the firms' pre-merger ROA.

The results of this analysis are provided in Table 5. Our valuations of net cost savings and total earnings gains are best explained by the degree of geographical overlap. Regressions including this variable explain about 58% of the variation in the valuation of net cost savings forecasts. The explanatory power of regressions combining cost savings and revenue enhancements is lower. High levels of overlap indicate substantial opportunities for cost savings via elimination of redundant facilities. Since a higher efficiency ratio is associated with higher noninterest expenses, the positive coefficient on the efficiency ratio is consistent with relatively inefficient banks offering the greatest cost savings. The negative coefficient on the combined banks' pre-merger ROA is also consistent with less-profitable banks offering the greatest cost savings potential. Larger acquisitions also result in larger cost savings estimates.

While the determinants of (estimated) value creation inferred from incremental earnings forecasts appear reasonable, it is still an open question whether the stock market takes these estimates seriously. To address this question, we estimate the cross-sectional relation between target and bidder announcement returns and our estimates of appropriately scaled merger-related gains. The results, reported in Table 6, indicate that our estimates of merger-related gains explain a considerable proportion of the cross-sectional variation in announcement-day returns of the bidder and target.

Panel A of Table 6 reports the results for the target returns. The slope coefficient suggests that target banks receive 36 cents of every dollar of estimated total gains. When the gains are broken out into a revenue component and a net cost saving component, the coefficient estimate on cost savings is similar at 0.37 and the coefficient on revenue gains is positive (0.19) but insignificant. Clearly, the important determinant of the target returns is the net cost savings. When this variable is introduced alone, the regression R^2 remains at 49%.

Panel B reports the results for the bidder returns. For every dollar increase in the total valuation gain estimate, the bidder's value increases 22 cents. When we break out the components of the gain, the bidder's value goes up 27.2 cents for every dollar of our estimated value of net cost savings and falls 21.3 cents for every dollar of estimated revenue valuation gains. The revenue coefficient, however, is not statistically different from zero. Again, the whole story is net cost savings. When this variable is introduced alone, the R^2 of the regression is 33%, about the same as when the revenue variable is included.

Some additional points emerge from the bidder return regressions. Each specification has a significant intercept of about -7%. One interpretation of the intercept is that it is related to news conveyed by the merger announcement that is unrelated to the merger gains. One aspect would be the negative signal of issuing a large quantity of equity in a merger. These are large acquisitions, and

Table 5
Determinants of the value of merger gains

Cross-sectional regressions relating the present value of management's estimated cost savings and revenue gains from the bank acquisition to the bidder and target's pre-merger efficiency ratio and return on assets, the market value of the target relative to the bidder, and the degree of geographic overlap. The sample consists of 41 large bank mergers with management estimates of cost savings or revenue gains over the period 1985–1996 (t-statistics are in parentheses). The estimated present value of the merger equals the discounted value of management's estimated cost savings and revenue gains computed by using Eq. (2) in the text and a perpetual growth rate equal to the expected rate of inflation. The inflation estimate is from the Philadelphia Federal Reserve Bank. Merger gains are computed net of restructuring charges. The rate for discounting estimated cost savings and revenues is based on the CAPM. The estimated present value of the cost savings equals the present discounted value of management estimated cost savings net of restructuring charges. The combined efficiency ratio is the sum of labor, equipment, and occupancy costs for both the bidder and the target divided by the sum of the taxable equivalent net interest income and noninterest income from nonrecurring items for the bidder and target. This ratio is computed using accounting information in a year preceding the merger. If the merger is announced in the first half of the fiscal year, the ratio is calculated using prior fiscal year data and if the merger is announced in the second half of the fiscal year, the ratio is calculated for that year. The adjusted pre-tax ROA begins with profit before tax of the bidder and target combined and then excludes securities gains and other nonrecurring income items and adds book provisions for loan losses, OREO expenses, amortization of intangibles (primarily goodwill), and restructuring charges associated with mergers and reorganizations. This adjusted pre-tax profit figure is divided by the average total assets for the bidder and target in the year it is calculated.

Market value equals the market value of common stock outstanding five days before the target (bidder) is identified as being involved in merger activity related to the eventual acquisition. Market overlap is a measure of the degree to which the operations of the bidder and target overlap geographically. The maximum value of overlap is 0.5 and the minimum value is zero. Overlap is defined as

$$Overlap = \frac{\sum_{i=1}^{n} \min(T_i, B_i)}{\sum_{i=1}^{n} (T_i + B_i)},$$

where n is the total number of cities in which either bank has offices in and T_i and B_i are the total number of officers the target and bidder have in city i.

	Estimated present value of merger/combined market value		Estimated present value of net costSavings/ combined market value	
	(1)	(2)	(3)	(4)
Constant	− 0.412	0.216	− 0.328	0.176
	(− 1.49)	(2.77)	(− 1.53)	(2.68)
Combined efficiency ratio (pre-merger)	1.046		0.827	
	(1.61)		(1.63)	
Combined adjusted pre-tax ROA(Pre-merger)		− 8.57		− 7.07
		(− 2.25)		(− 2.30)
Target market value/bidder market value	0.105	0.08	0.086	0.071
	(1.65)	(1.34)	(1.75)	(1.36)
Market overlap	0.762	0.874	0.809	0.896
	(4.68)	(4.94)	(5.81)	(5.67)
Adjusted R^2	0.513	0.517	0.581	0.588

Table 6
Cross-sectional regression relating bidder and target abnormal stock returns to estimated merger gains

Bidder and target abnormal stock returns are daily net-of-market returns compounded daily over a window running from four days before the bidder or target is identified in the financial press as being involved in merger activity related to the eventual acquisition until one day after the merger agreement is announced. The sample consists of 41 large bank mergers with management estimates of cost savings or revenue gains during the period 1985–1996. Panel A contains results using announcement-day abnormal returns for the target bank as the dependent variable. Panel B contains results using announcement-day abnormal returns of the bidder bank as the dependent variable. Panel C contains results using announcement-day abnormal returns of the combined bidder and target banks as the dependent variable. The combined bidder and target returns are a weighted average of the bidder and target returns where the weights are each bank's pre-merger market value (t statistics are in parentheses). Estimated present value of merger gains equals the discounted value of management's estimated cost savings and revenue gains computed using Eq. (2) in the text. In computing the value of gains, perpetual growth rate equal to the expected rate of inflation is used. The inflation estimate is from the Philadelphia Federal Reserve Bank. Merger gains are computed net of restructuring changes. Bidder and target market values are the market value of common stock outstanding five days before the target (bidder) is identified as being involved in merger activity related to the eventual acquisition. Estimated present value of net cost savings equals the present discounted value of management estimated cost savings net of restructuring charges Estimated present value of revenue enhancements equals the present discounted value of estimated after-tax revenue gains.

