

RISK AND RETURN OF PUBLICLY HELD VERSUS PRIVATELY OWNED BANKS

1. INTRODUCTION

In their seminal work, Berle and Means (1932) point out that the separation of ownership and control in the modern corporation creates a condition whereby the interests of owner and manager may diverge and many of the checks that once operated to limit the use of power have disappeared. The agency theory, formalized by Jensen and Meckling (1976), posits that the agency costs of deviation from value maximization increase as managers' stakes decrease and ownership becomes more disperse.

Countering the incentive problems in the separation of ownership and control are the disciplining forces exerted by the managerial labor market and the capital market. Fama (1980) notes that the signals provided by an efficient capital market about the value of a firm's securities are likely to be important for revaluations of the firm's management. Public ownership also facilitates the market for corporate control. Thus, the signals from publicly traded securities in the capital market could discipline managers and resolve potential agency problems. Hence, whether there is a significant difference in the performance of publicly owned and privately held companies remains an empirical question.

While previous empirical studies have found evidence that management ownership appears to play a significant role in firm performance, their samples often include firms from a cross-section of industries.¹ To the extent that ownership

structure may depend on industrial characteristics, as argued by Jensen and Warner (1988), Demsetz (1983), and Fama and Jensen (1983), disentangling the relationship between performance and ownership becomes difficult. Moreover, many papers rely on certain corporate events—such as initial public offerings (IPOs) or leveraged buyouts, which are also likely to be endogenous to firm performance—to discern the effects of changes in ownership structure.²

In this paper, we employ a different empirical strategy to study the effects of ownership structure on firm performance that is free from any corporate events in the rather homogenous banking industry. In essence, the performance of publicly traded bank holding companies (BHCs) is compared with that of privately held BHCs.^{3,4} By focusing on a single industry—banking—we control more precisely the effects of industrial organization on ownership structure. Within the banking industry, different firms may choose to organize themselves differently. To the extent that these firms all operate in the same industry with presumably very similar production functions, it seems plausible to view ownership structure as exogenous in this setting, especially after controlling for firm size.⁵ Thus, by focusing on a single industry, controlling for within-industry variations, and avoiding corporate events that may be associated with unusual performance (such as de novo banking or IPOs) and bank failures, this study contributes to the field by isolating the ownership effect more accurately.

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In addition, while other studies emphasize profitability in their performance comparisons, this paper also examines how ownership structure affects risk taking. According to the agency theory, managers with nondiversifiable human capital may take less risk than is optimal for shareholders. Although this agency problem could be mitigated by structuring the labor contract to induce the manager to move closer to optimal risk taking, such as by tying compensation to the stock price or including stock options as part of the manager's compensation, it is an empirical question whether publicly traded BHCs take less risk than privately held ones.⁶

A larger question about the effects of ownership structure on bank risk taking is whether market discipline is capable of constraining bank risk taking.⁷ In recent years, policymakers and bank regulators have warmed to the idea of harnessing market forces to enhance banking supervision. This idea is motivated mainly by: 1) the growing complexity of large banking organizations, 2) concerns about the cost of bank supervision, and 3) limiting the bank safety net so that uninsured debtholders and equityholders still have incentives to monitor bank risks. Both the Federal Reserve and the Basel Committee on Banking Supervision are actively promoting the concept of market discipline in banking. In the new Basel Capital Accord, to be implemented by 2006, market discipline is one of the three pillars, along with capital regulation (Pillar 1) and banking supervision (Pillar 2), designed to safeguard the banking system.⁸ In the United States, Federal Reserve Chairman Alan Greenspan (2001) has remarked that "the real pre-safety-net discipline was from the market, and we need to adopt policies that promote private counterparty supervision as the first line of defense for a safe and sound banking system."

Financial market discipline can influence bank risk taking as follows. The market price of publicly traded securities issued by a bank reflects the latest market assessment of the bank's financial condition. By monitoring those market signals, market participants and bank regulators could influence a bank's risk profile. For example, a bank's counterparties may limit or withdraw their trading with the bank if the counterparty risk is deemed unacceptable by market participants. With up-to-date market information, banking regulators could use their supervisory power to force bank management to reduce risk taking. Just the threat of market and regulatory responses to unfavorable market signals by itself has the potential to constrain bank risk taking. But whether market forces actually limit bank risk taking remains an open question.

