

Tax Planning, Regulatory Capital Planning, and Financial Reporting Strategy for Commercial Banks

Myron S. Scholes
Stanford University

G. Peter Wilson
Harvard University

Mark A. Wolfson
Stanford University

We test whether banks' investment and financing policies can be explained by tax status. We document changes in bank holdings of municipal bonds in response to changes in tax rules relating to deductibility of interest expense. We also document an association between banks' marginal tax rates and their investment and financing decisions, which is consistent with the existence of tax clienteles. However, banks do not sort themselves perfectly into investment and financing clienteles because of adjustment costs. We posit specific types of transaction-cost impediments to tax planning, and document that banks apparently trade off these costs against tax-planning benefits.

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In this article we examine both how the banking industry responds to changes in tax rules that affect the entire industry and how individual banks respond to changes in their own tax-paying status. The latter study of individual banks allows us to assess the substitutability of various investment and financing strategies and to measure the degree of adjustment to changes in tax status.

We find strong evidence that proposed and actual changes in the taxation of municipal bonds held by banks during the 1980s caused the banks to adjust their holding of these securities. We also show that individual banks changed their economic balance sheets as their tax-paying status changed, but find that they did not adjust investment and financing decisions instantaneously or to the extent they would have if there had been no adjustment costs.

By studying individual bank behavior, we are able to measure trade-offs between tax and nontax costs. By measuring the tax benefits that would have resulted from particular strategies that were *not* undertaken, a lower-bound estimate of the perceived nontax *cost* of implementing these strategies is obtained.¹ We find that banks with low levels of regulatory capital voluntarily pay substantial taxes as the result of realizing securities gains to increase book income and bolster regulatory capital. The realization of securities gains (or the postponement of securities losses) increases book regulatory capital, which regulators monitor. This enhances the ability of banks to garner deposits at the low rate of interest made possible by the Federal guarantee offered to depositors and to avoid regulatory intervention into their other investment and financing strategies.

We select the commercial banking industry not because banks are prototypical taxpayers, but because in this industry there are data on a large number of firms that are relatively homogeneous in their investment activities and financing methods. This allows us to develop tests of the trade-offs between tax minimization and nontax costs, and to estimate the relation between banks' propensities to realize losses on their holdings of marketable securities and their tax-paying status. Moreover, banks (along with other financial institutions) have enjoyed a variety of special tax provisions that are important to the design of our tests. Finally, we can identify changes in tax policy aimed specifically at banks, which permits us to test how the entire industry responds to a change in tax legislation.

In Section 1, we motivate and present results relating to banks' holdings of municipal bonds. As predicted, we find strong evidence of a decrease in municipal bond holdings during calendar quarters in which tax legislation discouraged such investments, and an increase

¹ This assumes that the firm's management is aware of the available tax benefits.

in holdings during calendar quarters in which legislative developments encouraged such investments.

In Section 2, we test whether differences in tax-paying status across banks give rise to investment and financing clienteles. We find that banks with net operating losses take fewer long positions in tax-favored assets (municipal bonds and direct lease assets) and more short positions in tax-favored assets (preferred stock and common stock) than do tax-paying banks.

Our sample includes many banks with net-operating-loss carryforwards, and this suggests the importance of nontax costs of restructuring for banks, even though bank balance sheets would seem less costly to restructure than the balance sheets of industrial corporations (since most bank assets and liabilities consist of financial instruments). Moreover, the nontax costs are not simply direct costs to buy and sell assets, since many tax-paying banks do not sell marketable securities to realize ordinary tax losses despite low transaction costs.

In Section 3, we develop and test a simple model in which banks trade off the tax advantages of realizing securities losses against the costs of reporting reduced regulatory capital and financial reporting income. We find that banks make this trade-off in the predicted manner, acting as though nominal book values are important both to regulators (in their consideration of whether to impose constraints on bank management) as well as to shareholders. This evidence indicates that efficient tax planning may be very different from simple tax minimization.

1. The Relation Between Changes in Tax Rules and Investment Decisions

The U.S. tax code precludes a deduction for interest expense incurred on debt used to purchase or carry tax-exempt bonds. The one exception, throughout our sample period, was for banks.^{2,3} As a result, banks have invested very heavily in the municipal bond market.⁴ Prior to 1983, banks could deduct all interest incurred to finance municipal bonds.⁵ Between 1983 and 1987, however, Congress passed three laws

² The bank exception was challenged by the Treasury Department prior to our sample period. For a discussion of this and the resulting stock market response, see Madeo and Pincus (1985).

³ Although banks represent the only explicit exception to the nondeductibility of interest to purchase or carry municipal bonds, property-casualty insurance companies implicitly have had similar opportunities. Moreover, unlike banks, their ability to deduct interest to carry municipal bonds continues beyond the passage of the 1986 Tax Act to a substantial extent.

⁴ At year-end 1985, 10 percent of commercial bank assets were invested in municipal bonds, and banks held over 30 percent of all municipal securities outstanding (Salomon Brothers, 1986).

⁵ Interest expense incurred in connection with holding municipal bonds is determined by allocating total interest expense to specific assets in proportion to their book values.

Table 1
Legislative events relating to the deductibility of interest incurred to carry municipal bond investments

Time period	Predicted effect on municipal bond holdings	Legislative event
(1) First quarter 1983	—	Deductibility of interest expense allocated to municipal bonds acquired after 12/31/82 was reduced from 100% to 85%
(2) First quarter 1985	—	Deductibility of interest expense allocated to municipal bonds acquired after 12/31/82 was reduced further from 85% to 80%
(3) Fourth quarter 1985	+	Proposal to eliminate the deductibility of <i>all</i> interest expense allocated to municipal bonds acquired after 12/31/85
(4) First quarter 1986	—	Congressional defeat of the proposal described in (3) above
(5) Fourth quarter 1986	—	Elimination of the deductibility of <i>all</i> interest expense allocated to municipal bonds acquired after 8/7/86

that gradually reduced this deduction from 100 percent to 0 percent of the interest incurred to finance *new acquisitions* of municipal bonds. The 1982 Tax Act reduced the deduction to 85 percent of the interest associated with bonds acquired after 1982 but grandfathered a 100 percent deduction for bonds acquired before 1983. Similarly, the 1984 Tax Act reduced the deduction to 80 percent of the interest associated with bonds acquired after 1984 but grandfathered the historical deduction rates for bonds acquired before 1985. Finally, with the exception of interest on debt issued by "small municipalities" (entities issuing less than \$10 million of debt), the 1986 Tax Act eliminated the deduction of interest incurred to finance municipal bonds acquired after August 7, 1986, but grandfathered historical deduction rates for bonds acquired earlier.⁶

Near year-end 1985, a legislative proposal was introduced that, if passed, would have precluded any interest deductions incurred in connection with holdings of municipal bonds acquired after December 31, 1985. Although this proposal was never enacted, our empirical analysis considers whether banks responded to this proposal and to its congressional defeat in the first quarter of 1986. These legislative events are summarized in Table 1.