Explanatory variable	(1)	(2)	(3)
Panel A: Target abnormal returns			
Constant	0.057	0.058	0.063
	(1.69)	(1.68)	(2.16)
Estimated present value of merger gains/target market value	0.361		
	(5.44)		
Estimated present value of net cost savings/target market value		0.371	0.374
		(6.86)	(6.82)
Estimated value of revenue enhancements/target market value		0.191	
		(0.41)	
R^2	0.492	0.497	0.492
Panel B: Bidder abnormal returns			
Constant	− 0.072	− 0.075	− 0.074
	(− 6.59)	(− 6.70)	
Estimated present value of merger gains/bidder market value	0.220		
	(3.94)		
Estimated present value of net cost savings/bidder market value		0.272	0.252
		(3.04)	(3.91)

Table 6 (*continued*)

Explanatory variable	(1)	(2)	(3)
Estimated value of revenue enhancements/bidder market value		− 0.213 (− 0.70)	
R^2	0.305	0.335	0.328
Panel C: Combined firm abnormal returns			
Constant	− 0.032 (− 2.65)	− 0.035 (− 3.38)	− 0.035 (− 3.21)
Estimated present value of merger/combined bidder and target market value	0.487 (4.29)		
Estimated present value of net cost savings/ combined bidder and target market value		0.579 (5.80)	0.550 (5.90)
Estimated value of revenue enhancements/ combined bidder and target market value		− 0.427 (− 1.30)	
R^2	0.591	0.655	0.641

the equity issuance literature tends to find larger negative returns for larger equity issues. A second component of the intercept might reflect disappointment that the bidder itself is now less likely to be acquired. The negative coefficient on the valuation of revenue gains is also suggestive. When coupled with the positive coefficient on the valuation of revenue gains for targets, it suggests that bidders anticipating revenue enhancement might be paying for something that will not pay off in the eyes of the market. Again, however, the coefficients on the revenue variables are statistically insignificant. What is encouraging, from a rational bidder perspective, is the coefficient on the net cost savings variable. The stock market is clearly capitalizing management's cost-cutting projections as if the bidder will get a slice of this "synergy." Thus, one hypothesis of mergers that can clearly be dismissed based on these results is the hypothesis that bidders routinely overestimate the cost savings gains and overpay that full amount to targets. If this hypothesis were true, we would expect a negative coefficient on the cost savings variable.

The final set of regressions in Panel C of Table 6 are for the combined bidder and target returns. Once again, cost savings have the greatest explanatory power. Indeed, when we present the value of revenue gains and cost savings separately, the estimated coefficient on revenue gains is significantly negative. The negative coefficient on revenue gains once again suggests the possibility that management includes estimates of revenue gains to justify what investors believe are questionable deals. Our valuation estimate of net cost savings, when entered in the regression alone, explains 64% of the cross-sectional variation in the

combined returns of the bidder and target banks. The slope coefficient suggests that a dollar in present value of estimated net cost savings results in about a 55-cent change in the combined value of the bidder and the target. Theoretically, if the stock market fully capitalized the merger wealth effects at announcement, we would expect the coefficient to equal one. However, we know that there is substantial prior anticipation of takeover activity that is already built in the respective banks' stock prices, which could explain why the coefficient is well below one. At the same time, the intercept (-3.53%) is also consistent with negative signaling effects from the merger announcement.

The combined evidence of Tables 4 and 6 could also indicate that management typically overvalues the merger-related gains. This conclusion seems particularly true for revenue estimates that appear to have no influence on returns. As for cost savings, the average valuation of cost savings is much higher than the average combined stock market revaluation of the bidder and target, and the coefficients on the net cost savings variable in the regressions in Panel C of Table 6 are well below one. We should be careful about this interpretation, however, because our valuation estimates do not come directly from management. Indeed, we take the cost and revenue forecasts and infer valuation consequences from those numbers. For instance, management generally forecasts some level of cost savings to be accomplished in two years. They rarely state what will happen after that date, though the inference is often that these are permanent cost cuts.

To investigate how alternative assumptions about the future affect our analysis, we use two alternative valuation models. In one model we assume no growth in nominal cost savings and revenue enhancements beyond year four. In the other model, we assume that the revenue enhancements and cost savings will decline 30% per year after year four. The rationale for tweaking the valuation models in these ways is based on the idea that any merger savings should be incremental relative to what would occur without a merger. For instance, a merger could provide the impetus for cost-cutting efforts, particularly if one of the organizations involved has been previously lax in that area. Once the changes are made, however, it is possible that the organization can again slip into bad habits and that the incremental merger benefits will be lost over time. Alternatively, it could be argued that even without a merger, competitive pressures would eventually lead an inefficient bank to get its house in order. Hence, the gap between a bank's expense levels with and without the merger will tend to converge through time. Additionally, employing a perpetuity valuation model assumes that the organization "will last forever." This too could be overly optimistic.

Table 7 provides the results for our robustness tests using alternative valuation models. Using the zero perpetual growth assumption, Table 7 shows that the total valuation estimate as a percentage of combined firm value falls from 13% to 10.1%. The estimated slope coefficient in the regression relating the

Table 7
Cross-sectional regressions relating combined bidder and target abnormal returns to valuation estimates of merger gains computed using alternative assumptions about long term-growth

Combined bidder and target abnormal returns are a weighted average of bidder and target abnormal returns where the weight is each bank's pre-merger market value. Abnormal returns are daily-net-of market returns compounded daily over a window running from four days before the bidder or target is identified in the financial press as being involved in merger activity related to the eventual acquisition until one day after the merger is announced. The sample consists of 41 large bank mergers with management estimates of cost savings or revenue gains during the period 1985–1996. Panel A contains regression results relating combined abnormal returns to the present value of merger gains assuming no growth in cost savings and revenue gains after four years following the merger. Panel B contains regression results relating combined abnormal returns to the present value of merger gains assuming that cost savings and revenue gains erode after four years at a rate of -30% (t statistics in parentheses). The estimated present value of merger gains equals the discounted value of management estimated cost savings and revenue gains computed by using Eq. (2) in the text, except the perpetual growth rate of incremental earnings after year four is set equal to zero in Panel A and -30% in Panel B. Merger gains are computed net of restructuring charges. Market value equals the market value of common stock outstanding five days before the target (bidder) is identified as being involved in merger activity related to the eventual acquisition. The mean value of the present value of merger gains relative to the market value of the bidder and target is 0.101 (10.1%) in Panel A and 0.043 (4.3%) Panel B. The estimated present value of net cost savings equals the present discounted value of management estimated cost savings net of restructuring charges, except the perpetual growth rate of incremental earnings after year four is set equal to zero in Panel A. The mean value of the present value of net cost savings relative to the market value of the bidder and target is 0.094 (9.4%) in Panel A and 0.039 (3.9%) Panel B.