This paper defines market discipline as the effects of publicly available market signals from bank-issued securities that lead to less risk taking by the issuing bank, relative to otherwise similar banks that do not issue publicly traded securities. Thus, the criterion by which we determine if market discipline works

is that it not only forces a publicly traded bank to make the appropriate trade-off between risk and return, it must also be able to reduce the bank's overall risk relative to that of banks not subject to market discipline. Also note that it is the net difference in risk taking between a privately held and a publicly traded BHC that matters, not just the changes in risk taking in a public BHC because of its market signal.⁹

Previous research on market discipline in banking focuses narrowly on whether bank security prices are efficient in reflecting bank risks. While bank-issued securities, including bank stock and subordinated debt, do seem to reflect bank risk taking accurately,¹⁰ this kind of market discipline does not necessarily affect banks' overall riskiness. Banks may still take large amounts of risk as long as the banks, and their investors, are properly compensated for bearing these risks. In this paper, the question concerning market discipline is different: Does the presence of readily available bank security prices result in lower asset risk, on net, by publicly traded banking companies? There has been very little research into whether market forces are capable of influencing banking firms' behavior. To our knowledge, Bliss and Flannery (2002) is the only paper to examine this question. Using a sample of publicly traded BHCs, the authors find little evidence that stock or bond investors influence managerial actions, casting doubt on the effectiveness of the market in shaping managers' behavior. Here, we approach the same question from a different angle. Rather than looking at managerial actions, we focus on the end results by comparing the performance and risk taking of publicly traded BHCs with the performance and risk taking of their privately held counterparts. Although our criterion for the operation of market discipline is whether a BHC issues stock that is publicly traded, the analysis subsumes any disciplining effects from the bond market, since all BHCs that issue bonds publicly have publicly traded stock.¹¹

Other papers have studied the relationship between ownership structure and firm performance in the banking or thrift industry. Saunders, Strock, and Travlos (1990) find that between 1978 and 1985, bank risk declined with managerial ownership, particularly during periods of deregulation. Their analysis uses a sample of only publicly traded banks. In the thrift industry, Cole and Mehran (1998) examine the stock price performance of thrift institutions that converted from mutual to stock ownership. Their focus was on the regulatory restrictions of ownership and stock performance. Esty (1997) and Schrand and Unal (1998) study the changes in risk taking when savings and loan associations were converted from mutual to stock ownership. Both studies find increases in risk after mutual thrifts were converted to stock institutions. Their findings seem to indicate that exposing thrifts' stocks to capital market discipline tends to raise, rather than lower, risk taking. But the change from mutual to stock ownership may be

endogenous to firm performance and thus could confound the pure ownership effect. Our methodology is designed to be free of such potential endogeneity.

Our first key finding is that publicly owned banking companies on average are less profitable than privately held BHCs. To the extent that publicly owned BHCs are found to incur significantly higher operating costs per dollar of assets than private BHCs, operating inefficiency is one contributing factor to public companies' subpar profitability. The results are consistent with the agency theory prediction that the separation of ownership and control will lead to shirking and perquisite consumption that undermine performance, and that the availability of public market signals from bank security prices does not fully curb this incentive.

The second key finding is that risk between publicly held and privately owned banking companies—whether measured by loan portfolio quality or earnings variability—is statistically indistinguishable. This finding casts doubt on the effectiveness of market discipline in limiting banks' portfolio risk. However, we do find that publicly held BHCs on average tend to hold significantly more capital than their private counterparts, providing some empirical support for proponents of market discipline in banking. The tendency of public BHCs to hold more capital also conforms with the agency theory.

The rest of our paper is organized as follows. Section 2 describes the data and provides summary statistics for the sample banking firms. In Section 3, we discuss the methodology and the empirical predictions under both the agency theory and the market discipline theory. Our empirical findings appear in Section 4.

2. DATA

To construct a sample of publicly traded and privately held banking firms, we begin with all BHCs that have filed Consolidated Financial Statements for Bank Holding Companies (FR Y-9C Reports) with the Federal Reserve from 1986 to 2001. Federal regulation requires all BHCs with total consolidated assets of \$150 million or more to file this report quarterly. To avoid double counting of multitiered BHCs, we retain only the top-tier ones. We then match these BHCs to their commercial bank subsidiaries that file Reports of Condition and Income (Call Reports) to determine the total banking assets controlled by each BHC. To ensure that our sample includes only BHCs that engage mainly in banking activities, we exclude those with more than 10 percent of assets in nonbanking subsidiaries. We control for the BHC's geographic location by using the Federal Reserve District in which the BHC is located and exclude all off-shore BHCs.

To control for the possibility of unusual performance due to de novo banking, bank failure, IPO, or takeover, we eliminate the first and last years of observations for each BHC that does not have a complete time series of data in either the public or the private samples.¹² Moreover, firms that report unusually low or unusually high operating costs per dollar of assets, defined as below the 5th percentile or above the 95th percentile, respectively, are also removed from the sample. These criteria yield a preliminary sample of 12,518 firm-years.

