10 THE EFFECT OF THE TAX REFORM ACT OF 1986 ON COMMERCIAL BANKS

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I. INTRODUCTION

Before tax reform, several studies concluded that commercial banks had low effective tax rates.[1] Thus, banks seemed likely candidates for tax reform, and subsequently they have been cited as one of the industries most adversely affected by the Tax Reform Act of 1986. Revenue estimates indicate that commercial banks will pay an additional $4 billion in taxes over the next five years. Like most estimates quoted during tax reform, this figure only includes the effects of bank-specific provisions.

This paper analyzes the overall effect of tax reform on the banking industry and shows that the banking industry benefits from tax reform. We estimate that as a result of tax reform commercial banks will pay more Federal income tax. However, their before-tax income will rise by more than the increase in taxes, with the net result of an increase in after-tax income. Pre-tax earnings rise because of portfolio shifting from tax-exempt bonds to taxable investments. This combined with the reduction in the corporate tax rate from 46 percent to 34 percent more than offsets the loss of bank-specific tax advantages.

In this paper, a banking model with individual bank data from 1977 to 1984 simulates the effects of tax reform on the banking industry. Aggregate tax revenue cannot be calculated from aggregated data. A disaggregate model of individual banks is necessary because a model using only aggregate data cannot calculate the effects of the minimum tax, tax-exempt bond holdings, and the amount of the tax bad debt reserves on individual banks.

The model extrapolates the 14,400 banks' income statements and balance sheets through 1991 and calculates Federal tax liability and after-tax income before and after tax reform. The model allows the separate estimation of the

effects of each of the major tax reform provisions affecting banks. including recapture of existing bad debt reserves and the adjustment to new levels of tax-exempt bond holdings.

The paper has five additional sections. The second section explains the tax reform provisions most directly affecting commercial banks. The third and fourth sections describe the model and data used for the simulations. The fifth section presents the simulation results of the effects of tax reform as well as some sensitivity analysis of changes to the key parameters. The final section includes a discussion of some limitations of the simulations and some future lines of research.

II. TAX REFORM PROVISIONS AFFECTING COMMERCIAL BANKS

Commercial banks are generally subject to the same tax rules as all other corporations.   For instance. the corporate rate structure. the alternative minimum tax. and the investment tax credit and depreciation rules apply to all corporations.   Several bank-specific tax rules were changed in tax reform: the bad debt reserve deduction. the deduction for interest incurred to carry or purchase tax-exempt bonds. the cash method of accounting. and the net operating loss carryover rules. In addition. the book income preference of the alternative corporate minimum tax will affect many commercial banks because book income includes interest from their large holdings of tax-exempt bonds.

A.   Bank Specific Provisions

In this section we look at each of these bank-specific provisions both under prior law and under the Tax Reform Act of 1986.

1.   Bad Debt Reserve Deductions

a.   Prior Law

Under prior law. banks could deduct loan losses using one of three methods: the specific charge-off method. the experience reserve method. and the percentage of eligible loan reserve method. The specific charge-off method permits deductions when the loans are considered either wholly or partially worthless. If part or all of the principal of such a loan is later recovered. the amount of the recovery is then included in the bank's taxable income. Under the specific charge-off method the bad debt reserve deduction at time t. $BDRD_t$, equals the charge-offs net of recoveries. NCO_t.

For growing firms, the two reserve methods are more advantageous. Under the methods. banks are allowed deductions to maintain reserves at the year-end

allowable level AR_t after subtracting net charge-offs against the beginning year reserve, AR_{t-1}. Thus, for both reserve methods bad debt reserve deductions equal additions to allowable reserve plus net charge-offs, as shown in equation 10.1.

$$BDRD_t = AR_t - (AR_{t-1} - NCO_t) \qquad (10.1)$$

$$= (AR_t - AR_{t-1}) + NCO_t$$

These two methods differ in the determination of allowable reserves, but if allowable reserves do not increase, both methods would reduce to the specific charge-off method. Allowable bad debt reserves are calculated by specific statutory formula. They do not correspond to banks' financial book income statement or regulatory bad debt reserves, which are based on the banks' and regulators' subjective judgment of the amount of funds necessary to cover current and future losses.

Percentage of Eligible Loan Reserve Method. Under the percentage of eligible loan (PEL) reserve method. a bank's allowable reserve equals a specified percentage. h_t, of its eligible loans, EL_t. The bad debt reserve deduction equals net charge-offs plus any addition to allowable reserve:

$$BDRD_t = (h_t * EL_t - h_{t-1} * E_{t-1}) + NCO_t \qquad (10.2)$$

Again, with no change in allowable reserve, this reduces to the specific charge-off method. Eligible loans are limited to a bank's total loans less loans to financial institutions, FHA and VA insured loans, and commercial paper in order to prevent a reserve deduction for loans which have little or no default risk. The allowable percentage was 1.8 percent from 1969 to 1975. 1.2 percent from 1976 to 1981, 1.0 percent in 1982. 0.6 percent in 1983 to 1987. The PEL method is scheduled to expire at the end of 1987.[2]

An important provision of the PEL reserve method is the base year reserve grandfathering rule. Banks using the PEL method are allowed to maintain their existing reserve level after a decrease in the allowable percentage of eligible loans. This prevents a reduction in a bank's tax reserve which would result in inclusion of the reserve decrease in taxable income. For instance. a bank can maintain its reserve at 1 percent of 1982 eligible loans if it is higher than 0.6 percent of eligible loans in later years. For banks using the base year reserve (i.e., those banks with product of allowable percentage and eligible loan decreasing), the allowable reserve is constant. which leaves the PEL method effectively equivalent to the specific charge-off method. Because of the declining allowable percentage. a large number of banks were on the base year reserve during the late 1970's and mid-1980's.

Experience Reserve Method. Under the experience reserve method. the allowable bad debt reserve is the product of a bank's six-year moving average loan loss rate and its total loans. The experience reserve method was

codified for banks in 1969 and is similar to the six-year moving average reserve method (the "Black Motor Formula") allowed for nonfinancial institutions' bad debt reserves before tax reform. The average loan loss rate, a_t, is the ratio of actual net charge-offs during the current and preceding five years to total outstanding loans during the current and preceding five years. The experience method reserve increases if total loans or the loan loss rate increases. As under the PEL reserve method, bad debt deductions equal increase in allowable reserves plus net charge-offs:

$$BDRD_t = (a_t * TL_t - a_{t-1} * TL_{t-1}) + NCO_t \qquad (10.3)$$

b. Tax Reform

The Tax Reform Act repealed both reserve methods for bad debt deductions for "large" banks. Banks with more than $500 million in assets (or that are part of a consolidated group with more than $500 million in assets) must now use the specific charge-off method. "Small" banks may still use the experience reserve method and, until it scheduled expiration in 1988, the percentage of eligible loan method.

The bad debt reserve deduction was repealed for nonfinancial institutions as well as large banks. The reserve method generally accelerated deductions so they are received prior to the year in which the loss would be determined under the "all events test." Thus, bad debt losses were allowed more generous tax treatment than other expected future losses, such as product liability claims. Acceleration of future loss deductions is the equivalent of the government making interest-free loans to banks of the amount equal to the current tax rate time the amount of the existing tax reserve.

In addition to the change in bad debt deductions of "large" banks, the Act requires the recapture of their existing bad debt reserves into taxable income. In general, the recapture of existing tax bad debt reserves recognizes that banks have already deducted amounts added to reserves. If future charge-offs are allowed as deductions rather than as nondeductible charges to the reserve, then banks would be allowed double deductions for those losses. The existing reserve outstanding at the end of 1986 generally must be brought back into taxable income over 4 years: 10 percent in 1987, 20 percent in 1988, 30 percent in 1989, and 40 percent in 1990. The four-year recapture rule is thus more generous than requiring future losses to be charged to the reserve, which would have recaptured the reserve for most banks in two or three years.

