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LIABILITIES

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Working Paper 12923
<http://www.nber.org/papers/w12923>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
February 2007

We are grateful to Melissa Andrews, Robert Brantley, Seema Kacker, Katherine Jackson, and Ekaterina Pak for outstanding research assistance in collecting 10-K data entries, to James Hines, Richard Larsen, Thomas Neubig, Richard Sansing, Andrew Schmidt and Jake Thomas for helpful comments and discussion, and to the American Tax Policy Institute, the Bradley Foundation, and the National Science Foundation for research support. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 12923
February 2007
JEL No. H25,M41

ABSTRACT

This paper investigates the importance of deferred tax assets and liabilities for a sample of large U.S. corporations between 1993 and 2004 and documents substantial heterogeneity in the deferred tax positions of different firms. In 2004, 25 firms in a sample of 73 reported net deferred tax assets and 48 reported net deferred tax liabilities. Firms differ substantially in the composition of their deferred tax assets and liabilities. The largest components of deferred tax assets for sample firms are Loss and Credit Carryforwards and Employment and Post-employment Benefits. The largest components of deferred tax liabilities are Property, Plant & Equipment and Leases. Total deferred tax assets for sample firms with net deferred tax assets in 2004 were \$61.9 billion, while total deferred tax liabilities for sample firms with net deferred tax liabilities were \$223.8 billion. A five percentage point decline in the federal statutory corporate tax rate could reduce net income at sample firms with net deferred tax assets by as much as \$8.8 billion, since a statutory rate cut would reduce the value of deferred tax assets and this change would be reflected on the income statement. We use data on the sales, market value, and assets of sample firms, relative to aggregate data for the U.S. corporate sector, to estimate the aggregate value of deferred tax assets and liabilities.

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Research on the economics of corporate taxation has historically ignored the financial accounting rules that link tax liabilities and payments to reported earnings. In contrast, accounting researchers have long recognized the potential impact of accounting rules not only on reported earnings but also on other aspects of firm behavior. Recent disparities between book and tax earnings, discussed for example in Desai (2005), Hanlon and Shevlin (2005), Joint Committee on Taxation (2006), and Mills and Plesko (2003), have drawn attention to tax accounting issues.

This paper examines deferred tax assets (DTAs) and deferred tax liabilities (DTLs) that are created by temporary differences between book and tax accounting provisions. We present new information on the aggregate value of both DTAs and DTLs, as well as on the effect of statutory corporate tax rate changes on these balance sheet items and on net earnings. We also discuss several non-tax policies that could affect deferred tax positions. For example, changes in federal social insurance programs such as Medicare could affect a firm's assets and liabilities related to employee health benefit commitments as well as the associated deferred tax positions. When estimating the effect of a policy change on a firm's financial status, legislators should recognize that removing a post-employment benefit liability will not improve a firm's balance sheet by the full amount of the liability since there is an offsetting deferred tax asset.

Deferred tax positions are likely to become more prevalent and to increase in magnitude as GAAP increases its reliance on fair-value accounting over transaction-driven cash-basis accounting. For example, SFAS 115, *Accounting for Certain Investments in Debt and Equity Securities*, which took effect in 1994, changed the accounting principles governing investments in debt and equity instruments. Prior to SFAS 115, gains and losses on debt and equity securities were recognized in both book and tax income at the time of sale. Under SFAS 115 firms may categorize their security investments to recognize unrealized security gains and losses either in net income or in other comprehensive income. Because the tax recognition rules for security gains and losses have not changed, SFAS 115 creates a temporary book-tax difference and generates a deferred tax position.

This paper is divided into five sections. The first explains how temporary differences between book and tax accounting generate deferred tax assets and liabilities, and it reviews previous research that has examined financial accounting issues that bear on deferred taxes. The second section describes the data set that we have assembled from a sample of SEC filings. It reports summary statistics on the number of firms in our sample with DTAs and DTLs and on the total value of these deferred tax positions. Section three extrapolates DTAs and DTLs from our sample to estimate the aggregate stock of DTAs and DTLs for the U.S. corporate sector. It also estimates the aggregate effect of a statutory rate change on corporate net income. The fourth section examines the relative importance of different types of temporary book-tax differences, such as those associated with depreciation of property, plant and equipment, retiree health costs, and accounting for leases. It also describes a number of policy changes that could lead to revaluations of deferred tax assets and liabilities. There is a brief conclusion.

1. Temporary Differences between Book and Tax Earnings

A firm's total tax expense, an accounting concept, equals its statutory corporate tax rate times its taxable book income. Taxable book income, which corresponds to income earned today that will be taxed at some point in time, equals pre-tax book income less permanent differences between book and tax income. Permanent differences arise when accounting rules and tax rules treat components of income or expenses in different ways. Examples of permanent differences are the treatment of municipal bond income, which is not included in taxable income but is included in book income, and the reporting of fines and penalties, which are not deductible for tax purposes but are deductible in computing book earnings. Permanent book-tax differences do not generate deferred tax assets or liabilities; their impact on the firm's accounting earnings is fully reflected when they accrue.

Temporary book-tax differences arise when accounting rules and tax rules differ on *when* a component of income is recognized. One example is the recognition of compensation expenses such as bonuses. Accounting standards attempt to match effort with accomplishment and so accrue

expenses incurred but not yet paid. The tax code, which tries to limit the number of assumptions used to compute taxable income, more closely matches cash-basis accounting for expenses.

Current tax expense is an estimate of the firm's taxes to be reported on its current year tax returns. Temporary book-tax differences generate disparities between a firm's current tax expense and its total tax expense. These disparities are deferred tax expenses. Provided tax rates are constant through time,

$$\begin{aligned} (1) \quad \text{Deferred Tax Expense} &= \tau * \text{Temporary Differences} \\ &= \text{Total Tax Expense} - \text{Current Tax Expense}. \end{aligned}$$

Temporary differences can arise from many sources, such as differences between depreciation schedules for book and tax purposes, differences in accounting and tax rules governing the accrual of expenses for retiree health benefits, and differences in the book and tax treatment of leases. Equation (1) does not hold when there are tax rate changes, which require deferred tax revaluations.¹

Deferred tax assets and liabilities are defined as the current statutory corporate tax rate times the historical sum of the firm's temporary differences:

$$(2) \quad \text{Deferred Tax Liability}_t = \tau_t * (\sum_i \text{Temporary Differences}_{t-i}).$$

Firms with a positive sum of temporary differences, where the cumulated total tax expense exceeds the cumulated current tax expense, have a net deferred tax liability (DTL). Such firms owe future taxes: they have not yet paid taxes on income that has been booked for accounting purposes. Firms for which taxable income has exceeded book income will, in contrast, have a deferred tax asset (DTA); they are owed future tax relief. They have already paid taxes on income that has not yet been reported for accounting purposes.

