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Stock repurchases and bank holding company performance

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Abstract

Using data from regulatory reports, we examine the relationship between stock repurchases and financial performance for a large sample of bank holding companies. The sample includes both publicly-traded and non-publicly traded banking companies. The primary result is that higher levels of repurchases in one year are associated with higher profitability and a lower share of problem loans in the subsequent year. Our results appear to be driven primarily by bank holding companies with publicly-traded stock, especially those companies whose stock is traded on major exchanges. In assessing the source of the repurchase-performance link, we find evidence suggesting that it may be driven by different factors for different types of bank holding companies. In particular, the evidence is consistent with free-cash-flow considerations for banks traded on major stock exchanges, but only weakly supports this explanation for smaller, closely-held companies.

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1. Introduction

Bank holding companies have been making shareholder payouts at record rates during the past several years. Dividend payout rates have risen gradually since the mid-1980s, while stock repurchases increased sharply following the banking industry's recovery from the financial stress of the early 1990s. The rise in stock repurchases is particularly striking, with aggregate repurchases rising from a negligible level at the beginning of the decade to an amount nearly equal to dividend payments in 1997. On a combined basis, dividends and repurchases equaled more than 70 percent of net income in that year and actually exceeded

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net income for the 25 largest bank holding companies (Hirtle, 1998). Thus, bank holding companies have been returning a considerable portion of profits to shareholders in recent years, with stock repurchases playing a newly enhanced role.

The sharp increase in stock repurchases in recent years raises the question: what role do these transactions play in the management and performance of bank holding companies? In particular, what are the motives underlying the surge in repurchase activity by bank holding companies? Do these motives differ between bank holding companies with publicly-traded stock and those with stock that is privately-held or closely-held?

This paper addresses these questions to help develop insights into the role that stock repurchases play in the banking sector. Using data from bank holding company regulatory reports, we examine the relationship between stock repurchases and financial performance for a large sample of bank holding companies over the years 1987 to 1998. In contrast to the data frequently used in studies of stock repurchases, these regulatory data provide aggregate information about the actual stock transactions conducted by bank holding companies in a given year, rather than announcements of repurchase programs.¹ Thus, the data enable us to examine the impact of actual transactions undertaken by bank holding companies on their subsequent operating performance.

The paper's primary result is that higher levels of repurchases by a bank holding company in one year are associated with higher profitability and a lower share of problem loans in the subsequent year. These results are robust to several different ways of measuring share repurchase activity. They are also evident when the sample is divided according to trading status of the banks' common equity. Both publicly-traded firms—including those traded on the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX) and the NASDAQ—and non-publicly traded bank holding companies exhibit a positive relationship between stock repurchases and subsequent operating performance, though the effect is significantly more pronounced for the publicly-traded firms. While the estimated size of the impact of increases in stock repurchases is only moderate, it is nonetheless economically meaningful. The impact of repurchases on operating performance does not appear to be persistent beyond a one year horizon, however.

The finding that higher repurchases are followed by better financial performance could reflect at least two distinct behavioral channels. First, bank holding company managers may opt to make repurchases when the bank has cash flows that exceed outside investment opportunities, perhaps reflecting poor future economic prospects in the broader economy or simply comparatively strong performance by the bank. In this story, managers choose to return funds to shareholders rather than investing in risky—possibly negative-net-present-value—balance sheet expansion. Alternatively, managers may choose to increase repur-

¹ The regulatory report data include information on treasury stock purchases and sales, but do not include information about the method used by the bank holding company to repurchase the stock (that is, self-tender offer or open market purchase). Thus, both types of transactions could be included in the data set. However, the vast majority of stock repurchases by bank holding companies appear to take place via open market purchases. A search of the *Wall Street Journal* between 1992 and 1998—the peak years for repurchases in our data set—revealed no reports of bank holding companies repurchasing equity via self-tender offers and only one report of a bank holding company repurchasing preferred stock via a self-tender offer. In contrast, there were numerous reports of bank holding companies engaging in open-market share repurchase programs.

chases when they have private information suggesting that the future profitability of the bank is likely to be strong. In that event, managers may be willing to return profits to shareholders as a way of signaling to the market that the future prospects of the bank are good.² The empirical link between stock repurchases and enhanced financial performance then arises because repurchases are effectively serving as a proxy for managers' unobserved expectations.

In practice, these two stories are difficult to separate empirically. And in fact, we find evidence suggesting that different bank holding companies may be motivated by different concerns in making repurchases. At publicly-traded bank holding companies, the results suggest that superior performance by these firms may be linked to the choice to return excess cash flow to shareholders rather than engage in balance sheet expansion. In contrast, at closely-held, non-publicly traded banks, there is at best a weak link between repurchases and future operating performance, although there is some evidence suggesting that these institutions enter into repurchases after periods of better-than-average performance. Together, these findings suggest that repurchases by non-publicly traded institutions may serve primarily as a means to distribute strong past profits to shareholders. For both sets of institutions, the results also suggest that some form of equity-capital-ratio targeting may also affect repurchasing behavior, though the link between this motivation and subsequent operating performance is unclear. In the end, the differences between publicly-traded and non-publicly traded bank holding companies may reflect differences in the degree of principal-agent problems between managers and shareholders at these two types of institutions.

The remainder of this paper is organized as follows. The next section reviews the literature on the impact of share repurchases and the motivations driving those repurchases. Section 3 describes the unique data set used in this study and presents some facts about the repurchase behavior of bank holding companies over the sample period. Section 4 contains the paper's main empirical results linking repurchases to enhanced operating performance. Section 5 reports results for various sub-samples defined according to whether a bank holding company's stock trades on a major exchange, and illustrates that the link between repurchase and operating performance differs across different types of institutions. Section 6 assesses the competing hypotheses about the source of these relationships. Finally, Section 7 contains summary and conclusions.

2. Previous work on share repurchases

The increased prominence of share repurchases in the banking sector mirrors the growth of share repurchases by non-financial firms, which has been documented by a number of studies (see, for instance, Jagannathan et al., 2000). Several of these studies have examined the factors motivating share repurchases, as well as their consequences for stock prices and firm performance. In general, share repurchases have been linked to increased stock prices

² Vermaelen (1985) and Ofer and Thakor (1987) discuss how repurchases can provide credible signals of managers' inside information about firm value.

(Dann, 1981; Vermaelen, 1981; Lakonishok and Vermaelen, 1990; Comment and Jarrell, 1991; Ikenberry et al., 1995, 2000, and Choi and Chen, 1997), and a variety of explanations have been offered to explain this link.

These explanations can be grouped into two broad categories. Papers in the first category emphasize the role that stock repurchases can play in conveying information about firms' future prospects. Dann (1981), Vermaelen (1981, 1984), and Ofer and Thakor (1987) argue that increases in stock prices following the announcement of repurchase programs reflect positive information signals from firm managers about the future prospects of the firm. Similarly, Stephens and Weisbach (1998) argue that share repurchase activity is related to the extent of perceived undervaluation of a firm's stock, suggesting that firms may be using repurchases to provide a signal of unobserved profitability. Further, Jagannathan et al. (2000) find that firms with more volatile cash flows tend to prefer more flexible stock repurchases over dividends, suggesting that firms use repurchases to distribute "temporary" profits and increase dividends only when they believe earnings have risen permanently.

The second category of papers emphasize the role that stock repurchases can play in addressing the principal-agent problem between firm managers and owners. These papers draw on the insights raised in Jensen (1986), who pointed out the potentially negative incentives that excessive "free cash flow" can present to managers. Grullon and Michaely (2000), for instance, finds evidence that repurchase announcements are signals of managers' commitments to reduce the agency costs of free cash flow, especially in circumstances where investment opportunities have been reduced. Similarly, Lie (2000) argues that large incremental distributions of cash through special dividends and stock repurchases help mitigate the agency problems associated with excess cash flows. Nohel and Tarhan (1998) also find evidence in support of the free-cash-flow explanation.

These papers present a mixed picture of the dominant motivation behind share repurchases and, indeed, the competing explanations for the positive stock price reaction to repurchase announcements need not be mutually exclusive.³ The papers focus almost exclusively on share repurchases by firms in the non-financial sector, so one question that arises is whether analysis of share repurchases by financial firms—in particular, banks—would offer any further insights.

Only a few papers have examined the role of stock repurchases in the banking sector and, like those involving non-financial firms, the explanations concerning share repurchases are mixed. Laderman (1995) examined stock repurchases by large bank holding companies and found evidence consistent with three separate explanations of repurchase behavior in 1993–1994: that banks were attempting to decrease their capital-to-assets ratios, that they faced limited investment opportunities, and that they were attempting to address the market's undervaluation of their stock. (Hirtle, 1998) reaches similar conclusions based on repurchase activity for a sample of large bank holding companies in 1997. Kane and Susmel (1999) find a positive stock price reaction to repurchase announcements by banks and conclude that a combination of excess capital and signaling may motivate these repurchases. In contrast, Billingsley et al. (1989) find no significant stock market re-

³ In addition to the signaling and free-cash-flow hypotheses, Hovakimian et al. (2001) suggest that repurchases may be used to help firms reach target debt ratios.

action to share repurchase announcements by bank holding companies from 1964–1983, though an increase in firm-specific risk resulting from lower capital ratios.

The analysis in this paper complements this previous work on stock repurchases by bank holding companies by examining the relationship between repurchases and operating performance for a large sample of institutions observed over time. The advantage of this approach is that we can observe bank holding company behavior for a wider range of institutions and over a longer horizon than Laderman (1995) and (Hirtle, 1998) and over a period when stock repurchases were more prominent than in the Kane and Susmel (1999) and Billingsley et al. (1989) samples.