Two exceptions are allowed to the recapture rule. First, "financially troubled" banks, which have nonperforming loans in excess of 75 percent of equity capital[3], can suspend the recapture of their existing reserve until they no longer meet this definition of financially troubled. Second, a bank may elect to include more than ten percent of its reserve balance in 1987 (or the first year of recapture). This may be advantageous to a bank with

expiring net operating losses or subject to tax credit limitations. The remainder of the reserve must then be included in taxable income: 2/9th in the second year, 3/9th in the third year, and 4/9th in the fourth year.

The recapture of the existing tax bad debt reserves will have a major effect on "large" banks' tax liability during the recapture period. Approximately 90 percent of the expected tax revenue from repeal of the bad debt reserve method during fiscal years 1987 through 1991 is due to the recapture provision. However, it should be noted that most deductions for increases in the bad debt reserve were taken at 46 percent, while the recaptured reserves are be taxed at only a 34 percent rate. This is the equivalent of the banks borrowing $1 from the U.S. government at a zero interest rate and then only paying back 74 cents (34/46) upon recapture.

2. Disallowance of Interest on Debt Used to
Purchase or Carry Tax-exempt Obligations

Before 1983, commercial banks deducted all interest paid on deposits and other borrowings irrespective of the amount of tax-exempt bonds held. Unlike corporations, banks have the ability to tax arbitrage. For example, a bank could earn after-tax profits by borrowing $100 at 10 percent (5.4 percent after-tax at a 46 percent tax rate) and investing in a tax-exempt bond yielding only 6 percent. On a pre-tax basis, this transaction results in a loss of $4, yet earns $0.40 after-tax. This rule also enabled banks to reduce their Federal tax liability nearly to zero by holding a small fraction of their assets in tax-exempt bonds.

For tax-exempt bonds acquired after 1982, pre-1986 law disallowed deductions for 20 percent of the interest on debt attributable to the purchase or carrying of tax-exempt obligations. The disallowance applied on a pro rata basis. If 10 percent of a bank's assets are tax-exempt bonds acquired after 1982, then 2 percent (10 percent times 20 percent) of interest deductions are disallowed.

The Tax Reform Act increases the disallowance percentage to 100 percent for tax-exempt bonds acquired after August 6, 1986. Exceptions are provided for public-purpose tax-exempt bonds issued by state and local government entities that expect to issue less than $10 million of such bonds during the year. Bank purchases of these issues, and bonds related to 20 specific projects listed in the Conference Report of the Tax Reform Act, are subject only to the 20 percent disallowance rule. Previously purchased tax-exempt bonds continue to have prior law treatment.

3. Special Rules for Net Operating Losses of Financial Institutions

Before the Tax Reform Act, financial institutions were allowed to carry net operating losses (NOLs) back to the prior ten taxable years and forward to the succeeding five taxable years. This special rule was adopted in 1969 to

offset the effect of the phasing-down of the percentage of eligible loan bad debt reserve method. Nonfinancial corporations were only allowed to carry NOLs back 3 years and forward 7 years (15 years after the 1981 Act). The longer carryback period increased the likelihood that NOLs could be deducted in the current year rather than carried forward into future years.

Tax reform requires financial institutions to have the same 3 year carryback and 15 year carryforward rules as all other corporations. However, a special transition rule is allowed for commercial banks with NOLs attributable to deductions for losses on bad debts. Such NOLs occurring before 1994 can continue to be carried back 10 years.

B.   General Tax Reform Provisions Affecting Commercial Banks

1.   Corporate Rate Reduction

Tax reform reduces the top corporate tax rate from 46 percent to 34 percent. The new rate schedules are shown in Table 10.1.

2.   Alternative Corporate Minimum Tax

Under prior law, corporations were potentially subject to an add-on minimum tax. Corporations had to pay 15 percent of certain preference items in excess of the greater of their regular tax liability or $10,000, in addition to their regular tax liability. The only bank-specific preference item was the excess of the percentage of eligible loan reserve method deduction over the experience reserve method deduction. By the 1980's most banks were not subject to the add-on corporate tax.

The Tax Reform Act repealed the add-on minimum tax and substituted a broadbased 20 percent alternative corporate minimum tax. The bad debt reserve preference item was retained as the excess over the experience method reserve

Table 10.1 Corporate Tax Rate

Taxable Income	Prior Law	1987	1988 and Beyond
	(percent)		
$25,000 or less	15	15	15
$25,000-$50,000	18	16.5	15
$50,000-$75,000	30	27.5	25
$75,000-$100,000	40	37	34
$100,000-$335,000	46	42.5	39
$335,000-$1,000,000	46	40	34
$1,000,000-$1,405,000	51	42.5	34
Over $1,405,000	46	40	34

deduction, but will be meaningless for banks after the expiration of the percentage of eligible loan reserve method after 1987. However, a number of preference items were added. The Act's most important preference item affecting banks is the inclusion of 50 percent of the excess of pre-tax book income over alternative minimum taxable income. "Business untaxed reported profits" are thus effectively taxed at a 10 percent tax rate. Tax-exempt interest income is the major difference between banks' book income and taxable income. No grandfathering of income from existing assets was provided, so banks' income from existing holdings of tax-exempt bonds will be subject to this tax. To the extent that book bad debt deductions exceed tax bad debt deductions, some of the tax-exempt income will continue to be fully sheltered from tax.

Two other elements of the alternative minimum tax are important to banks. First, only 90 percent of foreign tax credits and net operating losses are usable against the minimum tax. Amounts disallowed may be carried over to other taxable years. Second, minimum tax liability is allowed as a carryforward credit against regular tax liability to the extent attributable to deferral items. Minimum tax liability resulting from tax-exempt interest income, however, is not allowed as a carryforward credit.

3. Foreign Tax Credits

The Tax Reform Act made a number of changes to the foreign tax credit rules. Separate limitations for financial services income and interest income subject to high withholding taxes were included to prevent the "averaging" of domestic and foreign tax rates across different sources of income. Even with significant transition rules, over $1.1 billion in additional tax revenues in fiscal years 1987-91 are estimated from all corporations due to the separate limitation on interest subject to high withholding taxes.

4. Limitations on the Use of the Cash Method of Accounting

After tax reform, use of the cash method of accounting is not allowed for taxpayers with average annual gross receipts of $5 million or more. Additional income recognized in the first year from the required change in accounting methods must be included in taxable income over a 4-year period.

5. Investment Tax Credit and Depreciation Rules/Leasing

Tax reform repealed the investment tax credit and lengthened depreciation lives. These changes will affect depreciation deductions for banks' new physical assets (bank buildings, computers, etc.), but these account for a very small fraction of banks' total assets. A large amount of the banks' investment tax credits and depreciation deductions arise from their leasing activity. Some of the changes in the after-tax cost of leasing activity will be borne by the lessees.

III. THE BANK TAX SIMULATION MODEL

A. Overview of the Model

The banking model is designed to estimate the tax liability and after-tax profit under old law, under the Tax Reform Act of 1986, and under a variety of related proposals. There are four basic ingredients to the banking model:

° the Call Report data;
° extrapolation of the Call Report data;
° the bank tax calculator; and
° portfolio adjustment from tax-exempt to taxable bonds.

