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This paper tests a two-part hypothesis: first, that during the period between publication of the risk-based capital requirements in early 1989 and the end of 1992, bank holding companies (BHCs) faced a statistically significant decrease in stock returns if they issued new common stock; second, that this discouraged new common stock issuance and therefore, in effect, forced BHCs with Tier 1 and/or leverage capital-to-assets ratios below the regulatory minima to decrease loans outstanding more than did BHCs deficient only in their total capital ratios. Empirical evidence supporting both parts of the hypothesis is presented.

In December 1992, pursuant to the Basle accord, capital requirements for banks and bank holding companies (BHCs) changed. For the first time, the minimum amount of capital that a banking organization was required to hold depended on the riskiness of its asset portfolio as well as its size. Various types of assets were assigned weights, according to their perceived riskiness, with commercial loans receiving the highest weight and U.S. government securities the lowest. Banks and BHCs were required to hold at least 4 percent of their *risk-weighted* assets in so-called Tier 1 capital and 8 percent of their risk-weighted assets in Tier 1 plus supplementary (Tier 2) capital, which includes, for example, mandatory convertible debt and subordinated debt. For BHCs, the bulk of Tier 1 capital was required to be common shareholders' equity plus retained earnings. In addition to the new risk-based requirements, a new minimum Tier 1 capital-to-unweighted asset ratio of 4 percent was established.

When the new capital requirements were first made public in early 1989, some BHCs found themselves in a potentially deficient position. In order to meet the various new capital requirements by the December 1992 deadline, they would have to increase capital and/or decrease risk-weighted, or perhaps unweighted, assets. Some of the BHCs deficient in Tier 1 capital found that they would have to increase common shareholders' equity in particular or decrease assets. However, it has been well established that for a variety of firm types, the announcement of the intention to issue common stock tends to decrease a firm's stock value. This paper finds that this type of effect also existed for BHCs in the period following publication of the new capital requirements. The paper then argues that, given the presence of such an effect, BHCs deficient in common equity had a significant incentive to meet the capital requirements by decreasing asset growth rather than issuing new common stock.

The argument implies that BHCs deficient only in supplementary capital did not decrease asset growth as much. This is because, in contrast to the "constrained" BHCs that had to issue common stock, these "unconstrained" but still deficient BHCs could redress their capital insufficiency by issuing those types of securities that

do not lead to negative wealth effects. Deficient but unconstrained BHCs could therefore afford greater asset growth. Of particular interest in this context is loan growth, given that much has been written about the effects of the risk-based capital requirements on bank lending and that commercial loans receive such a high risk weighting. Therefore, I test the hypothesis that "constrained" BHCs exhibited lower loan growth than unconstrained but deficient BHCs during the two years prior to December 1992. Consistent with this hypothesis, I find that constrained BHC loan growth was statistically significantly lower, even after controlling for the size of each BHC's capital deficiency.

The remainder of the paper falls into five sections. Section I reviews literature related to the wealth effects of security issuance. Section II discusses the data and the empirical methodology used for estimating the effects of BHC announcements of common stock and supplementary capital securities issuances on common stock returns. This section also presents the empirical results of this estimation. Section III discusses the implications of a negative common stock wealth effect for common stock deficient BHCs and presents comparative summary statistics for capital sufficient and constrained and unconstrained capital deficient BHCs. Section IV presents the data, methodology, and results for a regression testing the effect of the Tier 1 capital requirements on constrained BHC loan growth. Section V concludes.

I. THE SHAREHOLDER WEALTH EFFECTS OF SECURITY ISSUANCE: LITERATURE REVIEW

In this section, I review the literature related to the wealth effects of security issuance. Included will be a discussion of various theories explaining why common stock issuance may lower common stock returns. This section will serve as conceptual background for the empirical estimation of the wealth effects of BHC security issuances and for the ensuing discussion of the interaction between negative wealth effects, capital requirements, and loan growth.

Modigliani and Miller (1958) show that, in the absence of tax effects, information asymmetries, or other distortions, the value of a firm should be independent of its capital structure and therefore unaffected by the issuance of new debt or equity. However, in the real world there are tax effects and information asymmetries. Accordingly, several researchers, including Asquith and Mullins (1986), Smith (1986), and Mikkelsen and Partch (1986), have found empirical evidence that a firm's stock price typically falls upon the announcement of upcoming issuances of new

common stock. In addition, economists have found that some, but not all, non-common stock security types also show statistically significant effects—some negative and some positive.

Miller and Rock (1985) attribute these results to information asymmetries. Specifically, they hypothesize that the market concludes that a firm that is seeking external financing must be expecting lower earnings. The reason is that, in the presence of information asymmetries, inside financing (e.g., increased retained earnings) usually would be less expensive. However, Miller and Rock's theory does not explain why announcements of issuances of different types of securities would have different effects.

Myers and Majluf (1984) offer a possible explanation. They argue that managers have an incentive to issue equity when the firm's stock is overvalued and debt when its stock is undervalued. This is because when a firm issues equity, it sells a portion of its existing assets but acquires, for its existing stockholders, a share in the net present value of the new project to be undertaken. If the firm's existing assets are significantly undervalued by the market, the dilution suffered by existing stockholders can be greater than any gains they receive from undertaking the new project, in which case no new equity will be issued. However, the project may be financed through debt, because the trade-off for existing stockholders between losing share in existing assets but gaining a share of the new project will be more favorable if debt is issued. On the other hand, as stock becomes overvalued, financing a new project through stock issuance rather than debt issuance begins to look more favorable to existing stockholders. Therefore, the choice between raising funds through equity or debt will be more likely to favor equity when the stock is overvalued and more likely to favor debt when the stock is undervalued. If there is information asymmetry such that managers have inside information regarding the value of the firm that market participants do not have, then the issuance of equity will impart new information to the market. In particular, investors, knowing managers' incentives, will interpret the issuance of new equity as a signal that the stock is overvalued, and the price will fall.