In addition, we focus on the operating performance of the bank holding companies rather than on the stock price reaction. In part, this focus reflects the nature of regulatory report data on stock repurchases, which reports aggregate repurchase activity over a calendar year rather than the date of specific repurchase program announcements. But more significantly, focusing on operating performance provides a different view of the impact of stock repurchases than examining stock price reactions. In particular, we can assess whether repurchases are linked to the operating performance of bank holding companies and, based on the nature of that link, develop some insight into the relationship between repurchases and the behavior of bank management.⁴ This should allow us to draw a more comprehensive picture of the role of stock repurchases in the banking sector.

A final benefit of examining repurchase activity in the banking sector concerns the role of management compensation in determining repurchase behavior. Several authors have documented a relationship between the use of executive stock options and repurchases. For instance, Weisbenner (2000), Lambert et al. (1989), Jolls (1998), and Fenn and Liang (2001) present analysis suggesting that repurchase activity is associated with management compensation structure, in particular, the presence of executive stock options. These papers argue that managers holding options will prefer stock repurchases to dividends due to tax incentives and because repurchases, in contrast to dividends, do not dilute share value. Weisbenner (2000) additionally suggests that repurchases are used to counter-act the dilution of earnings-per-share resulting from the issuance of stock options. These managerial incentives to prefer repurchases introduce another set of considerations that can make it difficult to distinguish between the signaling and free-cash-flow hypotheses.

In the banking sector, however, these managerial incentives are likely to play a much smaller role. Historically, bank executives have tended to receive a much smaller share of their compensation in stock options than managers in non-financial firms (see Houston and James, 1995). This means that the confounding effects of managerial incentives on the decision of whether or not to repurchase equity will be much less prominent in the banking sector. The smaller role of these incentives should provide a cleaner environment in which to examine the signaling and free-cash-flow hypotheses behind stock repurchases.

⁴ Evans and Gentry (1999) and Nohel and Tarhan (1998) assess the impact of stock repurchases on the operating performance of firms in the non-financial sector. The results of both studies tend to support the importance of free cash flow more so than signaling as a motivating factor behind repurchases.

3. Bank holding company stock repurchase data

As illustrated in Fig. 1, stock repurchases by bank holding companies have increased dramatically since the early 1990s. The data reported in this figure and used in the estimation reported below are derived from bank holding company regulatory reports (the FR Y-9C reports), which are available beginning in 1986 for all bank holding companies with assets exceeding \$150 million. The estimation sample is constructed by first selecting observations contained in the reports between 1986 and 1998 for all top-tier bank holding companies. We drop all observations with missing data, negative reported equity capital, and observations in which the bank holding company was involved in a significant merger.⁵ Since the estimation approach (described below) requires consecutive observations for a bank holding company over time, we also drop all observations for institutions where there is a “gap” between years (whether the gap was in the original sample or created by the screening described above). Finally, creating growth rates of key variables causes all observations for 1986 to drop from the final estimation sample. The final sample

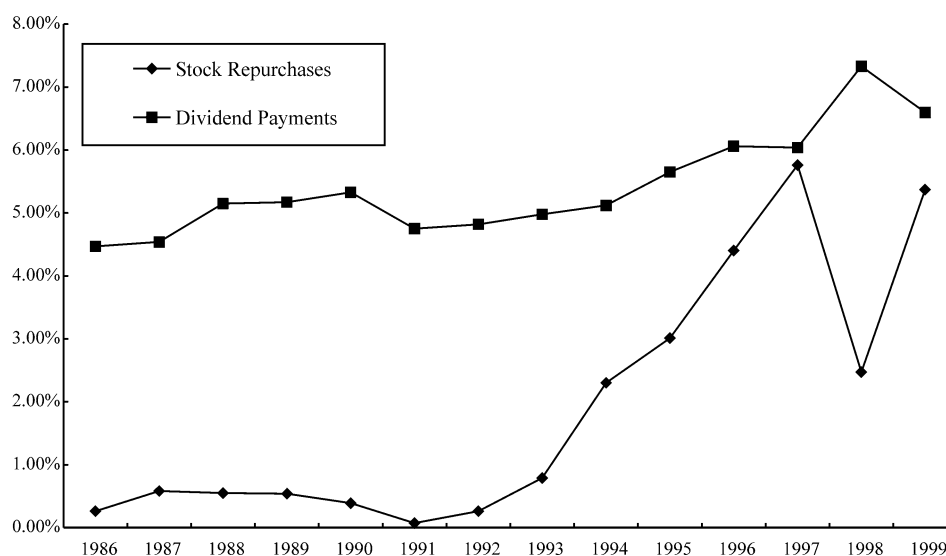


Fig. 1. BHC dividends and stock repurchases as share of equity capital. BHCs with assets greater than \$150 million.

⁵ To determine whether a bank holding company has been involved in a significant merger, we draw on several sources. These include information on the Y-9C on whether the company has been involved in a pooling-of-interests merger and whether it acquired any equity capital from “business combinations.” This information was supplemented by a merger data set constructed by the Federal Reserve Bank of Chicago (these data are available at <http://www.chicagofed.org>). If any of these sources indicated a bank holding company had been involved in a merger *and* the company’s asset growth was 15 percentage points higher than the median asset growth for all BHCs in that year, then the observation was dropped from the sample. The 15 percent cut-off was intended to capture significant mergers that would impact overall measured performance for a year. The estimation results are not sensitive to the particular cut-off used (including eliminating all merger observations).

consists of 8713 observations for 1717 bank holding companies over the years 1987 to 1998.⁶

Bank holding company regulatory reports contain information on the holding companies' equity capital accounts, including information about dividend payments and treasury stock purchases and sales. Unfortunately, the regulatory reports do not contain direct information about the extent of actual share repurchases by bank holding companies.⁷ Instead, we use gross treasury stock purchases as our basic measure. As discussed below, we also consider several alternative definitions using additional information from the Y-9C reports; the estimation results are not overly sensitive to the way that repurchases are calculated.

Table 1 contains information on the average annual rate of repurchases and dividend payments for the bank holding companies in the final estimation sample. The dividend series reflects cash dividends declared on common and preferred stock (in practice, preferred stock dividends tend to be small relative to common stock dividends) during the calendar year in question, while repurchases equal gross treasury stock purchases.

Table 1
Repurchases and dividends over the sample period

Year	Number of BHCs in sample	Repurchases (\$ billion)	Dividends (\$ billion)	Total payouts (\$ billion)	Repurchases as share of total payouts	Average ROE (%)
1987	497	0.462	2.914	3.376	0.137	−4.2
1988	507	0.314	3.127	3.442	0.091	15.7
1989	610	0.795	4.892	5.687	0.140	4.3
1990	686	0.621	5.718	6.339	0.098	8.1
1991	776	0.225	4.813	5.038	0.045	6.0
1992	794	0.538	4.550	5.088	0.106	13.0
1993	797	1.251	5.134	6.384	0.196	17.3
1994	785	3.367	5.761	9.128	0.369	15.9
1995	779	5.207	7.281	12.488	0.417	16.1
1996	797	9.970	7.411	17.381	0.574	16.0
1997	821	11.264	7.818	19.080	0.590	15.8
1998	864	3.238	4.230	7.469	0.434	14.3

Notes. Repurchases are defined as gross Treasury Stock purchases. Dividends are cash dividends declared on common and preferred stock. Average ROE is weighted average return on equity (defined as net income divided by beginning-of-year equity capital), using equity capital as weights.

⁶ These edits to the data set eliminate about 35 percent of the original 13,316 observations for top-tier US bank holding companies. About 40 percent of the dropped observations are dropped due to the merger screen. Another third are dropped as part of the process of creating growth rates from lagged observations, while 15 percent are due to gaps between observations for a given bank holding company. The screens for missing or miscoded data and negative equity capital account for the remaining dropped observations (about 10 percent of the total).

⁷ There is no direct source of information about actual share repurchases—as opposed to announcements of repurchase programs—available for financial or non-financial firms. Other studies focusing on non-financial firms have used information from Compustat and CRSP to impute the volume of share repurchases using an approach similar to the one used in this paper for bank holding companies. See Stephens and Weisbach (1998).

As the data in the table indicate, the dollar amounts of both repurchases and dividend payments increased significantly over the sample period.⁸ The aggregate amount of repurchases made by the bank holding companies in the sample increased sharply over the sample period, reaching a high of \$11 billion in 1997 and exceeding the aggregate amount of dividend payments by these firms in 1996 and 1997. This increase is evident on a per-bank-holding-company basis as well as in the aggregate: average repurchases increased from approximately \$1.0 million at the beginning of the sample period to nearly \$14 million in 1997. The sharp drop in repurchases and dividends in 1998 occurred because of a general decline in the level of repurchases in that year—due predominantly to effects of a large number of pooling-of-interest mergers, which prevent firms from repurchasing their stock for six months following the merger—and because a few very large bank holding companies dropped out of the sample in 1998 due to the merger screen.⁹

Overall, the growth of repurchases among sample bank holding companies was significantly greater than the growth of dividend payments. Repurchases as a share of total shareholder payouts (the sixth column of the table) increase from about 10 percent in the early 1990s to over fifty percent by the end of the sample period. The increased prominence of repurchases in banking companies' overall payout strategies appears to correlate with the greater profitability experienced by the banking industry following the turmoil of the late 1980s and early 1990s (see the last column of Table 1).