SFAS 109, *Accounting for Income Taxes*, which took effect for fiscal years beginning after December 15, 1991, prescribes the current rules governing deferred tax assets and liabilities. Our sample begins in FY 1993, the first year when some firms' financial statements were prepared in accordance with this regulation. Three features of SFAS 109 are particularly important for our

analysis. First, firms must report both deferred tax assets and deferred tax liabilities, not just a net deferred tax position. Deferred tax positions are presented on the balance sheet based on current/non-current classification, as determined by the current/non-current status of the underlying asset or liability that gave rise to the deferred tax position. Second, firms must adjust their reported DTAs and DTLs when laws change. Changes in statutory corporate tax rates, for example, must be reflected in a firm's DTAs or DTLs. This can link tax policy changes to reported earnings in a way that goes beyond the taxation of current income. For many firms, and for many but not all components of deferred taxes, a reduction in the statutory corporate tax rate would reduce the value of deferred tax assets and therefore reduce current earnings. Third, SFAS 109 requires firms to report a valuation allowance that indicates the probability of realizing deferred tax assets. This permits investors to more accurately value the tax cost or tax benefit associated with a DTA or DTL.²

Previous research has examined how analysts process information on deferred taxes and how the capital market values firms with deferred tax assets and liabilities. Chen and Schoderbek (2000) study how analysts reacted to changes in deferred tax assets that were triggered by the 1993 corporate tax rate increase. They test whether analysts recognized that such changes were transitory and that they had little or no predictive power for future earnings. Their findings suggest that analysts reacted to the component of earnings that was due to the revaluation of deferred tax assets in the same way that they reacted to other components of earnings and that they did not disaggregate the earnings news by source. The degree of erroneous reaction to the tax-induced earnings change was greatest at firms with the least revealing tax footnotes.

Schmidt (2006) examines a related issue concerning the tax component of earnings and its role in forecasting. He distinguishes initial and revised tax change components and rejects the null hypothesis that earnings changes due to variation in effective tax rates are transitory shocks with no long-run effects on earnings. The initial tax change component appears to be persistent and to contain information that helps forecast future earnings.

The valuation of deferred tax positions has attracted both conceptual and empirical research. Guenther and Sansing (2000) develop an analytical model for valuation of a firm with a deferred tax asset or liability. Givoly and Hayn (1992) study how share prices of firms with DTAs and DTLs reacted to the passage of the 1986 Tax Reform Act, which reduced corporate tax rates. They find that investors viewed DTLs as true liabilities, and that legislative changes that reduced the likelihood of paying these taxes had a favorable effect on share prices. Amir, Kirschenheiter, and Willard (1997) present related empirical findings on the market value of deferred tax components. They focus on Fortune 500 companies in fiscal years 1992-1994, and disaggregate deferred taxes to test the hypothesis that different components have different valuation effects. Their results suggest that market participants examine DTAs and DTLs at a disaggregate level.

2. Data Collection and Summary Findings

Our study of deferred tax positions aims to provide information on the significance and make-up of deferred tax positions and to explore how deferred tax balances have changed since the implementation of SFAS 109. Data on DTAs and DTLs can be used to quantify the potential earnings consequences of changes in corporate tax rates or other policy proposals, an often overlooked effect that may be of interest to policymakers. Publicly-available data sources such as Compustat do not contain sufficient detail on deferred tax positions to permit analysis of temporary book-tax differences. We therefore collect data from firms' 10-K filings. This section describes our sample and presents summary statistics.

2.1 Sample Construction

We collect data from the tax footnote in 10-K filings for FORTUNE 50 firms for fiscal years between 1993 and 2004. FORTUNE ranks firms by gross revenue.³ Our sample includes both financial and non-financial firms. Since we are interested in tracking DTAs and DTLs over time, we use the annual FORTUNE 50 lists to construct a panel data set on firm tax information. We collect data on any firm in the FORTUNE 50 in any year in our sample for the entire sample period, even if

the firm was not in the FORTUNE 50 in all of our sample years. There is moderate turnover in the FORTUNE 50. Only 25 of the firms in the 1995 FORTUNE 50 were in the 2004 FORTUNE 50. Nine of the 50 firms on the 1995 list had been acquired by 2004. In a typical year, five firms leave the FORTUNE 50 for various reasons.

A total of 100 firms appear in the FORTUNE 50 at least once during our twelve year sample. We drop nine because of data limitations. Chrysler and Amoco are acquired by foreign firms and do not have adequate disclosure after they are acquired, State Farm Insurance and TIAA-CREF are private companies that are not required to file a 10-K, Motorola provides extremely limited tax disclosures, McKesson and Allstate disclose only in proxy statements which we could not locate, and Fannie Mae and Freddie Mac are government-sponsored entities which may have different reporting incentives than private companies. Our remaining sample includes 91 firms.

Corporate control transactions complicate the problem of tracking FORTUNE 50 firms backward and forward through time. The sample firms acquire other firms, or in some cases are themselves acquired. When this occurs we expand our sample to include the acquired or acquiring firm in earlier years. To preserve data comparability over time, we create a “super-firm” by combining the distinct accounts of the two firms that subsequently consolidated. We exclude two “super-firms,” Cardinal Health and MCI Worldcom, from our sample because they engage in substantial private merger and acquisition activity which we cannot track. Excluding these two “super-firms” brings the number of Fortune 50 firms included in our sample to 89.

Because most of the companies acquired by FORTUNE 50 firms are companies that are not part of the FORTUNE 50, in constructing “super-firms” we collect data on many small firms as well as on the large firms in the FORTUNE 50. Collecting data on acquisition targets increases the number of firms in our sample to 222 firms. Each of these firms is included in our data base for at least one year. These firms combine to create 74 “super-firms.” Due both to limited availability of electronic filings in the early years of our sample and to the non-traded nature of some firms in our

sample, we have fewer super-firms early in our sample. There are 64 “super-firms” in the first year of our sample (1993), and 73 in the final year. Appendix A lists our sample firms. In our analysis of deferred tax positions, we use “super-firms” rather than individual companies as our units of observation to preserve comparability across years.

SFAS 109 mandates the following disclosures in a firm’s annual financial statements: (i) the income tax summary, which details the significant components of income tax expense; (ii) the rate reconciliation, reconciling reported income tax expense with the amount that would result from applying the domestic federal statutory rate to pretax income; and (iii) the schedule of deferred tax positions, which provides information about DTAs and DTLs. These three primary disclosures are generally presented in tabular format. Firms also are expected to disclose information regarding the amounts and expiration dates of loss and credit carryforwards, the division of tax expense between continuing operations and all other items, the composition of earnings before income taxes (domestic, foreign, and total), and temporary differences for which the firm has not recorded a deferred tax liability, including permanently reinvested foreign earnings. Often, these supplemental disclosures are provided in text format. Appendix B offers an example of an income tax disclosure.

We collect the tax summary, the rate reconciliation, and the schedule of DTAs and DTLs from each firm’s tax footnote. Our analysis relies primarily on the last of these. There is substantial variation across firms in the level of detail presented in the footnote, although most firms follow a fairly stable reporting policy from year to year. Appendix C describes our procedure for disaggregating DTAs and DTLs into their component parts. After collecting this information, we match each firm-year observation with COMPUSTAT using both firm name and year. We validate the match using total assets and net income.⁴

2.2 Data Limitations

There are several potential difficulties with the measures of deferred tax assets and liabilities that we collect from 10-K filings. First, SFAS 109 is a world-wide consolidated firm disclosure.

Most firms operate under multiple taxing jurisdictions, but do not disaggregate income tax disclosures by jurisdiction. Most firms consolidate foreign and domestic tax accounts, as well as state, local, and federal tax accounts within the United States. This makes it difficult to determine how changes in U.S. federal statutory tax rates alone would impact the reported DTAs and DTLs. For some firms with substantial multinational operations facing temporary book-tax differences in foreign jurisdictions that are similar to those they face in the United States, this may be an important limitation. State statutory tax rates are considerably lower than federal statutory rates, so the state and local limitation is likely less severe than the foreign limitation. Rather than attempt to disaggregate these different jurisdictions using an arbitrary method, we acknowledge this data limitation and proceed with estimates under the assumption that all DTAs and DTLs relate to federal temporary differences.