The banking tax model employs cross-section time-series regulatory accounting data. One advantage this data provides is the capability of calculating banks' tax bad debt reserves, which is the most controversial of all the tax reform provisions affecting banks. Available corporate tax return data does not include enough detail nor sufficient years of data to simulate effects of changes in allowable tax bad debt reserves. To calculate the percentage of eligible loan method reserve, FHA and VA real estate loans and loans to financial institutions are subtracted from total outstanding loans. To calculate the experience method bad debt reserve deduction in any year, data from the current and six previous years are required. Thus, to calculate the 1986 experience method reserve, data series beginning in 1980 are needed.

Several other new provisions cannot be estimated directly from tax data since relevant information had no bearing in the calculation of past tax liability. Book income, necessary for calculation of the new alternative minimum tax, was not recorded on tax returns, nor was tax-exempt income reliably reported. Both of these data items are directly available from book accounting data.

Due to the efforts of the industry's many regulators and unlike most other industries, consistent annual accounting data on nearly all firms is available for the banking sector. Our data set consisted of individual bank data for 1977 through 1984, the most recent available. These data are extended to 1985 and 1986 by extrapolating all variables from 1984 levels at the same rate as the industry's asset growth. Individual bank data is then extrapolated beyond 1986 at the same rate as forecasted nominal GNP.

The extrapolated individual bank data are used to calculate taxable income and alternative minimum taxable income. The first step in arriving at taxable income is the removal of state and local taxes and tax-exempt interest income from book income. The book provision for loan losses is added to book income, and estimated tax deductions for loan losses are subtracted. Most of these deductions are actual charge-offs and are directly available from the data. The remainder of the deductions are the addition to tax bad debt reserve.

Both the experience method and percentage of eligible loan method reserves are calculated for each bank and the largest is assumed to be the bank's chosen reserve.

For most large banks, no bad debt reserve deductions are allowed after 1986, and the outstanding tax reserve at the end of 1986 must be included in taxable income over the next four years. To calculate minimum taxable income, specified preference income and one-half of book income net of state and local taxes is added to taxable income. For each bank the graduated rate structure is applied to taxable income to arrive at regular tax liability and minimum taxable income is multiplied by 20 percent to arrive at alternative minimum tax liability. The greater of the two determines the bank's tax bill.

Banks currently have large tax-exempt holdings,[4] but lower tax rates and the total disallowance of deductions of interest to carry tax-exempts under tax reform are expected to virtually eliminate all new purchases of tax-exempt bonds by banks. Thus, in the tax reform simulations, banks' holdings of tax-exempt bonds are assumed to decline with a corresponding increase in investment in taxable assets. As taxable income replaces tax-exempt income, a large increase in tax liability occurs from this portfolio shifting. However, the negative effect of higher taxes on after-tax income is offset by the higher before-tax yields on taxable investments.

B.   Call Report Data

Reports of Conditions and Income (Call Reports) must be filed by all banks that are either members of the Federal Reserve System, insured by the part of a bank holding company, or borrow at the Fed's discount window. The reports include detailed data on loans, loan commitments, securities, deposits. as well as general balance sheet and income statement data. These individual bank data are stored on magnetic tape by the Federal Reserve; aggregations of these data are published annually in the FDIC's Statistics on Banking. The commercial bank tax simulation model uses Call Report data for over 16,000 banks from 1977 to 1984.

There are, however, several disadvantages to using Call Report data to analyze the effect of tax reform. Information about foreign tax credits, investment tax credits, and tax depreciation are not available from the Call Reports. The investment tax credit and accelerated depreciation, which account for most of the discrepancy between statutory and effective tax rates for nonfinancial corporations, play a relatively minor role in the taxation of financial institutions. The omission of foreign tax credits is more serious. particularly for large banks.

An additional shortcoming is that many banks calculate taxes on a consolidated basis. Thus, income of groups of banks as well as nonbank businesses are consolidated on the same return. Call Reports. on the other hand. are prepared for regulators on an individual bank basis. To the extent that one bank's income is sheltered by losses of another bank or other businesses

within a consolidated group, revenues calculated from Call Report data are overstated. A consolidated Call Report file, in which individual banks in a consolidated group are aggregated, was not available in time for this study. Even then, members of consolidated groups may elect to file separate returns.

C. Model Calibration

Despite the pains taken to reconcile book and taxable income, many adjustments necessary to achieve this goal could not be directly modeled because of incompleteness of the data. The resulting discrepancies between book and taxable income occur for several reasons. First, income from nonbank activities not reported to regulators are reported on the tax returns of banks that file consolidated returns with nonbank affiliates. Secondly, not all adjustments to book expenses to correct for larger corresponding tax deductions could be incorporated into the model. For example, the excess of tax over book depreciation deductions should be included in total tax deductions. Finally, as stated previously, banks file regulatory reports on an unconsolidated basis but may file tax returns with holding company affiliates. Thus, some banks may be able to shelter positive taxable income by filing a consolidated return with a bank that has losses. For all these reasons, it is not unexpected that taxable income computed by the model is different from that reported on tax returns.

These shortcomings do not greatly affect estimates of changes in bank-specific provisions. However, they are crucial in the estimations of the level of tax revenue and general tax provisions which depend on level of taxable income—namely, rate reduction and the alternative minimum tax. Unadjusted model estimates overstate the benefit to banks of rate reduction and underestimate the negative impact of the alternative minimum tax.

A two-step adjustment procedure has been employed to avoid these biases. Basically, this procedure attempts to reconcile model output to actual SOI data for the years 1980 through 1983, the latest year of aggregate tax return data available for this study. The average ratio of model to SOI total receipts from 1980 to 1983 is 1.21 and the corresponding average model to SOI total expense ratio is 1.27.[5] For the first-stage adjustment, total receipts and total expenses are multiplied by these factors. This eliminates the non-bank income and book/tax- accounting discrepancies described above.

When the model is run with these first-stage adjustments, although taxable income totals are substantially reduced, they remain above corresponding SOI figures for the 1980-1983 period. The remaining difference is due to joint filing of tax returns by profitable banks with banks reporting negative taxable income. This consolidation effect is not reflected in gross receipts or expenses. A correction to this model which uses unconsolidated data can be incorporated by adjustment to net taxable income. The average ratio of SOI taxable income to first-stage model taxable income for the 1980-83 period is 0.86. Accordingly, the second-stage model adjustment has taxable income for all banks multiplied by 0.86.

D. Extrapolation of Data

To extrapolate individual bank data to 1985 and 1986, most balance sheet and income statement items were increased from their 1984 levels by the industry's asset growth rate for 1985 and 1986. For 1987 through 1991, data was extrapolated by applying the Administration forecast of the growth of nominal GNP.[6] The growth rates applied to most data items for 1985 through 1992 are shown in the first line of Table 10.2. Extrapolations of charge-offs for loan losses, tax-exempt bond holdings, and tax-exempt interest income receive special treatment and are described below.

The calculation of the experience method reserve (and, therefore, the revenue effect of its repeal) is dependant upon to assumptions about future loan losses. Using unpublished FDIC data for 1985 and 1986, this growth rate of industry loan losses was assumed for individual banks. Industry or regulatory agency forecasts of future aggregate loan losses were not available. Loan losses depend on factors difficult to predict: the health of the agriculture and energy sectors; real estate values; whether poorly-performing loans to foreign governments will be charged-off; and unforeseen declines in other sectors. The baseline loan loss assumption predicts that the loan loss rate will return to pre-1980 levels. More pessimistic assumptions are evaluated in the sensitivity analysis in Section IV. All loan loss assumptions used are shown in the second panel of Table 10.2.