These tax changes lead us to expect that banks reduced their concentration in municipal bonds during the first quarters of 1983 and

⁶ Under certain circumstances, a portion of municipal bond interest income is a preference item for purposes of calculating the alternative minimum tax. In addition, if municipal bonds are issued (after 1986) for a "nongovernmental purpose," *all* of the interest is a tax preference item that is subject to the alternative minimum tax. The alternative minimum tax rate is 20 percent for corporations and 21 percent for individuals.

Table 2
Association of changes in municipal bond investment mix with legislative events

Event period	Direction of the expected change in the muni mix	Actual change in the muni mix ¹ %	Number of standard deviations from the sample mean ²	Probability of an observation this extreme occurring by chance ³
First quarter 1983	—	—3.52	—3.66	<.001
First quarter 1985	—	—2.15	—2.12	.020
Fourth quarter 1985	+	+6.36	+7.44	<.001
First quarter 1986	—	—1.65	—1.56	.060
Fourth quarter 1986	—	—3.59	—3.74	<.001
First quarter 1987	—	—2.71	—2.75	<.010

¹ Relative to an average muni mix of 43 percent from the first quarter of 1976 through the first quarter of 1987.

² The sample mean is —0.23 percent/quarter over the 38 nonevent quarters beginning with the first quarter of 1976.

³ This assumes a *t*-distribution; the sample distribution does appear to be normally distributed.

1985, increased the level of their municipal bond investment at year-end 1985, and reduced it in both the first and fourth quarters of 1986 as well as all quarters in 1987 and beyond. In Table 2 we report the average percentage of bank marketable securities portfolios invested in municipal bonds ("muni mix") at the end of each quarter from the beginning of 1976 through the first quarter of 1987 for the 150 firms on the quarterly *Bank Compustat* tape.⁷

In addition to the six "treatment" quarters listed in Table 1 (including the first quarter of 1987), there are 38 quarterly percentage changes in the average muni mix. Over these nontreatment quarters, the average muni mix is 43 percent, the average change in muni mix is —0.26 percent, and the standard deviation in the quarterly change in muni mix is 0.89 percent. In only one of these 38 quarters did the change in muni mix exceed 2 percent in absolute value.

Table 2 provides clear evidence that bank asset management policies are influenced by taxes. For all six of the treatment quarters, the muni mix changed in the direction predicted, and these differences are highly significant. The weakest of the results is for the first quarter of 1986 (testing for a reversal of an expected buildup in the muni mix during the fourth quarter of 1985), although even here, the change could have occurred by chance only six times in 100. Moreover, the muni mix in the second quarter of 1986 declined 2.18 percent. If this were treated as an event quarter (as a continuation of the reversal of

⁷ If banks are the marginal holders of municipal bonds, changes in tax laws could affect bond prices to such a degree that bank holdings in these securities would be unaffected. Had we not found the strong effects that we did, we would have looked more carefully at bond prices.

the buildup from the fourth quarter of 1985), the decline would be significant at the 3 percent level.

The results in Table 2 do not control for the changing aggregate supply of municipal bonds in the market. For example, there was an unprecedented increase in the net supply of municipal bonds during the fourth quarter of 1985. To the extent that this is unrelated to a change in bank tax legislation, it could bias our test results. To guard against this possibility, we obtained quarterly data from 1975-1 through 1987-1 on the aggregate change in supply of municipal bonds and the change in the amount of municipal bonds held by banks.⁸ More precisely, both the aggregate and bank data are "seasonally adjusted annual rates of net flows for tax-exempt obligations," as published in the *Flow of Funds Accounts* by the Federal Reserve Board of Governors. For the 43 nonevent quarters during this period, we relate the change in bank holdings of municipal bonds to the change in aggregate supply in the market to calibrate banks' normal share of aggregate supply changes.

A simple regression reveals that banks have increased their ownership of municipal bonds by about \$0.5 billion per quarter plus 16.5 percent of the aggregate change in supply of municipal bonds.⁹ Using this prediction model, we generate standardized residual changes in bank holdings of municipal bonds for each of our six event quarters. That is, the residual difference between the actual net change in muni holdings and the predicted net change is standardized by dividing by its standard error.¹⁰ The results in Table 3 are even more striking than those reported in Table 2. The smallest of the absolute values of the standardized residuals for the event quarter is equal to 2.69. Notably, the standardized residual for 1986-1, the one event quarter exhibiting only marginally statistically significant behavior in Table 2 (where there is no correction for changes in aggregate supply), is -7.98.¹¹

Bank holdings of municipal bonds have continued to decline beyond the first quarter of 1987. According to the Federal Reserve Statistics, commercial bank holdings of tax-exempt securities declined by \$31

⁸ In contrast to the results reported in Table 2, the results in Table 3 are based on changes in aggregate bank holdings of municipal bonds rather than changes in the average mix of municipal bonds in banks' investment portfolios. Also, the Compustat banks, used earlier, are a subset of the banks included in the Federal Reserve Board's calculations, and the sample period here is slightly longer.

⁹ The slope coefficient has a *t*-value of 4.6, and the regression exhibits an adjusted R^2 of 34 percent.

¹⁰ The standard error for the *p*th residual is the square root of $[s^2(1 + x_p'(X'X)^{-1}x_p)]$, where s^2 is the usual estimate for the variance of the regression's error term, $x_p' = [1, \text{aggregate supply for observation } p]$, and X is the sample design matrix.

¹¹ The standardized residual for 1986-2 is -2.73. Moreover, the results are qualitatively unaffected if our prediction estimates are based exclusively on data for the period 1975-1981.

Table 3
Association of changes in bank municipal bond holdings with legislative events,
controlling for changes in aggregate supply

Event period	Direction of expected change	Net change in muni supply (\$billion, annualized)			Standardized difference ²
		Actual		Predicted	
		Aggregate	Banks only	For banks ¹	
First quarter 1983	—	50.5	—10.5	10.4	—3.12 ³
First quarter 1985	—	59.6	—6.2	11.9	—2.69 ³
Fourth quarter 1985	+	378.6	184.3	64.5	8.59 ³
First quarter 1986	—	—15.5	—56.1	—0.5	—7.98 ³
Fourth quarter 1986	—	20.7	—69.7	5.4	—11.20 ³
First quarter 1987	—	55.5	—7.5	11.2	—2.78 ³

¹ The predicted change in holdings from the regression of bank holdings on change in aggregate supply. Prediction is \$0.5 billion plus 0.165 times the change in aggregate supply. The *t*-statistic on the slope coefficient of 0.165 is 4.6.

² The difference between the actual and predicted change in bank holdings divided by its standard error as defined in note 10.

³ Significant at $\leq .001$, one-tailed test.

⁴ Significant at $\leq .005$, one-tailed test.

billion in 1987, and by an additional \$13 billion during the first half of 1988 after increasing by \$18 billion per year from 1980–1985. Collectively, this evidence indicates substantial industry-wide responsiveness of bank holdings of municipal bonds to legislative changes that alter tax clienteles.