For the ownership variable, we distinguish between public and private ownership by whether a BHC issues publicly traded stock. Unlike prior studies, we do not use the fraction of managerial ownership to measure ownership structure because ownership data are generally unavailable for privately held banking companies.¹³ Moreover, our ownership variable is natural in testing the disciplining effects of having readily available market prices of publicly traded securities, the prerequisite for market discipline in banking.

To determine whether a BHC is publicly held in a certain year, we match the BHC data with the common stock data from the Center for Research in Security Prices (CRSP) by the name of the banking company. To confirm that a BHC's stock is the one identified in the CRSP data, we use the CUSIP number from CRSP to look up the total assets with the same CUSIP in Compustat and compare them with the reported total assets in the FR Y-9C Reports. This classification method assigns 3,313 observations to the public sample and 9,205 observations to the private sample.

In a comparison of the performance of publicly held BHCs with that of their privately held counterparts, an important dimension to control for is a possible scale effect, since publicly traded firms tend to be larger than privately held firms. Another reason for controlling for the size effect in the banking industry is that large money center or regional banks often have a different emphasis on their product and funding mix than do smaller community banks. Hence, when comparing the two types of firms, we want the two subsamples of publicly owned and privately held BHCs to be as homogenous as possible.

To control for firm size, we assign each sample observation a size quartile. Since public firms tend to be larger than private firms, firm size from the private sample is used to determine the cutoffs for each size class to ensure that for each size class public and private firms are comparable in size. Specifically, for each sample year, we first sort the total assets of all private BHCs. Firms with total assets at or above the 90th percentile are assigned Size Class 1, firms with total assets at or above the 75th percentile but below the 90th percentile are assigned Size Class 2, firms with total assets at or above the 50th percentile but below the 75th percentile are assigned Size Class 3, and firms with total assets below the 50th percentile are assigned Size Class 4. Based on the minimum and maximum total assets

of private BHCs in each size class at each year, we compare the total assets of each public BHC at each year with those size class cutoffs and assign public BHCs to size classes accordingly. The very large public BHCs whose total assets exceed the maximum total assets of private BHCs in Size Class 1 are eliminated from the sample. Hence, for each size class at each year, the largest BHC is always a private company. This practice is to ensure that our results are not driven by the very large publicly traded BHCs that are not directly comparable with those that are privately held.¹⁴ In addition, after all remaining public BHCs are assigned to each of the four size classes, we determine the smallest public BHC in Size Class 4 at each year. All private BHCs whose total assets are smaller than those of the smallest public BHC at each year are also eliminated from the sample. Again, this practice is to ensure that the results are not driven by the very small privately held BHCs that do not have directly comparable public counterparts. Dropping the very large public BHCs and the very small private BHCs from the sample reduces its size to 10,821 firm-years.

Table 1 provides descriptive statistics for the final sample, covering the entire period from 1986 to 2001. As expected, the number of observations for the public sample is skewed toward the larger size quartile, with 1,812 observations in the Size Class 1 public sample but only 986 in the private sample for that size class. The private sample has the exact opposite skew, with 3,091 observations in the private sample for Size Class 4 firms but only 149 observations in the public sample. Except for the largest size class, the mean and median total assets for

public and private firms are very similar, suggesting that these firms with different ownership structures are indeed comparable in size. In the largest size class, despite our effort to control for size differences, the mean and median public firms are almost twice as large as the average private firm. Nevertheless, we know that the largest firm in that size class is always a private firm in each of the sampling years.

3. EMPIRICAL STRATEGY

To compare the performance of public and private BHCs, we focus on three areas: profitability, operating efficiency, and risk taking. All three performance dimensions are measured by accounting variables. Profitability is measured by return on assets (ROA), which is defined as net income after tax divided by end-of-year total assets. Operating efficiency is measured by the ratio of total operating costs, including labor, occupancy, and equipment expenses, to total assets (OPCOST). Risk taking is measured in three ways. The first is the ratio of bad loans, including both past due loans and nonaccrual loans, to total loans (BADLOAN). The second is earnings variability, which is the standard deviation of ROA using quarterly observations (SDROA).¹⁵ The third is capitalization, which is the ratio of equity capital, including preferred stock, common stock, and retained earnings, to total assets (CAPITAL). Both BADLOAN and SDROA capture the amount of asset risk in a banking firm's portfolio. CAPITAL measures the ability of the banking firm to absorb losses. Firms with more capital are considered less risky, *ceteris paribus*. ROA, OPCOST, BADLOAN, SDROA, and CAPITAL are all expressed in percent.