To provide a further sense of scale of repurchase activity, Table 2 examines the repurchase and dividend data as shares of earnings and equity capital. Turning first to the top left-hand panel of panel of the table, the striking result is the rise in the overall share of earnings paid out to shareholders in the form of dividends or repurchases. This share rose from about 35 to 40 percent of net income in 1992 to 1993 to more than 80 percent towards the end of the sample period.¹⁰ This increase in aggregate payouts was fueled almost entirely by increases in repurchases, which rose from an average of less than 10 percent of earnings during 1992 and 1993 to nearly 50 percent by 1997. The relative increase in repurchases is also evident when repurchases and dividends are scaled by the book value of equity (the right-hand panel of Table 2).

The bottom panels of Table 2 provide a breakdown of the bank holding company sample that provides some additional insight into the growth of repurchases. In particular, the table divides the bank holding companies in the sample into two subsets according to the trading status of the BHCs' equity: bank holding companies that had publicly-traded stock at some point during the sample period ("publicly-traded BHCs") and those that did not ("non-

⁸ The same increase is evident for the universe of all top tier US bank holding companies. In general, the bank holding companies in the regression sample account for about two-thirds of the overall universe of top tier US bank holding companies, and about half to two-thirds of the dividend and repurchase payments made by these firms.

⁹ In 1998, bank holding companies in the sample accounted for about 25 percent of overall repurchases and 20 percent of dividends, as compared to an average of 50 percent for the remainder of the sample years.

¹⁰ The figures for repurchases and dividends as a share of net income (earnings) in the early part of the sample are somewhat anomalous due to the very low profitability experienced by the banking industry during this period.

Table 2
Dividends and repurchases as percentages of earnings and equity

Year	Number of BHCs	As percent of earnings			As percent of equity capital		
		Repurchases	Dividends	Total payouts	Repurchases	Dividends	Total payouts
All bank holding companies (BHCs)							
1987	497				0.69	1.38	5.08
1988	507	3.4	33.4	36.7	0.53	5.23	5.75
1989	610	20.8	127.8	148.6	0.89	5.46	6.35
1990	686	7.7	70.6	78.3	0.62	5.71	6.33
1991	776	3.6	76.9	80.5	0.22	4.62	4.84
1992	794	4.1	34.7	38.8	0.53	4.50	5.03
1993	797	6.7	27.5	34.2	1.16	4.75	5.91
1994	785	18.0	30.8	48.8	2.86	4.90	7.76
1995	779	23.7	33.2	56.9	3.83	5.35	9.18
1996	797	45.1	33.5	78.6	7.21	5.36	12.57
1997	821	49.9	34.6	84.5	7.90	5.48	13.38
1998	864	30.6	39.9	70.5	4.36	5.70	10.07
Publicly-traded BHCs							
1987	251				0.71	4.61	5.32
1988	257	3.1	34.0	37.1	0.51	5.59	6.10
1989	321	23.4	149.5	173.0	0.90	5.74	6.63
1990	347	7.6	72.2	79.7	0.63	6.04	6.67
1991	379	3.1	80.7	83.8	0.19	4.92	5.11
1992	364	4.1	36.1	40.1	0.53	4.72	5.25
1993	366	6.6	28.2	34.9	1.17	5.00	6.17
1994	355	19.2	31.9	51.1	3.11	5.16	8.28
1995	344	25.4	34.2	59.6	4.14	5.60	9.75
1996	325	48.8	34.7	83.5	7.92	5.64	13.56
1997	301	54.7	36.1	90.8	8.75	5.78	14.53
1998	290	38.8	43.1	81.9	5.53	6.15	11.69
Non-publicly traded BHCs							
1987	246	12.6	46.9	59.5	0.58	2.16	2.74
1988	250	7.5	23.2	30.7	0.69	2.13	2.82
1989	289	8.2	26.2	34.4	0.75	2.40	3.16
1990	339	9.1	44.8	54.0	0.47	2.31	2.78
1991	397	8.4	39.5	47.9	0.45	2.11	2.55
1992	430	4.3	24.1	28.4	0.51	2.90	3.42
1993	431	7.6	19.9	27.5	1.08	2.82	3.90
1994	430	3.6	18.4	22.0	0.48	2.41	2.89
1995	435	3.0	19.7	22.7	0.41	2.72	3.13
1996	472	5.9	20.7	26.6	0.81	2.84	3.65
1997	520	6.1	21.0	27.2	0.88	3.03	3.91
1998	574	3.5	29.6	33.0	0.49	4.24	4.73

Notes. The figures reflect aggregate repurchases or dividends for the bank holding companies (BHCs) in the sample divided by aggregate net earnings or equity capital for those BHCs (that is, the figures are weighted averages with earnings and equity capital, respectively, used as the weights). Dividends and repurchases as a share of earnings are not reported for the *All BHC* and *Publicly-traded BHC* samples in 1987 because aggregate net income for all BHCs and for publicly-traded BHCs was negative.

publicly traded BHCs”).¹¹ As comparison of the middle and bottom panels of Table 2 makes clear, the growth in repurchases was driven almost exclusively by the publicly-traded bank holding companies. Repurchases by non-publicly traded BHCs do not show a clear upward pattern and overall payout rates remained fairly constant from the early to late 1990s. These differences suggest that repurchases in particular—and perhaps shareholder payouts in general—may play different roles at these two types of institutions, a suggestion that will be explored more fully in the empirical work that follows.

The figures for the publicly-traded bank holding companies provide an opportunity to compare the repurchase behavior of bank holding companies to that of the more commonly studied non-financial firms. Studies of repurchasing activity by publicly-traded, non-financial firms suggest that repurchases by these firms averaged between one and two percent of the market value of equity during the 1990s.¹² The figures in Table 2 for publicly-traded bank holding companies are considerably higher than this level, particularly in the latter part of the sample period, where repurchases reached as high as 8.75 of equity capital. However, these figures are relative to the book value of equity capital, whereas the figures for non-financial firms are relative to market values. Given the general rise in the market value of equity over this period, the difference between book and market values could be significant. In fact, for a smaller sample of publicly-traded bank holding companies for which market value data were available, the ratio of repurchases to the market value of equity averaged just over 2 percent.¹³ Thus, the average degree of repurchase activity among the publicly-traded bank holding companies in our sample seems roughly comparable to that in the non-financial sector.

Tables 3 and 4 provide further information about the dividend and repurchase behavior of the bank holding companies in the sample. Table 3 divides the observations in the sample into various groups reflecting payment or non-payment of dividends and repurchases. Clearly, dividend payments are much more common than repurchases: For the sample as a whole, nearly 85 percent of the observations involved dividend payments, as opposed to less than 30 percent in which the bank holding company repurchased its stock (see the bottom of Table 3). Further, the data in Table 3 suggest that bank holding companies that use stock repurchases are also active dividend payers. In almost all cases (2301 out of 2527), observations with non-zero repurchases also had positive dividend payments. In contrast, nearly two-thirds of the observations involving positive dividend payments had no repurchase activity.

¹¹ Detail on how these subsets were identified is provided in Section 5.

¹² For instance, Weisbenner (2000) finds that repurchases average 1.7 percent of the market value of equity (MVE) over the years 1990 to 1998; Grullon and Michaely (2000) find that repurchases average 1.7 percent of MVE over the years 1980 to 1994; Fenn and Liang (2001) find that repurchases average 1.2 percent of MVE over the years 1993 to 1997.

¹³ This figure is a weighted average, using the market value of equity as weights. This gives proportionately more weight to the largest bank holding companies, which tend to have somewhat higher levels of repurchases (the unweighted average across bank holding companies for which market value data was available is 0.7 percent). However, these larger bank holding companies are in many respects comparable to the firms featured in studies of repurchases in the non-financial sector, which have tended to focus very large non-financial firms (e.g., those in the S&P 500).

Table 3
Distribution of observations with repurchases and dividend payments

Observations with	All BHCs	Publicly-traded BHCs	Non-publicly traded BHCs
Both repurchases and dividend payments	2301 (26.4)	1176 (30.2)	1125 (23.4)
Dividends payments, but not repurchases	4993 (57.3)	2374 (60.9)	2619 (54.4)
Repurchases, but not dividend payments	226 (2.6)	45 (1.2)	181 (3.8)
Neither repurchases nor dividend payments	1193 (13.7)	305 (7.8)	888 (18.5)
Dividend payments	7294 (83.7)	3550 (91.0)	3744 (77.8)
Repurchases	2527 (29.0)	1221 (31.3)	1306 (27.1)
Dividend payments or repurchases	7520 (86.3)	3595 (92.2)	3925 (81.6)
Total	8713	3900	4813

Notes. An observation is counted as involving a repurchase (dividend) if Treasury Stock purchases (cash dividends) are positive. Figures in parentheses are percentages of column totals.

Table 4
Distribution of BHCs by dividend and repurchase behavior

BHC behavior	All BHCs		Publicly-traded BHCs		Non-publicly traded BHCs	
	Repurchases	Dividends	Repurchases	Dividends	Repurchases	Dividends
Always pay	207 (12.1)	1199 (69.8)	88 (13.4)	522 (79.7)	119 (11.2)	677 (63.8)
Sometimes pay	629 (36.6)	264 (15.4)	279 (42.6)	92 (14.1)	350 (33.0)	172 (16.2)
Never pay	881 (51.3)	254 (14.8)	288 (44.0)	41 (6.3)	593 (55.8)	213 (20.1)
Total	1717	1717	655	655	1062	1062

Notes. An observation is counted as involving a repurchase (dividend) if Treasury Stock purchases (cash dividends) are positive. Figures in parentheses are percentages of column totals.