2. The Relation Between Marginal Tax Rates and Asset Allocations and Capital Structures

We turn now to investigate whether individual banks alter their investment and financing decisions in response to changes in their marginal tax rates. Specifically, we examine the cross-sectional association between tax status and balance-sheet composition.

On the assets side of the balance sheet, we investigate how banks change their holdings of municipal bonds and direct leases as their tax status changes (from being a taxpayer to generating net-operating-loss carryforwards or vice versa). Like municipal bonds, direct leases are highly tax-favored (as a result of accelerated depreciation and investment tax credits). Competition for the right to receive such benefits will naturally result in such assets bearing implicit tax through reduced rental rates charged to lessees. Consequently, these assets should be less attractive to firms with tax-loss carryforwards.

On the equities side of the balance sheet, the choice among capital notes, preferred stock, and common stock as a means of financing should also be a function of the marginal tax rate of the issuer. Preferred stock and common stock pay dividends that were 85 percent

tax exempt to most corporate investors during 1980–1985, and 80 percent tax exempt during 1986.¹² Since corporations are the dominant holders of preferred stock, the pretax cost of debt is substantially higher (on the order of 25 percent higher during the mid 1980s) than that of equally risky preferred stock.

Common stocks offered investors a second component of tax-favored returns relative to the return on capital notes during the period covered in this study. The capital gains earned on common stocks were not only tax deferred, they were also taxed at favorable rates. Since capital notes give rise to interest that is tax deductible, whereas common and preferred stock do not, we would expect banks with relatively high marginal tax rates to issue capital notes, and those with low marginal tax rates to issue common and preferred stock.¹³

A few caveats are in order before we present the regression model that tests these predictions. Although our results are consistent with our belief that banks alter their investment and financing decisions in response to changes in their tax status, our analysis is based on statistical associations rather than on a formal causal model. Also, as indicated in model (1) below, we regress tax status on the balance-sheet items discussed above, even though we believe that this regression's dependent variable (tax status) determines its independent variables (the balance-sheet items) rather than the other way around. This multivariate regression allows us to measure the partial correlations between tax status and specific balance-sheet items while controlling for the others. A more ambitious approach would be to develop a system of equations in which the dependent variables are the balance-sheet items, and the regressors in each equation include tax status plus the dependent variables from the other equations. A problem with such a model, however, is that, without stronger restrictions on the coefficients than our theory allows us to make, the model's parameters are not identified. But we do estimate a reduced form of this model that has one balance-sheet item per equation as the dependent variable and tax status as a single common regressor in each equation. The coefficients in this reduced-form model measure the statistical associations between tax status and specific balance-sheet items. The discussion below emphasizes the results from model (1), because it allows us to measure the partial correlations between tax status and the various balance-sheet items, while controlling for the presence of the other balance-sheet items.

Because we expect the errors from regressing tax status on balance-

¹² The 1987 Tax Act reduced this percentage to 70 percent for most corporations, and subsequent tax proposals have sought (so far, unsuccessfully) to reduce the percentage further.

¹³ Subordinated capital notes count as a form of regulatory capital.

sheet items to be serially correlated, we derive seemingly unrelated regressions (SUR) coefficient estimates for the following seven-equation system:

$$\begin{aligned}
 \text{TAX}_{i80} &= \beta_{080} + \beta_{M80}\text{MUNI}_{i80} + \beta_{D80}\text{DLF}_{i80} + \beta_{P80}\text{PFD}_{i80} \\
 &\quad + \beta_{C80}\text{COM}_{i80} + \epsilon_{i80}, \\
 \text{TAX}_{i81} &= \beta_{081} + \beta_{M81}\text{MUNI}_{i81} + \beta_{D81}\text{DLF}_{i81} + \beta_{P81}\text{PFD}_{i81} \\
 &\quad + \beta_{C81}\text{COM}_{i81} + \epsilon_{i81}, \\
 &\vdots \\
 \text{TAX}_{i86} &= \beta_{086} + \beta_{M86}\text{MUNI}_{i86} + \beta_{D86}\text{DLF}_{i86} + \beta_{P86}\text{PFD}_{i86} \\
 &\quad + \beta_{C86}\text{COM}_{i86} + \epsilon_{i86},
 \end{aligned} \tag{1}$$

where

Var (ϵ) = Σ : an intertemporal variance-covariance matrix that is assumed to be the same for all banks. Its diagonal elements are the annual variances (such as σ^2_{81}), and its off-diagonal elements are the intertemporal covariances (such as $\sigma_{81,82}$). Note that while the ϵ 's are assumed to be cross-sectionally independent, the regression intercepts are allowed to vary across time to capture industry shocks that are common across banks;¹⁴

i : denotes firm;

TAX: a dummy variable, taking on the value of 1 if firm i has a net-operating-loss carryforward for tax purposes at the end of year t , otherwise 0;¹⁵

MUNI: the book value of municipal bonds divided by the book value of total assets;¹⁶

DLF: the book value of direct lease finance assets divided by the book value of total assets;

PFD: the book value of preferred stock divided by the sum of the book values of preferred stock, capital notes, and common stock; and

COM: the book value of common stock divided by the sum of the book values of preferred stock, capital notes, and common stock.

¹⁴ For example, if industry-wide profits are substantial in a given year, then the related intercept will reflect the associated change in the probability of an NOL for all banks.

¹⁵ We also run regressions in which TAX takes on the value of 1 if the firm experiences a net operating loss or an investment-tax-credit carryforward. See note 23 for a discussion of the relation between investment-tax-credit carryforwards and marginal tax rates.

¹⁶ Throughout the paper, total assets are not reduced by the loan-loss reserve. Thus, it is the bottom line of the assets side of the balance sheet plus the loan-loss reserves.

The tax status variables are crude proxies for the true marginal tax rate, which is the present value of expected current and future taxes paid on a marginal unit of fully taxable income generated in the current period. This in turn depends upon the probability distributions of future taxable income, tax credits, and statutory tax rates, as well as on the levels of past periods' taxable incomes and tax credits, given the carryback rules for tax losses and tax credits. To estimate such marginal tax rates would be a demanding task, albeit potentially efficiency enhancing. Given the strength of our results, we elect not to pursue this approach here.¹⁷

The independent variables in model (1) include two categories of assets and two "equity mix" variables.¹⁸ The asset variables (deflated municipal bonds and deflated leases) are both tax shelters. Since explicit tax savings from investing in such tax shelters will exceed the related implicit tax costs only for banks that face relatively high marginal tax rates, we expect the coefficient on direct lease financing assets to be *negative*. A similar argument applies to the municipal bond variable.¹⁹

The two equity mix variables (deflated preferred stock and deflated common stock) in model (1) are tax shelters in the hands of investors who hold them. Because these variables sum to 1 minus capital notes deflated as above, we cannot include capital notes as a third equity mix variable. The coefficients of the equity mix variables included in the model represent the change in tax-paying status associated with an increase in an equity mix variable (common stock or preferred stock) holding constant the other equity mix variable, offset by a proportional decrease in capital notes. From the earlier discussion, the coefficients on each of these variables are expected to be positive.²⁰

For each of the balance-sheet items in model (1), we test the null hypothesis that the average coefficient for the seven years is zero. For example, we test whether the average of the muni coefficients, the β_{mi} 's, is zero. To this end, we estimate these averages using two procedures which assume that the coefficients and Σ are constant *across*

¹⁷ See Shevlin (1987, 1990) for further discussion and empirical applications. Also see Scholes and Wolfson (1990).