Bivariate analysis is conducted to compare the performance of public and private BHCs. In essence, we compare the distribution of each accounting measure of performance between publicly owned and privately held BHCs using the nonparametric Wilcoxon Rank Sum test separately for each size class.¹⁶ The Z-statistic for the Wilcoxon Rank Sum test is approximately normally distributed under the null hypothesis that the private sample and the public sample have the same distribution. This test statistic is calculated for the smaller sample size of the subject samples, that is, the private sample for Size Class 1 firms and the public sample for Size Class 2, 3, and 4 firms. For robustness, we also break down the sample period into three subperiods: 1986-90, 1991-95, and 1996-2001.

The first subperiod was characterized by tremendous difficulties in the banking industry. The banking sector was suffering from the worst crisis since the Great Depression; the

TABLE 1
Descriptive Statistics, 1986-2001

Size Class	Public BHCs		Private BHCs	
	Mean (Median)	Number of Observations	Mean (Median)	Number of Observations
1	2,145.4 (1,491.3)	1,812	1,118.9 (778.0)	986
2	451.3 (442.6)	520	420.8 (413.1)	1,471
3	293.3 (290.6)	347	270.8 (267.1)	2,445
4	197.3 (201.1)	149	188.0 (187.5)	3,091

Source: Author's calculations, based on data from Federal Reserve FR Y-9C Reports.

Notes: The table presents the mean and median total assets of the sample of publicly owned and privately held bank holding companies (BHCs), in millions of dollars, by ownership status and size class. Size Class 1 contains the largest firms.

total number of bank failures exceeded 200 in both 1987 and 1989 and peaked at 279 in 1988. During the second subperiod, the banking industry was gradually coming out of the crisis while the economy was recovering from the recession after the first Gulf War. Accordingly, the banking sector was stabilizing and returning to profitability. The last subperiod was marked by a fast-growing economy and financial market booms; profitability of banking firms soared to a record level while asset quality improved markedly. Those were the banner years of the banking industry.

The agency theory predicts that publicly traded BHCs will tend to be less profitable, less efficient, and less risky than comparable privately held institutions. According to the market discipline theory, for market discipline to have an effect, publicly traded BHCs that constantly signal their financial well-being to market participants through their stock prices must be less risky, on net, than their privately held counterparts that do not emit such signals.

4. EMPIRICAL FINDINGS

4.1 Profitability

A bivariate comparison of ROA between public and private BHCs is offered in Table 2. For the firms in the two larger size classes, the average privately held BHC in general has a higher ROA than the average publicly held BHC for both the overall period and the three subperiods, but the differences are not statistically significant. The only exception is in subperiod 1986-90 for firms in Size Class 2: both the mean and the median ROAs for the public sample are higher than they are for the private sample, and the differences are marginally significant. For the firms in the two smaller size classes (3 and 4), the mean and the median ROAs of privately held BHCs are significantly higher than those of public BHCs. For Size Class 3 firms, the results are robust with respect to the two later subperiods; for Size Class 4 firms, the comparisons are robust with respect to all three subperiods. The findings in Table 2 indicate that for larger firms, publicly owned and privately held BHCs are about equally profitable. However, for smaller BHCs, privately held firms are significantly more profitable than publicly traded companies, averaging between 15 and 30 basis points in ROA.

TABLE 2
Bivariate Comparison of Profitability

Size Class	Sample Period	Public BHCs, Mean (Median)	Private BHCs, Mean (Median)	Wilcoxon Z (p-Value)
1	1986-2001	0.93 (1.01)	1.01 (1.02)	0.4784 (0.6324)
	1986-90	0.71 (0.89)	0.74 (0.81)	-0.9855 (0.3244)
	1991-95	0.98 (1.07)	1.00 (1.05)	-0.2312 (0.8172)
	1996-2001	1.09 (1.10)	1.20 (1.08)	-0.3248 (0.7453)
2	1986-2001	0.97 (0.99)	0.98 (1.03)	-0.3522 (0.7247)
	1986-90	0.92 (0.89)	0.75 (0.86)	1.8566* (0.0634)
	1991-95	0.88 (0.97)	0.99 (1.05)	-1.5066 (0.1319)
	1996-2001	1.05 (1.04)	1.12 (1.09)	-1.1584 (0.2467)
3	1986-2001	0.83 (0.95)	0.95 (1.00)	-2.3744** (0.0176)
	1986-90	0.66 (0.93)	0.72 (0.82)	0.4660 (0.6412)
	1991-95	0.69 (0.89)	0.95 (1.01)	-2.7782*** (0.0055)
	1996-2001	0.97 (0.98)	1.10 (1.09)	-3.2390*** (0.0012)
4	1986-2001	0.69 (0.93)	0.98 (1.03)	-4.3651*** (<0.0001)
	1986-90	0.26 (0.29)	0.55 (0.70)	-2.0067** (0.0448)
	1991-95	0.46 (0.81)	1.00 (1.04)	-3.5472*** (0.0004)
	1996-2001	0.92 (0.99)	1.15 (1.12)	-4.0366*** (<0.0001)

Source: Author's calculations, based on data from Federal Reserve FR Y-9C Reports.