Table 3 also divides the sample into publicly-traded and non-publicly traded bank holding companies (the second and third columns of the table). Somewhat in contrast to the results in Table 2—which focused on the dollar amounts of dividends and repurchases—the figures in Table 3 suggest a much less striking difference between publicly-traded and non-publicly traded BHCs in terms of the frequency of repurchases and dividend payments. Just over 30 percent of the observations in the publicly-traded BHC sample involved a repurchase, as compared to 27 percent for the non-publicly traded banking organizations (see the bottom panel of Table 3). The more significant difference between the two samples appears to be in the propensity to pay dividends: over 90 percent of observations for the publicly-traded BHCs involved a dividend payment as compared to 78 percent for non-publicly traded BHCs.

Table 4 groups the bank holding companies in the sample into cohorts according to their pattern of dividend and repurchase behavior over the sample period.¹⁴ These data echo the points made in Table 3 in that bank holding companies clearly tend to pay dividends much more frequently than they make repurchases. For the sample as a whole, more than 85 percent of bank holding companies make dividend payments at some point in the sample period, as opposed to less than 50 percent (836 of 1717) that repurchase their stock. Further, the table suggests that those bank holding companies that make dividend payments tend to do so much more consistently over time than banking companies that make repurchases. Nearly 70 percent of the bank holding companies paid dividends in every year they were in the sample, as compared to just 12 percent of banks that made repurchases in every year. In addition, of those bank holding companies that make any repurchases, only 25 percent do so in every year they are in the sample, as opposed to 80 percent of the bank holding companies that ever make dividend payments.

Table 4 also divides the sample into publicly-traded and non-publicly traded subsets. As in Table 3, the contrast between the publicly-traded and non-publicly traded bank holding companies appears to be less marked than for the dollar figures reported in Table 2. That said, the figures in Table 4 suggest a somewhat higher propensity for publicly-traded bank holding companies to engage in repurchases and make dividend payments than non-publicly traded firms. Approximately 56 percent of non-publicly traded BHCs never make a repurchase during the years they are in the sample, as compared to 44 percent of publicly-traded bank holding companies. Similarly, just over 20 percent of non-publicly traded BHCs never make a dividend payment, as compared to 6 percent of publicly-traded banks.

Taken together, the data in Tables 3 and 4 suggest that repurchases are used by bank holding companies in ways quite separate from the ways in which dividend payments are made. This finding is consistent with work that has examined dividend and repurchase behavior by non-financial firms (see, for instance, Jagannathan et al., 2000). Further, the data suggest that dividends and repurchases may play different roles for publicly-traded and non-publicly traded banking companies. The next section of the paper presents a more formal statistical analysis of the link between repurchases and bank holding company operating performance to see if we can develop further insights into the role played by stock repurchases among different types of banking organizations.

4. The relationship between repurchases and BHC performance

To understand the role of stock repurchases in the performance of bank holding companies, we specify a simple, reduced-form equation that relates a series of performance

¹⁴ Note that the figures reported in Table 4 are based on the number of years that each bank holding company is in the sample. Most of the BHCs are in the sample for only a subset of full 1987 to 1998 sample period, predominantly due to the impact of mergers. In fact, less than 10 percent of the sample BHCs appear for the entire 12-year sample period; the average tenure is five years. Thus, in interpreting the figures reported in the table it is important to recall that any particular BHC's repurchase and dividend paying behavior is being tracked over a period that could be considerably shorter than the full 12 years in the sample.

variables to contemporaneous and lagged control variables and lagged dividend and repurchase behavior by the bank holding. The idea is to ask how stock repurchases are related to the future performance of the bank holding company.

We use a variety of measures to gauge bank holding company performance. These include return on equity (ROE), return on assets (ROA), real growth of earnings (defined as the year-over-year change in real net income divided by beginning-of-year equity capital), non-performing loan share (loans 90 or more days past due plus non-accrual loans divided by total loans), and net charge-offs (scaled by total loans). All real variables are created by deflating nominal amounts using the consumer price index. The estimation equation regresses each of these variables in turn on a set of contemporaneous and lagged control variables. These control variables include lagged values of the log of real asset size, the equity capital ratio, and the loan-to-assets ratio, as well as a variable that measures contemporaneous personal income growth in the states in which the bank holding company operate banks.¹⁵ Finally, the equation contains lagged values of the repurchase and dividend variables discussed above. Given the time-series-cross-section nature of the data set, the equation is estimated with bank-holding-company-specific fixed effects, as well as year dummies. Descriptive information on these variables is reported in Table 5.

The holding companies in our sample have total assets ranging between \$150 million and \$315 billion, with a median asset size of about \$350 million. Clearly, the sample includes banks from across the size spectrum. For these companies, repurchases equal 0.7 percent of equity capital on average, though this share varies significantly across the years in the sample, as illustrated in Table 2. Table 5 also contains a breakdown of the variables into the publicly-traded and non-publicly traded subsamples. The most

Table 5
Data set description

Variable	Mean	St. dev.	Minimum	Maximum
All observations				
Repurchases	0.007	0.026	0.000	0.731
Dividends	0.032	0.029	0.000	0.514
ROE	0.119	0.121	−1.950	1.263
ROA	0.009	0.009	−0.204	0.119
Earnings growth	0.013	0.169	−1.242	7.408
Non-performing loans	0.016	0.019	0.000	0.203
Charge-offs	0.005	0.009	−0.031	0.151
Asset size in \$ billion	2.600	15.330	0.152	315.740
(Median)	(0.349)			
Equity capital ratio	0.084	0.027	0.0001	0.751
Loan-to-asset ratio	0.582	0.125	0.037	0.930
Number	8713	8713	8713	8713

(continued on next page)

¹⁵ State-level personal income growth is weighted by the share of the bank holding companies' banking assets in each state.

Table 5 (Continued)

Variable	Mean	St. dev.	Minimum	Maximum
Publicly-traded BHCs				
Repurchases	0.008	0.025	0.000	0.376
Dividends	0.039	0.023	0.000	0.353
ROE	0.118	0.113	−1.950	0.640
ROA	0.009	0.008	−0.204	0.031
Earnings growth	0.016	0.173	−1.242	7.408
Non-performing loans	0.016	0.018	0.000	0.195
Charge-offs	0.005	0.008	−0.031	0.101
Asset size in \$ billion	5.284	22.615	0.157	315.740
(Median)	(0.550)			
Equity capital ratio	0.082	0.021	0.001	0.220
Loan-to-asset ratio	0.607	0.110	0.037	0.913
Number	3900	3900	3900	3900
Non-publicly traded BHCs				
Repurchases	0.006	0.027	0.000	0.731
Dividends	0.027	0.033	0.000	0.514
ROE	0.119	0.126	−1.308	1.263
ROA	0.009	0.009	−0.129	0.119
Earnings growth	0.011	0.165	−1.070	6.664
Non-performing loans	0.016	0.019	0.000	0.203
Charge-offs	0.005	0.009	−0.023	0.151
Asset size in \$ billion	0.425	0.726	0.152	26.103
(Median)	(0.280)			
Equity capital ratio	0.084	0.030	0.0001	0.751
Loan-to-asset ratio	0.561	0.132	0.051	0.930
Number	4813	4813	4813	4813

Notes. The data set consists of top-tier bank holding companies (BHCs) with assets greater than \$150 million with data over the years 1987–1998. Observations in which the BHC was involved in a significant merger are omitted. The *All observations* data set consists of 8713 observations from 1717 BHCs. The Publicly-traded BHC sample consists of 3900 observations from 655 bank holding companies with stock traded on the NYSE, AMEX, NASDAQ or over-the-counter at some point during the years 1987 to 1998. The Non-publicly traded BHC sample consists of 4813 observations from 1062 bank holding companies that did not have publicly-traded stock over the years 1987 to 1998. *Repurchases* are defined as treasury stock purchased divided by beginning-of-year equity capital; *Dividends* are defined as cash dividends declared divided by beginning-of-year equity capital; *ROE* is defined as net income divided by beginning-of-year equity capital; *ROA* is defined as net income divided by end-of-year assets; *Earnings growth* is defined as the annual change in real net income divided by beginning-of-year equity capital; *Non-performing loans* is defined as loans 90 or more days past due plus non-accrual loans divided by total loans; *Charge-offs* is defined as charge-offs minus recoveries divided by total loans; *Asset size* is defined as the log of real total assets; *Equity capital ratio* is defined as the end-of-year ratio of equity capital to total assets; and *Loan-to-assets ratio* is defined as the end-of-year ratio of total loans to total assets. All real variables are deflated using the consumer price index. Equity and asset values are book values. All flow variables are for the calendar year.

striking difference between the two subsamples is the range of asset size: the publicly-traded subsample includes the largest bank holding companies and therefore has an average and median asset size considerably greater than the non-publicly traded subsample. Both subsamples, however, contain institutions at the smaller end of the overall asset size range.¹⁶

The basic results of the estimation are reported in Table 6. The table reports results for the three performance variables that capture profitability (ROE, ROA, and earnings growth) and the two that capture asset quality (non-performing loans and charge-offs). Turning first to the results for the profitability variables, the regression results indicate that higher-than-average levels of repurchases by a bank holding company in one year are associated

Table 6
Impact of repurchases on BHC earnings and asset quality

	Dependent variable				
	ROE	ROA	Earnings growth	Non-performing loans	Charge-offs
Lagged shareholder payouts					
Repurchases	0.1451** (0.0418)	0.0074** (0.0029)	−0.1098 (0.0746)	−0.7080* (0.3638)	−0.0069** (0.0030)
Dividends	0.3567** (0.0644)	0.0298** (0.0045)	−0.3256** (0.1145)	−2.1764** (0.5586)	−0.0182** (0.0047)
Lagged control variables					
Asset size	−0.0980** (0.0085)	−0.0050** (0.0006)	−0.2402** (0.0151)	0.4535** (0.0735)	0.0054** (0.0006)
Equity capital	−0.6970** (0.1153)	0.0307** (0.0080)	−4.5994** (0.2054)	−5.1351** (1.0018)	−0.0359** (0.0084)
Loans-to-assets	−0.0808** (0.0206)	−0.0042** (0.0014)	0.0492 (0.0367)	0.8484** (0.1792)	0.0158** (0.0015)
Contemporaneous control variable					
Income growth	1.1627** (0.0832)	0.0789** (0.0058)	0.2845* (0.1482)	−10.3599** (0.7231)	−0.0852** (0.0061)
R^2 (within)	0.072	0.086	0.086	0.136	0.108

Notes. The sample consists of 8713 observations from 1717 bank holding companies over the years 1987 to 1998. Variable definitions, as in Table 5, also: *Income growth* which is defined as the weighted average of annual personal income growth in the states in which each BHC operates, using state asset shares as weights. All real variables are deflated using the consumer price index. Each equation includes year dummies and BHC-specific fixed effects. Standard errors are in parentheses.