Second, we assume that all DTAs and DTLs will be affected by statutory rate changes. Tax credit carryforwards will not be affected by a rate change because, as credits, they apply below the tax computation and so are independent of the current statutory rate. By assuming that all DTAs will be affected by a change in the statutory rate, we may overstate the effect of a statutory rate change. We attempt to address this concern by separating credits from other carryforwards where possible. We make the conservative assumption that any disclosure which includes credits, such as “Net Operating Loss and Credit Carryforwards or Tax Carryforwards,” is entirely credits. In 2004, credit carryforwards including foreign tax credit carryforwards average \$538 million per sample firm, or almost 65 percent of the total carryforward category and approximately 15 percent of total deferred tax assets. This provides an upper bound for the carryforward-related DTAs that would not be affected by a statutory rate change.

Third, we assume that changes in DTAs and DTLs will affect net income. There are at least two instances where this will not be the case: Mark-to-market adjustments for available-for-sale (AFS) securities will affect Other Comprehensive Income rather than Net Income and changes to

purchased DTAs and DTLs will affect Goodwill rather than Net Income. This assumption will not affect our estimates of the change in the DTA or DTL but will cause us to overestimate the effect of such a change on Net Income. While we do not often have information about purchased DTAs and DTLs, firms do sometimes disclose deferred tax positions related to AFS securities separately. Where possible, we separate AFS securities from other items marked-to-market. Disclosed AFS securities are a very small proportion of total mark-to-market deferred tax positions. DTAs average \$2 million per firm in 2004 relative to average total mark-to-market DTL of \$267 million per firm.

Finally, firms may make different auxiliary assumptions in computing and presenting the value of DTAs and DTLs. These differences may lead a statutory tax change or another shock to the policy environment to have different impacts on different firms. We do not have any information regarding the detailed calculations underlying the tax footnotes.

2.3 Summary Findings

Table 1 presents summary information on our sample, including the number of firms included each year and their market value. The last four columns show the number of firms in each sample-year that report deferred tax assets, the number that report deferred tax liabilities, and the total value of these deferred tax positions. The data demonstrate the heterogeneity in firm tax positions, as well as the evolution of these positions through time. In 1993, 31 “super-firms” report net deferred tax assets of \$50.7 billion, while 33 report net deferred tax liabilities of \$68.6 billion. In addition to showing that a higher proportion of our sample firms have a net DTL than a DTA, Table 1 also reveals that firms with a net DTL have a larger deferred tax position than firms with a DTA. The average net DTL is \$2.1 billion in 1993 while the average net DTA is \$1.6 billion. The proportion of net DTL firms increases through our sample period, and in 2004, 25 of the 73 sample “super-firms” report net DTAs, while 48 report net DTLs. The average net DTL also increases during our sample, rising 125% to \$4.7 billion in 2004 while the average net DTA increases only 56% to \$2.5 billion over the comparable period. The descriptive statistics in Table 1 show that the

changes in deferred tax liabilities have outpaced the changes in deferred tax assets for firms in our sample, leading to an increase in both the number of firms with DTLs and the size of net DTLs.

Tables 2 and 3 present more detailed information on the composition of deferred tax positions. Table 2 disaggregates deferred tax positions into their constituent components, and indicates the sources of the most important temporary book-tax differences, while Table 3 separates deferred tax asset positions from deferred tax liability positions for components which are not overwhelmingly asset or liability. Average firm amounts facilitate comparison across years with different sample sizes, although they are sensitive to the set of firms included.

The results in Table 2 display some variation in the key sources of deferred tax positions within our twelve year sample. At the start of our sample, the most important source of deferred tax assets, other than unclassifiable deferred tax positions, was Other Post-Employment Benefits (OPEB), which is primarily retiree health and pension when it is not separately stated. The most important source of deferred tax liabilities was Property, Plant and Equipment (PPE). Other major factors in deferred tax assets were Employee Benefits, which includes deferred and accrued compensation, accrued vacation, stock-based compensation, accrued employee medical and OPEBs and pension when they are not separately stated, and both NOL Carryforwards and Tax Credits and Other Carryforwards, which includes investment tax credits, general business credits, research and development credits and NOL Carryforwards when they are not separately stated. Other significant contributors to deferred tax liabilities were related to Leases and Other Mark-to-Market Adjustments, which are related to unrealized security and derivative gains and losses that have been recognized for financial purposes.

While the overall ranking of the categories does not change dramatically during our sample, the magnitude of certain categories does change. Tax Credits increase 265% from \$148 million to \$538 million and NOL Carryforwards increase 135% from \$129 million to \$305 million. Valuation Allowances do not increase in tandem with the Credit and Carryforward increases. The rise in NOL

Carryforwards can be partly explained by the extension of the carryforward period under the Taxpayer Relief Act of 1997. There are also dramatic changes to the categories relating to employee or post-employment benefits. DTA Employee Benefits more than double from \$263 to \$548 million, the DTA component for OPEB falls by more than half, and the DTL for Pensions increases from \$18 to \$226 million. Changes to accounting for other post-retirement benefits and pensions were implemented concurrently with SFAS 109 at the beginning of our sample and so do not explain the deviation we observe. One possible explanation is that firms have changed the level of detail they disclose. Together, OPEB, Pension, and Employee Benefits in 2004 are 70 percent of their nominal value in 1993, and the 2004 sum of OPEB and Employee Benefits is virtually equal to the nominal 1993 amount. A change in disclosure appears to explain these patterns.

Table 2 also shows that there is some variation over time in the magnitude of certain DTL categories. The DTLs for Leases and PPE nearly double during our sample and Subsidiary Positions and Intangibles increase even more dramatically. Possible explanations for the changes in PPE and Intangibles are new FASB pronouncements that allow asset impairments and reserves for obligations at retirement as well as special tax depreciation rules implemented in the second half of our sample. Deferred tax positions related to mark-to-market adjustments rise and fall with the general equity market. In 2004, the last year of our sample, the most significant source of deferred tax assets was Employee Benefits, and the most important source of deferred tax liabilities was PPE. One concern in evaluating the year to year changes in the relative importance of various DTA and DTL components is that changes in our sample may confound our analysis. While we try to address this concern by analyzing deferred tax positions at the “super-firm” level, we can not eliminate it, especially since merger and acquisition activity can itself affect deferred tax positions.

Table 3 separates deferred tax asset positions from deferred tax liability positions for the deferred tax components that include substantial assets as well as liabilities. Some categories, such as Revenue Related, appear small when the net deferred tax positions are presented in Table 2, but

represent a significant deferred tax asset for some firms and a significant liability for others. For example, a firm with a deferred revenue liability that received cash and paid income tax on that cash, but did not record the cash as revenue until the associated goods or services were delivered would have a deferred tax asset. A firm with installment sales, which recognizes a gain for book purposes when the sale closed but recognizes the gain for tax purposes as the payments are made, would have a deferred tax liability.