Explanatory variables	(1)	(2)
Panel A: Explaining combined abnormal returns with present value estimates based on perpetual growth of 0%		
Constant	-0.034	-0.038
	(-2.75)	(-3.40)
Estimated present value of merger gains/combined bidder and target market value	0.646	
	(4.86)	
Estimated present value of net cost savings/combined bidder and target market value		0.735
		(6.05)
R^2	0.610	0.667
Panel B: Explaining combined abnormal returns with present value estimates based on perpetual growth of -30%		
Constant	-0.035	-0.039
	(-2.99)	(-3.46)
Estimated present value of merger gains/combined bidder and target market value	1.558	
	(5.23)	
Estimated present value of net cost savings/combined bidder and target market value		1.805
		(6.03)
R^2	0.577	0.632

combined revaluation to the value of net cost savings increases to 0.735 and slightly decreases the R^2 of the regression relative to the inflation rate perpetual growth model. The slope coefficient for the newly estimated total valuation gains (including revenues) also increases. The more draconian valuation model assuming a 30% decay rate in incremental earnings produces much smaller estimates of total valuation gains that are only 4.3 percent of the combined value of the bidder and target. The regression slope coefficients are in excess of one and generate smaller regression $R^2 s$.

It is worth noting that the effect of tweaking the model with lower growth rates is very similar to multiplying the estimated gains with a different scalar. As the gains are multiplied by a smaller factor, the slope coefficient increases and the intercept stays about the same. Being slightly less optimistic about the long run (i.e., assuming zero growth) tends to preserve the interpretation that the merger gains are somewhat anticipated (though the coefficient edges closer to one) and that combined returns are reduced due to negative signaling at the announcement of mergers. The more aggressive decay model gives results with respect to the slope coefficient that suggest the valuation estimates are downward biased.

A final way to evaluate management's cost savings and revenue estimates is to determine the market value multiple revaluation for the incremental cash flows. To estimate this multiple we used the third-year after-tax revenue and cost projections. These projections are assumed to represent management's assessment of the "long-run" or steady-state cash flow gains from the merger. We take these projections of nominal incremental cash flows in year 3 and discount the projections back to the time of the merger at the anticipated inflation rate over the three-year horizon. This gives us steady-state projections in real terms. We then regress the market revaluation of the bidder and target against the steady-state incremental earnings projections. The estimated regression coefficients can be interpreted as the multiple at which the market values incremental cash flows.

The regression results using this methodology are reported in Table 8. For the combined banks, the cash flow multiple for cost saving is about 3.5. In contrast, the multiple for revenue gains is negative. By comparison, banks covered by the Value Line Investment Survey have average-price to-earnings multiples in the early to mid 1990s in the 8–12 range. Hence, the multiple attached to extra earnings, even in the case of cost savings, is well below market multiples during this time period. Nevertheless, one should keep in mind that the estimate of the multiple assigned to future earnings is not directly comparable to a current earnings multiple. The market revaluation also accounts for the restructuring costs associated with the merger, which typically equal the projected annual cost savings for the merger. Furthermore, the estimated savings used in the regression are based on peak savings that will not be achieved in two to three years. When one adjusts for the fact that our estimated multiple does not account for restructuring costs and the time delay in achieving earnings, the results are quite

Table 8

Cross-sectional regression relating bidder and target abnormal stock returns to estimated after-tax merger-related revenue gains and cost savings in the third year after the merger

Bidder and target abnormal stock returns are daily net-of-market returns compounded daily over a window running from four days before the bidder or target is identified in the financial press as being involved in merger activity related to the eventual acquisition until one day after the merger agreement is announced. The sample consists of 41 large bank mergers with management estimates of cost savings or revenue gains during the period 1985–1996. Panel A contains results using announcement-day abnormal returns for target bank as the dependent variable. Panel B contains results using announcement-day abnormal returns of the bidder bank as the dependent variable. Panel C contains results using announcement-day abnormal returns of the combined bidder and target banks as the dependent variable. The combined bidder and target returns are a weighted average of the bidder and target returns where the weights are each bank's pre-merger market value. (*t*-statistics are in parentheses). Estimated real after-tax revenue gains and cost savings for the third year after the merger are taken from management projections and are adjusted for expected inflation. The inflation estimate is from the Federal Reserve Bank of Philadelphia. Bidder and target market values are the market value of common stock outstanding five days before the target (bidder) is identified as being involved in merger activity related to the eventual acquisition.

Explanatory variable	(1)	(2)	(3)
Panel A: Target abnormal returns			
Constant	0.081	0.081	0.082
	(1.86)	(1.95)	(2.20)
Estimated present value of merger gains/target market value	2.362		
	(3.43)		
Estimated present value of net cost savings/target market value		2.499	2.504
		(4.55)	(4.22)
Estimated value of revenue enhancements/target market value		0.154	
		(0.03)	
Adjusted R^2	0.379	0.374	0.390
Panel B: Bidder abnormal returns			
Constant	− 0.067	− 0.072	− 0.070
	(− 6.34)	(− 7.05)	(− 6.65)
Estimated present value of merger gains/bidder market value	1.399		
	(3.91)		
Estimated present value of net cost savings/bidder market value		1.870	1.597
		(3.41)	(4.09)
Estimated value of revenue enhancements/bidder market value		− 2.947	
		(− 1.15)	
Adjusted R^2	0.308	0.338	0.334

Table 8 (*continued*)

Explanatory variable	(1)	(2)	(3)
Panel C: Combined firm abnormal returns			
Constant	− 0.025	− 0.029	− 0.036
	(− 2.05)	(− 3.14)	(− 3.21)
Estimated present value of merger/combined bidder and target market value	3.107		
	(4.11)		
Estimated present value of net cost savings/combined bidder and target market value		3.963	3.514
		(6.82)	(4.98)
Estimated value of revenue enhancements/combined bidder and Target market value		− 6.089	
		(− 2.21)	
Adjusted R^2	0.589	0.686	0.653

consistent with the regressions based on discounted cash flows, which find that roughly half the estimated cost savings are capitalized into market prices.[5]