**, * Statistical significance at the 5 and 10 percent levels, respectively.

¹⁶ One interesting feature to note is that there is a much less striking difference between the average value of the repurchase variable for the publicly-traded and non-publicly traded subsamples in Table 5 than was evident in Table 2. This difference results from the difference in the way that the averages were calculated in the two tables. The averages in Table 2 are weighted averages, using equity capital as weights, whereas the averages in Table 5 are simple (unweighted) averages across the BHCs in the sample. The higher average value of the repurchase variable in Table 2 therefore reflects the influence of the largest institutions in the sample, which tend to higher dollar levels of repurchase activity (relative to equity capital) than the smaller institutions.

with higher-than-average return on equity and return on assets in the following year. The coefficient on repurchases in both equations are positive and statistically significant at fairly high confidence levels.¹⁷ However, while the coefficients are statistically significant, their magnitude suggests that the economic impact of repurchase activity on earnings is only moderate: a one-standard-deviation increase in repurchases would increase ROE by 38 basis points (ROE averaged 11.9 percent across the observations in the sample) and ROA would increase by just one basis point (as compared to an ROA of 0.90 percent). The coefficient on the earnings growth variable, in contrast, is negative and not statistically significant.

Turning now to the variables that capture asset quality, the regression results indicate that higher-than-average levels of repurchases are associated with lower-than-average levels of non-performing loans and charge-offs in the subsequent year. Somewhat more so than in the case of the profitability variables, the economic impact of increased repurchases appears to be modest, with, for instance, a one-standard-deviation increase in repurchases leading to just a one-basis-point decrease in the charge-off rate (as compared to an average value for this rate of 50 basis points).

4.1. *Alternative definitions of repurchases*

Despite the modest size of the impact, the results presented in Table 6 are consistent with the idea that higher levels of stock repurchases are associated with enhanced future financial performance, both in terms of earnings and asset quality. To test the robustness of this finding, we re-run the regression equations using alternative definitions of the repurchase variable.¹⁸

As discussed above, our basic definition of repurchases is based on gross treasury stock purchases as reported in the bank holding companies' regulatory reports. However, it is possible that this figure could misstate a bank's true intentions in terms of the volume of stock it would like to repurchase. In particular, many of the banking organizations in our sample sold treasury stock to the market in years in which they also reported purchasing

¹⁷ One reason to examine both ROE and ROA as profitability measures is to ensure that any conclusions about enhanced future profitability as measured by ROE—which is arguably the more meaningful measure of profitability—are not purely mechanically driven by decreases in equity capital as a result of repurchases.

¹⁸ We also test the robustness of the results by running alternative specifications of the regression model. The first of these is a simplified specification in which the only explanatory variable, aside from year dummies and bank-holding-company-specific fixed effects, is lagged repurchases. The second alternative specification extends the regression model used in Table 6 to include a lagged dependent variable. This specification is a particularly stringent test of the impact of repurchases, given that the regression accounts for both firm-specific fixed effects and lagged behavior of the performance variables. The results are generally consistent with those reported in Table 6. In particular, there is a positive and statistically significant relationship between lagged repurchases and profitability (as measured by ROE and ROA) and a negative and marginally statistically significant relationship between lagged repurchases and non-performing loans and charge-offs. Interestingly, the results suggest a positive and significant relationship between lagged repurchases and earnings growth when lagged earnings growth is included in the regression. With that exception, however, the size of the coefficients on the lagged repurchases are markedly smaller in the specification including the lagged dependent variable, suggesting that the economic impact of repurchases may be quite modest once the past behavior of the performance variables are taken into account.

treasury stock. This means that treasury stock purchases would overstate the bank's net repurchase activity. To account for this possibility, we specify an alternative repurchase variable defined as net treasury stock purchases, that is, treasury stock purchases minus treasury stock sales.

However, both net and gross treasury stock purchases could understate total stock repurchases due to the way these items are reported in the regulatory reports. Specifically, the treasury stock purchases figures include only stock that is repurchased and retained as treasury stock. If stock is repurchased and then retired, it may not be included in this figure. Unfortunately, the Y-9C reports do not include a separate figure for retirements; instead, the retired stock is included in an aggregate variable, calculated as stock conversions (from options or convertible debt) minus retirements.¹⁹

Despite this limitation, we use these data to adjust our repurchase variables in two ways. First, we construct a variable equal to net treasury stock purchases plus net retirements (that is, the net conversions–retirement variable if it is positive, indicating that retirements exceed conversions). This variable should make a partial adjustment for retirements, though may continue to understate the extent of retirements in cases where there were offsetting stock conversions. We also construct a second variable equal to net treasury stock purchases plus net retirements minus net conversions (that is, we add the conversions/retirements variable whether it is positive or negative). Adding conversions may be an appropriate adjustment if a bank holding company chooses to offset the increase in stock outstanding as a result of the conversions by making stock repurchases. In that event, the basic repurchase variable—treasury stock purchased minus treasury stock sold—would overstate the bank's intended repurchase amount.²⁰

The results of the estimation using these three alternative variables are reported in Table 7. To present the results efficiently, the table simply reports the coefficients on repurchases and dividends and omits the other variables included in the equation. For comparison, the first columns repeat the results from Table 6 using the basic repurchase variable. The five panels of the tables contain the results for the five performance variables: ROE, ROA, earnings growth, non-performing loans, and charge-offs.

Reading across the row in each panel, it is clear that the results are fairly robust to changes in the definition of the repurchase variable. The coefficients on repurchases in the ROE and ROA equations are generally positive and statistically significant, the coefficients in the non-performing loans and charge-off equations are generally negative and statistically significant, while the coefficient in the earnings growth equation tends not to enter the equation significantly. Of the three alternative repurchase definitions, the final one—net treasury stock purchases plus net retirements minus net conversions—appears

¹⁹ Also, these data are available only beginning in 1990, so regressions using the retirements/conversions variable are performed on observations between 1990 and 1998.

²⁰ Other studies working with similar treasury stock purchase data for non-financial firms (available through COMPUSTAT) have made additional adjustments to the reported figures that we do not make here (see, for instance, Fenn and Liang, 2001). These adjustments are intended to account for non-open-market repurchases such as self-tender offers and privately negotiated third-party transactions. These actions were often used to prevent take-overs; since the take-over market in the banking sector is quite limited, the failure to correct for these types of transactions most likely does not affect our results.

Table 7
Impact of repurchases on BHC earnings and asset quality. Alternative definitions of repurchases

Lagged shareholder payouts	Gross treasury stock purchases	Net treasury stock purchases (treasury stock purchased minus treasury stock sold)	Net treasury stock purchases plus net retirements	Net treasury stock purchases plus net retirements minus net conversions
ROE				
Repurchases	0.1451** (0.0419)	0.1465** (0.0424)	0.0822** (0.0270)	0.0111 (0.0242)
Dividends	0.3567** (0.0643)	0.3578** (0.0643)	0.2216** (0.0658)	0.2121** (0.0658)
ROA				
Repurchases	0.0074** (0.0029)	0.0072** (0.0030)	0.0051** (0.0020)	0.0003 (0.0018)
Dividends	0.0298** (0.0045)	0.0299** (0.0045)	0.0306** (0.0049)	0.0300** (0.0049)
Earnings growth				
Repurchases	−0.1098 (0.0746)	−0.1089 (0.0756)	−0.0561 (0.0414)	−0.1476** (0.0370)
Dividends	−0.3256** (0.1145)	−0.3264** (0.1145)	−0.2294** (0.1008)	−0.2403** (0.1006)
Non-performing loans				
Repurchases	−0.7080* (0.3638)	−0.7153* (0.3689)	−0.9801** (0.2890)	−0.7882** (0.2588)
Dividends	−2.1764** (0.5586)	−2.1821** (0.5586)	−1.4857** (0.7028)	−1.4539** (0.7027)
Charge-offs				
Repurchases	−0.0069** (0.0030)	−0.0063** (0.0031)	−0.0034* (0.0021)	−0.0024 (0.0019)
Dividends	−0.0182** (0.0047)	−0.0182** (0.0047)	0.0006 (0.0051)	0.0008 (0.0051)
Number of BHCs	1717	1717	1536	1536
Number of obs.	8713	8713	6413	6413

Notes. Alternative definitions of repurchases are indicated at the top of each column. Variable definitions, as in Table 5. All real variables are deflated using the consumer price index. The sample consists of all top-tier BHCs between 1987 and 1998. Due to data limitations, the regressions using net retirements and net conversions are run on a sample consisting of all top-tier BHCs between 1990 and 1998. Each equation includes year dummies and BHC-specific fixed effects. Standard errors are in parentheses.