Therefore, a synthesis of the Miller and Rock and Myers and Majluf theories would say that equity issuance announcements should have negative effects, while debt issuance announcements should have less negative or maybe even positive effects on common stock returns.

The first part of this paper's thesis is that, during the period after publication of the risk-based capital standards in early 1989, BHC's common stock issuance announcements created negative wealth effects. (Again, the second

part is that the wealth effect combined with the risk-based capital requirements to discourage common stock issuance and encourage loan growth cutbacks among certain undercapitalized BHCs.) Wansley and Dhillon (1989), Keeley (1989), Polonchek, Slovin, and Sushka (1989), Wall and Peterson (1991), and Cornett and Tehranian (1994) all have investigated the existence of negative wealth effects for BHCs. At least for some subset of BHCs, all found statistically significant negative abnormal returns associated with common stock issuance. Although the time period for these studies differed from the time period used in this paper, it is important to review these studies' results.

Wansley and Dhillon examine the stock market response to public security offerings by BHCs between 1978 and 1985. Using an event study methodology, they find a statistically significant decrease in common stock prices at the time of the announcement of an upcoming common stock issue.

Keeley investigates the period from 1975 to 1986 in addition to two subperiods—January 1, 1975 through November 30, 1981, and December 1, 1981 through December 31, 1986. The two periods are distinguished by the imposition of specific objective capital requirements in 1981. (Prior to 1981, capital requirements were more subjective and nebulous.)

For the whole period, Keeley finds a statistically significant negative announcement effect for common stock and a statistically significant positive effect for perpetual preferred stock. He also finds statistically significant negative effects for debt and common stock together in the earlier period and for mandatory convertible debt in the later period and a significant positive effect for perpetual preferred stock in the later period.¹

In addition, Keeley finds a statistically significant negative announcement effect for common stock in the earlier period, but not in the later period. However, when he confines his sample to BHCs he classifies as capital deficient, he finds statistically significant negative common stock effects for both periods. In contrast, he finds a statistically significant negative effect for his capital sufficient subset in the earlier period only. Therefore, it appears that the difference in the results for the two periods for the group as a whole largely is driven by a difference in the results for the capital sufficient BHCs.

In explaining his results, Keeley entertains three hypotheses. First, he rejects the hypothesis that the difference

in the results across periods for the entire sample is due to a Myers and Majluf signaling effect. It is logical to suppose that the institution of objective capital standards made equity offerings more predictable and therefore diminished their information content. However, Keeley argues, this also would imply that capital deficient BHCs would exhibit less negative common stock issuance wealth effects than capital sufficient BHCs, whose issuances should be more voluntary. But, as he shows, this is not the case. In both the earlier and later periods capital deficient BHCs showed more negative wealth effects, and the difference between the effects for the two groups of BHCs was statistically significant.

Keeley then suggests that the results for the two types of BHCs differ because common stock issuance diminishes the value of banks' deposit insurance guarantee. This is especially true for banks with relatively low capital-to-asset ratios.² However, this explanation is somewhat unsatisfactory in that it does not adequately explain the difference in results across time periods for the sample as a whole and for the capital sufficient BHCs.

Moreover, the deposit insurance hypothesis implies that there should be a negative relationship between the increase in the capital-to-assets ratio and the announcement effect; a larger common stock issuance (relative to assets) should be associated with a more negative announcement effect. Keeley's results only weakly support this inference: He finds the implied negative relationship for the capital deficient BHCs only in the later period, and even then it is not statistically significant.

Keeley's third explanation is the most satisfactory. Here, he suggests that the issuance of common stock reveals private information held by regulators. As Keeley explains, market participants can tell when a BHC may be under regulatory pressure to increase its capital ratio by looking at its balance sheet. However, the market does not necessarily know the future prospects of the BHC or the method the BHC will use to augment capital.

Therefore, investors may view common stock issuance by capital deficient BHCs as a sign that the BHCs are under regulatory pressure not to issue securities that require increased payouts from earnings, such as debt or preferred stock; thus, Keeley suggests, it also may be a signal of management and regulator skepticism about the BHC's ability to generate sufficient future earnings to meet the cash flow requirements of additional debt or preferred stock or to generate cash flow sufficient to permit the accumulation of retained earnings to meet the new capital requirements. On the other hand, if regulators and

1. Actually, Keeley has no observations for perpetual preferred stock or mandatory convertible debt for the earlier period and no observations for simultaneous debt and common stock announcements for the later period.

2. See Furlong and Keeley (1987 and 1989).

bank management believe that the BHC's future earnings prospects are very good, retained earnings rather than a security issuance can be used to meet higher capital requirements. Moreover, he says, this explains why common stock issuance by a capital sufficient BHC might not provide a negative signal.