Tables 4 and 5 provide some context for evaluating the significance of deferred tax positions relative to total firm assets and relative to firm market value. Table 4 reports the distribution of the ratio of net deferred tax assets or liabilities as a share of firm assets for each “super-firm” and for each individual firm. Table 5 reports a similar distribution for net deferred tax assets or liabilities as a percentage of a firm’s market value of outstanding equity. Both tables suggest that there are a substantial number of firms for which the absolute value of the net deferred tax position is substantial. In 2002, for example, 40 percent of both the “super-firms” and the individual firms in our sample reported either net DTA or net DTL in excess of five percent of assets. Moreover, although not shown, more than fifteen percent of our sample firms, both individual firms and super-firms, had a DTA or DTL valued at more than ten percent of assets. For super-firms, the maximum (minimum) DTA as a function of assets occurred in 2004 (1995) and was 14.5% (-31.9%). Relative to market value, the maximum (minimum) DTA occurred in 2002 (1993) at 91.9% (-1540.0%).

The data in Tables 4 and 5 suggest a shift away from large deferred tax assets, scaled relative to firm assets or market value, during our sample period. The fraction of firms with a large DTA position declines between 1993 and 2004. The fraction of firms with a moderate DTA position and with a small DTL position increases over the same period. The fraction of firms with a large deferred tax liability is relatively stable during our sample.

Table 6 distinguishes financial and non-financial firms and reports the distribution of the ratio of net deferred tax assets or liabilities to firm assets for each group. The table shows that

financial firms have smaller deferred tax positions, on average, than non-financial firms. In every sample year, at least 80 percent of the financial firms have a net deferred tax position, either positive or negative, that represents less than three percent of total assets. For non-financial firms, in contrast, less than half of the firms have deferred tax assets in this range. The extreme values of the ratio of deferred tax assets to firm assets are also smaller for financial than for non-financial firms. The maximum (minimum) DTA/Assets for individual financial firms occurred in 2002 (1997) and was 11.0% (-18.5%) while the maximum (minimum) DTA/Assets for individual non-financial firms occurred in 2001 (1995) and was 48.0% (-46.3%).

Table 6 also suggests that deferred tax assets are more common amongst financial than non-financial firms. Fifty-six percent of our observations on financial firms have a net DTA position, compared with 43 percent for non-financial firms. These results suggest the potential importance of disaggregating firms when studying deferred tax positions. In a larger sample, it would be natural to focus on industry-level measures of deferred tax positions.

3. Extrapolating Sample Values to Economy-Wide Aggregates

Our sample includes a very small fraction of the firms in the United States, but the sample firms account for a substantial fraction of aggregate economic activity. To provide potential insight on the aggregate importance of deferred tax assets and liabilities, we extrapolate our summary statistics using two procedures that are based on the assets, sales, and market values of the firms in our sample. One exploits the ratio of aggregate quantities, such as firm assets, in our sample and in the population of U.S. firms. The other proceeds at a lower level of aggregation, and exploits industry-level aggregates relative to aggregates based on the firms in each industry in our sample.

Our basic procedure is similar in the two cases. We illustrate it for an asset-based extrapolation using economy-wide data. Represent the deferred tax position of firm i in year t by D_{it} , and denote the firm's net assets as A_{it} . Denote total deferred tax assets of our sample firms by $D_{*t} = \sum_i D_{it}$ and the total assets of sample firms by $A_{*t} = \sum_i A_{it}$. If deferred tax assets as a share of corporate

net assets are similar for firms throughout the size distribution, then we can estimate the total stock of deferred tax assets ($D_{tot,t}^*$) as

$$(3a) \quad D_{tot,t}^* = (A_{tot,t}/A_{*t}) * D_{*t}$$

where $A_{tot,t}$ denotes the total assets of U.S. firms, which we estimate from Compustat. When we extrapolate using industry-level information, we replace (3a) with

$$(3b) \quad D_{tot,t}^* = \sum_{j=1,N} (A_{tot,j,t}/A_{*j,t}) * D_{*j,t}$$

where subscript j varies over industries, and $D_{*j,t} = \sum_{i \in J} D_{it}$ denotes the sum of deferred tax positions for firms within an industry. One danger of this procedure at the disaggregate level is that the industry-specific multipliers, $(A_{tot,j,t}/A_{*j,t})$, may be very large for some industries in which our sample includes very few firms. There are two one-digit SIC code industries, agriculture and mining, for which this ratio, or the corresponding ratio based on sales or market value, regularly exceeds five.⁵ Fortunately, these firms contribute only 0.03% to 0.5% of the total DTAs and DTLs in our sample, making our results relatively insensitive to the data entries for these industries that have high multipliers.

The most important potential difficulty with our extrapolation procedure is that the large firms in our sample may not be representative of smaller firms. This could occur if the large firms in most industries are more diversified, and less likely to experience tax losses, than smaller ones. It is also possible that large firms engage in more corporate control transactions than smaller firms, thereby inducing different levels of goodwill and deferred tax assets than one finds at smaller firms.

Table 7 shows the results of our extrapolation procedure, which suggest that aggregate deferred tax positions are substantial.⁶ It presents our estimates using assets, market value, and sales to extrapolate our sample results to the entire U.S. corporate sector. It compares the findings from a single aggregate extrapolation and an industry-level extrapolation. While the different extrapolation procedures yield somewhat different results, and there is clearly significant imprecision with each extrapolation strategy, the results suggest that for the U.S. corporate sector as a whole, net DTLs may

exceed \$400 billion in 2004, and could be substantially greater. The gross value of deferred tax assets may exceed \$850 billion, since even our lowest extrapolation is greater than that value.

For each sample year, our estimate of the aggregate value of deferred tax liabilities exceeds our estimate of the value of deferred tax assets. The disparity between gross DTAs and gross DTLs rises during our sample, and by 2004, we estimate gross deferred tax liabilities that are nearly eighty percent larger than gross deferred tax assets. The rise in deferred tax liabilities is in part due to the growth of accelerated tax depreciation starting in 2003. Recall that Table 2 showed a rising DTL component from depreciation of PP&E between 2000 and 2004, likely due in part to the introduction of “bonus depreciation” in 2003.

The results using economy-wide aggregate and industry-level extrapolation are similar.⁷ For 2004, the industry-level extrapolations based on assets, market value of equity, and on sales yield net DTLs of \$581 billion, \$571 billion, and \$644 billion, respectively. The comparable values based on simple aggregate extrapolation are \$438 billion, \$443 billion, and \$511 billion, respectively. Comparing the simple-multiplier and industry-multiplier results offers some support for the robustness of our extrapolation procedure.

When interpreting estimates of aggregate deferred tax assets or liabilities, it is important to recognize that gross DTA and DTL positions offset each other when we are reporting information for the corporate sector as a whole. For individual firms with either a net DTA or a net DTL, however, these positions loom much larger. In 2004, for example, the gross deferred tax liabilities of our sample firms totaled \$486 billion, while gross deferred tax assets totaled \$324 billion. The net position was a net deferred tax liability of \$162 billion. These entries are shown in Table 7, as well as in Table 1, where we report that the aggregate net DTL for firms with DTLs was \$223.8 billion and the aggregate DTA for firms with DTAs was \$61.9 billion.

The extrapolation using market values suggest that the net DTA of firms with DTAs in 2004 was \$887 or \$1093 billion, depending on whether we use the aggregate or industry-level procedure.

The corresponding DTL values for firms with DTLs were \$1.33 and \$1.66 trillion. For understanding how firms with DTAs or with DTLs will react to potential changes in statutory tax rates, these gross magnitudes are more informative than information on the net DTA or DTL of the corporate sector.

4. Policy Changes that Affect Deferred Tax Assets and Liabilities

The stock of DTAs and DTLs is a function of the prevailing policy environment. One of our reasons for examining these balance sheet measures is to understand how they might react to substantial policy changes. We illustrate this by considering a change in the corporate tax rate and then discuss other potential policy shocks.