4.3. Potential sources of over-optimism in managerial projections

Given the inability of the stock market evidence to provide a conclusive answer regarding the degree of overptimism (except perhaps with respect to revenue estimates) in managerial forecasts, we now turn our attention to management's estimates to find additional insights. There is some reason to believe that management is being too optimistic in certain dimensions of its forecasts (or is at least not being totally forthcoming about negative aspects of their deals). For example, one of the most important oversights is the fact that management rarely includes an estimate of revenue losses arising from consolidation. Despite the likelihood of occurrence, expected revenue losses are infrequently reported and are rarely mentioned by analysts. In fact, within our

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[5] To see this, note that if there were no restructuring costs associated with the merger, the market revaluation could be raised by the amount of the restructuring charge. Then the cost savings multiple would be 4.5 rather than 3.5. Also, since there is a time delay in achieving savings, this might artificially shave another point off of our estimated earnings multiple relative to a current earnings multiple. Thus, the reported multiple of 3.5 on three year steady state earnings is more comparable to a multiple of 5.5 if the earnings could be achieved immediately and at no restructuring costs. Comparing a multiple of 5.5 to a bank earnings multiple of 10 suggests that about 55% of the estimated savings are capitalized by the market, which is similar to the regression estimates based on discounted cash flow valuation of cost savings.

sample, expected revenue losses are reported in only one transaction (Wells Fargo's acquisition of First Interstate Bancorp). The American Banker (December 9, 1997, p. 25) notes that "customer retention is something that most analysts rarely monitor unless something goes really wrong." Nevertheless, the same article quotes Lehman Brothers analyst Michael Plodwick as saying that "Most banking companies start out by estimating that five percent to ten percent of an acquired bank's deposits will be lost during an in-market transaction … but usually a little less in an out-of-market deal." Losses are generally greater for in-market transactions because cost saving branch closures are more likely to lead to customer shifts.

While a 5% (or even 10%) deposit loss does not necessarily imply a 5% revenue loss, a cost-cutting merger that creates a 5% loss of the acquired bank's revenues could easily cut our valuation of merger benefits by about one-third of the gains realized from a typical in-market merger. It is worth noting that some analysts are cognizant of this potential. Specifically, for the analyst reports that we review, at least one analyst forecasts and quantifies significant revenue losses in four separate deals (the mergers of Fleet and Shawmut, Comerica and Manufacturers National, Wells Fargo and First Interstate, and Chemical Bank and Manufacturers Hanover). These four deals were all big cost-saving mergers, which suggests that omitted revenue losses are probably proportional to cost savings. This sort of forecast omission (or overoptimism) would tend to lower the slope coefficient on the present value of net cost savings for our regressions in Table 6.

A second area of overoptimism can occur when management estimates the costs of integrating the two banks. These restructuring charges include items such as severance payments and lease buyouts. As we indicate in Section 3.2, restructuring charge estimates are sometimes omitted by firms. In these cases, we substitute ex post cost disclosures. It appears, however, that when restructuring estimates are given, they frequently underestimate ex post integration costs or actual charges subsequently taken. For 27 firms in our sample, we are able to glean some additional information about actual restructuring costs from the corporate disclosure statements. On average, the actual costs cited by management are 24.2% higher than what was initially estimated. These underestimates of restructuring costs will lead to upward-biased estimates of management's forecasts of the value gained from the merger. We should note, however, that estimates of after-tax restructuring charges in our sample average only about 1% of the combined bidder and target equity values. Hence, a 24% underestimate is not a large source of bias. On the other hand, these numbers do not include operating losses associated with lost customer transactions and misposting of deposits and loan payments to customer accounts. These snafus may occur in the process of integrating back-office computers. These items cost Wells Fargo roughly $200 million in 1997 in the process of integrating First Interstate Bancorp. Wells Fargo, however, appears to be an outlier in this regard.

A final source of bias in management forecasts is the tendency to include cost savings that would have been realized without a merger transaction. For instance, security analysts note that at least $250 million of the $1.5 billion of cost savings originally forecasted in the Chase Manhattan and Chemical Bank merger were attributable to a cost-cutting program already under way at Chase. Lehman Brothers analyst M.L. Mayo notes that in the Nationsbank acquisition of Boatmen's Bancshares, "Boatmen's has lots of low hanging fruit. Even without a merger, Boatmen's earnings could increase by one-fourth to one-third if excess capital were redeployed and efficiency gains achieved." In the case of the merger of First Union and Dominion Bankshares, First Union estimated that $30 million of the cost savings from the acquisition would be due to lower costs associated with real estate workouts once the bank got healthier. Presumably, this would have occurred without the merger.

In each of the items we have just discussed, it is not clear that management is unaware of the biased nature of the forecasts. For instance, strict adherence to accounting rules suggests that restructuring charges should not be taken until the acquirer is certain about the liabilities associated with the merger. Hence, initial charges might cover only the easier-to-estimate integration costs. Lumping in "nonmerger related" cost savings and failure to discuss what, on average, might be minor revenue losses from an acquisition could also be management's attempt to put the best face on a stock-financed acquisition without making explicitly false claims. These tendencies do, however, tend to exaggerate the valuation estimates we use in this paper.

4.4. Analyst assessments of merger related gains

Another way to assess merger-related gains and the reasonableness of management's forecasts is to examine analysts' opinions. In order to assess analysts' reaction to each of the bank mergers, we collect detailed analyst reports around the time of each announcement. We are able to find at least one analyst report for 36 of the 41 mergers in our subsample. While the reports vary considerably in their style and level of detail, a few general impressions emerge from reading these reports. These impressions are summarized in Table 9.

In most cases, analysts' primary focus is on the estimated cost savings. In Table 9, we classify each deal according to whether analysts view management's cost savings estimates as realistic, too optimistic, or too conservative. In the vast majority of cases, analysts view management's numbers as being realistic. Moreover, when analysts disagree with management, they appear to be just as likely to view management's numbers as too optimistic as they are to view them as too conservative. Consequently, analysts' forecasted cost savings are not biased in any particular direction on average with regard to management's projections. This rough alignment of analyst and management forecasts could reflect management's incentives to report realistic numbers and/or analysts'

Table 9
Analysts' assessments of management's ability to achieve their targeted cost savings and revenue targets

Sample consists of 41 large bank acquisitions with management estimates of cost savings or revenue gains during the period 1985–1996.