The inside information hypothesis provides a plausible explanation for all of Keeley's major findings concerning common stock issuance. First, it can explain the difference between common stock announcement effects for his capital deficient and capital sufficient subsets. Second, it can explain the difference between announcement effects for his capital sufficient subset in the earlier and later periods. As Keeley says, prior to the institution of specific minimum capital requirements, market participants might have been unsure whether a BHC's common stock issuance were due to regulatory pressure. Since there was some chance that it was, there was a small mean negative announcement effect even for capital sufficient organizations. However, he explains, after specific capital requirements were introduced, market participants could be confident that a common stock issue by a capital sufficient BHC was not a signal that regulators viewed the firm's earning prospects unfavorably. Therefore, common stock issuance announcements no longer lowered stock prices for this group. Third, the insider information hypothesis also provides a plausible explanation for the difference between the earlier and later period results for his capital sufficient subset as well as for the full sample.

Polonchek, Slovin, and Sushka's results basically are consistent with Keeley's results. These authors also examine a pre-1981 period (January 1975 to November 1981) and a post-1981 period (December 1981 to December 1984), as well as an aggregated 1975 to 1984 period. They find statistically significant negative common stock announcement effects only for the earlier period by itself.

Wall and Peterson examine the announcement effects of BHC's securities issuances between 1982 and 1986. These authors improve on prior studies by using information from the *Dow Jones News Wire (DJNW)* rather than the *Wall Street Journal (WSJ)* to identify announcement dates. The news wire is a more accurate source of when the market first gets the news of an impending securities issue, which may be a day or more before the news appears in the *WSJ*. Wall and Peterson also find that common stock announcements have statistically significant negative effects on common stock returns.

Finally, Cornett and Tehranian study the wealth effects of BHC announcements of issuances of various types of securities during the period June 1983 through December 1989. The imposition of specific capital requirements for multinational BHCs, which had previously been exempted

from objective capital standards, marks the beginning of the period. Also, the "acceptable" total capital-to-asset ratio (greater than the "minimum" total capital-to-asset ratio) was increased from 6.5 percent to 7 percent in June 1983.

Cornett and Tehranian separate their sample into "voluntary" and "involuntary" issues of securities. They classify an issue as voluntary if the BHC's total capital ratio is above 7 percent at the end of the year prior to the security issue, involuntary if not. These authors find statistically significant negative wealth effects for common stock for the voluntary issues. For the involuntary issues, one type of statistical test indicates a statistically significant negative effect, while a second type indicates a lack of statistical significance. In addition, the negative announcement effect for the voluntary issuers is larger in absolute value than is the estimated effect for involuntary issuers, and the difference between the effects for the two groups is statistically significant. These results contrast with Keeley's results regarding his capital deficient and capital sufficient subsets; Keeley found significant negative effects for his capital deficient BHCs, but *not* for the capital sufficient BHCs. Cornett and Tehranian also found a statistically significant positive announcement effect for involuntary issues of straight (not convertible into common stock) debt.

Cornett and Tehranian attribute their results to the capital structure signaling model found in Ross (1977). Similar in spirit to Myers and Majluf's later paper, Ross's paper has managers possessing inside information about the prospects for the firm issuing equity when prospects are poor and debt when prospects are good. As Cornett and Tehranian explain, this is because a firm with poor prospects will want to share its downside with new claimants and thus prefers financing via stock issuance, whereas a firm with good prospects will not want to share its upside with new claimants and thus prefers debt financing.

Investors recognize these incentives, and therefore the stock price falls upon announcement of an impending voluntary equity issuance. However, Cornett and Tehranian reason, equity issuances perceived by market participants as involuntary need not necessarily imply poor prospects and therefore need not depress stock returns.

Several methodological differences between Keeley's and Cornett and Tehranian's approaches may help to explain the differences in results. First, it is possible that Cornett and Tehranian's sample of security issuances gives a positive bias to their involuntary issuance results. In contrast to Keeley, Cornett and Tehranian do not exclude issuances that are not publicly announced. Instead, these authors use the Securities and Exchange Commission filing (registration) date as the announcement date for

security issuances not located in the *Wall Street Journal Index*. It is likely that nonpublicly announced security issuances have a weaker effect on the market than those that are publicly announced. Because Cornett and Tehranian's involuntary issuers are on average smaller than their voluntary issuers, the involuntary issuers are less likely to announce publicly.³ Therefore, if common stock announcement effects for all BHCs tend to be negative, Cornett and Tehranian's methodology might have biased the effects for involuntary issues upward.

Another distinction between the two studies concerns the definition of undercapitalized BHCs. Keeley's distinction between capital deficient and capital sufficient BHCs depends on their capitalization as of a fixed date, December 1981, and its status does not change over time. This means that Keeley's classification of a security issuance announcement depends only on the identity of the announcing BHC. In contrast, Cornett and Tehranian's designation of involuntary versus voluntary issues depends on the issuing BHC's capitalization at the end of the year before the security offering. Therefore, their classification of a security issuance announcement depends partially on the identity of the issuer and partially on the timing of the issue.

Because BHCs can change their capital-to-assets ratios over time, Cornett and Tehranian's procedure seems more intuitively appealing than Keeley's. Cornett and Tehranian's method more likely correctly identifies security issuance announcements by BHCs that had relatively low levels of capital at the time of the announcement. It is somewhat puzzling, however, that Cornett and Tehranian look at BHC capitalization at the end of the year before the security issuance rather than at the end of the year before the security issuance announcement.

Keeley and Cornett and Tehranian also use different capital ratios for their classifications. Keeley uses a 5.5 percent primary capital ratio cutoff, and Cornett and Tehranian use a 7 percent total capital ratio cutoff.⁴ This may be an important distinction, but it would not, a priori, tend to yield the particular differences in results that we see.

3. The mean value of assets for BHCs issuing voluntarily was (in millions) \$38,289.6, and the median was \$16,488.5, while the corresponding figures for those issuing involuntarily were \$29,809.6 and \$12,236.2.