Historical experience as well as accounting relationships suggest a strong positive correlation between loan losses and the book accounting provision for loan losses. Thus, variation in loan losses generates variations in book provision for loan losses. Individual banks' provision for loan losses are assumed to equal 1.29 of their net charge-offs based on a linear least-squares regression of 1976-84 aggregate loan loss experience on net charge-offs.

Assumed percentage changes in bank holdings of tax-exempt securities are shown in the third panel of Table 10.2. As will be explained in detail in

Table 10.2   Extrapolation Assumptions Used in
             Banking Model Simulations

Calendar Year	1985	1986	1987	1988	1989	1990	1991
	(Percent)						
Baseline Growth Rate	8.9	3.3	6.5	7.2	7.2	6.9	6.4
Loan Loss Rate							
Baseline	.709	.828	.700	.600	.500	.400	.300
Static	.709	.828	.828	.828	.828	.828	.828
Pessimistic	.709	.850	.900	.900	.900	.900	.900
Change in Tax-Exempt Bond Holdings With Portfolio Adjustment	-21.5	-15.2	-27.3	-25.6	-22.5	-18.7	-16.0

Section III.F, large increases in bank holdings of tax-exempt bonds occurred at the end of 1985 in anticipation of tax reform, and a steady decline in their holdings are predicted after 1986. Total assets are still assumed to grow at the forecasted rate of GNP growth, but the composition of bank portfolios are allowed to change as a result of tax reform. Reduced holdings of tax-exempt bonds are mirrored by increased holdings of taxable securities.

E. Modeling of Tax Provisions

The bank tax simulation model estimates the tax liability and after-tax income of each commercial bank in the United States and sums these figures to estimate revenue. Several adjustments are made to book net income to arrive at regular taxable income and alternative minimum taxable income. First, tax-exempt income and state and local taxes are both subtracted from book income. Then the difference between a bank's book provision for loan losses and its the estimated tax bad debt reserve deduction is added. Finally, the graduated rate structure is applied to estimated regular taxable income of each bank and compared to 20 percent of the estimated alternative minimum taxable income. The larger amount is the bank's estimated tax liability.

1. Assignment of Tax Bad Debt Accounting Methods to Individual Banks

Before 1987 all commercial banks could use one of three methods for calculating bad debt deductions: the specific charge-off method, the percentage of eligible loans reserve method, or the experience reserve method. Banks were permitted to switch between the experience reserve method and percentage of eligible loans reserve method from year to year. Furthermore, banks were not required to reduce their bad debt reserve balance below a base year reserve as long as total loans outstanding did not decline. Until 1987, the base year reserve for each bank is its reserve in the last year it adopted the experience method; after 1988, the base year reserve is the 1987 reserve calculated under either method. The model assumes that each bank uses the method which provides the largest tax reserve.[7]

Table 10.3 **Estimated Use of the
Experience Bad Debt Reserve Method**

Calendar Year	1977	1981	1982	1983	1984	1985	1986
Number of Banks	294	376	679	1,382	2,605	3,755	4,377
Percent of Banks	2.0	2.6	4.7	9.6	18.0	26.0	30.3
Percent of Bank Assets	1.1	1.1	1.7	5.0	10.0	19.2	23.3

In the late 1970's and early 1980's, as the allowable percentage of eligible loans was phased down and as bank loan losses mounted, the model estimates that an increasing percentage of banks elected the experience method. As indicated in Table 10.3, only 2 percent of banks were estimated. As a result of tax reform, individual banks (or banks part of a consolidated group with more than $500 million in assets) are no longer allowed to include increases in their tax reserve as part of their bad debt deduction.[8] Tax deductions for loan losses, however, still result as specific charge-offs occur. Figure 10.1 shows the relationship between charge-offs and estimated tax bad debt deductions. The difference between the two, additions to tax bad debt reserve, have consistently been a small fraction of the total deduction for bad debts. For example, in 1984, only 5 percent, or $600 million, of $11.4 billion of estimated deductions for bad debt was attributable to use of the reserve methods; the other $10.8 billion was due to specific charge-offs.

2. Recapture of Existing Tax Bad Debt Reserve

Paralleling its treatment of the repeal of the reserve method, the model designates banks "large" (and therefore required to recapture existing tax bad debt reserves) only on the basis of individual bank asset size. For most banks with over $500 million in assets, 10 percent of their outstanding tax reserves at the end of 1986 are included in 1987 taxable income, 20 percent in

Figure 10.1 Commercial Bank Actual Net Charge-Offs and Estimated Tax Bad Debt Deductions, 1978-1984
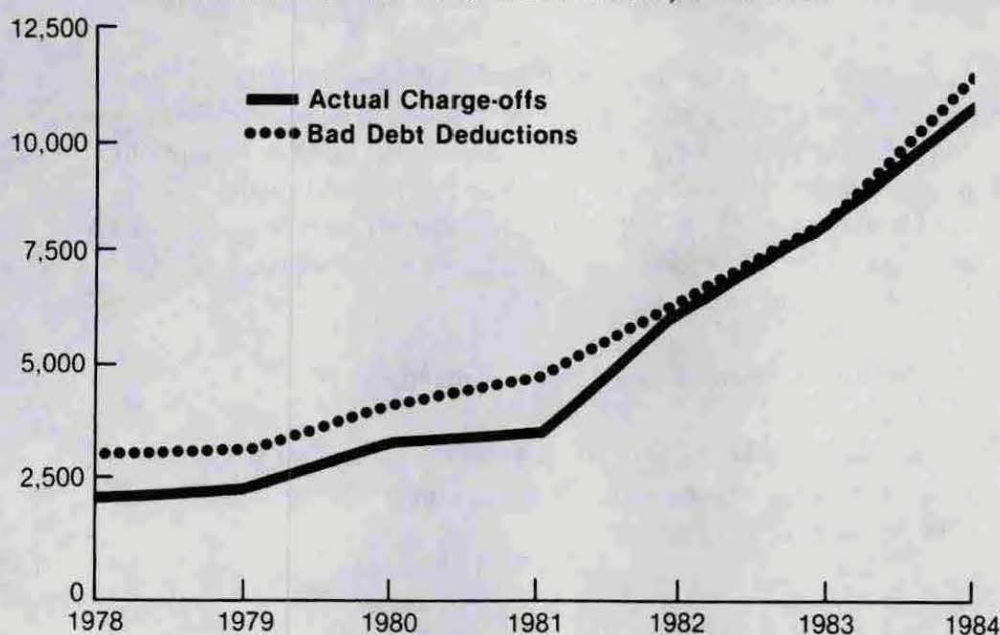
1988, 30 percent in 1989, and 40 percent in 1990. If a bank's growth causes its assets to exceed $500 million in any year starting after 1987, then 10 percent of its tax reserve are recaptured in that year with 20, 30, and 40 percent recaptured in the following years. Due to lack of data on non-performing loans the exception that allows "troubled" banks to defer recapture is not included in these simulations.

The Tax Reform Act allows large banks the choice of recapturing more than 10 percent of the existing tax reserve in the first year. Since it would be advantageous for a bank to shelter recaptured income with net operating losses, the model assumes that a bank accelerates recapture in 1987 (or its first year of recapture) if inclusion of 10 percent of tax reserve still leaves the bank with negative taxable income. For the following three years, banks taking accelerated recapture, in accordance with the Tax Reform Act, include 2/9's, 3/9's, and 4/9's of their remaining tax reserve in income.