¹⁸ For a discussion of the motivation for including such variables in a model designed to capture a firm's tax-paying status, see Scholes and Wolfson (1989).

¹⁹ Remember that a high value for the TAX variable corresponds to a *low* tax rate (tax loss carry-forwards).

²⁰ If we had included capital notes and either preferred stock or common stock as the equity mix variables in the regression, we would *not* have been able to conduct one-sided significance tests on the coefficients of the latter variable since our theory does not predict whether low-tax firms are more likely to finance operations with preferred stock or common stock. The specification we have chosen, however, does permit one-sided tests.

banks but make different assumptions about whether the coefficients are constant *over time*. Both procedures use SUR estimation and do not restrict Σ . Thus, they allow for the errors to be serially correlated and to have time-varying variances. The first procedure restricts all of the coefficients except the intercepts to be constant over time, while the second relaxes this restriction. If the coefficients are in fact constant over time, then imposing this restriction yields more efficient estimates. Because this restriction is not rejected (F -test probability = .319), we focus primarily on these restricted regression results and present the average coefficient estimates for the unrestricted SUR regression only for completeness. Also, to underscore the importance of controlling for serial correlation, we report pooled OLS estimates in column (iv) of Table 4.

Both estimation procedures suffer from the shortcoming that the right-hand side of the equations in model (1) represents the probability of a net-operating-loss carryforward, and yet this expression is not constrained to lie between 0 and 1. One costly way to address this problem is to estimate a seven-equation probit model with cross-equation restrictions. Our estimation strategy is first to see whether our conclusions differ using the pooled probit estimates rather than pooled OLS estimates and, if they do, to then use this somewhat more onerous seven-equation probit approach. Fortunately, the significance levels are virtually the same for the pooled models.

A second problem with the SUR estimates is that the related hypothesis tests are based on asymptotic theory, and we have only 121 observations. To address this problem, we report bootstrapped p -values for the SUR estimates based on the empirical distribution of the SUR residuals.

The results for the restricted SUR estimation are reported in column (i) of Table 4, along with both asymptotic and bootstrap p -values.²¹ Each coefficient has the predicted sign, and based on the asymptotic p -values, each differs significantly from zero at conventional levels. The bootstrap p -values confirm the significance of each coefficient, although at somewhat less striking levels. That the coefficient on direct lease financing is significant is of particular interest because it may be more costly to adjust direct lease holdings than to take other actions, such as adjusting municipal bond holdings. Although other model specifications could be considered, our objective is not to

²¹ The source of the data for the independent variables is the *Bank Compustat* tapes. Missing values for direct finance leases are set to zero. This appears to be the appropriate strategy based upon inspection of a number of actual financial statements. Data for tax status are hand-collected from annual reports.

Table 4
Relation between tax status and asset and equity structure: Coefficient values for variables in Equation (1)

Variable	Predicted sign	(i)	(ii)	(iii)	(iv)	(v)
Constant	None	Varies by year	0.0097 (0.0963)	-0.0076 (-0.0709)	0.0928 (-1.1307)	Varies by year
MUNI	-	-0.9060 (-3.5813)*** (0.002) ¹	-1.4065 (-3.8252)***	-1.5432 (-3.7938)***	-1.5182 (-5.4874)***	-2.3674 (-5.4800)***
DLF	-	-2.0298 (-2.2571)* (0.032) ¹	-1.8488 (-1.7384)*	-2.3819 (-2.0733)*	-1.7108 (-2.2233)*	2.0929 (1.4688)
PFD	+	0.2266 (1.9289)* (0.069) ¹	0.2950 (2.1962)*	0.3600 (2.5209)**	0.5677 (4.7909)***	0.3261 (1.8943)*
COM	+	0.1580 (1.8617)* (0.104) ¹	0.2080 (1.9701)*	0.2481 (2.2109)*	0.3220 (3.7158)***	0.1160 (0.8979)

t-statistics are in parentheses below the coefficient estimates. Column key: (i) seemingly unrelated regression with coefficients for each variable (other than the constant term) constrained to be equal over the entire period; (ii) average coefficients from year-by-year seemingly unrelated regression; (iii) same as column (ii), except observations for 1981 are excluded; (iv) pooled ordinary least-squares regression; (v) same as column (i) with dependent variable taking on the value of 1 for net-operating-loss or investment-tax-credit carryforwards, rather than for net-operating-loss carryforwards only.

* $p < .050$; ** $p < .010$; *** $p < .001$.

¹ Bootstrap p -values are in angle brackets for column (i) only.

select the best model specification but to document an association between tax status and tax planning alternatives.

If we take these coefficient estimates at face value, they have the following interpretations. An increase in municipal bond holdings from the 25th percentile ($MUNI = 0.038$) to the 75th percentile ($MUNI = 0.085$), holding other factors constant, is associated with a 4.3 percent decline in the likelihood of the bank reporting a net-operating-loss carryforward. Similarly, holding other factors constant, an increase in direct lease holdings from the 25th ($DLF = 0$) to the 75th percentile ($DLF = 0.015$) is associated with a 3 percent probability decline. An increase in preferred stock issued from the 25th ($PFD = 0$) to the 75th percentile ($PFD = 0.10$) is associated with a 2.3 percent increase in the probability of reporting an NOL, and an increase in common stock issued from the 25th ($COM = 0.738$) to the 75th percentile ($COM = 0.999$) is associated with a 4.1 percent probability increase. These are substantial differentials because only 11 percent of the observations report net-operating-loss carryforwards.²²

The results for the unrestricted SUR estimation are reported in column (ii) of Table 4. Here we conduct one-sided *t*-tests of the hypothesis that the *average* regression coefficient for each variable over the 7 years is equal to zero. The results are quite similar to those reported with the restrictions.

The significance of the negative average coefficient on the direct lease financing variable is especially impressive since its estimated value is *positive* 1.13 in 1981, the year in which "safe harbor leasing" was introduced. Some banks sold the tax benefits from leases they had originated under such provisions, and this tends to pollute our tests, since theory calls for a measure of the *net* tax shelter position held; because of data limitations we use a gross measure. Column (iii) of Table 4 reveals that when 1981 is excluded from the sample, the results are sharpened somewhat [compared to column (ii)] despite the loss of 121 observations.

As an indication of the importance of using SUR estimation to control for intertemporal correlation of residuals, we also report pooled ordinary least-squares regression results in column (iv) of Table 4. The reported *t*-statistics on COM and PFD are twice those of the seemingly unrelated regression, and the *t*-statistic on the MUNI variable is 50 percent higher. This suggests that controlling for intertemporal correlation of residuals is important.