4. In 1981, specific minimum primary capital-to-total assets ratios were set for BHCs based on their size. The minima were 6 percent for BHCs with assets of \$1 billion or less and 5 percent for BHCs over \$1 billion. The 17 largest banking organizations, the multinationals, were treated on an individual basis. Also in 1981, the Federal Reserve set up "zones" of adequacy for regional banking organizations, based on total capital-to-assets ratios. An "acceptable" total capital-to-assets ratio was

Finally, as Cornett and Tehranian point out, their sample size is considerably larger than Keeley's. By itself, this lends credence to Cornett and Tehranian's results. In particular, it may explain why Keeley did not find a statistically significant negative common stock announcement effect for his capital sufficient BHCs in the post-1981 period, whereas Cornett and Tehranian did.⁵ Also, neither study mentions excluding security issuance announcements contaminated by the concurrent announcement of other important news, such as ratings changes or merger agreements. Although not removing contaminated announcements would not, a priori, bias results in one direction or the other, it might lead to spurious conclusions. This would more likely be a problem with small samples such as Keeley's.

II. ANNOUNCEMENT EFFECTS: METHODOLOGY, DATA, AND RESULTS

Methodology

This section reexamines the effect of the announcement of an upcoming issuance of securities on BHC stock returns. Studies cited above did not estimate announcement effects for the period of time relevant to this paper—after publication of the risk-based capital guidelines. Given the regulatory regime shift and the dependence of this paper's thesis on the continued existence of a negative common stock wealth effect, it is important to examine the post-1989 period in particular.

The announcement effect of a security issuance is the change in the announcing firm's common stock return resulting from the announcement, or the "abnormal return." To calculate abnormal returns, some estimate of "normal" returns must be made. In this paper, I use the market model to estimate normal, or expected, returns.

deemed to be 6.5 percent, and banking organizations in this zone were subject to minimum regulatory supervision. The minimum was set at 5.5 percent.

In June 1983, the 6.5 percent cutoff for acceptable total capital was increased to 7 percent, and the 5 percent primary capital requirement was extended to the multinationals. Cornett and Tehranian use the 7 percent total capital requirement as their cutoff for involuntary issues.

In 1985, regulators introduced a minimum primary capital-to-assets ratio of 5.5 percent and a minimum total capital-to-assets ratio of 6 percent for all BHCs. Keeley argues that these 1985 rules were the ultimate goal as early as 1981, so he designates any BHC with a primary capital ratio in December 1981 of less than 5.5 percent as capital deficient.

5. Keeley had only five observations in his post-1981 sample of common stock issuance announcements by capital sufficient BHCs, whereas Cornett and Tehranian had 61 observations in their sample of voluntary common stock issuances.

Under the market model,

$$(1) \quad R_{jt} = \alpha_j + \beta_j R_{mt} + \epsilon_{jt},$$

where R_{jt} is bank j 's common stock return on day t and R_{mt} is the market return on day t . I estimate the market model for each bank and for each announcement event for a 120-day period. The first part of the estimation period begins 79 trading days before the security issuance announcement and ends 20 days before it; the second part begins 20 days after the announcement and ends 79 days after it.⁶ The "announcement day" is defined as the day that news of the planned issuance appears on the *DJNW*. The abnormal return, or prediction error, PE_{ji} for bank j on announcement day t_{ji} , is then the difference between the actual return and the predicted return as given by the market model

$$(2) \quad PE_{ji} = R_{jt_{ji}} - (\alpha_{ji} + \beta_{ji} R_{m,ji})$$

where $R_{jt_{ji}}$ is bank j 's common stock return on day t_{ji} , α_{ji} and β_{ji} are the coefficients estimated from equation (1) for bank j and announcement event i , and $R_{m,ji}$ is the market return on day t_{ji} .

I calculate an average prediction error for various security types. The average prediction error simply adds together the prediction errors for events associated with a particular security type, and averages this sum across all events (for all BHCs) of that type. Let $\{K\}$ be the set of all events associated with security type k , and let K be the number of events of type k . Then the "average prediction error" for security type k , APE_k is defined as:

$$(3) \quad APE_k = \left(\frac{1}{K}\right) \sum_{k \in \{K\}} PE_{ji}$$

The average prediction error indicates the size of the abnormal return. A test of the statistical significance of the abnormal return requires a transformation of the prediction error into the "standardized prediction error," defined as

$$(4) \quad SPE_{ji} = \frac{PE_{ji}}{S_{ji}},$$

where

$$(5) \quad S_{ji} = \sqrt{V_{ji}^2 \left(1 + \frac{1}{120} + \frac{(R_{m,ji} - \bar{R}_{m,ji})^2}{\sum_{t=1}^{120} (R_{mt} - \bar{R}_{m,ji})^2}\right)}.$$

In (5), V_{ji} is the residual variance from the market model regression for bank j and event i , $R_{m,ji}$ is the market return on event day t_{ji} , R_{mt} is the market return on day t of the mar-

ket model estimation period, and $\bar{R}_{m,ji}$ is the mean market return in the estimation period associated with bank j and event i .

The "average standardized prediction error" for security type k , $ASPE_k$, is defined as

$$(6) \quad ASPE_k = \frac{1}{K} \sum_{k \in \{K\}} SPE_{ji}.$$

Under reasonable assumptions, it can then be shown that the statistic

$$(7) \quad Z = \sqrt{K} (ASPE_k)$$

has a standard normal distribution (Mikkelsen and Partch 1986).