Notes: The table reports the mean and median return on assets, in percent, of publicly owned and privately held bank holding companies (BHCs), by size class and sample period. The Wilcoxon Rank Sum statistic, Z, is calculated for the smaller sample, that is, the private sample for Size Class 1 and the public sample for Size Class 2, 3, and 4. Size Class 1 contains the largest firms.

*Statistically significant at the 10 percent level.

**Statistically significant at the 5 percent level.

***Statistically significant at the 1 percent level.

4.2 Operating Efficiency

Table 3 presents a bivariate comparison of operating efficiency between public and private BHCs. Except for Size Class 1 firms,

TABLE 3
Bivariate Comparison of Operating Efficiency

Size Class	Sample Period	Public BHCs, Mean (Median)	Private BHCs, Mean (Median)	Wilcoxon Z (p-Value)
1	1986-2001	2.09 (2.07)	2.15 (2.04)	-0.7419 (0.4582)
	1986-90	2.19 (2.18)	2.22 (2.12)	-0.7484 (0.4542)
	1991-95	2.11 (2.11)	2.09 (2.04)	-1.4483 (0.1475)
	1996-2001	1.98 (1.95)	2.15 (2.00)	1.8501* (0.0643)
2	1986-2001	2.20 (2.11)	2.09 (1.99)	4.3945*** (<0.0001)
	1986-90	2.51 (2.28)	2.11 (2.01)	5.5106*** (<0.0001)
	1991-95	2.24 (2.19)	2.11 (1.97)	3.8594*** (0.0001)
	1996-2001	2.02 (2.00)	2.07 (1.99)	-0.5149 (0.6066)
3	1986-2001	2.30 (2.15)	2.08 (2.01)	5.9056*** (<0.0001)
	1986-90	2.65 (2.46)	2.18 (2.07)	4.2172*** (<0.0001)
	1991-95	2.37 (2.27)	2.04 (2.00)	5.4375*** (<0.0001)
	1996-2001	2.14 (2.05)	2.04 (2.00)	2.1472** (0.0318)
4	1986-2001	2.42 (2.19)	2.08 (2.01)	5.9383*** (<0.0001)
	1986-90	3.16 (3.17)	2.17 (2.06)	5.9293*** (<0.0001)
	1991-95	2.60 (2.36)	2.03 (1.98)	5.1012*** (<0.0001)
	1996-2001	2.15 (2.10)	2.07 (1.99)	1.5236 (0.1276)

Source: Author's calculations, based on data from Federal Reserve FR Y-9C Reports.

Notes: The table reports the mean and median ratio of total operating costs to total assets, in percent, of publicly owned and privately held bank holding companies (BHCs), by size class and sample period. The Wilcoxon Rank Sum statistic, Z, is calculated for the smaller sample, that is, the private sample for Size Class 1 and the public sample for Size Class 2, 3, and 4. Size Class 1 contains the largest firms.

*Statistically significant at the 10 percent level.

**Statistically significant at the 5 percent level.

***Statistically significant at the 1 percent level.

strong evidence of higher operating costs per dollar of assets among publicly owned companies is found, and the Wilcoxon Z-statistic is significant at the 1 percent level for all three size classes. The results are also fairly robust with respect to subperiods. For the overall period, the differences in mean operating costs between public and private BHCs are 11 basis points for Size Class 2 firms, 22 basis points for Size Class 3 firms, and 34 basis points for Size Class 4 firms. Note that the difference in mean operating costs narrows as firm size increases. For Size Class 1 firms, there is some evidence that privately held BHCs incurred higher operating costs than public BHCs did during the 1996-2001 subperiod, but the difference is only marginally significant. Results in Table 3 reveal that except for the large banking firms, publicly traded BHCs tend to be less efficient than privately owned banking companies.