Buyer	Target	# of analysts that believe mgmt's cost savings targets are too optimistic	# of analysts that believe that mgmt's cost savings targets are realistic	# of analysts that believe mgmt's cost savings targets are too conservative	# of analysts that believe mgmt's revenue targets are too optimistic	# of analysts that believe mgmt's revenue targets are realistic	# of analysts that believe mgmt's revenue targets are too conservative
Bank of New York	Community Banks of NJ						
Bankamerica	Continental Illinois	1					
Bankamerica	Security Pacific		4				
BankBoston	Baybanks		3		1		
Barnett Banks	First Florida		1			1	
BB&T Corp (Win-Sal) or Southern	United Carolina Bancshares Corp.		1				
Boatmen's Bancshares	Centerre		2	1			
Boatmen's Bancshares	Fourth Financial			1			
Chemical Banking	Chase Manhattan		4				
Chemical Banking	Manufacturers Hanover		3	1	3	1	
Comerica	Manufacturers National		4				
Corestates Financial	First Pennsylvania		4			3	
Corestates Financial	Meridian Bancorp		2				
Crestar Financial	Citizens Bancorporation (Md)						1
First Bank System	FirsTier Financial		1				
First Chicago	NBD		4		3		
First of America	Security Bancorp	1			1		

Acquirer	Target						
First Union	Dominion Bancshares	2					
First Union	Florida National		2				
First Union	First Fidelity		1	4			3
Fleet Financial	Shawmut National	1					1
Keycorp	Puget Sound Bancorp						2
Marshall & Isley	Valley Bancorporation		1				
Mercantile Bancorporation	Mark Twain Bancshares Inc.						1
MNC Financial	Equitable Bancorporation						3
National City Corp	First Kentucky Bancorp	1		1	1		1
National City Corp	Integra Financial	1					1
National City Corp	Merchants National	1					1
NationsBank	C&S Sovran		1				
NationsBank Corp.	Boatmen's Bancshares, Inc.			3	3		3
NBD Bancorp	INB Financial		1				1
PNC Bank	Midlantic Corp.	1	1	1	1		1
Regions Financial Corp.	First National Bancorp.						
Society Corp	Ameritrust		1				3
Society Corp	Keycorp	1	1				1
Southern National	BB&T	1					1
Sovran	Commerce Union	1					1
U.S. Bancorp (Ore)	West One Bancorp	1					1
UJB Financial	Summit Bancorporation						
Wells Fargo	First Interstate Bancorp	5		1			4

unwillingness or inability to meaningfully question management's assumptions. It is apparent, from the reports, that analysts regularly take into account management's track record in previous mergers when assessing their likelihood of achieving the projected cost savings of a particular merger.

While analysts focus heavily on cost savings, in some acquisitions they also consider revenue enhancements. Interestingly, as shown in Table 9, analysts more frequently disagree with management about the size of revenue enhancements. When disagreements arise, analysts are more likely to view management's projected revenue enhancements as being too optimistic. Consistent with this view, many analysts seem to heavily discount management revenue forecasts in their pro forma earnings models. For example, M.A. Orenbach of Sanford Bernstein in his September 6, 1996 report on the merger between Nationsbank and Boatmen's Bancshares writes that "Our practice with respect to revenue enhancements is to haircut management's projections by fifty percent if they seem reasonable (and more if they do not)."

Apart from the estimated cost savings and revenue enhancements, some mergers allegedly provide capital structure benefits. Details regarding this information are reported in Table 10. In four cases, analysts argue that the merger might enable the combined bank to free up excess capital which can be used to either reduce less-profitable assets or to repurchase common stock. However, in only one case (the merger between First Union and First Fidelity) does management actually attempt to quantify the benefits from adjusting the capital structure. It is notable that at least one of the analysts following this merger did not believe that the projected capital structure benefits would be fully realized. In the merger between Chemical and Manufacturer's Hanover, analysts noted that the merger would enable the banks to jointly increase their capital ratio, which would make it easier for the joint bank to be an underwriter in the derivative market.

Not surprisingly, analysts also focus heavily on whether they believe that the bidding firm is overpaying for the target. This information is also summarized in Table 10. The evidence here is somewhat mixed. For our subset of 41 mergers, 36 firms have at least one analyst report. For 12 of the 36 firms, at least one of the analysts believes that the bidder overpaid. For transactions in which at least half of the analysts with an opinion believe the bidder overpaid (11 cases), the average abnormal return for the bidder is -8.65%. We do not know whether analysts' assessments of overpayment are made after the announcement date and are therefore simply a way of explaining the negative return to bidders.

In contrast, for mergers in which the majority of analysts found the purchase price defensible, the average bidder return is -0.04% (the difference is statistically significant at the 1% level). Target returns, however, are not significantly higher in mergers where analysts believe that bidders overpaid (in fact, the average return is slightly lower in deals involving overpayment). The combined

target and bidder returns are also significantly lower in transactions in which analysts believe the bidder overpaid.

Analysts often address a variety of other factors that are related to potential overpayment. In some cases, there is considerable discussion of the target's credit quality–instances arise in which analysts believe that management can obtain the projected cost savings but worry that the target's loan portfolio will have more potential bad loans than indicated in the bidding firm's forecast. In other cases, analysts are concerned that the acquisition is just one of a series of future dilutive acquisitions. Finally, concerns sometimes arise that the acquisition will prevent the bidder from itself becoming a target.

Overall, our review of analyst reports suggests that the primary source of merger-related gains is cost savings, not revenue growth. Moreover, the evidence is also consistent with at least a portion of the negative return to bidders resulting from overpayment for the target bank.

4.5. Post-merger performance

An additional way to assess management's estimates of merger gains is to examine the relation between changes in operating performance following mergers and management's estimate of merger-related gains. Since merger gains arise primarily from cost savings, we examine the relationship between changes in operating performance and management's estimated cost savings. We measure changes in operating performance by the change in the combined bank's adjusted efficiency ratio and changes in the combined bank's adjusted pre-tax ROA. The changes are computed by taking the difference between the performance of the bank the year after the merger and the performance of the bank the year prior to the merger. The dating convention can be explained with an example. If the merger was announced in the first half of 1995, we compare performance in 1996 and 1994. If the merger was announced in the second half of 1995, we compare 1997 and 1995. The definitions of the performance measures are given in Table 11. An improvement in the efficiency ratio implies a negative difference, while an improvement in pre-tax ROA implies a positive difference. Both measures are obtained by eliminating nonrecurring items, such as restructuring charges and asset sale gains, from the calculations. Also, loan loss provisions were excluded due to the tendency of managers to take pre-merger accounting "big baths." Two firms are omitted from the analysis because they were acquired before we could fully monitor their performance and four banks are eliminated because they made even larger acquisitions than the one we analyze before we could measure their performance.