Column (v) of Table 4 reports seemingly unrelated regression results, where the coefficients are restricted across years and the

²² Approximately 23 percent of the observations report net-operating-loss or investment-tax-credit carryforwards.

dependent variable takes on the value of 1 when there exists a net-operating-loss or an investment-tax-credit carryforward. There are costs and benefits of using this proxy for marginal tax rates. The benefit is that the presence of investment tax credits reduces marginal tax rates.²³ However, there is a problem in using this variable to test for a positive association with direct lease financing assets. Direct financing leases represent the primary source of investment tax credits for banks,²⁴ so banks without these investments largely avoided the possibility of generating investment-tax-credit carryforwards. This implies a positive relation between investment-tax-credit carryforwards and direct lease assets by construction, although our earlier discussion implies that tax planning should reduce the positive relation. The results reported in column (v) of Table 4 confirm this: the coefficient on direct lease assets is indeed positive with this specification.

As indicated earlier, the results reported in Table 4 [for model (1)] "reverse" the dependent and independent variables relative to what the theory motivating the tests would suggest. Generally, a bank reacts to a change in its tax status by altering its assets and liabilities. As an alternative specification, we also estimate a reduced form model in which the asset and equity mix variables are regressed on contemporaneous, lagged, and forward tax status dummy variables. We find that the sum of the coefficients in these regressions is highly significant and of the predicted sign, with the exception of the direct-lease-financing regressor.

The results reported in this section are important for at least three reasons. First, they demonstrate a clear link between a firm's financing and investing strategies and its tax status. Myers (1984) characterizes as "weak" the empirical evidence on this link and claims that the prospects are bleak for documenting such a relation. One reason for the weak evidence would appear to be that the literature to date presents univariate tests with regression coefficients assumed constant across diverse industries.²⁵ Our success in documenting these effects may well be due to our focusing on a homogeneous set of firms that face a relatively simple production environment. Another reason for the weakness of published results is that any variable used to represent

²³ The presence of ITC carryforwards reduces marginal tax rates because the amount of the tax credit available is linked to the regular income tax. Hence, when an ITC carryforward is present, each unit of taxable income frees up a portion of the ITC carryforward to be used to reduce the marginal tax. Moreover, any ITC carryforward present at year-end 1986 was reduced by 17.5 percent in 1987 and reduced further by a like amount in 1988 if not used up in 1987.

²⁴ Prior to 1986, tax credits were available only on depreciable property *other* than real property (such as that to house bank operations). The Tax Reform Act of 1986 eliminated investment tax credits retroactive to January 1, 1986.

²⁵ For an exception, see Mackie-Mason (1988). For examples, see the references cited in Myers (1984) and Mackie-Mason (1988).

tax status (e.g., a net-operating-loss carryforward dummy) is endogenous, the result of tax-planning strategies that have been undertaken. The preferred variable is what the tax status would have been in the absence of tax-shelter investment. This "but-for-tax-planning-action" tax status variable is one that we could calculate with some effort, but given the strength of our results, we elect not to. In considering other industries in which researchers have failed to document clientele effects, the theoretically more powerful "but-for" tax status variable could provide stronger results, as could joint tests that consider a host of tax-planning substitutes.

Second, organization theorists have largely ignored taxes in their attempts to prescribe (or describe) efficient organizational arrangements.²⁶ Their implicit assumption that taxes are of second order in importance is refuted by our evidence.

Third, researchers have been notoriously unsuccessful in linking financial-accounting rule changes to changes in the real economic balance sheets of firms. Since changes in tax rules have cash-flow implications that are more direct than are the cash-flow implications of financial-accounting rule changes, failure to find a relation between tax changes and organizational restructuring would not bode well for the more demanding task of linking organizational changes to changes in financial-accounting rules.

3. Costs of Tax-Minimizing Policies Due to Regulators and Other Capital Market Participants

While the results reported above are suggestive of the importance of taxes in influencing investment and financing decisions, evidence presented below suggests that banks forgo very substantial opportunities to reduce taxes. In this section, we document this behavior and consider nontax factors that may explain it.

A tax rule with clear implications for the asset-management policy of banks is that gains and losses on the sale or exchange of corporate bonds, government bonds, and most other evidences of indebtedness (such as commercial and personal loans) give rise to ordinary income or loss, rather than capital gain or loss. While capital losses may offset only capital gains, ordinary losses are deductible against ordinary taxable income. Therefore, income can be sheltered from taxation by selling or exchanging loans and investment securities that have declined in value and by retaining appreciated loans and securities, although the tax saving from postponing taxable income depends upon expected changes in tax rates, as well as on the after-tax discount

²⁶ For elaboration, see Scholes and Wolfson (1989).

rate.²⁷ For example, the scheduled reduction in marginal tax rates from 46 percent in 1986 to 40 percent in 1987 and 34 percent in 1988 created a greater tax incentive for commercial banks to postpone the recognition of ordinary income in 1986 than in other years.²⁸

The unexpected increase in interest rates in the late 1970s and early 1980s gave rise to billions of dollars in potential tax write-offs for banks. In the absence of nontax costs, profitable banks should have realized these losses to save taxes. The evidence, however, suggests that many profitable banks did not postpone taxable income nearly to the extent possible. For our sample of banks over the years 1969 to 1985, unrealized securities losses averaged 14 percent of shareholders' equity, with a standard deviation of 19 percent. The average unrealized loss across the more than 130 banks for which data were available in 1980 and 1981 was in excess of 40 percent of shareholders' equity! Indeed, a number of banks with unrealized losses on their marketable securities portfolios selectively sold portions of their portfolios that had appreciated in value, thereby accelerating voluntarily the payment of the tax on the increase in value.

This evidence does not *necessarily* imply, however, that banks deviated from tax-minimizing strategies. It is possible, for example, that profitable banks were taking losses and that banks with tax-credit or tax-loss carryforwards (or high probabilities of generating them in the future) were not. Two facts are worth noting here. First, there are years in the sample in which 100 percent of the banks reported unrealized losses on their overall marketable securities portfolios. Second, the vast majority of banks in the sample held substantial amounts of municipal bonds in their marketable securities portfolio at the same time they were experiencing unrealized losses. Since municipal bond investments provide after-tax returns exceeding those for equally risky taxable investments only if the investor faces a high marginal tax rate,

²⁷ Sources of increasing intertemporal tax rates (and hence reduced incentive to postpone taxable income) include legislative tax changes (such as those applying to thrifts and life insurance companies following passage of the 1986 Tax Act); the temporary imposition of the alternative minimum tax; and investment-tax-credit carryforwards.