Data

Although the risk-based capital requirements were not fully implemented until the end of 1992, final guidelines were issued in March 1989. Therefore, this data set covers 1989 through 1992.⁷ A list of BHC securities issuances was obtained from Securities Data Company (SDC). Most of the issuances on the SDC data set include the SEC filing date (registration date) for the offering. Relatively few have missing filing dates. The SDC data also include the security type, the date the security was offered to the market, and the dollar amount raised by the offering.

The filing date given on the SDC data set was used to locate the announcement date on the *DJNW*. Usually, the first announcement was on the day of or day after the filing or, rarely, soon before the filing.⁸ Given the widespread coverage offered by the *DJNW*, issuances for which no *DJNW* announcement could be located were assumed to be not publicly announced and were omitted from the sample.

Security issuances that are filed as shelf registrations also were omitted from the sample. A shelf registration permits a firm to issue at any time in the future and is therefore a weaker signal than a non-shelf registration that the firm intends to issue in the near future. (Common stock issuances in the SDC data set were never filed as shelf registrations, so the omission of shelf registrations does not affect prediction error estimates for common stock.)

7. To be included in the data set, the announcement had to be between 1989 and 1992, inclusive, and the actual issuance had to take place by the end of 1992.

8. The close on the New York Stock Exchange, the American Stock Exchange, and NASDAQ (National Association of Securities Dealers Automated Quotations System for stock traded over-the-counter) is at 4:00 p.m., Eastern time. Therefore, if the news came over the wire after 4:00 p.m., the announcement date was taken to be the next trading day.

6. I use post-event data in addition to pre-event data to estimate the market model because the event itself may alter stock price volatility.

In addition, if on the announcement day significant news other than the security issuance announcement appeared (for example securities ratings changes, unexpected changes in earnings or loan loss provisions, and merger announcements), that observation was dropped from the sample. Finally, initial public offerings and secondary offerings of securities were omitted.

Common stock returns for estimation of the prediction errors were obtained from two sources. Returns for BHCs whose stock trades on the New York Stock Exchange or the American Stock Exchange were obtained from the Center for Research in Securities Prices. Those for BHCs whose stock trades over the counter were calculated using stock prices obtained from Data Resources, Incorporated. The market return used in estimation of the market model was the return on a broad-based index, the Wilshire 5000 Index.

Results

Average prediction errors and their associated Z statistics were calculated for common stock, subordinated debt, and preferred stock. I also calculated prediction errors for two subcategories of preferred stock: auction-rate preferred stock and non-auction-rate preferred stock. The risk-based capital requirements state that common stock and non-auction-rate perpetual preferred stock count as Tier 1 capital for BHCs, while subordinated debt and auction-rate perpetual preferred stock count as supplementary capital.

Mandatory convertible debt and term preferred stock also count as secondary capital. However, neither the SDC data set nor the *DJNW* specified whether debt issuances were mandatory convertible or not, nor whether preferred stock was perpetual or term. Therefore, no prediction errors are provided for mandatory convertible debt. Also, all preferred stock was assumed to be perpetual (and, unless otherwise noted by SDC or the *DJNW*, was assumed to be non-auction-rate). Table 1 shows the number of securities issuance announcements in the sample, by year of announcement and type of security.

Table 2 contains the average prediction errors and their associated Z statistics for the various security types listed in Table 1. The results in Table 2 indicate that, on average, there are significant negative abnormal returns associated with the issuance of common stock. On average, the announcement of an impending issuance of new common stock decreases common stock returns relative to their predicted values by approximately 1.6 percentage points. Abnormal returns due to the announcement of the issuance of other types of securities are not statistically significant.

The magnitude of the announcement effect found for

TABLE 1
SECURITIES ISSUES^a

SECURITY TYPE	1989	1990	1991	1992	ALL YEARS
Common Stock	7	1	16	20	44
Subordinated Debt	1	1	2	2	6
Preferred Stock	3	2	7	7	19
Auction-Rate	3	0	1	1	5
Nonauction-Rate	0	2	6	6	14

SOURCE: Securities Data Company.

^aPublicly announced, non-shelf registered issues only.

TABLE 2
AVERAGE PREDICTION ERRORS (APE)
1989-1992^a

SECURITY TYPE	APE	Z	PERCENT NEGATIVE ^b (SAMPLE SIZE)
Common Stock	-.0155*	-4.17	77.3 ^c (44)
Subordinated Debt	.0012	-.11	66.7 (6)
Preferred Stock	.00009	.009	63.2 (19)
Auction-Rate	.005	.35	60.0 (5)
Nonauction-Rate	-.0016	-.2	78.6 (14)

^aPrediction errors are actual residual returns, not percentage point residual returns.

^bThe null hypothesis is that the proportion of negative prediction errors equals 0.5. I use the Wilcoxon signed-ranks test described by Daniel (1978).

^cSigned-ranks test is significant at the 1 percent level.

*Significantly different from 0 at the 1 percent level.

common stock is remarkably similar to those found by previous researchers. Wansley and Dhillon found a two-day announcement effect for common stock of -1.5 percentage points; Keeley found the same for his entire sample; Polonchek, et al., found a three-day announcement effect of -1.4 percentage points; and Wall and Peterson found a one-day announcement effect of -1.5 percentage points.