4.3 Risk Taking

Our bivariate comparison of the first measure of risk taking, BADLOAN, can be found in Table 4. Only BHCs in Size Class 2 exhibit a significantly different bad loan ratio between private and public firms for the full sample period. The finding that private BHCs in Size Class 2 have significantly more bad loans than do public BHCs appears to be driven by the last subperiod, 1996-2001. No significant difference is found in the other two subperiods. For Size Class 1 firms, although privately held BHCs have more bad loans than do public BHCs during the 1986-90 subperiod, the result is only marginally significant and the relationship reverses course during the 1991-95 subperiod. For Size Class 3 firms, not only are public BHCs less profitable than privately owned BHCs, they also have significantly more bad loans than their private counterparts do during the 1991-95 subperiod. Overall, the findings in Table 4 do not seem to exhibit a strong pattern in loan quality differences between public and private banking firms.

Table 5 offers a bivariate comparison of the second measure of risk taking, earnings volatility, between public and private firms. For the full sample period, the standard deviation of ROA is similar between public and private BHCs, and none of the full period comparison is significant. For the subperiod analysis, privately held BHCs are found to have significantly higher earnings volatility in one of the three subperiods for Size Class 1 and 2 firms, while publicly owned BHCs are found to have significantly higher earnings volatility in one of the three subperiods for Size Class 3 and 4 firms. As in the analysis of BADLOAN, overall the bivariate comparison of earnings volatility does not reveal any significant pattern across the two types of banking firms. For robustness, we also compute the

TABLE 4
Bivariate Comparison of Loan Quality

Size Class	Sample Period	Public BHCs, Mean (Median)	Private BHCs, Mean (Median)	Wilcoxon Z (p-Value)
1	1986-2001	1.35 (0.89)	1.33 (0.90)	-1.2753 (0.2022)
	1986-90	1.91 (1.34)	2.15 (1.54)	1.7618* (0.0781)
	1991-95	1.45 (0.98)	1.27 (0.88)	-2.1233** (0.0337)
	1996-2001	0.76 (0.66)	0.84 (0.65)	0.2646 (0.7913)
2	1986-2001	1.22 (0.77)	1.29 (0.89)	-2.1057** (0.0352)
	1986-90	1.62 (1.39)	1.99 (1.37)	-1.0198 (0.3078)
	1991-95	1.62 (0.90)	1.27 (0.96)	0.3824 (0.7022)
	1996-2001	0.78 (0.56)	0.86 (0.65)	-2.0907** (0.0366)
3	1986-2001	1.50 (0.91)	1.39 (0.89)	0.3810 (0.7032)
	1986-90	2.32 (1.89)	2.17 (1.61)	0.7730 (0.4395)
	1991-95	2.06 (1.32)	1.46 (0.96)	3.0214*** (0.0025)
	1996-2001	0.90 (0.66)	0.85 (0.67)	-0.2192 (0.8265)
4	1986-2001	1.27 (0.81)	1.34 (0.85)	-0.3877 (0.6982)
	1986-90	2.18 (1.14)	2.45 (1.85)	-1.6348 (0.1021)
	1991-95	1.50 (0.83)	1.33 (0.85)	0.4386 (0.6610)
	1996-2001	0.93 (0.72)	0.87 (0.65)	1.0357 (0.3004)

Source: Author's calculations, based on data from Federal Reserve FR Y-9C Reports.

Notes: The table reports the mean and median ratio of past due and non-accrual loans to total assets, in percent, of publicly owned and privately held bank holding companies (BHCs), by size class and sample period. The Wilcoxon Rank Sum statistic, Z, is calculated for the smaller sample, that is, the private sample for Size Class 1 and the public sample for Size Class 2, 3, and 4. Size Class 1 contains the largest firms.

*Statistically significant at the 10 percent level.

**Statistically significant at the 5 percent level.

***Statistically significant at the 1 percent level.

TABLE 5
Bivariate Comparison of Earnings Volatility

Size Class	Sample Period	Public BHCs, Mean (Median)	Private BHCs, Mean (Median)	Wilcoxon Z (p-Value)
1	1986-2001	0.12 (0.08)	0.11 (0.08)	-0.0606 (0.9517)
	1986-90	0.12 (0.06)	0.13 (0.07)	0.3260 (0.7444)
	1991-95	0.09 (0.05)	0.08 (0.07)	1.7437* (0.0812)
	1996-2001	0.07 (0.04)	0.07 (0.05)	0.9152 (0.3601)
2	1986-2001	0.16 (0.06)	0.14 (0.08)	-0.1809 (0.8564)
	1986-90	0.09 (0.06)	0.11 (0.06)	0.1998 (0.8417)
	1991-95	0.16 (0.07)	0.10 (0.07)	0.4924 (0.6224)
	1996-2001	0.06 (0.04)	0.08 (0.07)	-2.1743** (0.0297)
3	1986-2001	0.18 (0.19)	0.16 (0.08)	1.6025 (0.1090)
	1986-90	0.12 (0.11)	0.13 (0.08)	0.9408 (0.3468)
	1991-95	0.17 (0.11)	0.10 (0.07)	1.8215* (0.0685)
	1996-2001	0.09 (0.07)	0.07 (0.06)	0.4921 (0.6227)
4	1986-2001	0.22 (0.07)	0.09 (0.06)	0.7006 (0.4835)
	1986-90	0.27 (0.27)	0.14 (0.09)	1.8263* (0.0678)
	1991-95	0.24 (0.10)	0.10 (0.08)	1.3148 (0.1886)
	1996-2001	0.06 (0.05)	0.08 (0.06)	-0.8914 (0.3727)