3. The Corporate Alternative Minimum Tax

Tax reform replaces the corporate add-on minimum tax with an alternative minimum tax (AMT). Alternative minimum tax liability is generally due to the extent it is in excess of regular tax liability. A minimum tax rate of twenty percent is applied to the minimum tax base that includes regular taxable income (TI), specified tax preferences (PR), and one-half of business untaxed reported profits:

$$\text{Tentative Minimum Tax} = 0.2 * [\text{ TI } + \text{ PR } + 0.5*\text{BURP }] \quad (10.4)$$

where BURP is the excess of book income, net of state and local taxes, over regular taxable income and minimum tax preference items. The only preference income other than BURP included is the excess of bad debt reserve deductions over deductions allowable under the experience reserve method, which is only relevant for small banks in 1987. In the model, business unreported profits consist entirely of tax-exempt interest and the difference between tax bad debt deductions and book provision for loan losses.

F. Bank Portfolio Reallocation to Taxable Securities

For banks paying the regular tax at rate u and not subject to the alternative minimum tax, the net after-tax interest advantage of tax-exempt bonds compared to taxable securities is:

$$i_e - (1-u)*i_t - u* b *r \quad (10.5)$$

where i_e is the tax-exempt rate rate. i_t is the rate on alternative taxable bank investments, b is the nondeductible percentage of interest expense attributable to carrying tax-exempts, and r is average interest rate on all bank interest-bearing liabilities.

Banks find tax-exempt bonds more attractive:

° the higher the tax-exempt interest rate, i_e;
° the lower the rate on alternative assets, i_t;
° the lower the average interest expense, r;
° the lower the proportion of interest which is nondeductible, b;
° the greater the corporate tax rate, u.

Tax reform repeals the deductibility of interest used to carry newly purchased tax-exempt bonds and lowers the top statutory corporate tax rate from 46 to 34 percent. Both changes make tax-exempt bonds less attractive relative to taxable investments. Banks prefer taxables to tax-exempts by a wide margin with these two changes in effect. Tax-exempt rates relative to taxable rates must rise far in excess of their historical levels for banks to purchase new tax-exempt securities.

Tax-exempt bonds are even less attractive investments for banks facing the alternative minimum tax. For banks subject to the alternative minimum tax, the net after-tax interest advantage of tax-exempt bonds compared to taxable securities is:

$$0.9*i_e - 0.8*i_t - 0.2*b*r \qquad (10.6)$$

The 100 percent disallowance of interest attributable to tax-exempt securities, the 10 percent minimum tax on tax-exempt interest income, and the lower marginal tax rate each reduce the incentive for new purchases of tax-exempt securities by banks.

This analysis suggests that, except for qualified small issues, banks will not make new purchases of tax-exempt securities. Furthermore, banks will not sell tax-exempt bonds purchased before August 7, 1986. Despite lower tax rates, bonds purchased before tax reform remain a good deal. When old securities mature, banks will replace them with taxable investments.

In addition, tax reform had anticipation effects on bank purchases of tax-exempt securities. The tax law prompted banks to purchase extra tax-exempts before they lost their special tax treatment. The House tax reform bill slated the new law to take effect January 1, 1986. During December of 1985 commercial banks increased their tax-exempt bond holdings by approximately 20 percent. The exception for new purchases of bonds supplied by small-issuers and special projects combined with these eleventh hour purchases considerably dampened the aggregate effect of the 100 percent disallowance rule. Preliminary estimates indicate that the supply of qualified bonds will equal roughly 20 percent of what bank demand for tax-exempt bonds would have been without the 100 percent disallowance rule.

In simulations of tax reform, all banks' tax-exempt bonds holdings are reduced by the same percentage, shown in Table 10.2.[9] Then, to maintain balance sheet consistency for each bank, taxable investments are increased by exactly the decline in tax-exempt bonds. Figure 10.2 shows the banking

industry's tax-exempt bond holdings in 1984 and 1985 and estimates for later years under three different scenarios. Line (1) represents the expected growth of bank holdings of tax-exempt securities with no changes in the tax law. The jump at the end of 1985 depicted in lines (2) and (3) represents the actual increase in the holdings of tax-exempt securities by banks, presumably in response to an anticipated January 1, 1986 effective date for the new tax law. To estimate retirements of banks' August 1986, information on the maturity structure of banks tax-exempt bond holdings was used. Line (3) shows the industry's holdings decline with maturation of existing bonds and without any purchases of qualified small issues. Beginning at the end of 1986, line (2) shows the decline in tax-exempt holdings which include bank purchases of 'qualified' small issues. Line (2). taking into account extra purchases at the end of 1985 and new purchases of bonds from small issuers after 1986, represents the portfolio shifting in the simulations of tax reform.[10]

IV. SIMULATION RESULTS

The banking model was used to simulate the changes in banks' Federal tax liability and after-tax income from 1987 through 1991 due to the revisions most affecting banks. The overall effect of tax reform is an increase of $5.3

Figure 10.2 **Commercial Bank Holdings of Tax-Exempt Loans and Securities**
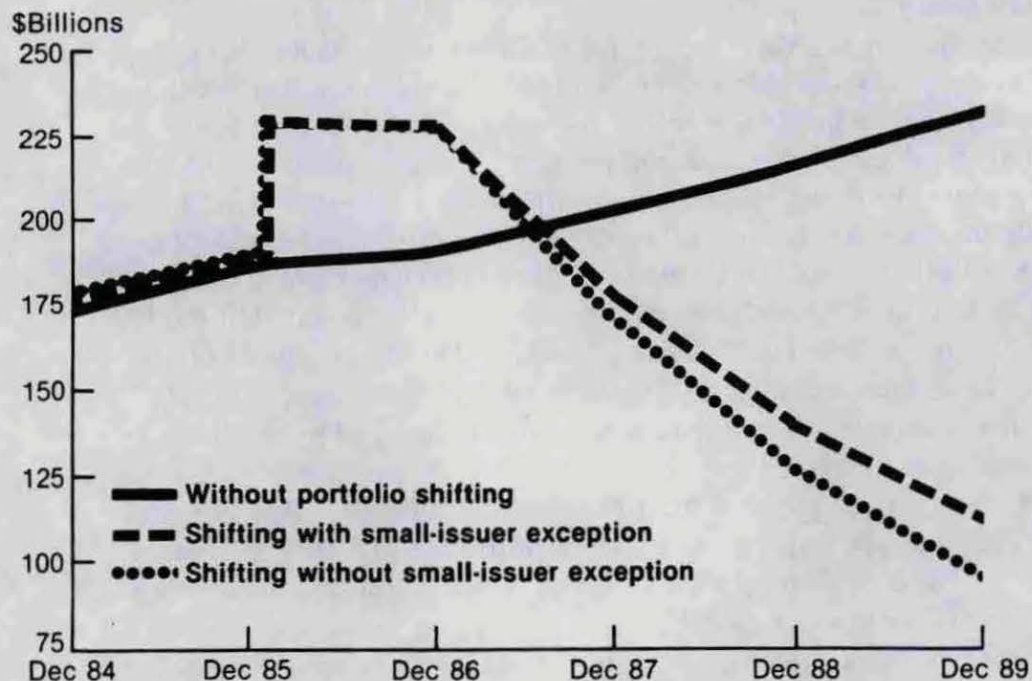
Assumes "qualified" issues are 20 percent of new issues purchased by banks with no portfolio shifting. Runoffs of new and existing issues are based on maturity structure of 1982 tax-exempt holdings.

billion over the five year period in the Federal income tax liability of commercial banks. Nevertheless, banks are net "winners" from tax reform. Despite their paying more Federal taxes, after-tax income increases by over $6.1 billion over five years due to rate reduction and higher pre-tax incomes from altered investment portfolios.