However, as discussed in the literature review in Section I, Cornett and Tehranian's results cast some doubt on the existence of a negative common stock wealth effect for relatively low-capital banking organizations. Therefore, given the focus of this paper, it is important to test for the existence of a negative common stock wealth effect for low-capital banks. I looked at BHCs' capital positions in

December 1990 (the first date for which risk-based capital figures were available) and chose those that had to issue common stock to meet the well-capitalized risk-based capital guidelines.⁹ There were ten common stock issuance announcements by such BHCs in 1991 and 1992. The average prediction error for this group was estimated to be -2.74 percentage points, which was statistically significant at the 1 percent level. In addition, nine out of the ten prediction errors were negative.

III. THE EFFECT ON CAPITAL DEFICIENT BHCs

BHCs that were capital deficient when the risk-based capital rules were published had to redress the situation or face tight regulatory supervision and perhaps closure. It is reasonable to suppose that capital deficient BHCs would not have chosen to meet the guidelines exclusively by issuing common stock given its negative wealth effect. For some BHCs, the alternatives to issuing common stock included decreasing assets and issuing other types of securities that, as shown in the last section, appear not to have negative wealth effects. I will refer to deficient BHCs with such options simply as "unconstrained" BHCs. For other deficient BHCs, the only alternative to issuing common stock was to decrease assets. I will refer to these BHCs as "constrained" BHCs. BHCs that meet the guidelines will be called "unaffected" BHCs.

Given their lack of attractive options, it is likely that, following the publication of the risk-based capital guidelines, constrained BHCs decreased assets more than did unconstrained BHCs. Whether this is in fact the case must be ascertained empirically. The first step in this exercise is to identify properly constrained and unconstrained BHCs, which depends on an understanding of the risk-based capital rules.

The calculation of Tier 1 capital for BHCs sums common shareholders' equity (including retained earnings), non-auction-rate perpetual preferred stock, up to a certain limit, and minority interests in equity accounts of consolidated subsidiaries. The rules then deduct "goodwill" and 50 percent of investments in unconsolidated banking and finance subsidiaries from this sum to obtain Tier 1 capital.¹⁰ Non-auction-rate perpetual preferred stock is

limited to 25 percent of Tier 1 capital exclusive of the deductions.

The calculation of supplementary (Tier 2) capital for BHCs sums allowance for loan and lease losses, perpetual preferred stock not eligible for inclusion in Tier 1 capital (including auction-rate perpetual preferred), hybrid capital instruments (e.g., mandatory convertible debt and perpetual debt), term subordinated debt, and intermediate-term preferred stock. Then, the other 50 percent of investments in unconsolidated subsidiaries is deducted. Finally, the rules set Tier 2 capital equal to this net amount or Tier 1 capital, whichever is greater.

Total capital is the sum of Tier 1 capital plus Tier 2 capital minus reciprocal holdings of other depositories' capital securities. The risk-based capital rules specify minima for three capital ratios. Stated differently, the rules require that different types of capital be equal to at least a certain percentage of risk-weighted or unweighted assets. Tier 1 capital is required to be equal to at least 4 percent of risk-weighted assets. Total capital is required to be at least 8 percent of risk-weighted assets. The "leverage ratio" requirement is that Tier 1 capital plus 50 percent of investments in unconsolidated subsidiaries be at least 4 percent of total tangible assets, not risk-weighted.

Although the risk-based capital requirements were first made public in early 1989, Tier 1 capital, Tier 2 capital, and risk-weighted assets figures were not all available until December 1990. Therefore, categorization of BHCs into capitalization groups is based on year-end 1990 data rather than early 1989 data. Capital ratio elements were obtained from the Consolidated Financial Statements for BHCs for all 1,119 BHCs reporting risk-weighted assets figures in December 1990.

Constrained BHCs were identified as those BHCs that did not meet the Tier 1 requirement, the leverage ratio requirement, or both, in December 1990, and would not be expected to meet them by the end of 1992, taking into account projected growth in retained earnings.¹¹ The risk-based rules required full compliance by the end of 1992. In devising a strategy to meet the guidelines by that time, capital deficient BHCs likely took into account probable growth in retained earnings. I assume that, at the end of 1990, BHCs projected that retained earnings growth during 1991 and 1992 would be the same as during 1989. Therefore, the group of constrained BHCs excludes those that would have been predicted to meet the Tier 1 and

9. To be considered well-capitalized under the risk-based capital rules, a BHC has to hold Tier 1 capital equal to at least 6 percent of risk-weighted assets. Total capital is required to be at least 10 percent of risk-weighted assets, and, under the leverage ratio requirement, Tier 1 capital must be at least 5 percent of unweighted assets.

10. Goodwill is an intangible asset that is entered on the books of a banking organization when it pays more than book value to acquire assets.

11. This group was filtered to remove those BHCs that might have met the Tier 1 and leverage ratio minima simply by issuing nonauction-rate perpetual preferred stock, taking into account the limit on the use of this type of security for Tier 1 purposes. However, no BHCs fell into this category.

leverage capital ratio minima by the end of 1992 simply through sustained retained earnings growth. Of 82 BHCs that failed to meet the Tier 1 ratio, the leverage ratio, or both, in December 1990, 15 were excluded by this means, leaving 67 constrained BHCs.

Unconstrained BHCs were defined to be those that met the Tier 1 and leverage ratio minima (or were projected to by year-end 1992), but not the total ratio minimum, in December 1990. Unaffected BHCs were defined to be those that met all three capital ratio minima in December 1990.