**, * Statistical significance at the 5 and 10 percent levels, respectively.

to be least strongly related to subsequent bank holding company performance. Nonetheless, these findings suggest that the general results are not overly sensitive to the particular definition of repurchases used in the estimates.

4.2. Timing and persistence

The regressions discussed above explore the relationship between repurchases in one year and bank holding companies' operating performance in the following year. One

issue that is worth exploring is whether the observed positive relationship between repurchases and performance extends beyond the one-year horizon assumed in the regression specification. In other words, are repurchases in a given year linked to persistent higher-than-average performance or is the relationship confined to the one-year horizon?

The results in Table 8 explore this question. The table contains an extended version of the basic Table 6 specification in which an additional lagged value of both the repurchase and dividend variables are included in the regression. That is, the regression includes repurchases and dividends lagged both one and two years. The regression thus tests whether bank holding companies' operating performance is affected by repurchases made two years in the past, controlling for repurchases, dividends, and other control variables from the previous year.²¹ Again, to conserve space, just the coefficients on the repurchase and dividend variables are reported in the table.

As the results in Table 8 indicate, there is at best weak evidence that repurchases are linked to bank holding company operating performance at a two-year horizon. The coefficients on the two-year lagged repurchase variables all have the same sign as the one-year lagged variables, but are generally not statistically significant. The one exception is the coefficient on repurchases in the income growth equation, which enters with a negative and statistically significant coefficient, indicating that repurchases in a given year tend to lead to lower income growth one and two years out.

Table 8
Impact of repurchases on BHC earnings and asset quality. Repurchases lagged one and two years

Lagged shareholder payouts	Dependent variable				
	ROE	ROA	Earnings growth	Non-performing loans	Charge-offs
Repurchases					
Lagged one year	0.1147** (0.0448)	0.0050 (0.0032)	−0.2229** (0.0802)	−0.5800 (0.4055)	−0.0063* (0.0034)
Lagged two years	0.0288 (0.0471)	0.0020 (0.0034)	−0.1532* (0.0843)	−0.6223 (0.4263)	−0.0031 (0.0036)
Dividends					
Lagged one year	0.4178** (0.0776)	0.0370** (0.0056)	−0.3950** (0.1386)	−2.0170** (0.7017)	−0.0209** (0.0059)
Lagged two years	−0.3755** (0.0774)	−0.0250** (0.0056)	−0.1772 (0.1383)	0.1961 (0.6996)	0.0191** (0.0059)
R ² (within)	0.0811	0.087	0.1005	0.131	0.114
Number of BHCs	1409	1409	1409	1409	1409
Number of obs.	6996	6996	6996	6996	6996

Notes. Variable definitions, as in Table 5. All real variables are deflated using the consumer price index. The sample consists of all top-tier BHCs between 1987 and 1998. Each equation includes year dummies and BHC-specific fixed effects. Standard errors are in parentheses.

**, * Statistical significance at the 5 and 10 percent levels, respectively.

²¹ The regression results are not qualitatively affected if the one-year lagged repurchase and dividend variables are omitted or if the control variables—asset size, the equity capital ratio, the loan-to-assets ratio, and personal income growth in the bank's service area—are also lagged two years.

Thus, the results in Table 8 suggest that the link between repurchases and operating performance is not strongly persistent beyond a one-year horizon. While the results are generally consistent with the repurchase-performance link observed at a one-year horizon, they are not strong in either statistical or economic terms. In most of the regressions, the coefficients on the two-year lagged repurchase variables are significantly smaller than those on the one-year variable. Taken together, these results suggest that repurchases have the strongest link with subsequent operating performance within one year.

5. Publicly-traded versus non-publicly traded BHCs

The regression results reported in Tables 6, 7, and 8 are for the entire sample of bank holding companies, regardless of whether the company's stock is traded on a public exchange. Smaller bank holding companies can have stock that is very closely-held or traded on only a sporadic basis through regional market makers. The meaning and implications of stock repurchases for such companies could be quite different than those for publicly-traded banks with a large and diverse shareholder base. For one, corporate governance issues can differ significantly between smaller, closely-held bank holding companies and larger, widely held institutions. In addition, from a purely mechanical perspective, conducting a share repurchase could be more complex for firms without publicly-traded equity, since questions of fair valuation could be more difficult to determine for these firms.

To explore this observation and to produce results that are more comparable with prior research on stock repurchases—most of which has dealt with firms traded on major exchanges—we divide the sample into various subsets according to the trading status of the BHCs' equity and re-estimate the equations in Table 6. In particular, we first identified those bank holding companies in our sample that traded on the NYSE, AMEX, NASDAQ, or over-the-counter as of 1999 using information provided by SNL Securities. This process allows us to identify the firms in our sample that were publicly-traded as of the end of the sample period. We supplemented this matching with a manual name matching between the bank holding companies in our sample and firms listed on the CRSP daily stock price files at two points in time: year-end 1985 and year-end 1994. This supplemental matching allows us identify publicly-traded bank holding companies that existed in the early or intermediate part of our sample period but that had exited by the end, either because of failure or merger. However, we can only identify those bank holding companies that traded on the NYSE, AMEX or NASDAQ, as these are the exchanges covered by the CRSP data (that is, we cannot identify banks traded over-the-counter for the early part of our sample).

Using these two matching procedures, we divided the sample into three subsets. The first division is between bank holding companies that had publicly-traded stock at some point during the sample period ("publicly-traded BHCs") and those that did not ("non-publicly traded BHCs").²² That is, the publicly-traded BHC sample contains all observations for bank holding companies that were identified as having traded on the NYSE, AMEX, NASDAQ, or over-the-counter at some point during the sample period. The non-publicly traded

²² These subsamples are the same as those reported in Tables 2, 3, and 4.

subset is the remainder of the sample. In addition to this division, we also created a sample consisting of all observations for bank holding companies that traded on the NYSE, AMEX or NASDAQ for those years in which they traded on these exchanges (“major-exchange-traded BHCs”). This is a subsample of the publicly-traded BHC sample in which banks that traded only over-the-counter are eliminated, as are observations for years in which a bank holding company was not listed on an exchange.

The results of the regression estimation on the non-publicly traded, publicly-traded, and major-exchange-traded subsamples are reported in Table 9. For convenience, only the coefficients on the repurchase and dividend variables are reported, but as in Table 6, the regressions contain lagged and contemporaneous control variables, as well as year dummies and fixed effects.

The most striking aspect of the results is how they differ across subsamples. The results are by far the strongest for the publicly-traded and major exchange-traded subsamples, suggesting that the overall results presented in Table 6 are being driven by these bank holding companies. For these firms, there is a consistent positive relationship between repurchase activity and future profitability and asset quality. While these relationships are

Table 9
Impact of repurchases on BHC earnings and asset quality: alternative samples

Lagged shareholder payouts	Dependent variable				
	ROE	ROA	Earnings growth	Non-performing loans	Charge-offs
Non-publicly traded bank holding companies					
Repurchases	0.1087** (0.0487)	0.0048 (0.0034)	−0.1477* (0.0877)	−0.7632 (0.4774)	−0.0044 (0.0037)
Dividends	0.4089** (0.0758)	0.0361** (0.0052)	−0.0496 (0.1365)	−1.4154** (0.7533)	−0.0126** (0.0057)
R ² (within)	0.054	0.070	0.080	0.097	0.082
Publicly-traded bank holding companies					
Repurchases	0.2176** (0.0828)	0.0130** (0.0058)	0.0859 (0.1464)	−0.5004 (0.5936)	−0.0116** (0.0057)
Dividends	0.2450** (0.1240)	0.0136 (0.0087)	−1.1026** (0.2192)	−3.9154** (0.8889)	−0.0270** (0.0086)
R ² (within)	0.111	0.116	0.103	0.230	0.161
Major exchange-traded bank holding companies					
Repurchases	0.3045** (0.1334)	0.0189** (0.0095)	0.2449 (0.2579)	−0.5829 (0.6863)	−0.0165** (0.0079)
Dividends	0.0479 (0.2036)	−0.0011 (0.0144)	−1.2490** (0.3936)	−3.6019** (1.0475)	−0.0159 (0.0120)
R ² (within)	0.118	0.117	0.129	0.313	0.204

Notes. The non-publicly traded BHC sample consists of 4813 observations from 1062 bank holding companies that did not have publicly-traded stock over the years 1987 to 1998. The publicly-traded BHC sample consists of 3900 observations from 655 bank holding companies with stock traded on the NYSE, AMEX, NASDAQ or over-the-counter at some point during the years 1987 to 1998. The major exchange-traded sample consists of 1762 observations from 345 bank holding companies with stock traded on the NYSE, AMEX, or NASDAQ during the years 1987 to 1998. Variable definitions, as in Table 5. All real variables are deflated using the consumer price index. Each equation includes year dummies and BHC-specific fixed effects. Standard errors are in parentheses.

**, * Statistical significance at the 5 and 10 percent levels, respectively.

also evident for the non-publicly traded sample, the coefficients are generally smaller in size and not precisely estimated.