As shown in Panel A of Table 11, the post-merger operating performance of the banks improves. The average adjusted efficiency ratio declines, while the average pre-tax ROA increases. The medians of the performance measures are significantly different in both cases. Note also that the results report numbers

Table 10
Analysts' assessment of additional motivations for undertaking the acquisition, whether management overpaid for the target, and other considerations involved in the merger

Sample consists of 41 large bank acquisitions with management estimates of cost savings during the period 1985–1996.

Buyer	Target	Unreported revenue enhancements opportunities	Significant capital structure benefits	# of analysts indicating that mgmt overpaid for the target		Other considerations
				YES	NO	
Bank of New York	Community Banks of NJ					
Bankamerica	Continental Illinois				2	
Bankamerica	Security Pacific				4	
BankBoston	Baybanks				3	Concern that bidder wasn't a target
Barnett Banks	First Florida	×		1		
BB&T Corp (Win-Sal) or Southern	United Carolina Bancshares Corp.	×			1	
Boatmen's Bancshares	Centerre	×			3	
Boatmen's Bancshares	Fourth Financial				1	
Boatmen's Bancshares	Worthen Banking				2	
Chemical Banking	Chase Manhattan	×			5	
Chemical Banking	Manufacturers Hanover[a]		Raises/improves overall capital position		5	
Comerica	Manufacturers National				4	
Corestates Financial	First Pennsylvania				4	
Corestates Financial	Meridian Bancorp	×			2	
Crestar Financial Corporation	Citizens Bancorporation (MD)					
First Bank System	FirsTier Financial				1	
First Chicago	NBD Bancorp		Benefits from freeing up excess capital		4	Concern that bidder wasn't a target
First of America	Security Bancorp			1		
First Union	Dominion Bancshares				1	Concern about continued dilution

Bidder	Target		Note			Comment
First Union	First Fidelity		benefits from freeing up excess capital	1	1	Analysts skeptical about capital structure benefits
First Union	Florida National					
Fleet Financial	Shawmut National			2	3	Concern about continued dilution
Keycorp	Puget Sound Bancorp		benefits from freeing up excess capital		2	
Marshall & Isley	Valley Bancorporation	×			1	
Mercantile Bancorporation Inc.	Mark Twain Bancshares Inc.				3	Concern that bidder wasn't a target
MNC Financial	Equitable Bancorporation				3	
National City Corp	First Kentucky Bancorp			1	1	Concern about continued dilution
National City Corp	Integra Financial			1	1	
National City Corp	Merchants National			2	2	
NationsBank	C&S Sovran			1	1	
NationsBank Corp.	Boatmen's Bancshares, Inc.		benefits from freeing up excess capital	2	2	
NBD Bancorp	INB Financial			2	2	
PNC Bank	Midlantic Corp.			2	1	Analysts thought PNC shareholders would reject offer; concern that deal removes PNC as a potential target.
Regions Financial Corp.	First National Bancorp.					
Society Corp	Ameritrust				4	
Society Corp	Keycorp	×			3	Concern that bidder wasn't a target
Southern National	BB&T	×			2	
Sovran	Commerce Union			2	2	Concern about continued dilution
U.S. Bancorp (Ore)	West One Bancorp	×			1	concern that bidder wasn't a target
UJB Financial	Summit Bancorporation					
Wells Fargo	First Interstate Bancorp			1	3	

[a] Bankamerica merger with Security Pacific often characterized as "disappointing" from Bankamerica's view due to large unforseen liabilities at Security Pacific.

Table 11

Changes in operating performances around bank acquisitions for a sample of 36 bank acquisitions with management estimates of cost savings and revenue gains during the period 1985–1996

Pre-merger performance measures are for the fiscal year before the merger announcement if the merger is announced in the first half of a fiscal year or in the fiscal year of the merger announcement if the merger is announced in the second half of the fiscal year. Post-merger performance measures are two fiscal years after the pre-merger performance year. Panel A contains descriptive statistics for the performance measures. Panel B contains regression results relating changes in performance to cost saving estimates and pre-merger performance. Results are presented with and without the MNC Financial acquisition of Equitable Bancorporation because this firm is an extreme outlier (*t*-statistics are in parentheses.) The combined efficiency ratio is the sum of labor, equipment, and occupancy costs for both the bidder and the target divided by the sum of the taxable equivalent net interest income and noninterest income from nonrecurring items for the bidder and target. This ratio is computed using accounting information in the year preceding and the year following the merger (as defined in the Table 10 heading). When possible, restated data are used to insure comparability of firms. The combined adjusted pre-tax ROA begins with profit before tax of the bidder and target combined and then excludes securities gains and other non-recurring income items and adds book provisions for loan losses, OREO expenses, amortization of intangibles (primarily goodwill), and restructuring charges associated with mergers and reorganizations. This adjusted pre-tax profit figure is divided by the average total assets for the bidder and target in the relevant year it is calculated. Second-year cost savings estimates are in dollar terms.

Panel A: Change in performance measure

	Before merger	After merger
Combined adjusted efficiency ratio	0.4179	0.4069
	(0.4165)	(0.4051)*
Combined adjusted pre-tax ROA	0.0229	0.0248
	(0.0222)	(0.0249)*
Combined adjusted efficiency ratio (excluding MNC Financial acquisition)	0.4179	0.4011
	(0.4149)	(0.4042)*
Combined adjusted pre-tax ROA (excluding MNC Financial acquisition)	0.0228	0.0254
	(0.0221)	(0.0251)*

Panel B. Regressions relating changes in performance measures to cost savings measure

	Change in combined efficiency ratio		Change in combined pre-tax ROA	
	Entire sample	MNC Financial acquisition omitted	Entire sample	MNC Financial acquisition omitted
Constant	0.071	0.076	0.0145	0.0101
	(1.27)	(1.52)	(2.53)	(3.64)
Second year cost savings estimate/(average total assets for the post merger year)	0.425	−4.061*	−0.062	0.364
	(0.08)	(−2.07)	(−0.10)	(1.50)
Combined adjusted efficiency ratio before the merger	−0.198	−0.199		
	(−1.44)	(−1.62)		
Combined adjusted pre-tax ROA before the merger			−0.543*	−0.369*
			(−2.32)	(−2.78)
Adjusted R^2	0.023	0.173	0.165	0.233

*Significantly different from the pre-merger distribution at the 0.01 level based on a Wilcoxon sign rank test.