Table 3 gives various descriptive statistics for the subset of each of the three groups of BHCs that reported loans in both December 1990 and December 1992. Of particular interest is total loan growth between year-end 1990 and year-end 1992, the deadline for full compliance with the risk-based capital requirements. Because of the relatively high weighting given to loans in the calculation of risk-weighted assets, BHCs with inadequate Tier 1 or total capital ratios who chose to remedy the situation with a decrease in assets would have had a particularly strong incentive to decrease loans. Commercial business, commercial real estate, and consumer loans receive a 100 percent weight in the calculation of risk-based capital. Residential mortgages

TABLE 3
DESCRIPTIVE STATISTICS FOR 997 BHCs REPORTING RISK-WEIGHTED ASSETS IN DECEMBER 1990 AND LOANS IN DECEMBER 1990 AND DECEMBER 1992

	ASSETS ^a (MILLIONS)	RISK- WEIGHTED ASSETS ^b	TOTAL LOAN GROWTH ^c
Unaffected BHCs (<i>n</i> = 906)			
Mean	\$2,616.7	\$2,603	10.28%
Minimum	\$140.9	\$18.2	-82.29%
Maximum	\$110,728	\$104,116.3	293.54%
Unconstrained BHCs (<i>n</i> = 52)			
Mean	\$3,107.7	\$2,815.1	11.54%
Minimum	\$155.2	\$79.8	-41.99%
Maximum	\$45,389.9	\$48,771.7	316.77%
Constrained BHCs (<i>n</i> = 39)			
Mean	\$7,289.3	\$7,604.3	-12.64%
Minimum	\$152.7	\$54.4	-84.16%
Maximum	\$216,986	\$245,556.6	173.72%

SOURCE: Consolidated Financial Statements for BHCs.

^aBook value of unweighted assets in December 1990.

^bBook value of risk-weighted assets in December 1990.

^cDecember 1990 to December 1992.

receive a 50 percent weight. U.S. government securities receive a zero weight. BHCs with inadequate leverage ratios may also have chosen to decrease loans.

As can be seen from Table 3, the mean asset size of constrained BHCs was larger than the mean asset sizes of unconstrained and unaffected BHCs. More important, average loan growth for the constrained BHC group was considerably lower than for the unconstrained group. In addition, average growth for the unconstrained group was comparable to that for unaffected BHCs. This suggests that decreasing loans, although an option for unconstrained BHCs, was avoided as much as possible and was pursued only by the constrained BHCs. However, this result is not conclusive because it does not control for the extent of capital deficiency in the unconstrained and constrained groups, nor for changes in loan demand, both of which may influence loan growth. I will control for these factors when I compare loan growth for these two groups in the next section.

Table 4 compares the incidence of common stock issuance and the amounts raised through common stock issuance for the three groups of BHCs.

Given the negative wealth effects of common stock issuance, the incidence of common stock issuance seen for all three groups in Table 4 seems surprisingly high.¹² Apparently, despite its negative wealth effects, some BHCs have good reasons to want to issue common stock. An example might be issuing common stock for acquisition purposes. However, by itself, "having" to issue common stock to avoid a decrease in assets apparently was not a very good reason. All other things equal, one would have expected that the issuance rate for constrained BHCs, which had to issue common stock or decrease assets, would have been higher than for unconstrained or unaffected BHCs. However, the negative wealth effect seems to have been strong enough that constrained BHCs were not *especially* likely to issue common stock. As shown in Table 4, constrained BHCs were no more likely to have been common stock issuers than unconstrained BHCs and only slightly more likely than unaffected BHCs, although they did seem to raise somewhat larger amounts when they did issue.

12. The Consolidated Financial Statements data set covers a much wider universe of common stock issuers than does the SDC data set, but it has no information on filing dates or announcement dates. Only the larger BHCs with publicly traded securities are reported on the SDC data set. For 1991 and 1992, SDC reported 53 BHC common stock issuers, whereas the Consolidated Financial Statements reported 424 issuers.

TABLE 4
COMMON STOCK ISSUANCES BY SAMPLE BHCs
DECEMBER 1990–DECEMBER 1992

NUMBER OF BHCs	AMOUNT ISSUED ^a	
Unaffected BHCs (382 out of 906, or 42.16%)	Mean	.67%
	Minimum	.0006%
	Maximum	11.66%
Unconstrained BHCs (24 out of 52, or 46.15%)	Mean	.99%
	Minimum	.001%
	Maximum	8.75%
Constrained BHCs (18 out of 39, or 46.15%)	Mean	1.49%
	Minimum	.0007%
	Maximum	10.43%

SOURCE: Consolidated Financial Statements for BHCs.

^aAmount raised as a percent of risk-weighted assets in December 1990. Statistics are based on issuing BHCs only.

IV. THE EFFECT OF THE TIER 1 CAPITAL REQUIREMENTS ON CONSTRAINED BHC LOAN GROWTH

In this section, I investigate whether the difference shown in Table 3 between constrained and unconstrained BHC loan growth is statistically significant, controlling for other factors likely to affect loan growth. I will test the hypothesis that constrained BHC loan growth between year-end 1990 and year-end 1992 was statistically significantly more negative than unconstrained BHC loan growth over the same period.

Given the results in Section II, I will assume that negative common stock wealth effects apply to constrained BHCs.¹³ The simple regression that I will estimate has loan growth as a function of the BHC's maximum capital ratio

13. The ideal approach would be to estimate common stock announcement effects for constrained BHCs for 1991 and 1992. (Announcements during 1991 and 1992 are relevant because the dependent variable in the regression will be loan growth between December 1990 and December 1992.) Unfortunately, the sample size was insufficient to permit such estimation. There were four common stock issuance announcements between December 1990 and December 1992 by constrained BHCs. Securities Data reported no filing dates for three of these, and therefore no announcement dates were located. The remaining announcement, by Riggs National Corporation, resulted in a 1.11 percentage point drop in the return on common stock. Therefore, results for constrained BHCs were proxied by the announcement effects reported in Section II for BHCs that had to issue common stock (or decrease assets) to meet the well-capitalized guidelines.

shortfall. This is the maximum of the three differences between the three required minimum levels and the three corresponding actual ratios in December 1990.