²⁸ The propensity of financial institutions to postpone capital gains income should differ from their propensity to postpone ordinary income, especially in the period following the Tax Reform Act of 1986. First, the (long-term) capital gains tax rate has been below that on ordinary income. The statutory rate was 28 percent (alternative rate) until the Tax Reform Act of 1986. Moreover, this rate could be reduced substantially by exchanging capital assets for installment notes rather than cash. See Gilson, Scholes, and Wolfson (1988) for an elaboration. Second, whereas the tax rate on ordinary income has been reduced, the tax rate applying to long-term capital gains has been increased. The maximum federal capital gains tax rate is 34 percent for all banks in 1987 and beyond. Moreover, beginning in 1987, installment sales no longer postponed capital-gains taxation on the sale of publicly traded equities. Changes in installment sales rules were passed in 1984, 1986, 1987, and 1988. In each case, Congress chipped away at the opportunities to postpone the payment of taxes on capital assets.

factors other than a low marginal tax rate may have been driving the decision not to exploit the opportunity to reduce taxable income.²⁹

Nontax factors that affect the management of the marketable securities portfolio include *asset-turnover costs*, concern over the level of *income reported to shareholders*, and *regulatory capital* considerations. Since these securities are rarely "marked to market" for financial-reporting or regulatory accounting purposes, even when market value is below book value, their sale has essentially the same effect on financial reporting equity, regulatory capital, and income reported for tax purposes.

Asset-turnover costs include any discount a relatively well-informed seller may have to offer a relatively uninformed buyer if the buyer is unable to distinguish the assets from those of lesser value, as well as appraisal fees and other "due diligence" costs incurred to reduce information asymmetries between buyers and sellers. Asset-turnover costs for marketable securities, however, are likely to be less than for commercial loans, real estate acquired in foreclosures, bank branches, and fixed assets where information asymmetries are more chronic.

There are several reasons why firms may be concerned with the income reported to shareholders and associated balance-sheet numbers. First, if management is better informed than are outside suppliers of capital about the value of their firm's assets (including the value associated with management's ability to make good investments), the management may find it worthwhile to convey this private information even if it is costly to do so, particularly when new financing is to be arranged. One way to convey information about the value of the firm's net assets is to sell them. Symmetrically, one of the costs associated with selling assets to realize tax losses is that the sale might increase financing costs by revealing asset values below the market's expectations (see Brennan, 1989). Second, financial contracts with suppliers, creditors, management, and other stakeholders frequently specify an allocation of property rights that depends on financial statement numbers which will affect asset/liability management policy.³⁰

Financial reporting costs are not likely to be great for marketable securities held by banks, since both book and market values are

²⁹ Several caveats are warranted here. First, beginning in 1983 it became costly (because of forgone arbitrage possibilities as described earlier) to sell municipal bonds that had been owned prior to January 1, 1983. For similar reasons, it became especially costly, beginning in 1987, to sell municipal bonds that had been owned prior to August 7, 1986. Second, while municipal bonds may represent the wrong tax clientele with respect to new investments for banks with tax-loss carryforwards, it may be undesirable to sell existing municipal bonds if they have appreciated in value since their date of acquisition, because the tax on the sale may exceed the costs of being in the "wrong" clientele. Finally, banks may be motivated to hold certain municipal debt to generate other profitable business with municipal issuers.

³⁰ See, for example, Watts and Zimmerman (1986).

provided in reports to shareholders. Nevertheless, the evidence to be presented suggests that bank management believes these costs are important.

Banks are also likely to be concerned about the effects of asset/liability management policy on regulatory capital. For example, a bank that sells marketable securities affects taxable income and regulatory capital by similar amounts. To avoid costly direct intervention by regulators, banks must maintain a minimum ratio of primary capital (which is roughly equal to shareholders' equity plus loan-loss reserves) to adjusted assets (total assets plus loan-loss reserves). Since 1984, banks have also been required to meet a minimum secondary capital ratio set one half percent above the primary capital requirement (where certain subordinated debt securities are included in regulatory capital). The regulators also impose some restrictions on investment activity at specified levels of regulatory capital above the minimum level that triggers direct intervention in the management oversight of bank activities.³¹ For example, completion of a bank merger requires regulatory approval, which is often tied to regulatory capital considerations.

A bank that maintains a 6 percent regulatory capital ratio can issue roughly \$16 in demand deposits and other obligations for each dollar of additional regulatory capital. Because deposit insurance is provided by the Federal Deposit Insurance Corporation at subsidized rates, banks have an induced demand for additional regulatory capital. This demand increases as the riskiness of their assets increases, and decreases, but at a decreasing rate, in the market value of shareholders' equity.³²

Restrictions on investment and operating behavior are more likely to be binding and costly the closer the bank is to meeting the minimum capital requirements. The cost of these restrictions can be reduced by increasing regulatory capital beyond the required minimum. Moreover, even when regulatory capital is above the minimum required amount, monitoring by the bank examiners imposes costs

³¹ Buser, Chen, and Kane (1981) suggest that the cost of regulatory intervention is similar to an implicit tax on bank activities. Moreover, Kane (1985) shows that thrifts failed to realize losses on their mortgage portfolios to reduce their tax bills from 1965–1979 and again in 1983. The industry generated net operating losses from 1980–1982. He argues that by not selling mortgages, thrifts kept their net worths from falling below the level required to maintain insurance from the Federal Savings and Loan Insurance Corporation. Also, Scholes and Wolfson (1987) argue that banks, when faced with the prospect of losing the value of net-operating-loss carryforwards in the event of bankruptcy, might *reduce* the riskiness of net asset holdings despite the presence of limited liability.

³² A sufficient condition for this is that each dollar of debt financing is issued at the riskless rate of interest. Note that new debt financing need not be demand deposits, which are fully federally insured (i.e., \$100,000 or less per depositor), to be viewed by lenders as riskless—some of the investments made with the proceeds of the insured demand deposits and the uninsured loans to the bank can be pledged to secure the uninsured loans.

on banks that decrease in the level of regulatory capital.³³ Just as "nominal" contracts with the taxing authority can cause taxpayers to be quite interested in "managing" the level of their taxable income, so contracts with regulators can cause banks (and other regulated financial institutions) to be quite interested in managing the level of their regulatory capital.

To summarize, regulatory costs consist of three components: direct monitoring costs, costs resulting from restrictions on investment activities, and restraints on the issuance of demand deposits. Each component (and hence the aggregate) is decreasing, but at a decreasing rate, with increases in regulatory capital. Thus, monitoring costs and costs from restrictions on investment activities decrease with regulatory capital increases (but never approach a level of zero costs) as the regulators scale back the intensity of audits and restraints on investment activities in response to the reduced exposure to bank failure reflected in the expanding equity cushion. However, some degree of oversight is exercised at *all* levels of regulatory capital.

The cost of restraints on the issuance of demand deposits is proportional to the risk premium that banks would have to offer to attract deposits in the absence of federal insurance. This risk premium is also decreasing, but at a decreasing rate, as shareholders' equity (and hence regulatory capital) increases.

The earlier reference to "nominal" contracts begs the question of why regulators might rely on only a subset of all available information in implementing regulatory policy. For example, why not regulate based on measures of regulatory capital and earnings that incorporate unrealized holding gains and losses that are reported in banks' annual reports? We can think of at least four possible reasons.