Table 12
Qualitative assessment of post-merger performance for a sample of 41 large bank acquisitions with management estimates of cost savings and revenue gains during the period 1985–1996. Mergers are classified according to the authors' assessments.

Buyer	Target	Significantly worse than expected	Worse than expected	Performance roughly in line with management's expectations	Better than expected	Inconclusive
Bank of New York	Community Banks of NJ					×
Bankamerica	Continental Illinois					×
Bankamerica *	Security Pacific			×		
BankBoston	Baybanks			×		
Barnett Banks	First Florida				×	
BB&T Corp (Win-Sal) or Southern National	United Carolina Bancshares Corp.			×		
Boatmen's Bancshares	Centerre				×	
Boatmen's Bancshares	Fourth Financial					×
Boatmen's Bancshares	Worthen Banking					×
Chemical Banking	Chase Manhattan			×		
Chemical Banking	Manufacturers Hanover[a]			×		
Comerica	Manufacturers National		×			
Corestates Financial	First Pennsylvania					×
Corestates Financial	Meridian Bancorp		×			
Crestar Financial	Citizens Bancorporation (MD)					×
First Bank System	FirsTier Financial			×		
First of America	Security Bancorp			×		
First Chicago	NBD Bancorp			×		
First Union	Dominion Bancshares			×		
First Union	First Fidelity					×
First Union	Florida National				×	

Fleet Financial					×
Shawmut National			×		
Keycorp	×				
Puget Sound Bancorp	×				
Marshall & Isley					×
Valley Bancorporation			×		
Mercantile Bancorporation Inc.					×
Mark Twain Bancshares Inc.					×
MNC Financial	×		×		
Equitable Bancorporation	×				
National City Corp		×			
First Kentucky Bancorp		×			
National City Corp	×				
Integra Financial	×				
National City Corp	×				
Merchants National	×				
NationsBank			×		
C&S Sovran			×		
NationsBank Corp.			×		
Boatmen's Bancshares, Inc.			×		
NBD Bancorp			×		
INB Financial			×		
PNC Bank					×
Midlantic Corp.					×
Regions Financial Corp.			×		
First National Bancorp.			×		
Society Corp	×				
Ameritrust	×				
Society Corp	×				
Keycorp	×				
BB&T	×				
Southern National	×				
Commerce Union			×		
Sovran			×		
U.S. Bancorp (Ore)					×
West One Bancorp			×		
UJB Financial	×				
Summit Bancorporation	×				
Wells Fargo	×				
First Interstate Bancorp	×				

with and without MNC Financial. MNC is a severe outlier. The company was hit with large-scale nonperforming loans after its merger with Equitable Bancorp due to widespread real estate problems in the Washington D.C. area in the early 1990s. Facing financial difficulty, it sold its large and profitable MBNA subsidiary for a substantial gain, thereby eliminating it from its operating numbers.

The regressions in Panel B of Table 11 attempt to explain the changes in operating performance. The independent variables are the level of prior performance and a cost savings variable. The cost savings variable is the forecasted cost savings in year 2 of the merger deflated by the merged banks' average assets in the post-merger year. Given that most of these mergers are somewhere between their first year and second year of integration, the variable is an imperfect proxy for the amount of cost savings anticipated at the time the accounting numbers are measured. In spite of this fact, the regressions in Panel B that omit the MNC merger show that changes in performance are related to estimates of cost savings, though the strength of this result is marginal in terms of statistical significance. Not surprisingly, changes in performance are also related to prior performance, with poor prior performance leading to improvement.

4.6. Post-merger performance: qualitative assessment

The improved operating efficiency following the mergers in our sample reinforces the argument that an important motive for bank mergers is cost savings. However, the accounting measures of operating efficiency and profitability do not provide a clear picture of whether management successfully meets their cost savings or revenue targets. Moreover, as discussed in Section 2, and as illustrated by the plight of MNC Financial, accounting numbers do not always give an accurate description of whether management met its merger goals. To better gauge post-merger performance, we examine annual reports and proxy statements in the three years following the merger for any discussion of whether management meets its cost savings goals for the merger. We also examine related press accounts in Dow Jones News Retrieval over the same three-year period. From these various accounts, we classify the merger's performance as being in line with management's original forecast, significantly worse than expected, worse than expected, better than expected, or inconclusive. Expected performance refers to management's original expectations regarding the merger's projected cost savings. Mergers are classified as worse than expected if cost savings fall more than 10% below targets, cost cuts are well behind their initial timetable, news accounts suggest significant negative surprises with respect to customer loss, or integration costs are sufficiently above expectations to merit press coverage. The classifications are reported in Table 12.

In the large majority of cases, the mergers appear to exceed or at least meet management's original expectations. We characterize performance as below expectations in only four of the mergers, and in only one case (the merger between Wells Fargo and First Interstate) is performance significantly worse than expected. It is important to note that the classifications reported in Table 12 only address whether management meets its stated cost reduction targets. In a few instances, these targets are met, yet the combined firm suffers because of other events. For example, the merger between Bankamerica and Security Pacific is not classified as a failure due to large unknown liabilities inherited from the merger partner. These liabilities existed with or without the merger.

While these numbers are instructive, they should be interpreted with some caution. In a large number of cases, the post-merger performance is inconclusive. Moreover, there is a potential selection bias to the extent that managers report good news more readily than bad news. For example, management might report that it met its cost savings target on schedule but fail to report that revenue losses were much larger than expected.

5. Summary and conclusion

Deregulation and changing technology have dramatically transformed the banking industry over the past two decades enabling many banks to provide a wider range of banking services and to service more customers across a larger geographical area. These same forces are also routinely offered as a justification for the consolidation of the banking industry over this time period. Despite these often-stated rationales for bank mergers, most of the previous academic literature tends to find that the net value created from bank mergers is quite limited.

This paper tries to get at the root of this apparent contradiction by building upon the existing literature in two important ways. First, we consider the estimated value gains from bank mergers over a longer period of time, taking into account more-recent mergers. Second, we calculate the expected net present value of the merger's net benefit for the subset of mergers for which we are able to obtain management's projections of the merger's estimated cost savings and revenue enhancements. These details enable us to assess what management believes to be the primary source of merger gains. By linking management's assessment of the merger's value to stock analysts' reports and the stock market's reaction, we are able to look at each bank merger from the perspective of management, analysts, and investors.