Our estimates of the gross value of DTAs and DTLs on an economy-wide basis offer some insight on the potential impact of a change in statutory corporate tax rates on the aggregate earnings of U.S. corporations. We will focus on our most conservative extrapolation, which yields an economy-wide estimate of corporate deferred tax assets of \$878 billion in 2004 (Table 7, column 2). If all of the DTAs were proportional to the statutory corporate tax rate, then a five percentage point drop in that rate from 35 to 30 percent would reduce the DTA by \$125 billion. That would reduce earnings at the time when the tax rate change was enacted. There would be a corresponding favorable effect on deferred tax liabilities, and the estimates in Table 7 suggest that this effect would be larger than the adverse effect on deferred tax assets. These estimates focus on total deferred tax assets at firms with both net DTAs and net DTLs and generate larger revaluations than our earlier estimates based on firms' net positions.

Information in Table 1 makes it possible to estimate the net income effect of a corporate rate change on firms with a net DTA or a net DTL. Firms in our sample with a net DTA would experience an \$8.8 billion dollar decrease to their net DTA and their net income; firms in our sample with a net DTL would experience a \$32 billion dollar decrease to their net DTL—and a \$32 billion dollar increase to their net income. Assuming a proportional number of net DTA and net DTL firms

economy-wide and extrapolating using the conservative asset multiplier for 2004 yields a net income decrease of \$24 billion economy-wide for firms with a net DTA and a net income increase of \$87 billion economy-wide for firms with a net DTL. We explained above that data limitations make it difficult to determine exactly which DTAs and DTLs relate to U.S. federal temporary differences and to estimate how a change in U.S. federal statutory tax rates alone would impact these DTAs and DTLs. Our assumption that all reported deferred tax positions relate to U.S. federal temporary differences may lead to us overstate the effect of a federal statutory rate change.

The foregoing statistics make clear that firms with DTAs are distinct from those with DTLs. This may be important for understanding the political economy of corporate tax reform. Neubig (2006) argues that firms are very sensitive to the impact of tax reform on their reported earnings, including effects through the revaluation of DTAs and DTLs. Our findings suggest that the magnitude of these effects could be substantial for some firms.

The decline in reported earnings that could accompany a reduction in statutory corporate tax rates could be an important concern for some firms, and it represents one of the transition costs of tax reform. At least one recent tax reform, the phase-out of Ohio's corporate income tax, recognized this and provided three measures of transition relief to affected firms. First, firms operating in Ohio under the income tax regime were encouraged to schedule the reversal of their temporary differences during the phase-out of the corporate income tax. To the extent that any temporary items would not reverse by the end of the phase-out, an adjustment for the estimated deferred tax position at the end of the transition period was recognized in income in the period in which the phase-out began. Second, certain deferred tax assets, primarily research and development tax credits, were converted to credits under the new activity tax regime. These credits are not recorded as assets on the financial books of the firm, however, because SFAS 109 applies only to taxes on income. Finally, Ohio provided for a transitional tax credit aimed at those firms with large NOL carryforwards, who would lose the ability to use these assets under the new tax regime. These policies together provide

transition relief to firms that were ‘owed’ tax relief in the future under the income tax regime, and that lost this prospective tax relief as a result of the tax reform.

A second example of a policy change that could have an important impact on deferred tax assets and liabilities is a reform of federal health insurance policies, particularly those for the elderly. As our data demonstrates, firms may have either an asset or a liability position related to Other Post-Employment Benefits. A deferred tax asset position could arise from recording the liability to retirees but not fully funding the plan, while a deferred tax liability position could arise from over-funding the plan relative to the retiree liability. If Medicare expanded to provide coverage for retirees that reduced the expected cost of firms’ existing retiree health benefits, most firms in our sample would experience a reduction in their liability to retirees and a reduction in their associated deferred tax asset position. The change in the deferred tax position would partially offset the direct effect of such a reform on the firm’s balance sheet.

Changes in both taxable income and in book income have the potential to affect temporary book-tax differences. One example of a GAAP change that could have an important impact on DTAs and DTLs is the increased use of fair value accounting. Proponents of this initiative believe the relevance of the fair value market-traded assets to decision-makers is greater than the lower reliability introduced by replacing historic cost-based values with market values. The federal government has not followed this move, instead staying with a cash-basis, transaction-driven system for tax purposes. Deferred tax liabilities based on SFAS 115, *Accounting for Certain Investments in Debt and Equity Securities*, which allows marking-to-market for securities depending on the firm’s intentions for those securities, nearly tripled between 1993 and 2004. SFAS 123R, *Share-Based Payment*, which requires expensing of stock options when they are granted using estimates of their value generated by financial models, seems likely to result in a sharp increase in deferred tax positions related to employee benefits.

Another example of a change in GAAP that could have an impact on deferred tax assets and liabilities is statements that actually change the calculation or presentation of deferred tax positions. FIN 48, *Accounting for Uncertainty in Income Taxes*, is such a statement. In addition to expanded disclosure requirements, FIN 48 specifies a two-step approach for evaluating tax positions. Measurement of the deferred tax position is not addressed if a deferred tax position is not recognized, and recognition occurs when a tax position is deemed more likely than not to be sustainable upon examination. FIN 48 will impact deferred tax positions by requiring firms to consider the odds that open tax positions will be sustained under audit separately from, and before, the valuation decision. FIN 48 may have a substantial impact on firms, depending on how aggressively they minimize their taxes and on what likelihoods they assign to potential outcomes. It may even force some firms to reclassify certain deferred tax positions as FIN 48 liabilities. Changes in tax law, changes in public policy, or changes in accounting principles can have significant effects on deferred tax positions.

5. Conclusion

This paper explores the substantive importance of deferred tax assets and deferred tax liabilities for large U.S. corporations. It finds that there is substantial heterogeneity across firms in their deferred tax positions. In 2004, however, more than forty percent of the firms in our sample of FORTUNE 50 companies reported a net deferred tax position valued at more than five percent of corporate assets. Thus while different firms face different circumstances, policy changes that affect deferred tax assets and liabilities are likely to have material consequences for many large corporations. Recognizing the way policy changes affect deferred tax assets and liabilities can be an important for designing transition relief that minimizes the adverse effect of changes in tax policy or accounting rules on affected corporations.

Our findings on the significance of deferred tax accounts are limited by the modest sample of firms that we analyze. Because the tax footnote information for firms is not publicly available in electronic form, the possibility of a database that includes detailed information for all publicly traded

firms seems remote. Nevertheless, we hope in future work to expand our sample and to be able to present more precise estimates of aggregate deferred tax assets and liabilities.

The detailed information on tax accounts that we have collected may also provide a starting point for other studies on the interplay between financial accounting for taxes and various aspects of corporate behavior. Information on the components of deferred tax assets and liabilities, for example, offers valuable insights into diverse issues including the importance of investments in assets that qualify for more favorable tax depreciation than book depreciation and the significance of accruals for post-employment benefits. We hope to explore some of these issues in future work.