First, a commitment by regulators to use book rather than market value may prevent distortions in banks' investment decisions. Absent such a commitment, banks might be motivated to invest in riskier assets, the market values of which are unobservable by the regulator (and hence noncontractible). This in turn could give rise to greater exposure to government-insured losses.

³³ Regulatory capital considerations for thrifts are quite similar to those for banks except that the required level of regulatory capital has been lower for thrifts in recent years. The pretax benefit of increasing regulatory capital (e.g., by selling appreciated assets) has, therefore, tended to be higher for thrifts than for banks. On the other hand, for purely tax reasons, debt, which gives rise to tax-deductible interest expense, is not the natural financing clientele for low-tax entities such as thrifts. This serves to reduce the advantage of increasing regulatory capital. Insurance companies are also interested in the level of regulatory capital. Property casualty companies are permitted to write insurance coverage only up to a specified multiple of their "policy holder surplus capacity reserve." The surplus amount is increased (decreased) by gains (losses) on the sale of bonds. Similar considerations apply to life insurance companies. So regulatory capital planning can quite naturally conflict with tax planning, although the conflict may be rather different across different types of financial institutions, across different firms for a given type of financial institution, as well as for a given firm across time.

Second, if regulators are given too much discretion in implementing policy, banks might be motivated to overinvest in producing information to promote favorable treatment by the regulators. In hierarchical arrangements, top management may find it desirable to close down communication channels or to commit to ignoring certain information to discourage overinvestment in information-production activities.³⁴

Third, allowing bank regulators too much discretion might result in regulators being "captured" by bank managements; that is, there is the possibility of collusion in the hierarchical arrangement, and this may prove to be against the public's interest. Such collusion can be mitigated by restricting communication and invoking bureaucratic rules that ignore certain relevant information (see Tirole, 1986).

Fourth, monitoring costs are undoubtedly lower when regulators face a limited number of fixed decision rules that are based on observables. A related explanation here is "bounded regulator rationality."

To determine whether trade-offs between tax and nontax factors contribute to an explanation of cross-sectional differences in banks' propensity to realize securities gains and losses, we regress realized marketable securities gains and losses, deflated by book value of total assets, realized securities gains (RSG),³⁵ on tax factors, nontax factors, and "nuisance" factors. The average (across time) coefficients for the following six-equation system ($t = 1981-1986$) are estimated using the SUR procedures described earlier:

$$\begin{aligned} \text{RSG}_{it} = & \beta_{0i} + \beta_{P1i}\text{PC}_{it} + \beta_{P2i}\text{PC}_{it}^2 + \beta_{Li}\text{LLP}_{it} + \beta_{Ti}\text{TAX}_{it} \\ & + \beta_{Ui}\text{USG}_{it-1} + \beta_{Mi}\text{MCB}_{it} + v_{it}, \end{aligned} \quad (2)$$

where

- i : denotes firm;
- PC: "primary capital," measured as book value of shareholders' equity plus loan-loss reserve divided by book value of total assets;
- LLP: the annual "loan-loss provision," deflated by the book value of total assets;
- TAX: a dummy variable, taking on the value of 1 if firm i in year t experiences a net-operating-loss carryforward for tax purposes;³⁶
- USG: "unrealized securities gains and losses" on marketable investment securities measured as the market value less

³⁴ See, for example, Milgrom and Roberts (1990).

³⁵ Note that when securities are sold at a loss, RSG takes on negative values.

³⁶ We also run regressions in which TAX takes on the value of 1 if the firm experiences a net-operating-loss or an investment tax-credit carryforward.

the book value of marketable investment securities, deflated by book value of total assets; and

MCB: a dummy variable, taking on the value of 1 for so-called "money center banks."

From our earlier discussion, the expected signs on the coefficients for primary capital, the square of primary capital, and taxes, are negative, positive, and positive, respectively. That is, securities-gains realizations are expected to decrease as primary capital increases (but at a decreasing rate) and as tax rates increase. (Once again, recall that a high value for the tax variable denotes a low tax rate.)

The loan-loss provision variable is included to provide a simple test for income management; that is, strategic choice by management of accounting policies designed to affect the levels of reported income. It possesses three properties that make it especially appropriate for this purpose. First, it typically represents a very large fraction of income. Second, conventional wisdom suggests that there is a large discretionary component to the loan-loss provision. And third, it is the only income statement item whose effect on income reported to shareholders is either not matched by an effect on regulatory capital at all or is matched by an effect of opposite sign on financial accounting income. To see this, note that an increase in the loan-loss provision both reduces shareholders' equity and increases the allowance for loan losses. Ignoring tax effects, regulatory capital is unaffected. If the reduction to shareholders' equity is less than the increase in the loan-loss provision as a result of a reduction in tax expense, then regulatory capital actually increases while financial accounting income decreases as the result of an increase in the loan-loss provision. This allows us to distinguish between effects of regulatory capital and financial reporting considerations.

The expected sign of the coefficient on the loan-loss provision variable in Equation (2) depends upon whether firms seek to offset or to reinforce the effect of the loan-loss provision on net income reported to shareholders.³⁷ Both objectives are forms of earnings management. In the former case, the expected sign on LLP is positive, and in the latter case it is negative.³⁸ Given the competing hypotheses,

³⁷ An example of earnings management is provided by First Bank System during the third quarter of 1986. According to the *Wall Street Journal* (October 10, 1986, p. 10), "First Bank System's results were bolstered by \$197.8 million in gains on massive securities sales . . . [T]he Minneapolis-based bank holding company sold nearly \$3 billion of its \$7.5 billion investment portfolio, which is invested mostly in government securities. The huge gains were needed to help counter write-offs of bad assets totaling \$336.2 million, about 10 times more than a year earlier."

³⁸ While we have chosen to focus on the relation between realized securities gains and losses and loan-loss provisions, both of which have discretionary components, other dependent variable candidates, such as gains from the sale of capital assets (e.g., intangible assets and bank buildings),

we conduct two-sided tests of significance of the coefficient on this variable.

The beginning-of-period *unrealized* securities gains and losses are included in the regression to control for a nondiscretionary component of realized securities gains. The sign of its coefficient is expected to be positive. Finally, because money center banks were subject to regulatory guidelines that differed from those of other banks (Beatty, Santomero, and Smirlock, 1987), we include as an independent variable a dummy variable taking on the value of 1 for money center banks only.

We compute unrealized securities gains and losses using the market value information from bank annual reports. Since we collect a complete set of data for the years 1980–1986, and since we use beginning-of-period values for unrealized securities gains and losses in the regression, the regressions are based on six years of data (1981–1986).

Over the period 1981–1986, the average primary capital ratio ranges from 6.6 percent (1981 and 1982) to 7.4 percent (1986), and marketable securities as a fraction of total assets ranges from 15.7 percent to 17.4 percent. Net-operating-loss carryforwards are reported in just under 11 percent of all bank years, ranging from 5 percent in 1981 to 17 percent in 1986.³⁹

As reported in Table 5, Equation (2) is estimated by a seemingly unrelated regression in which the coefficients on regulatory capital, tax, and loan-loss provision are restricted to be equal across the six years. An *F*-test on the restrictions rejects the specification, and since unrestricted year-by-year SUR estimates reveal instability in the coefficient estimates for the loan-loss provision variable, we also generate SUR estimates in which the loan-loss provision coefficients are allowed to change each year. The *F*-test for this restricted regression is not rejected ($p = .624$), and Table 5 shows these results in column (i).