In fact, for most of the performance variables, the coefficient on repurchases increases sharply in magnitude moving from the non-publicly traded to the publicly-traded to the major exchange-traded subsamples. For instance, in the ROE equation, the coefficient on repurchases doubles between the non-publicly traded and publicly-traded subsamples, and increases by another 40 percent when moving from the publicly-traded to the major exchange-traded sample. These increases have correspondingly important effects on the estimated economic impact of repurchase activity: a one-standard deviation increase in repurchases increases ROE by 29 basis points for the non-publicly traded sample, by 54 basis points for the publicly-traded sample, and by 88 basis points for the major exchange-traded samples (as compared to average ROEs of 11.9 percent for the non-publicly traded and publicly-traded subsamples and 10.6 percent for the major exchange-traded companies).

Overall, the results in Table 9 suggest that there may be important differences in the reaction of different types of bank holding companies to repurchase activity. For the publicly-traded and major-exchange-traded subsamples, repurchases appear to be strongly linked with enhanced future operating performance. In contrast, for the non-publicly traded bank holding companies, repurchases appear to have at best a weak link to future profitability and asset quality. These results suggest that repurchases by these different groups of bank holding companies may be motivated by different factors or concerns of management and shareholders. This implication is explored further in the next section of the paper.

6. What accounts for the relationship between repurchases and BHC performance?

Drawing on the broader literature on the role of stock repurchases in the non-financial sector, we can identify two competing hypotheses to explain the relationship between higher stock repurchases and enhanced financial performance by bank holding companies. First, repurchases may serve as a proxy for the private information held by bank managers about the institution's future performance prospects. When managers have private information suggesting that this future performance is likely to be good, they may be willing to increase repurchases, either because they want to send a signal to the market about their future good prospects or because they are willing to return profits to shareholders now in the anticipation of future strong profitability. Alternatively, a positive link between stock repurchases and future bank performance could reflect managers' decision to return excess funds to shareholders in the face of limited outside investment opportunities. In this story, the decision to make stock repurchases—as opposed to using retained earnings to fund further balance sheet growth—actually *causes* future profitability to be higher as compared to a similar bank that chose to retain the funds.²³

²³ Both of these explanations assume that the manager's objective is to try to maximize shareholder utility, either by maximizing stock value or by returning cash profits directly to shareholders. This assumption, of course, abstracts from the principal-agent problem between managers and owners. Papers by Weisbenner (2000), Jolls (1998), and Fenn and Liang (2001) demonstrate that there is a link between repurchase activity and executive

In practice, it is very difficult to separate these two hypotheses empirically. The key difficulty is finding variables to capture the private information held by bank managers about their firms' future prospects. In addition, the hypotheses need not be mutually exclusive, as managers could have private information indicating that the bank's own stock is a high net present value investment in an environment in which outside prospects are limited. Nonetheless, we can do some empirical tests that will provide insight into this question.

The general approach we use is to compare the characteristics of bank holding companies that repurchase shares with those that do not. Specifically, we examine a range of characteristics in the two years before a bank holding company makes a repurchase to those same characteristics for bank holding companies that do not repurchase shares to see whether there are observable differences between these two groups of banks. We might expect, for instance, that if repurchases are motivated by managers' desire to signal improved prospects, that performance by these banks in the period prior to the repurchase might be worse than that of a comparable set of institutions. Conversely, if repurchases are motivated by the desire to return excess cash flow, then pre-repurchase performance might be better than that of non-repurchasing firms.

Given the panel data structure of our data—in which a single bank holding company appears multiple times—we perform this exercise using a simple regression specification in which we regress the lagged two-year average value of a range of bank holding company characteristics against a dummy variable for whether or not the bank holding company repurchased stock during the year in question.²⁴ The regression also includes a series of dummy variables for the year of the observation and for bank holding company asset size (less than \$500 million, \$500 million to \$1 billion, \$1 billion to \$25 billion, more than \$25 billion, all in 1998 dollars), as well as bank-holding-company-specific fixed effects. Finally, because many bank holding companies repurchase stock for several years during the sample period, we include a dummy variable equal to one if the bank holding company repurchased stock during the two-year “pre-repurchase” period.²⁵ In this structure, a positive (negative) coefficient on the current-year repurchases dummy means that the bank holding company experienced higher-than-average (lower-than-average) values of the variable in question in the two years prior to the repurchase.

The results of this exercise are reported in Table 10. The table reports the coefficient on the current repurchases dummy variable and the *p*-value associated with the estimate (in parentheses). Results are reported for the sample as a whole and for the non-publicly traded, publicly-traded, and major exchange-traded subsamples. On the whole, the results

compensation structure that is consistent with the idea that repurchases are made in firms where the principal-agent problem has been addressed through such devices as stock options and management ownership of shares in the firm.

²⁴ Note that this regression essentially reverses the timing of the regressions reported in the rest of the paper. In these other regressions, current (year *t*) performance variables are regressed on lagged (year *t* – 1) repurchases. In the regressions being described now, lagged values of the performance variables (from years *t* – 1 and *t* – 2) are being regressed on current (year *t*) repurchases.

²⁵ Note that the direction of the potential bias from repurchase activity during the “pre-repurchase period” is not completely clear because a bank holding company that did not repurchase in a particular year may have repurchased in a prior year, so the performance variables for a “non-repurchaser” could also be affected by prior year repurchases.

Table 10

Relative performance of repurchasing BHCs and non-repurchasing BHCs. Controlling for year, asset size, and BHC-specific effects

Performance variable	All BHCs	Non-publicly traded BHCs	Publicly-traded BHCs	Major exchange-traded BHCs
ROE	0.0065** (0.021)	0.0032 (0.401)	0.0083** (0.046)	0.0249** (0.003)
ROA	0.0006** (0.001)	0.0003 (0.197)	0.0008** (0.002)	0.0019** (0.000)
Earnings growth	−0.0010 (0.726)	−0.0043 (0.254)	0.0011 (0.814)	0.0138 (0.159)
Asset growth	0.0034 (0.223)	−0.0006 (0.870)	0.0055 (0.188)	0.0067 (0.320)
Loan growth	0.0065* (0.076)	0.0040 (0.426)	0.0071 (0.183)	0.0120 (0.157)
Charge-offs	−0.0007** (0.002)	−0.0004 (0.215)	−0.0009** (0.005)	−0.0018** (0.002)
Non-performing loans	−0.0008* (0.074)	−0.0001 (0.908)	−0.0012** (0.044)	−0.0018* (0.084)
Equity capital	0.0024** (0.000)	0.0023** (0.000)	0.0027** (0.000)	0.0035** (0.000)
Loan share	−0.0023 (0.243)	0.0015 (0.594)	−0.0044 (0.108)	−0.0000 (0.999)
Income growth	−0.0006 (0.178)	−0.0013** (0.020)	−0.0001 (0.873)	0.0004 (0.713)
Stock return	n/a	n/a	n/a	−0.0144 (0.585)
Number of obs.	5587	2912	2675	1131
Number of repurchase obs.	1678	811	867	409
Number of BHCs	1180	672	508	246

Notes. The figures reported in this table are the difference in means of “pre-repurchase” performance between observations in which the bank holding company (BHC) repurchased equity and those in which the BHC did not repurchase equity. The figures are derived from a regression of the average value of each performance variable during years $T - 1$ and $T - 2$ on a dummy variable equal to one if the BHC repurchased equity in year T . The regressions also include dummy variables for the year of the repurchase (year T), for the asset size category of the BHC in year T (less than \$500 million, \$500 million to \$1 billion, \$1 billion to \$25 billion, greater than \$25 billion), and for whether the BHC repurchased equity during the two-year “pre-repurchase” window (years $T - 1$ and $T - 2$), as well as BHC-specific fixed effects. Variable definitions, as in Table 5; also: *Loan share*, the end-of-year ratio of total loans to total assets; *Stock return* is defined as the return on the BHC’s common stock. The p -values for the test of equivalence of the means are reported in parentheses.

**, * Statistical significance at the 5 and 10 percent levels, respectively.

suggest that bank holding companies that repurchased stock performed measurably better than average in the two years prior to the repurchase. Repurchasing bank holding companies had statistically significantly higher-than-average profitability (ROE and ROA), lower-than-average charge-offs and non-performing loans, and higher-than-average equity capital ratios during the pre-repurchase period.²⁶

²⁶ The equity-capital-ratio result is consistent with a third motivation for repurchase activity: maintaining target equity-capital ratios. Earlier studies of repurchase activity in both the banking and non-financial sectors

These differences appear in the sample as a whole, and for the publicly-traded and major exchange-traded subsamples. Interestingly, for these samples, income growth in the states in which repurchasing banks operated was no higher than average in the pre-repurchase period, which suggests that the superior performance of repurchasing banks is a bank-specific phenomenon and not simply driven by better economic conditions in the banks' services areas. In contrast, for the non-publicly traded bank holding sample, repurchase observations are not associated with measurably stronger pre-repurchase performance, with the exception of higher-than-average equity capital ratios. For these observations, repurchases appear to be associated with lower-than-average income growth in their service areas.

For the publicly-traded and major exchange-traded bank holding companies, these results seem more consistent with the idea that repurchases were motivated by excess-cash-flow concerns rather than a desire to signal strong future performance, since the repurchasing banks were already performing observably better than their own long-run average performance in the years before the repurchases. For the non-publicly traded bank holding companies, in contrast, the results seem more consistent with signaling, since there is no noticeable performance difference in the pre-repurchase period and at least some evidence of better post-repurchase performance.