References

- Amir, Eli, Michael Kirschenheiter, and Kristen Willard, 1997, "The Valuation of Deferred Taxes," Contemporary Accounting Research 14, 597-622.
- Chen, Kevin C. W. and Michael P. Schoderbek, 2000, "The 1993 Tax Rate Increase and Deferred Tax Adjustments: A Test of Functional Fixation," Journal of Accounting Research 38, 23-44.
- Desai, Mihir, 2005, "The Degradation of Corporate Profits," Journal of Economic Perspectives 19, 171-192.
- Givoly, Dan and Carla Hayn, 1992, "The Valuation of Deferred Tax Liability: Evidence from the Stock Market," Accounting Review 67, 394-410.
- Guenther, David A. and Richard C. Sansing, 2000, "Valuation of the Firm in the Presence of Temporary Book-Tax Differences: The Role of Deferred Tax Assets and Liabilities," The Accounting Review 75, 1-12.
- Hanlon, Michelle, Edward L. Maydew, and Terry Shevlin, 2006, 'Book Tax Conformity and the Information Content of Earnings,' mimeo, University of Michigan.
- Hanlon, Michelle and Terry Shevlin, 2005, "Book-Tax Conformity for Corporate Income: An Introduction to the Issues," in J. Poterba, ed., Tax Policy and the Economy, Volume 19 (Cambridge: MIT Press).
- Miller, Gregory S. and Douglas J. Skinner, 1998, "Determinants of the Valuation Allowance for Deferred Tax Assets Under SFAS No. 109," The Accounting Review 73, 213-233.
- Mills, Lillian and George Plesko, 2003, "Bridging the Reporting Gap: A Proposal for More Informative Reconciling of Book and Tax Income," National Tax Journal 56 (December), 865-893.
- Neubig, Thomas, 2006, "Where's the Applause? Why Most Corporations Prefer a Lower Tax Rate," Tax Notes April 24, 483-486.
- Schmidt, Andrew P., 2006, "The Persistence, Forecasting, and Valuation Implications for the Tax Change Component of Earnings," The Accounting Review 81, 589-616.
- Shackelford, Douglas A. and Terry Shevlin, 2001, "Empirical Tax Research in Accounting," Journal of Accounting and Economics 31, 321-387.
- State and Local Tax Alert. June 30, 2005. "Analysis of Ohio Tax Reform Legislation".
- U.S. Congress, Joint Committee on Taxation. 2006. Present Law and Background Relating to Corporate Tax Reform: Issues of Confirming Book and Tax Income and Capital Cost Recovery. Washington: Joint Committee on Taxation.

Table 1: Sample Characteristics by Year

Year	Number of “Super-Firms” in Sample	Market Capitalization of Sample Firms (\$B)	Firms with Net DTL > 0		Firms with Net DTA > 0	
			Number	Aggregate Value (\$B)	Number	Aggregate Value (\$B)
1993	64	1,583	33	-68.6	31	50.7
1994	69	1,639	37	-71.4	32	51.2
1995	69	2,257	40	-77.5	29	40.7
1996	71	2,843	43	-90.2	28	42.2
1997	71	3,874	44	-100.9	27	45.9
1998	71	5,283	41	-100.5	30	54.4
1999	72	6,122	42	-136.2	30	47.8
2000	73	6,112	44	-162.0	29	53.4
2001	73	5,641	42	-177.2	31	60.7
2002	73	4,344	44	-185.9	29	81.8
2003	73	5,196	48	-227.0	25	57.3
2004	73	5,498	48	-223.8	25	61.9

Sample includes firms ranked in the Fortune 50 from 1993-2005. To standardize firms across time, firms engaged in merger, acquisition, or divestiture activity with the Fortune 50 ranked firm are included with the Fortune 50 ranked firm to create a “super-firm.” Market capitalization is calculated from Compustat as Common Shares Outstanding (DATA25) multiplied by fiscal year-end price (DATA199). Information on Net Deferred Tax Assets (DTA) and Net Deferred Tax Liabilities (DTL) are hand collected from income tax disclosures in 10-K and Annual Report filings.

Table 2: Components of Net Deferred Tax Assets and Liabilities (\$Millions), Average per “Super-Firm”, 1993-2004

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Number of “Super-Firms” in Sample	64	69	69	71	71	71	72	73	73	73	73	73
Allowance for Doubtful Accounts	173	165	167	176	173	211	200	193	259	264	226	211
Benefits												
Employee Benefits	263	254	246	299	366	422	440	385	457	491	500	548
Other Post-Employment Benefits	511	513	512	477	453	436	368	392	379	541	280	203
Pensions	-18	-45	-50	-84	-85	-86	-132	-134	-173	-127	-183	-226
Credits and Carryforwards												
Foreign Tax Credit Carryforwards	30	27	22	5	0	7	12	11	6	6	8	16
NOL Carryforwards	129	138	138	140	134	152	210	206	162	240	272	305
Tax Credits & Other Carryforwards	148	163	164	162	171	190	212	246	344	478	496	538
International Activity-Related	8	11	15	15	29	39	52	60	55	52	-28	-69
Inventory	9	8	10	2	2	7	7	14	6	6	2	0
Mark-to-Mark Adjustments												
Available for Sale Securities	-3	7	-2	1	-5	-5	10	1	9	1	7	2
Other Mark-to-Market Adjustments	-118	-30	-191	-186	-261	-274	-300	-235	-181	-207	-281	-269
Merger & Acquisition-Related	-38	-38	-49	-50	-51	-60	-48	-15	-222	-214	-220	-218
Oil & Gas, Environmental	-5	-1	9	4	-6	0	-4	-1	22	26	41	50
Other Assets	1003	935	960	952	1002	1088	1025	1124	1350	1418	1421	1528
Other Liabilities	-316	-332	-365	-399	-426	-439	-454	-537	-647	-616	-653	-671
Property												
Intangible Assets	-61	-71	-117	-163	-156	-113	-285	-386	-414	-165	-395	-340
Leases	-361	-364	-392	-450	-496	-532	-557	-608	-641	-671	-660	-619
Property, Plant & Equipment	-1383	-1376	-1346	-1347	-1385	-1457	-1536	-1587	-1700	-2124	-2209	-2300
Regulated Accruals and Deferrals	-10	-17	-19	-23	-27	-28	-35	-38	-36	-43	-44	-48
Revenue-Related	-3	8	12	33	38	-10	-7	-31	-21	-6	6	44
U.S. State-related	2	2	-1	-2	-7	-5	-11	-11	-8	-7	-4	-4
Subsidiary-Related Items	-10	2	-10	-10	-13	-30	-193	-321	-411	-348	-428	-426
Valuational Allowance	-229	-252	-245	-229	-222	-163	-202	-214	-189	-422	-478	-472

Information on deferred tax positions are hand collected from income tax disclosures in 10-K and Annual Report filings and assigned to 23 principal categories based on frequency and monetary significance of disclosure items. Amounts presented here are annual averages per “super-firm;” “super-firm” is defined in the text.