Our results suggest that most of the estimated value gains from bank mergers stem from the opportunity to cut costs by eliminating overlapping operations and consolidating backroom operations. For the typical bank merger, estimated revenue enhancements are significantly less important. Furthermore, both

Table 13

Bidder	Target	Announcement Date
Banc One	Marine Corp	07/24/87
Banc One Corp.	American Fletcher Corp.	05/07/86
Banc One Corp.	Valley National Corp.	04/14/92
Bank of New England	Conifer Group, Inc.	08/14/86
Bank of New York**	National Community Banks, Inc.	01/29/93
Bankamerica Corp.**	Security Pacific Corp	08/12/91
Bankamerica Corp.**	Continental Bank Corp.	01/28/94
BankBoston Corp.**	BayBanks, Inc	12/13/95
Barnett Banks Inc.**	First Florida Banks Inc.	05/18/92
BB&T Financial Corp.**	Southern National Corp NC*	08/01/94
BB&T Corp.**	United Carolina Bancshares Corp	11/04/96
Boatmen's Bancshares Inc.**	Centerre Bancorporation	05/04/88
Boatmen's Bancshares, Inc.**	Fourth Financial Corporation	08/28/95
Boatmen's Bancshares, Inc.**	Worthen Banking Corp.	08/18/94
Citizens & Southern (GA)	Landmark Banking	02/22/95
Chemical Banking Corp.	Texas Commerce Bancshares Inc.	12/15/86
Chemical Banking Corp.**	Chase Manhattan Corp.*	08/28/95
Chemical Banking Corp.**	Manufacturers Hanover Corp*	07/15/91
Comerica Inc.**	Manufacturers National Corp*	10/28/91
Corestates Financial Corp.**	Meridian Bancorp, Inc.	10/10/95
Corestates Financial Corp.**	First Pennsylvania Corp.	09/18/89
Crestar Financial Corporation**	Citizens Bancorporation (MD)	09/16/96
First Bank System, Inc.**	FirsTier Financial Inc.	08/07/95
First Chicago Corporation**	NBD Bancorp, Inc.	07/12/95
First Fidelity Bancorporation	Fidelcor Inc.*	07/31/87
First of American Bank Corporation**	Security Bancorp, Inc. (Southgate)	09/12/91
First Union Corp.	Atlantic Bancorporation	06/17/85
First Union Corp.	First Railroad	06/11/86
First Union Corp.**	First Fidelity Bancorporation	06/19/95
First Union Corp.**	Dominion Bankshares Corp.	09/21/92
First Union Corp.**	Florida National Banks, Inc.	03/07/89
Fleet Financial Group Inc.	Norstar Bancorp*	03/18/87
Fleet Financial Group, Inc.**	Shawmut National Corporation	02/21/95
Hartford National Corp.	Shawmut Corp*	08/26/87
Keycorp**	Puget Sound Bancorp	03/09/92
M N C Financial Inc.**	Equitable Bancorp (MD)	07/12/89
Marshall & Isley Corp.**	Valley Bancorporation	09/20/93
Maryland National Corp.	American Security Corp.	08/01/86
Mercantile Bancorporation Inc.**	Mark Twain Bancshares Inc.	10/28/96
Midlantic	Continental Bancorp	02/21/86
N B D Bancorp Inc.**	I N B Financial Corp.	03/18/92
National City Corp.**	Merchants National Corp.	10/30/91
National City Corp.**	First Kentucky	01/28/88
National City Corp.**	Integra Financial Corporation	08/28/95
NationsBank Corp.**	Boatmen's Bancshares, Inc.	08/30/96
NationsBank Corp.**	C & S Sovran Corp	07/22/91

Table 13 (*continued*)

Bidder	Target	Announcement Date
P N C Financial Corp.	Citizens Fidelity Corp.	06/30/86
P N C Financial Corp.	Central Bancorporation Inc.	07/31/87
PNC Bank Corp.**	Midlantic Corporation	07/10/95
Regions Financial Corporation**	First National Bancorp (GA)	10/23/95
Republicbank Corp.	Interfirst Corp.	12/17/86
Security Pacific Corp.	Rainier Bancorporation	02/24/87
Society Corp.	Trustcorp Inc.	06/19/89
Society Corp.**	Keycorp*	10/04/93
Society Corp.**	Ameritrust Corp.	09/13/91
Sovran Financial Corp.	Citizens and Southern Corp (GA)*	09/27/89
Sovran Financial Corp.	Suburban Bancorp	09/24/85
Sovran Financial Corp.**	Commerce Union Corp.	04/27/87
Suntrust Banks Inc.	Third National Corp.	09/02/86
UJB Financial Corp.**	Summit Bancorporation (NJ)	09/11/95
US Bancorp**	West One Bancorp	05/08/95
Wachovia Corp.	First Atlantic Corp	06/17/85
Wachovia Corp.	South Carolina National Corp.	06/24/91
Wells Fargo and Company **	First Interstate Bancorp	01/24/96

*Indicates that the merger was announced as a merger of equals.
**Indicates that we have detailed cost savings and/or revenue enhancement figures.

bidder and target bank merger announcement returns are strongly and positively related to managers' estimated cost savings. We also find that more-recent bank mergers (those occurring in the 1990s) are more likely to be accompanied by detailed projections of cost savings, and generate higher abnormal returns than mergers prior to 1990. In this respect our results do not conflict with earlier studies, but they indicate that bank mergers have gotten better over time.

Finally, while we find that the market responds positively to deals with higher projected cost savings, the market also appears to significantly discount management's projections. Merger announcement stock revaluations are well below our present value estimates of merger gains inferred from managerial projections. The explanation for this discount is multifaceted. In part, it reflects prior market anticipation of merger activity and negative signaling associated with stock-financed acquisitions. It could also involve potential error in converting cost savings estimates into valuation gains. There is also evidence, however, that management's initial projections typically understate the costs that are incurred in order to realize the estimated cost savings, and that management typically understates the potential revenue loss that arises as part of the consolidation. These factors can at least partially explain why the market generally discounts management's forecast of the anticipated gains from bank mergers.

Appendix

Our sample consists of 64 bank mergers announced between 1985 and 1996 in which the stated deal value (the amount paid for the target's share) exceeds $400 million in 1985 inflation-adjusted dollars and the target bank's assets are equal to at least 10% of the acquiring bank's assets in the year preceding the merger (Table 13).

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