The model examines five major changes in the tax law and their interactions. The two general corporate tax changes are varied from column to column in Table 10.4: (a) the new rate structure and (b) the new alternative minimum tax. Three banking- specific changes and combinations thereof are varied from row to row: (1) the repeal of the bad debt reserve method for large banks, (2) the recapture of existing bad debt reserves into taxable income for large banks, and (3) the disallowance of deductibility of interest to carry tax-exempt securities.

A.   General Corporate Provisions

The primary benefit of tax reform to banks is rate reduction. The reduction of the top corporate rate from 46 to 34 percent by itself would reduce

Table 10.4   **Effect of Tax Reform Provisions on Banks' Federal Tax Liability and After-Tax Income Between 1987 and 1991, Total 5-Year Changes**[a]

	Without Alternative Minimum Tax		With Alternative Minimum Tax	
	46% Rate	34% Rate	46% Rate	34% Rate
	($Billions)			
(0) Changes Only in Regular Tax Rate and/or Minimum Tax				
Revenue	0	-5.76	1.59	-3.69
After-tax Income	0	5.76	-1.59	3.69
(1) Repeal of Bad Debt Reserve Method				
Revenue	0.03	-5.73	1.61	-3.67
After-tax Income	-0.03	5.73	-1.61	3.67
(2) Recapture of Bad Debt Reserve				
Revenue	2.84	-3.66	3.35	-1.90
After-tax Income	-2.84	3.66	-3.35	1.90
(3) Disallow Deductibility of Interest Allocable to Tax-Exempt Bonds				
Revenue	11.83	3.08	11.86	3.14
After-tax Income	-0.17	8.58	-0.20	8.52
(4) Changes (1), (2), and (3) Combined				
Revenue	15.09	5.49	15.11	5.53
After-tax Income	-3.43	6.17	-3.45	6.13

[a] Except for the second and third columns of Row (0) and the first column of Rows (1) to (3), these figures represent changes from current law due to combinations of tax law changes.

commercial bank taxes by $5.8 billion over the first five years of tax reform. Besides this direct benefit to banks, rate reduction lessens the impact of tax reform base-broadening measures, because each additional dollar of taxable income yields 34 instead of 46 cents in revenue. In the following sections, the benefits of rate reduction are weighed against the base-broadening provisions which raise bank tax liabilities.

The effects of the alternative minimum tax (AMT) can be observed by comparing the first and third columns and the second and fourth columns in Table 10.4. With no base broadening, the AMT increases tax liabilities by $1.6 billion under the pre-tax reform rate structure and $1.9 billion dollars with lower rates during 1987 through 1991.

The alternative minimum tax for banks is largely a function of the difference between book and taxable income because banks do not have a large amount of preference income. Recapture and repeal of the bad debt reserve method increase taxable income do not significantly reduce the alternative minimum tax. However, the large amount of portfolio switching to taxable securities, which increases taxable income by more than it increases book income, reduces much of the potential impact of the alternative minimum tax on banks. Once banks shift their portfolios toward more taxable securities few banks will have minimum tax liability. This is consistent with our earlier assertion that banks maximize after-tax income by holding enough taxable securities so that regular tax liability equals minimum tax liability.

B.   Provisions Specific to Banking

By comparing rows (0) and (1) in Table 10.4 it can be seen that repeal of the bad debt reserve method for large banks increases taxes by less than $0.1 billion under the new rate structure. The effect is small since the banks will continue to deduct net charge-offs which have been about 95 percent of tax bad debt deductions. Excess bad debt deductions have been reduced due to the phasedown and future expiration of the percentage of eligible loans method and the base year grandfathering rule which put many banks or the equivalent of the specific charge-off method.

The revenue impact of the recapture of large banks' existing tax bad debt reserves can be calculated by comparing rows (0) and (2) of Table 10.4. Under lower rates, recapture increase banks' tax liability increases by $1.8 billion over the five year period. An important distinction to make between the repeal of bad debt reserve methods and recapture is that the former is a permanent change while most of the revenue impact of recapture takes place during the 1987-1990 period.

The effects of commercial banks' shifting from tax-exempt to taxable securities due to the disallowance of interest for carrying tax-exempt securities can be calculated by comparing rows (0) and (3) in Table 10.4. Under new rates and the alternative minimum tax, portfolio shifting increases bank taxes by $6.7 billion. Nevertheless, after-tax income increases by $4.8 billion.[11]

How is it possible that banks pay more taxes yet will still be better off?

The switch to taxables is induced primarily by two factors: rate reduction and the disallowance of interest expense. However, although both these changes have the same behavioral effect, they have opposite impacts on the banks' bottom line. A switch to taxables will increase banks' taxable income and thus tax liability, but because taxable investments have higher yields than tax-exempt bonds, banks' extra tax burden is offset by higher pre-tax yields. This explains why tax increases are greater than reductions in after-tax income. However, with rate reduction after-tax yields on taxables may exceed tax-exempt yields and the portfolio switching would increase after-tax income.

The interest disallowance causes banks to switch to taxable investments, increases tax liability, and reduces after-tax income (first and third columns in row (3) in Table 10.4). This occurs because after-tax returns from taxable investments at a 46 percent rate are lower than tax-exempt yields. Rate reduction increases after-tax returns from taxable securities so that when banks switch to taxables and increase their taxes, banks could experience an increase in after-tax income assuming the implicit tax rate remains constant at 33 percent on tax-exempt bonds acquired in the future, as can be seen in the second and fourth columns in row (3) of Table 10.4.

C.   The Effects of Tax Reform over Time and on Small and Large Banks

The $5.5 billion in additional tax revenue shown in the lower right corner of Table 10.4 is not evenly spread over the 1987-91 period. The last panel of Table 10.5 shows that tax reform lowers the banking industry's tax liabilities by $0.4 billion in 1987. Taxes increase after 1987 as banks increase their purchases of taxable investments; by 1991 banks have an additional $12.6 billion of taxable income due to portfolio shifting. Taxes also tend to rise from 1987 to 1990 as the percentage recapture of existing bad debt reserves increases.[12]   Thus, relative to prior law, taxes rise from 1987 through 1990, drop in 1991 with the decline in recapture, and then resume their rise as banks continue to substitute taxables for maturing tax-exempts. The effect of tax-reform on after-tax income is relatively stable until 1991 when it jumps from $1.2 billion to $2.3 billion due primarily to the reduction of recapture from $3.2 billion in 1990 to $0.5 billion in 1991.