For unconstrained BHCs, the maximum capital ratio shortfall is the percentage point difference between the total capital ratio minimum and the actual total capital ratio. For constrained BHCs, it is the difference between the total capital ratio minimum and the actual total capital ratio, or the difference between the leverage ratio minimum and the actual leverage ratio, whichever is greater. In making loan growth a function of the capital shortfall below the minimum, I assume that the minimum is the target for most BHCs.¹⁴ In addition, I control for the possibility that lower loan growth by the constrained BHCs is simply the result of a greater capital deficiency, however capital is defined, and is not the result of a deficiency in common equity in particular.¹⁵

To control for changes in loan demand, the regression also includes economic growth in the BHCs' subsidiaries' states. This is the weighted average personal income growth between December 1990 and December 1992, in percent, in the BHC's subsidiary banks' states, weighted by the share of total BHC assets held by the BHC's subsidiaries in that state. I expect that there is a positive relationship between economic growth and loan growth.

A constant is included to help capture the effects of other influences on loan growth not stemming from the need to achieve regulatory capital minima. BHCs that reported loans in December 1990 but not in December 1992 are omitted from the regression. A dummy variable indicates whether or not the BHC is constrained or unconstrained.

The model was estimated using ordinary least squares regression on a sample of 75 unconstrained and constrained

14. Furlong (1993) argues that, for many capital deficient BHCs, becoming well-capitalized, not just adequately capitalized, was the goal. Furlong examines changes in capital and risk-based assets between December 1990 and December 1992. Official requirements for being considered well-capitalized were not published until June 1992. However, it is reasonable to assume that these rules just codified unwritten rules already well-understood by BHCs. Therefore, it is reasonable to argue that many BHCs that did not meet well-capitalized guidelines in December 1990 intended to do so by December 1992. However, using the capital shortfall below the *minimum* rather than the well-capitalized level is consistent with the BHC group definitions and, in the regression, merely changes the relative sizes of the coefficients on the constant and the shortfall variable.

15. Strictly speaking, given a target ratio, the increase in capital and decrease in assets chosen to achieve the goal will depend on the shortfall and the initial levels of capital and assets. However, when initial levels for capital and assets were included in the regression, their coefficients were not statistically significant.

BHCs.¹⁶ The dependent variable is percent growth in total loans outstanding between the fourth quarter of 1990 and the fourth quarter of 1992, as indicated on the Consolidated Financial Statements for BHCs. Table 5 reports the regression results.

The results in Table 5 support the hypothesis that constrained BHCs had statistically significantly lower loan growth over the 1991–1992 period than unconstrained BHCs, even controlling for differences in loan demand and general capital deficiency. The results indicate that, on average and with other factors held constant, loan growth at BHCs that were constrained either to issue common stock or to decrease assets was about 28 percentage points lower than loan growth at BHCs that could reach the minimum by issuing other types of capital instruments. This difference is comparable to, but somewhat larger than, the difference in mean loan growth between the two groups seen in Table 3. The capital shortfall and economic growth variables also have the expected signs and are statistically significant.

TABLE 5

REGRESSION RESULTS

LOAN GROWTH BETWEEN DECEMBER 1990 AND DECEMBER 1992 FOR 75 CONSTRAINED AND UNCONSTRAINED BANK HOLDING COMPANIES

EXPLANATORY VARIABLE	COEFFICIENT	t RATIO
Constant	-48.878**	-2.046
Capital Ratio Shortfall	-2.83*	-1.865
Economic Growth in BHC Subsidiary States	7.157***	2.867
Constrained	-28.103***	-2.708
Adjusted R ² = .164		

*Significantly different from zero at the 10 percent level.

**Significantly different from zero at the 5 percent level.

***Significantly different from zero at the 1 percent level.

V. CONCLUSION

This paper tests a two-part hypothesis. First, during the period between publication of the risk-based capital requirements in early 1989 and the end of 1992, BHCs faced a statistically significant decrease in stock returns—a negative shareholder wealth effect—if they issued new common stock. Second, this negative wealth effect discouraged new common stock issuance and therefore in effect forced BHCs deficient in common stock to decrease loans outstanding more than did BHCs deficient in other types of capital. Empirical evidence supporting both parts of the hypothesis was presented.

One interpretation of the results presented in this paper is that, had the risk-based capital rules not included a requirement for a certain level of common shareholders' equity, loan growth for the group of BHCs identified in this paper as constrained would have been considerably higher. This does not necessarily mean that it would therefore have been wise to reduce or eliminate requirements for common shareholders' equity. This type of capital arguably provides the best protection to the deposit insurance fund in case of bank failure. However, it does mean that if we are concerned about the flow of bank credit to the economy, we should take into account the type of effect described in this paper in weighing the likely costs and benefits of the design and enforcement of capital regulations.

16. The number is less than the sum of unconstrained and constrained BHCs indicated in Table 3 (91). The BHCs excluded are ones for which

the required information on bank subsidiary location could not be located (including foreign BHCs), BHCs with no commercial bank subsidiaries, and individuals or pseudo BHCs.

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