Table 3: Detail of Select Components of Net Deferred Tax Assets and Liabilities (\$Millions), Average per “Super-firm”, 1993-2004

		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Benefits													
Employee Benefits	DTA	290	290	317	373	425	477	518	462	466	507	513	557
	DTL	-26	-36	-71	-74	-59	-55	-79	-77	-9	-16	-14	-9
Other Post-Employment Benefits	DTA	534	534	545	513	491	488	422	449	445	577	452	398
	DTL	-23	-21	-33	-37	-38	-51	-54	-56	-66	-36	-172	-195
Pensions	DTA	56	38	46	32	37	45	14	1	4	24	25	20
	DTL	-75	-83	-97	-116	-122	-131	-145	-136	-177	-151	-208	-246
International Activity-Related	DTA	25	37	38	47	65	81	94	105	127	146	126	114
	DTL	-17	-25	-24	-32	-37	-43	-42	-45	-72	-95	-155	-183
Inventory-related	DTA	32	35	35	28	26	33	36	41	39	43	41	31
	DTL	-23	-27	-24	-26	-24	-26	-29	-27	-33	-37	-39	-31
Mark-to-Mark Adjustments													
Available for Sale Securities	DTA	0	7	2	2	0	0	19	5	10	6	7	2
	DTL	-3	0	-5	-2	-5	-5	-10	-4	-2	-5	-1	0
Other Mark-to-Market Adjustments	DTA	19	71	10	8	9	6	35	27	64	128	143	161
	DTL	-136	-102	-201	-194	-270	-280	-335	-263	-245	-335	-424	-430
Oil & Gas, Environmental	DTA	23	22	25	21	18	16	14	17	22	26	41	50
	DTL	-28	-24	-16	-17	-24	-16	-18	-18	0	0	-1	0
Intangible Assets	DTA	47	47	47	38	41	45	36	22	36	83	95	112
	DTL	-108	-118	-165	-201	-197	-158	-322	-409	-450	-248	-489	-452
Regulated Accruals and Deferrals	DTA	30	22	24	20	16	16	6	4	8	3	3	2
	DTL	-40	-39	-43	-42	-44	-44	-40	-42	-45	-45	-47	-50
Revenue-Related	DTA	46	46	44	67	74	77	90	105	110	132	138	131
	DTL	-49	-38	-32	-34	-36	-87	-97	-135	-131	-138	-132	-88

Information on deferred tax positions are hand collected from income tax disclosures in 10-K and Annual Report filings and assigned to 23 principal categories based on frequency and monetary significance of disclosure items. Amounts presented are annual averages per “super-firm.” For principal components which are primarily DTA or DTL, we do not present the DTA and DTL detail here.

Table 4: Distribution of Net Deferred Tax Assets as a Share of Total Assets, 1993-2004

“Super-Firm” Sample							
Year	Sample Size	Firms with Net Deferred Tax Liabilities			Firms with Net Deferred Tax Assets		
		$\leq -5\%$	-5 to -3 %	-3 to -0 %	0 to 3 %	3 to 5 %	$\geq 5\%$
1993	64	23.4%	4.7%	23.4%	31.3%	4.7%	12.5%
1994	69	26.1	5.8	21.7	33.3	8.7	4.3
1995	69	20.3	14.5	23.2	29.0	7.2	5.8
1996	71	23.9	7.0	29.6	23.9	11.3	4.2
1997	71	23.9	7.0	31.0	25.4	8.5	4.2
1998	71	22.5	9.9	25.4	29.6	4.2	8.5
1999	72	30.6	4.2	23.6	30.6	4.2	6.9
2000	73	27.4	4.1	28.8	27.4	5.5	6.8
2001	73	26.0	2.7	28.8	24.7	9.6	8.2
2002	73	24.7	6.8	28.8	21.9	2.7	15.1
2003	73	28.8	5.5	31.5	17.8	5.5	11.0
2004	73	28.8	8.2	28.8	16.4	9.6	8.2
Individual Firm Sample							
Year	Sample Size	Firms with Net Deferred Tax Liabilities			Firms with Net Deferred Tax Assets		
		$\leq -5\%$	-5 to -3 %	-3 to -0 %	0 to 3 %	3 to 5 %	$\geq 5\%$
1993	133	23.3%	6.8%	21.1%	33.1%	3.8%	12.0%
1994	146	24.0	4.8	24.7	30.1	11.0	5.5
1995	148	17.6	10.8	27.7	29.7	7.4	6.8
1996	166	21.7	7.2	25.3	30.1	7.2	8.4
1997	159	19.5	7.5	23.3	32.7	8.2	8.8
1998	150	20.0	8.7	21.3	31.3	9.3	9.3
1999	129	24.8	4.7	20.9	34.1	7.8	7.8
2000	111	22.5	7.2	26.1	27.0	8.1	9.0
2001	103	24.3	3.9	25.2	25.2	7.8	13.6
2002	102	21.6	5.9	29.4	21.6	3.9	17.6
2003	98	24.5	9.2	27.6	19.4	10.2	9.2
2004	95	24.2	8.4	27.4	21.1	7.4	11.6

Information on Net DTA and Net DTL are hand collected from income tax disclosures in 10-K and Annual Report filings. Assets is Compustat Total Assets (DATA6). The distribution in the upper panel is calculated at the “super-firm” level; the distribution in the lower panel is calculated with each individual firm as its own observation.

Table 5: Distribution of Net Deferred Tax Assets as a Share of Market Value, per “Super-firm”, 1993-2004

“Super-Firm” Sample							
Year	Sample Size	Firms with Net Deferred Tax Liabilities			Firms with Net Deferred Tax Assets		
		≤ -5 %	-5 to -3 %	-3 to -0 %	0 to 3 %	3 to 5 %	≥ 5 %
1993	64	28.1%	4.7%	18.8%	21.9%	6.3%	20.3%
1994	69	30.4	2.9	20.3	20.3	4.3	21.7
1995	69	23.2	10.1	24.6	23.2	5.8	13.0
1996	71	22.5	8.5	29.6	21.1	8.5	9.9
1997	71	23.9	4.2	33.8	21.1	5.6	11.3
1998	71	22.5	1.4	33.8	23.9	7.0	11.3
1999	72	23.6	13.9	20.8	22.2	8.3	11.1
2000	73	24.7	9.6	26.0	17.8	8.2	13.7
2001	73	28.8	6.8	21.9	19.2	4.1	19.2
2002	73	35.6	5.5	19.2	15.1	4.1	20.5
2003	73	32.9	9.6	23.3	12.3	8.2	13.7
2004	73	31.5	12.3	21.9	16.4	4.1	13.7
Individual Firm Sample							
Year	Sample Size	Firms with Net Deferred Tax Liabilities			Firms with Net Deferred Tax Assets		
		≤ -5 %	-5 to -3 %	-3 to -0 %	0 to 3 %	3 to 5 %	≥ 5 %
1993	129	34.9%	1.6%	14.7%	21.7%	6.2%	20.9%
1994	140	30.0	4.3	18.6	21.4	3.6	22.1
1995	144	23.6	8.3	22.9	27.1	5.6	12.5
1996	161	21.7	7.5	24.2	31.1	5.6	9.9
1997	153	21.6	5.2	22.9	35.9	5.2	9.2
1998	148	20.9	6.1	22.3	32.4	6.8	11.5
1999	129	25.6	8.5	16.3	28.7	8.5	12.4
2000	111	23.4	9.9	22.5	19.8	11.7	12.6
2001	103	26.2	8.7	18.4	19.4	6.8	20.4
2002	102	32.4	6.9	17.6	15.7	5.9	21.6
2003	98	32.7	10.2	19.4	15.3	6.1	16.3
2004	95	32.6	9.5	18.9	18.9	4.2	15.8

Information on Net DTA and Net DTL are hand collected from income tax disclosures in 10-K and Annual Report filings. Market value is calculated from Compustat as Common Shares Outstanding (DATA25) multiplied by fiscal year-end price (DATA199). The distribution in the upper panel is calculated at the “super-firm” level; the distribution in the lower panel is calculated with each individual firm as its own observation. Sample sizes of individual firms differ from Table 4 because market value information was unavailable for some individual firms.