Just over one-quarter of the banking system's assets in 1986 were held by banks with less than $500 million in assets. Comparison of the first two panels of Table 10.5 indicates that $3.2 billion of the total increase of $6.2 billion in after-tax income flows to small banks. This larger than proportionate increase is not unexpected since small banks are not affected by recapture or repeal of the bad debt reserve method. Nevertheless, disproportionate revenue is also derived from small banks: collectively, small banks pay $2.4 billion in extra taxes while large banks only pay $3.1 billion more than under prior law over the five-year period. This is due to small banks' relatively large holdings of tax-exempt securities: these banks earned just

Table 10.5   The Effects of Tax Reform on
Small and Large Commercial Banks, by Year, 1987-1991

Calendar Year	1987	1988	1989	1990	1991	Total
			($ Billions)			

Banks with Less Than $500 Million in Assets

Additional Taxable Income:

	1987	1988	1989	1990	1991	Total
Reserve Recapture	0.00	0.00	0.00	0.00	0.00	0.00
Reserve Method Repeal	0.00	0.00	0.00	0.00	0.00	0.00
Portfolio Adjustment	0.22	1.92	3.62	4.97	6.05	16.78
Change in Tax Liability	-0.08	0.14	0.46	0.80	1.11	2.43
Change in After-Tax Income	0.16	0.50	0.75	0.86	0.90	3.16

Banks with Greater Than $500 Million in Assets

Additional Taxable Income:

	1987	1988	1989	1990	1991	Total
Reserve Recapture	3.47	1.59	2.40	3.20	0.46	10.71
Reserve Method Repeal	0.95	0.68	0.49	-0.16	-0.51	1.44
Portfolio Adjustment	0.24	2.08	3.92	5.39	6.55	18.19
Change in Tax Liability	-0.28	-0.19	0.90	1.49	0.80	3.10
Change in After-Tax Income	0.36	0.50	0.41	0.31	1.39	2.97

All Commercial Banks

Additional Taxable Income:

	1987	1988	1989	1990	1991	Total
Reserve Recapture	3.47	1.59	2.40	3.20	0.46	10.71
Reserve Method Repeal	0.95	0.68	0.49	-0.16	-0.51	1.44
Portfolio Adjustment	0.46	4.00	7.55	10.37	12.60	34.97
Change in Tax Liability	-0.36	0.33	1.36	2.29	1.91	5.53
Change in After-Tax Income	0.51	1.00	1.16	1.16	2.29	6.13

under one-half of tax-exempt interest income in 1984. In sum, small banks are bigger winners than large banks.

D.   The Effect of Tax Reform Under Alternative Scenarios

Alternative loan loss scenarios were discussed in Section 3 and displayed in Table 10.2. Although it was originally expected that different loan loss assumptions would have a significant impact on after-tax income, model simulations under different scenarios did not confirm our suspicion. Under the "static" scenario, where the loan loss rate remains constant at the record 1986 level of 0.828, net charge-offs would total $86.7 billion over the 1987-1991 period as opposed to $52.0 billion in the model baseline extrapolation;

therefore, by 1991 the experience reserve method tax reserve would have grown to $22.6 instead of $17.3. Under the worst-case "pessimistic" scenario where the aggregate loan loss rate rises to 0.9 percent in 1988 and remains at that level through 1991, net charge-offs would total $93.3 billion over the 1987-91 period and by 1991 the experience reserve method tax reserve would have grown to $22.8. However, these increases of $5.4 and $6.5 billion in taxable income only translate respectively into $0.5 billion and $0.6 billion in extra taxes. These low effective average tax rates occur because firms with large losses have little taxable income and pay little tax anyway. The alternative minimum tax has little impact since increases in loan losses reduce book income by almost as much as the reduction in taxable income.

V. FUTURE EXTENSIONS OF THE BANKING MODEL

The current version of the banking model is designed to provide revenue estimates and serve as a tool for analysis of the major provisions of the Tax Reform Act of 1986 that affect commercial banks. This section outlines potential model improvements for more refined estimates.

A. Tax Provisions Not Included

The primary reason for not modeling specific provisions is lack of data. The usual suggested correction for this problem is to estimate for each bank the missing data item from that bank's data where the relationship is determined from other information. This section lists shortcomings of the model, resultant biases, and potential improvements.

1. Foreign Tax Credits

Modeling foreign tax credits requires information about foreign taxes and foreign income. Alternatively, extrapolations of 1983 SOI tax return data could be undertaken. Non-inclusion of this provision causes U.S. taxes to be higher than they would be otherwise. Foreign tax credits are most advantageous to large banks with overseas income. Since tax reform reduces foreign tax credits, the revenue increases under tax reform, especially for large banks, will be larger than shown in these simulations. The separate FTC limitation for income subject to gross withholding greater than 5 percent is estimated to yield an additional $1.1 billion in tax revenue over the 1987-91 period.

2. Investment Tax Credits and Accelerated Depreciation

Estimating investment tax credits and accelerated depreciation requires information about tangible investment that is not available in current Call

Report data set. The repeal of the ITC and reduction in depreciation deductions increases the tax liabilities of all banks, and this increase in tax liability is not captured in these simulations.

3. Carryforwards and Carrybacks

The model should have banks with tax losses building up stocks of unused NOLs and using them in years with positive taxable income. In general, the non-inclusion of carryforward and carryback provisions causes tax liabilities to be overstated. In addition, tax liabilities of any one bank will have more variance over time. (Offsetting current taxable income with unused NOLs will smooth out peaks in tax liability.) The change in carryforward and carryback provisions under tax reform will cause banks to carryforward, rather than carryback, more losses which reduces the present value of the losses. The estimated revenue effect from the change was only about $0.1 billion in 1987-91.

4. The "Troubled Bank" Exception

Banks with high percentages of nonperforming assets are allowed to suspend recapture of tax reserves into income until the quality of their loan portfolio improves. Thus, these simulations recapture bad debt reserve into taxable income more quickly than will actually occur. This causes the simulation revenue estimates of tax reform to be too high in the early years and too low in later years. Estimates indicate that the troubled bank exception will reduce revenue by $0.5 billion over the 1987-91 period.

5. Other Excluded Provisions

As stated earlier, these simulations allow banks with less than $500 million in assets on an individual basis continued use of the reserve method (and also no recapture). This treatment overstates the extent of the small bank exception. Thus, the change in revenues in these simulations is understated.

In addition, repeal of the cash method of accounting was also not modeled. Repeal of the cash method of accounting for banks was estimated to raise about $0.5 billion between 1987 and 1991.

B.   Extrapolation Features Not Included

More elaborate extrapolation techniques would improve individual company estimates but have not yet been incorporated in the model. These include non-uniform growth rates for different firms and different balance sheet and income statement items, and consistent treatment of balance sheet and income statement accounts.

Even if there were a high-degree of confidence in the forecast of aggregate growth of bank assets and liabilities, revenue estimates are sensitive to how this growth is distributed among firms. More realistic revenue estimates would include a distribution of growth rates for individual firms consistent with forecasted aggregate growth.

Growth of all assets and liabilities by the same aggregate rate, as is assumed in these simulations, maintains balance sheet consistency for each firm. However, banks may change the composition of their balance sheets while growing at the aggregate asset growth rate. The model maintains balance sheet consistency in the case of changes in portfolios from tax-exempt to taxable securities, but assumes equal growth rates for all other assets.

If corporate profits are targeted at one growth rate and certain income or expense items, such as the provision for loan losses, are assumed to grow at different rates, assumptions about the growth rates of other income and expense items must be made which are consistent with each bank's income identity. Currently, the model does not employ a general mechanism to reconcile disparate growth rates of income statement items.

Several balance sheet items, such as provision for loan losses and depreciation, have direct effects on the balance sheet. Conversely, income (or expense) flows from asset (or liability) stocks should be consistent with reasonable assumptions about rates of return. For example, if interest-bearing assets grow by ten percent and interest rates are expected to rise, interest income can be expected to grow by more than ten percent.

C. Shortcomings of Forecasts

Aside from the issues surrounding the question of the proper extrapolation techniques, revenue estimates rely heavily on forecasts of target variables. The key target variable in these simulations is total bank assets. Bank asset growth is affected by macroeconomic conditions which are in themselves difficult to forecast. However, in addition, as outlined above, many non-macroeconomic factors may affect industry growth. Relaxation and/or tightening of various regulations of not only banks but their competitors will affect the future of commercial banking. Similarly, taxation of current or potential banking competitors or innovation in financing technology or techniques could affect the banking industry's share of total financial services income.