Source: Author's calculations, based on data from Federal Reserve FR Y-9C Reports.

Notes: The table reports the mean and median standard deviation of return on assets, in percent, of publicly owned and privately held bank holding companies (BHCs), by size class and sample period. The Wilcoxon Rank Sum statistic, Z, is calculated for the smaller sample, that is, the private sample for Size Class 1 and the public sample for Size Class 2, 3, and 4. Size Class 1 contains the largest firms.

*Statistically significant at the 10 percent level.

**Statistically significant at the 5 percent level.

***Statistically significant at the 1 percent level.

ROA and its standard deviation by replacing the net income with the less volatile operating earnings before tax and extraordinary items. Qualitatively similar results are found with the alternative measure of ROA.

TABLE 6
Bivariate Comparison of Capitalization

Size Class	Sample Period	Public BHCs, Mean (Median)	Private BHCs, Mean (Median)	Wilcoxon Z (p-Value)
1	1986-2001	8.05 (7.94)	8.06 (7.85)	-1.1412 (0.2538)
	1986-90	7.10 (7.00)	7.07 (6.88)	-0.9595 (0.3373)
	1991-95	8.51 (8.49)	7.99 (7.85)	-5.0450*** (<0.0001)
	1996-2001	8.60 (8.45)	8.74 (8.57)	0.3040 (0.7611)
2	1986-2001	8.53 (8.43)	8.44 (8.27)	1.2770 (0.2016)
	1986-90	7.47 (7.41)	7.54 (7.30)	-0.3362 (0.7367)
	1991-95	8.66 (8.60)	8.37 (8.14)	1.6947* (0.0901)
	1996-2001	9.02 (8.98)	9.08 (8.91)	0.0398 (0.9682)
3	1986-2001	8.61 (8.69)	8.22 (8.07)	4.2188*** (<0.0001)
	1986-90	7.81 (7.59)	7.24 (7.22)	1.4387 (0.1502)
	1991-95	8.33 (8.57)	8.14 (8.01)	1.5663 (0.1173)
	1996-2001	9.04 (8.90)	8.89 (8.66)	1.5918 (0.1114)
4	1986-2001	9.06 (8.88)	8.57 (8.44)	2.0541** (0.0400)
	1986-90	8.83 (7.54)	6.99 (6.83)	2.5409** (0.0111)
	1991-95	7.98 (7.91)	8.27 (8.16)	-0.5286 (0.5971)
	1996-2001	9.71 (9.24)	9.47 (9.32)	0.4782 (0.6325)

Source: Author's calculations, based on data from Federal Reserve FR Y-9C Reports.

Notes: The table reports the mean and median capital-to-asset ratio, in percent, of publicly owned and privately held bank holding companies (BHCs), by size class and sample period. The Wilcoxon Rank Sum statistic, Z, is calculated for the smaller sample, that is, the private sample for Size Class 1 and the public sample for Size Class 2, 3, and 4. Size Class 1 contains the largest firms.

*Statistically significant at the 10 percent level.

**Statistically significant at the 5 percent level.

***Statistically significant at the 1 percent level.

Finally, a comparison of the third dimension of risk, capitalization, is presented in Table 6. For smaller banking firms in Size Class 3 and 4, publicly owned BHCs tend to hold significantly more capital than do privately held BHCs, averaging about 40 to 50 basis points. Although these publicly held BHCs are also found to hold more capital than private BHCs hold during the subperiods, the difference is significant only in the first subperiod for Size Class 4 firms. In the 1991-95 subperiod, publicly owned BHCs in the two larger size quartiles, Size Class 1 and 2, are also found to have significantly more capital than privately held BHCs, averaging about 50 and 30 basis points, respectively. Overall, the bivariate results suggest that publicly held BHCs tend to hold more capital than privately held BHCs, on the order of about 40 to 50 basis points on average, when the average capital-to-asset ratio in the banking industry is about 8 to 9 percent.