The primary capital and tax variables all have the predicted signs and are significant at conventional levels. The positive coefficient on the loan-loss provision variable is consistent with the argument that realized securities gains and losses are chosen strategically to “smooth” the level of income reported to shareholders by offsetting the income effect of the bad debt expense. More specifically, each \$1 of increase in the loan-loss provision, holding constant primary capital, tax status,

represent another promising avenue that might be pursued. As an example, Shawmut National Corporation recognized a gain of \$114 million upon the sale of its interest in its Boston headquarters. Shawmut indicated its intention to allocate \$60 to \$65 million of this gain to increasing its reserves for Third World loan losses and to add much of the remainder to other reserves (*Wall Street Journal*, July 1, 1988, p. 21).

³⁹ Just over 23 percent of the observations had net-operating-loss or investment-tax-credit carryforwards, ranging from 21 percent in 1981 and 1985 to 25 percent in 1983 and 1984.

Table 5
Test for trade-offs between tax and nontax factors in explaining cross-sectional variation in realized securities gains

Variable*	Predicted sign	(i)	(ii)
Constant	none	varies by year	varies by year
PC	—	—0.0300 (—1.6718)* (0.025) ¹	—0.0310 (—1.7601)*
PC ²	+	0.2005 (1.6789)* (0.028) ¹	0.2096 (1.7874)*
LLP	ambiguous (+ for income smoothing)	0.0479 (3.3153)*** (0.005) ¹	0.0471 (3.2583)***
TAX	+	0.0002 (2.2677)* (0.014) ¹	0.0002 (2.8002)**
USG	+	varies by year	varies by year
MCB	None	varies by year	varies by year

t-statistics are in parentheses below the coefficient estimates. Column key: (i) seemingly unrelated regression with regression coefficients for PC, PC², and TAX constrained to be equal over the entire period. The coefficient and *t*-statistic reported for LLP is for its average value over the 6 years; (ii) same as column (i), except that the TAX variable takes on the value of 1 when a net-operating-loss or an investment-tax-credit carryforward is reported for tax purposes.

For variable definition, see the description below Equation (2) in the text.

* $p < .050$; ** $p < .010$; *** $p < .001$.

¹ Bootstrap *p*-values are in angle brackets for column (i) only.

and the other “control variables,” is associated with nearly a 5-cent increase in realized securities gains.

The finding that realized securities gains are higher when regulatory capital is low, holding other factors constant, is consistent with the argument that as regulatory capital falls, banks are more inclined to sacrifice tax benefits by selling appreciated securities (or postponing the sale of losers) to improve their regulatory capital positions. Similarly, as regulatory capital increases, banks can better afford to postpone the sale of appreciated securities (or accelerate the sale of losers) to save on taxes.

Realized securities gains and losses are associated nonlinearly with primary capital. When primary capital is equal to 3 percent of assets, each \$1 decrease in primary capital is associated with nearly a 2-cent increase in realized securities gains (or with nearly a 2-cent decrease in realized losses). When primary capital is equal to 5 percent of total assets, each \$1 decrease in primary capital is associated with a 1-cent increase in realized securities gains. And when the primary capital ratio is 7.5 percent, changes in primary capital and realized securities gains are unrelated. If we compare two moderate-sized banks, each of which reports \$10 billion of total assets, one of which has primary capital of \$400 million and the other which has primary capital of

\$600 million, the less-well-capitalized bank (for regulatory purposes) is expected to generate roughly an extra \$2 million per year in realized securities gains, holding constant other factors.

The positive coefficient on the tax variable is consistent with a greater willingness on the part of high-tax-rate banks to take losses on their marketable securities portfolios to reduce taxes. Similarly, it is consistent with a reluctance on the part of high-tax-rate banks to take gains to improve their reported profitability and regulatory capital position, but at a tax cost.

More specifically, holding nontax factors constant, banks reporting net-operating-loss carryforwards realize, on average, an additional \$200,000 in securities gains per billion dollars of assets. For a bank reporting five years of net-operating-loss carryforwards and \$10 billion of assets, the model predicts an extra \$10 million of realized securities gains over the five years above and beyond any effects of loan-loss provisions and regulatory capital on realized securities gains.

As expected, the coefficient on beginning-of-year unrealized securities gains is consistently positive and significant in most of the six years. The coefficients on the money-center-bank variable are not significant and appear to add little to the regression.

4. Concluding Remarks

The evidence suggests that banks are more inclined to take actions that reduce taxes when the costs of doing so, in terms of the effects on income reported to shareholders and regulators, are relatively small and the magnitude of the potential tax benefits is large. The evidence is consistent with the following statement made by Douglas McEachern, a partner at Touche Ross and Chairman of the AICPA's Committee on Savings and Loans:⁴⁰

In dealing with clients and others, I often end up in discussions that focus on a transaction basis and ask "what is the GAAP result of this transaction? What happens for tax purposes? What happens under regulatory accounting practices and lastly, unfortunately, in some cases, what is the economic result of this?" Unfortunately, many of the transactions that are being undertaken by the industry, especially by the savings and loan industry, and by Wall Street, are driven by and designed around the accounting result.

⁴⁰ The statement was made at a roundtable discussion on generally accepted accounting principles and regulatory accounting principles, held at the University of Southern California during October 1987 (Arnold, 1988).

In our macro tests, we document a strong response of bank holdings of municipal bonds to legislative changes in tax rules. In this case, asset-turnover costs are low and the date of change in tax circumstances is relatively well-documented. The ability to document strong responses of asset allocations to changes in tax rules is an encouraging prelude to investigations in other circumstances in which the nontax costs of balance-sheet restructuring are higher and the date of a change in tax circumstances is more elusive.

Our tests also document a significant association between tax status and firms' investment and financing decisions. We further provide evidence of nontax costs associated with restructuring economic balance sheets that impede tax-related restructuring. Our evidence is consistent with banks choosing to realize securities gains or defer losses that increase taxation so as to increase their regulatory capital (and thus reduce regulatory costs) even though regulators learn nothing new about the banks' economic balance sheets in the sense that both the book and market values of the securities are publicly available information (indeed, they are side-by-side in annual reports).

This research only begins to scratch the surface in identifying and measuring the tax and nontax costs and benefits of economic restructuring in response to changes in economic circumstances. In future work, we hope to calibrate these factors in other empirical domains.

Our ultimate objective in this line of inquiry is to provide a means by which tax-planning analysis can be used to measure indirectly transaction costs that are otherwise unobservable. If successful, this work should help organization theory scholars (including those specializing in accounting and financial institutions) to sharpen the focus of their inquiries and to channel their investigations to areas where the transaction-cost impediments to trade are found to be relatively large.

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