To the extent that tax reform increases after-tax income of banks, growth of the banking sector should be expected. All these factors add uncertainty to forecasts of commercial bank assets. However, although errors in forecasts greatly affect the level of bank profits and taxes, the difference in after-tax profits and taxes due to tax reform (i.e. revenue estimates) will be considerably smaller because the marginal tax rate is less than 100 percent.[13]

VI. SUMMARY AND CONCLUSION

Base-broadening provisions specific to banks—namely, the repeal of the bad debt reserve method, the recapture of existing bad debt reserves into taxable income, and the disallowance of interest costs used to carry-tax exempts securities—are commonly highlighted when assessing the effects of the tax reform on banks. However, empirical analysis with a model using individual bank data shows that the added tax liability due to these provisions, along with the alternative minimum tax, is offset largely by rate reduction.

Although banks on the whole pay more taxes over the 1987-91 period, the banking industry's after-tax income increases because additional interest income will be earned when banks shift their portfolios to taxable securities. Taxable securities earn higher yields than tax-exempt securities, and, because of tax reform, they are taxed at lower rates.

APPENDIX

DERIVATION OF CONDITIONS FOR HOLDING TAX-EXEMPT SECURITIES

Banking Facing Regular Tax

Abstracting from the important considerations of risk and liquidity, a bank with only two assets picks the level of each (and implicitly, by the balance sheet constraint, total liabilities) in order to maximize after-tax profit. A firm subject only to regular tax and not the minimum tax has an after-tax profit function:

$$P = i_e * TE + i_t * BA - i_D * DD - OC - u* \{i_t * BA - [i^D * DD - b * IE * TE/(TE+BA)] - OC\} \quad (10.A1)$$

where P = after-tax profit;

TE = holdings of tax-exempt securities;

BA = holdings of other (taxable) loans and securities;

DD = bank liabilities;

OC = noninterest costs;

i_e = interest rate on tax-exempt securities;

i_t = interest rate on other assets;

i_D = interest rate on bank borrowing (deposits);

u = statutory corporate tax rate;

b = the percentage of interest expense disallowed;

IE = total interest expense = $i_D * DD$.

By using the balance sheet identity to eliminate BA (=DD-TE) from the profit function (10.A1), differentiating with respect to TE, and setting the derivative equal to zero, the net-after tax interest advantage of tax-exempts compared to taxable securities is:

$$i_e - (1-u)*i_t - u*b*r \qquad (10.A2)$$

where r = interest expense as a fraction of total assets ($=$ IE/TA). Banks purchase tax-exempt bonds only if (10.A2) is positive. According to equation (10.A2) if taxable bonds earn 9 percent interest and bank average interests expense is 6 percent, under pre-tax reform law tax-exempt bonds yielding only 5.4 percent (or 60 percent of the comparable taxable yield) would be preferred to taxable investment. After-tax reform tax-exempt rates would have to rise to 8.0 percent (or 88.4 percent of comparable taxable yield) to be attractive to banks.

Banks Facing the Alternative Minimum Tax

A bank subject to the new alternative minimum tax has the profit function:

$$P = (i_e*TE + i_t*BA - i_D*DD - OC)*(1-0.5*m) - m*PR$$
$$- 0.5*m * \{i_t*BA - OC - [i_D*DD - b*IE*TE/(TE+BA)]\} \qquad (10.A3)$$

where

    m = the minimum tax rate ($=$ 20 percent);
    PR = dollar amount of preference income.

Again, by substituting the BA+TE for DD, differentiating with respect to TE. and setting the derivative of profits equal to zero, the net advantage of tax-exempts over taxable securities for banks subject to the minimum tax can be derived:

$$i_e * (1-0.5*m) - i_t *(1-m) - 0.5* m *b *r \qquad (10.A4)$$

For banks with taxable investments earning 9 percent, an average interest expense of t percent and an alternative minimum tax rate of 20 percent, the tax-exempt rate would have to rise above the taxable rate of 8.7 percent for its after-tax yield to exceed that of taxable investment for banks.

FOOTNOTES

[1] See Joint Committee (1984) and Marovelli (1986).
[2] It should also be noted that the 1982 Tax Act reduced the benefit of PEL reserve method by disallowing 15 percent of the excess of the PEL method deduction over the allowable deductior

computed under the experience reserve method. The disallowance was increased to 20 percent for tax years after 1984. The disallowance affected few banks due to the phase-down of the allowable percentage and to the base year reserve.

[3] Nonperforming loans or loans that are either 90 or more days past due, "nonaccrual loans" or "renegotiable troubled debt." Equity capital means the equity of a bank as defined for regulatory purposes. It does not include any book reserve for loan losses.

[4] At the end of 1984 banks held over $170 billion in tax-exempt investments. Banks with assets size of less than $300 million had tax-exempt holdings equal to 9.6 percent of their assets. while the larger banks held only had 6.1 percent of their assets in tax-exempt investments.

[5] The two first stage adjustment factors and the second data adjustment factor was calculated as follows:

	1980	1981	1982	1983	Average
Ratio of SOI to unadjusted model output:					
Total Receipts	1.14	1.19	1.27	1.26	1.21
Total Expenses	1.19	1.24	1.32	1.31	1.27
Ratio of SOI to first-stage model output:					
Net Taxable Income	0.91	0.67	0.89	0.95	0.86

[6] Before-tax book profits of the banking industry as a percentage of GNP were 0.55 in 1976. increased to 0.71 in 1979 and 1980, and declined to 0.55 in 1984. Bank profits over this period generally moved with interest rates; however. deregulation of deposit rates will reduce the positive correlation between bank profits and interest rates. In addition, other structural changes in commercial banking make profits difficult to forecast. Repeal of the Glass-Steagall Act would allow banks to enter other activities, most notably. investment banking, which may increase the banking industry's total profits in the long-run. but not necessarily in the near future. Income from service charges will increase banks profits, while increased competition from other intermediaries (e.g., credit unions, thrifts) and financial instruments (e.g., commercial paper, collateralized mortgage obligations) may reduce profits.

[7] The assumption is consistent with after-tax profit maximization. if tax minimization results from acceleration of deductions. Banks may not want to accelerate deductions if they expect that tax rates they may increase or that loss carryforwards from deductions might expire.

[8] As mentioned above. Call Report data is only available on an unconsolidated basis. In the banking model. banks eligible for the small bank exception are defined as those individual banks with less than $500 million in assets. This overstates the percentage of industry assets to which the small bank exception applies.

[9] A later paper extends the model to include endogenous financial portfolio holdings of commercial banks with more detailed specification of banks' tax-exempt bond holdings. See Neubig and Sullivan (1987).

[10] This differs from the standard treatment in revenue estimation of pre-enactment effects described in Howard Nester's "A Guide to Interpreting the Dynamic Elements of Revenue Estimates" in Chapter 1 of this volume. Consistency with the revenue estimating methodology would require including the end-of-1985 surge in purchases of tax-exempt securities in the baseline simulation.

[11] The estimated change in after-tax income is sensitive to the estimated future tax-exempt taxable yield ratio. The estimates in the paper assume taxable yields are 150 percent of comparable tax-exempt yields. If the yield differences narrow. then the change in after-tax income would be smaller.

[12] In the calculation of tax revenue low average effective tax rates apply to the large amount of recapture in 1987 since $2.8 billion of the total of $3.5 billion is accumulated by firms with no current tax liability that are assumed to have opted to accelerate recapture.

[13] As a simple example, consider a revision of industry five-year profits from $140 to $130 billion.   The effect of the revised forecast on the revenue estimate of a rate change (if all firms were fully taxable at the top rate) from 46 to 34 percent would be a revision of the revenue loss figure from $16.8 to $15.6 billion.

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