The cash-flow motivation is also supported by an examination of the market price performance of the major exchange-traded BHCs' equity during the two years prior to a repurchase. Specifically, we repeat the regressions described above using the two-year annual average stock return for the major exchange-traded bank holding companies as the performance variable (see the last column of Table 10).²⁷ Arguably, the signaling hypothesis focuses as much, if not more, on stock price returns as on operating performance. Thus, if signaling were the dominant motivation for bank holding company stock repurchases, we might expect that the pre-repurchase stock return would be significantly lower-than-average for repurchasing firms as compared to non-repurchasing bank holding companies. In fact, as Table 10 illustrates, while the point estimate on the current repurchases dummy variable is negative, it is not significantly different from zero, suggesting that there was no meaningful deviation from long-term stock return performance for repurchasing bank holding companies during the pre-repurchase period.

One potential criticism of the results in Table 10 is that because the regressions include BHC-specific fixed effects, they in effect compare the pre-repurchase performance of the each bank holding company to its own long-run average performance, rather than to the performance of other, non-repurchasing bank holding companies. This makes the interpretation of the results somewhat complex and introduces questions of timing, since the fixed effects control for the average performance of each bank holding company over its entire

have identified equity-ratio (or, conversely, debt-ratio) targeting as an important motivation for repurchases (see Hovakimian et al., 2001 and Laderman, 1995). While potentially an important motivation for repurchases by bank holding companies—especially in light of the fact that these institutions face minimum regulatory capital requirements—the link between target capital ratio considerations and subsequent improved operating performance is not clear.

²⁷ This analysis is limited to the major-exchange-traded subsample because these are the firms for which stock price data are available on the CRSP tapes. The full publicly-traded BHC sample includes firms that are traded over-the-counter and for which market data are not readily available and, by definition, the non-publicly traded subsample does not have market price data available.

appearance during the sample period, rather than just during the period prior to a repurchase.²⁸ To test the sensitivity of the results to the fixed-effects specification, we re-run the regressions without the fixed effects (but with robust standard errors and a correction for clustered residuals to account for potential heteroskedasticity across bank holding companies). These results—which provide a more direct comparison across repurchasing and non-repurchasing bank holding companies—are reported in Table 11.

In broad terms, the results in Table 11 are similar to those in Table 10. For the sample as a whole, repurchasing bank holding companies appear to have measurably better operating performance than non-repurchasing bank holding companies in the two year prior to repurchase. Measures of profitability and capital strength (ROE, ROA and the equity capital ratio) were significantly higher and measures of troubled assets (non-performing loans and charge-offs) were significantly lower for BHCs that ultimately repurchased their

Table 11

Relative performance of repurchasing BHCs and non-repurchasing BHCs. Controlling for year and asset size

Performance variable	All BHCs	Non-publicly traded BHCs	Publicly-traded BHCs	Major exchange-traded BHCs
ROE	0.0062** (0.032)	0.0022 (0.568)	0.0098** (0.026)	0.0133 (0.132)
ROA	0.0007** (0.000)	0.0003* (0.066)	0.0010** (0.002)	0.0009 (0.131)
Earnings growth	0.0000 (0.996)	−0.0032 (0.119)	0.0027 (0.483)	0.0153** (0.016)
Asset growth	0.0024 (0.389)	0.0037 (0.949)	0.0029 (0.524)	−0.0029 (0.688)
Loan growth	0.0042 (0.231)	0.0040 (0.388)	0.0029 (0.582)	−0.0007 (0.935)
Charge-offs	−0.0008** (0.000)	−0.0006** (0.050)	−0.0010** (0.001)	−0.0011* (0.068)
Non-performing loans	−0.0018** (0.000)	−0.0013* (0.055)	−0.0021** (0.005)	−0.0021 (0.120)
Equity capital	0.0031** (0.000)	0.0036** (0.008)	0.0027** (0.009)	0.0009 (0.586)
Loan share	−0.0254** (0.000)	−0.0228** (0.003)	−0.0300** (0.000)	−0.0110 (0.341)
Income growth	−0.0010** (0.016)	−0.0009 (0.119)	−0.0011* (0.076)	−0.0010 (0.332)
Stock return	n/a	n/a	n/a	0.0134 (0.559)
Number of obs.	5587	2912	2675	1131
Number of repurchase obs.	1678	811	867	409
Number of BHCs	1180	672	508	246

Note. See legend to Table 10.

**, * Statistical significance at the 5 and 10 percent levels, respectively.

²⁸ This structure is appropriate if we are willing to assume that there is a BHC-specific performance factor that is unvarying over the sample period; in that event, the fixed effects results measure each BHC's performance relative to its own long-run average.

stock. In contrast to the results in Table 10, however, there is somewhat greater evidence of stronger pre-repurchase performance for non-publicly traded BHCs (higher ROA and equity capital ratios and lower non-performing loans and charge-offs). In addition, the evidence of stronger performance for the major exchange-traded subsample is weaker in this specification: although the point estimates have the same signs, the significance levels are generally lower than in the fixed-effects specification. That said, the results do not provide any evidence of the *weaker* pre-repurchase performance that might be expected if signaling were the dominant repurchase motivation. Consistent with this view, the point estimate for the stock return regression for the major exchange-traded subsample is positive, indicating better (though not statistically significant) pre-repurchase stock price performance for repurchasing bank holding companies.

Taken together, these results suggest that the relationship between repurchases and future operating performance is associated with the choice to return profits to shareholders when cash flow is abundant and investment prospects are comparatively limited. This finding seems to apply most strongly to publicly-traded bank holding companies, especially those that are traded on major exchanges. With respect to smaller, closely-held banks, however, the evidence is more mixed. As discussed above, there is weak evidence suggesting that these firms also repurchased stock following periods of observably better-than-average performance. However, the basic link between repurchases and future operating performance is much weaker for these institutions, suggesting that the role that repurchases play in the actual future operation of these firms may differ from that for publicly-traded banks.

This difference may be explained by differences in corporate governance issues between these two types of firms: at closely-held firms, the principal-agent conflicts between managers and owners are likely to be less significant and the problems associated with excess cash flow commensurately less severe. For these firms, then, it may not be necessary to use repurchases to deal with excess funds. In that event, repurchases may have more to do with past rather than future performance by serving simply as a means of taking past strong profits out of the bank. In contrast, the principal-agent problems between managers and owners of widely-held, publicly-traded bank holding companies are likely to be more significant, and repurchases therefore more likely to be used to mitigate the associated problems.

7. Summary and conclusions

This paper has examined the relationship between stock repurchases and the future financial performance of bank holding companies. The results indicate that higher repurchases by a bank holding company are associated with enhanced earnings and better asset quality in the year following the repurchases, especially for publicly-traded firms. There are two potential explanations for this relationship: first, that bank holding company managers have private information about the bank's future prospects that leads them to return profits to shareholders in the form of repurchases, possibly as a way of signaling to market about improved future performance. In this story, repurchases are essentially a proxy for this private information. In the second explanation, managers choose to make repurchases when cash flow is abundant relative to outside investment opportunities.

The paper presents evidence suggesting that different bank holding companies may be motivated by different concerns in making repurchases. At publicly-traded bank holding companies, the results suggest that superior performance by these firms may be associated with the choice to return excess cash flow to shareholders rather than engage in balance sheet expansion. In contrast, at closely-held, non-publicly traded banks, the results do not appear to be consistent with this hypothesis. Repurchases at these institutions may simply be serving as a means to transfer strong past profits to shareholders. These differences may reflect differences in the degree of principal-agent problems between managers and shareholders at these two types of institutions.

It would be interesting in future research to explore this last idea a bit more fully. One gap in the work in this paper is that we do not have information about the exact extent to which the shares of the bank holding companies are closely- or widely-held, beyond knowing that certain of them are traded on major exchanges. If it were possible to get such information, it could be informative to use better proxies for the extent of corporate governance issues than the simple division into publicly-traded and non-publicly traded companies. A related avenue to explore would be to see whether, even within the universe of publicly-traded bank holding companies, measures of agency problems such as the extent of managers' stock options or lending to insiders can help us identify differences in the motivations for stock repurchases. A final avenue to explore would be the role of employee stock ownership plans (ESOPs) in banks' repurchasing behavior. At least one variable is available on the regulatory reports that might allow us to identify those bank holding companies with active ESOPs. If this variable proved reliable, it might be possible to construct another alternative repurchase variable that takes account of repurchases associated with ESOPs.

Another avenue to explore concerns the persistence (or lack thereof) of the repurchases-performance link. As described above, the empirical evidence suggests that the link between repurchases and enhanced future performance lasts only one year. It is possible to interpret this arguably weak result as further support for the free-cash-flow motivation for stock repurchases. Jensen (1986) argues that the extent of managerial discipline resulting from the disbursement of free cash flow will depend on the degree of commitment inherent in the method used to disperse the funds. The comparatively brief persistence of the repurchase-performance link may therefore reflect that banks (similar to non-financial firms) appear to use repurchases flexibly over time, especially as compared to dividends. To test this hypothesis, it would be interesting to explore more fully the persistence of enhanced performance resulting from dividend payments as compared to repurchases.

Finally, it would be interesting to pursue a slightly different tack with these data and examine the role that repurchases play in bank holding companies' capital structure strategies. The results presented in Tables 10 and 11 suggest that maintaining target equity-capital ratios could be a motivation behind these firms' stock repurchases, and it could be worthwhile to pursue this observation more directly. These issues are likely to be of particular interest in the banking sector, since these institutions face regulatory capital constraints, both in terms of minimum regulatory capital ratios and in terms of their ability to make shareholder payouts when under financial stress.

Whatever the approach, however, the real contribution of the bank holding company data used in this study is that it allows us to make these comparisons between publicly-

traded and more closely-held firms. These comparison provide us insight not only into the role that share repurchases play in affecting bank holding company operating performance, but also into the corporate governance issues that drive the performance of these companies.

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