5. SUMMARY AND CONCLUSIONS

This paper conducts a straightforward test of the agency theory and the market discipline theory by comparing the performance of a large sample of publicly owned and privately held firms in the rather homogenous banking industry. The three areas of performance analyzed are profitability, operating efficiency, and risk taking. We find that smaller publicly owned BHCs tend to be less profitable than similar sized privately held BHCs, on the order of 15 to 30 basis points when the return on assets averages about 1 percentage point. The results are robust with respect to sample period. Because these smaller publicly owned BHCs are also found to hold more capital than privately held BHCs hold, the difference in return on equity would be more pronounced. One source of lower profitability among publicly owned banking companies is their operating inefficiency, as the operating costs in public BHCs are found to be significantly higher on average than those in private BHCs, on the order of 10 to 30 basis points of operating costs per dollar of assets. BHCs in the smallest size class that exhibit the greatest difference in return on assets are also found to have the greatest difference in operating costs, bolstering the link between profitability and operating efficiency.

Loan quality or earnings variability are comparable across public and private BHCs. However, publicly owned BHCs are found to hold significantly more capital than their private counterparts hold, averaging about 40 to 50 basis points more among the smaller BHCs, while the capital ratio averages about 8 to 9 percentage points in the banking industry.

The results are consistent with the theory that separating ownership from control can lead to shirking and perquisite

consumption by management, thereby compromising operating efficiency and profitability. The agency theory prediction of less risk taking by publicly traded BHCs is also partially borne out by the data, as evidenced by the tendency of these BHCs to hold significantly more capital.

While providing support for the agency theory, our evidence is somewhat mixed on the market discipline theory. In terms of portfolio risk, the availability of constant market signals for publicly traded BHCs hardly leads to any detectable differences in loan portfolio quality or earnings variability compared with that of otherwise similar privately held firms.

Public BHCs do hold significantly more capital. Since capital is the ultimate buffer against bank failure, this by itself may be sufficient to argue for leveraging market forces to enhance the safety and soundness of the banking system.

Finally, in advocating the use of market discipline in banking, it is helpful to know what the market can and cannot do. Specifically, having a market signal is no panacea for limiting bank asset risk. Moreover, the agency costs of public ownership, in terms of both profitability and efficiency, should not be overlooked.

ENDNOTES

1. See, for example, Morck, Shleifer, and Vishny (1988).
2. See, for example, Holthausen and Larcker (1996), Jain and Kini (1994), and Mikkelson, Partch, and Shah (1997).
3. Hereafter, the term “bank” refers to a bank holding company.
4. In this paper, the ownership structure is proxied by whether a firm is publicly traded. The ownership proxy is discussed fully in Section 2.
5. One may still argue that ownership structure may be endogenous in portfolio composition. However, absent any convincing arguments in support of this, we assume here that ownership structure is not determined by portfolio characteristics.
6. Using a sample of large, publicly traded banking firms, Houston and James (1995) find that bank CEOs tend to receive less cash compensation, are less likely to participate in a stock option plan, hold fewer stock options, and receive a smaller percentage of their total compensation in the form of options and stock than do CEOs in other industries. However, the differences in compensation between publicly traded and privately held banks are less clear.
7. In this paper, we assume that the reduction of bank risk taking is socially desirable because of the externalities associated with bank failures.
8. Bank for International Settlements (2003).
9. The presence of a public market signal may lead a publicly traded BHC to take less risk at the margin. However, for market discipline to be considered successful in reducing bank risk taking, the overall risk of a publicly traded BHC must be less than the overall risk of an otherwise similar privately held BHC.
10. For details, see the survey paper by Flannery (1998).
11. Note that stockholders and bondholders may have different incentives for bank risk taking, due to their different claims on the bank. However, in this paper, market discipline works through the signals in both stock and bond prices to other market participants (that trade with the bank) and regulators—so the source of the market signal does not really matter.
12. Admittedly, this procedure eliminates only the short-term abnormalities in firm performance.
13. Studying a sample of IPO firms, Mikkelson, Partch, and Shah (1997) report that the median ownership stake of officers and directors in privately held companies is 68 percent, compared with a median stake of 18 percent in publicly traded companies.
14. Although the exclusion of very large publicly traded BHCs from the sample is an empirical necessity, it limits the analysis of market discipline on large banking firms. Market discipline of very large banking firms may be of particular importance because of the potential systemic implications of large bank failures.
15. To calculate the SDROA, we require firms with an incomplete time series of data to have at least twelve quarters of data for the full sample period and eight quarters of data for the subperiod. Otherwise, no SDROA is computed for these firms.
16. Results of the multivariate analysis are qualitatively similar and are presented in Kwan (2003).

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