Table 6: Distribution of Net DTAs and DTLs as a Share of Firm Assets: Financial and Non-Financial Firms, 1993-2004

Financial Firms							
Year	Sample Size	Firms with Net Deferred Tax Liabilities			Firms with Net Deferred Tax Assets		
		$\leq -5\%$	-5 to -3 %	-3 to 0 %	0 to 3 %	3 to 5 %	$\geq 5\%$
1993	29	3.4%	0.0%	24.1%	69.0%	0.0%	3.4%
1994	31	3.2	0.0	29.0	54.8	9.7	3.2
1995	32	3.1	0.0	37.5	53.1	0.0	6.3
1996	31	3.2	0.0	41.9	48.4	3.2	3.2
1997	29	3.4	0.0	51.7	44.8	0.0	0.0
1998	30	3.3	0.0	46.7	46.7	3.3	0.0
1999	26	3.8	0.0	34.6	57.7	3.8	0.0
2000	19	5.3	0.0	36.8	57.9	0.0	0.0
2001	18	0.0	5.6	44.4	38.9	5.6	5.6
2002	18	5.6	0.0	44.4	38.9	5.6	5.6
2003	18	5.6	0.0	44.4	38.9	5.6	5.6
2004	16	6.3	0.0	43.8	37.5	6.3	6.3
Non-Financial Firms							
Year	Sample Size	Firms with Net Deferred Tax Liabilities			Firms with Net Deferred Tax Assets		
		$\leq -5\%$	-5 to -3 %	-3 to 0 %	0 to 3 %	3 to 5 %	$\geq 5\%$
1993	104	28.8%	8.7%	20.2%	23.1%	4.8%	14.4%
1994	115	29.6	6.1	23.5	23.5	11.3	6.1
1995	116	21.6	13.8	25.0	23.3	9.5	6.9
1996	135	25.9	8.9	21.5	25.9	8.1	9.6
1997	130	23.1	9.2	16.9	30.0	10.0	10.8
1998	120	24.2	10.8	15.0	27.5	10.8	11.7
1999	103	30.1	5.8	17.5	28.2	8.7	9.7
2000	92	26.1	8.7	23.9	20.7	9.8	10.9
2001	85	29.4	3.5	21.2	22.4	8.2	15.3
2002	84	25.0	7.1	26.2	17.9	3.6	20.2
2003	80	28.8	11.3	23.8	15.0	11.3	10.0
2004	79	27.8	10.1	24.1	17.7	7.6	12.7

Information on Net DTA and Net DTL are hand collected from income tax disclosures in 10-K and Annual Report filings. Assets is Compustat Total Assets (DATA6). The distribution is calculated with each individual firm as its own observation. The sample parallels that of the individual firm analysis in the lower panel of Table 4. Industry was determined using one-digit SIC codes; financial firms are SIC code 6.

Table 7: Estimates of Aggregate DTAs and DTLs by Year (\$Billions), 1993-2004

Year	Deferred Tax Assets							Deferred Tax Liabilities						
	Total DTA for Sample Firms	Extrapolation Using Economy-wide:			Extrapolation Using Industry-wide:			Total DTL for Sample Firms	Extrapolation Using Economy-wide:			Extrapolation Using Industry-wide:		
		Assets	MVE	Sales	Assets	MVE	Sales		Assets	MVE	Sales	Assets	MVE	Sales
1993	179	604	556	590	520	563	540	-196	-664	-612	-649	-595	-616	-592
1994	192	624	570	617	532	574	578	-212	-689	-631	-683	-618	-627	-644
1995	193	665	563	640	605	582	607	-230	-792	-670	-762	-737	-687	-717
1996	200	687	558	659	608	560	621	-248	-853	-693	-817	-803	-712	-786
1997	207	704	558	688	643	566	651	-262	-890	-706	-871	-858	-737	-839
1998	223	830	524	775	739	543	754	-269	-1,001	-632	-935	-950	-685	-914
1999	228	797	577	766	726	595	741	-316	-1,106	-801	-1,063	-1,061	-845	-1,045
2000	238	806	606	782	782	631	764	-346	-1,174	-883	-1,138	-1,164	-935	-1,136
2001	268	853	714	862	792	680	821	-385	-1,224	-1,025	-1,236	-1,219	-1,016	-1,175
2002	313	970	756	985	913	1,363	1,007	-417	-1,293	-1,008	-1,313	-1,278	-2,047	-1,424
2003	311	938	807	973	901	1,113	1,015	-481	-1,449	-1,247	-1,504	-1,459	-1,705	-1,639
2004	324	878	887	1,025	940	1,093	1,038	-486	-1,316	-1,330	-1,536	-1,521	-1,664	-1,682

Aggregate multipliers are computed using all Compustat firms with a U.S. or a Puerto Rico domicile and a non-subsidary stock ownership code. Economy aggregates are applied at the “super-firm” level; industry multipliers are applied at the individual firm level using one-digit SIC codes. Estimates differ in the scaling variable that is used to extrapolate the deferred tax assets or liabilities. All scaling variables are from Compustat: Assets are Total Assets (DATA6), Market Value is calculated as the fiscal year-end market value of equity (DATA25 * DATA199), and Sales is Net Sales (DATA12).

Endnotes

1. If a change in statutory tax rates or a change in tax position requires revaluing gross temporary differences at new rates, deferred taxes will be calculated as the difference between last period's reported net DTA (DTL) and the net DTA (DTL) required this period after applying the new rates to this period's cumulative gross temporary items. Total tax expense would then be calculated as current taxes plus deferred taxes.
2. SFAS 96 also required firms to report the asset and liability detail of their net deferred tax position as well as revalue their deferred tax position for changes in enacted rates or laws. Under SFAS 96 however, the probability of realizing an asset was incorporated in to the value of the asset, rather than separately stated as a valuation allowance.
3. Prior to 1995, Fortune rankings included only manufacturing firms. To avoid including firms that are only included in the Fortune 50 due to the exclusion of non-manufacturing firms, we formed our sample using the Fortune rankings from 1995-2004.
4. We collected tax information from the first 10-K or annual report filing for a fiscal year. Restatements may cause differences between the total assets and net income numbers we collected from the 10-K and the reported number in Compustat. We hand-check the 39 firm-years where neither DATA6 nor DATA172 tie to our hand-collected total assets and net income numbers. The majority of the differences were due to restatements. We drop fourteen firm-years for which Compustat did not have data or where a stub year caused a mismatch.
5. The assets multiplier for Transportation and Communications and the assets multiplier for Services each exceed five for one year. The average assets multipliers were 4.2 and 3.8 respectively.
6. Table 6 presents extrapolation results using the market value of equity calculated using all Compustat firms with a U.S. or Puerto Rico domicile and a non-subsidary stock ownership code. We also performed the extrapolation using the CRSP market index level, adjusted for the foreign firms. Results were similar and so are omitted from Table 6.
7. A notable exception is the market value extrapolations beginning in 2002. This increase is driven by the price collapse of Dynegy, who is the only representative of the Mining and Construction industry in our sample. The rest of the Mining and Construction industry does not experience a similar downturn in market value, which causes the industry multiplier applied to Dynegy to increase dramatically in 2002.

Appendix A: Sample Firms and Years in Sample

Our sample was constructed based on Fortune magazine's annual sales-based ranking of US firms. The top 50 firms for each year from 1995 until 2004 were included in the sample. To mitigate the effects of changes in firm size for each Fortune50 firm in the net deferred tax analysis, the tax notes for all firms acquired or sold by Fortune50 firms during the sample period were also included. For example, Berkshire Hathaway acquired General Re Corp in 1998, so the tax note information for General Re Corp was added to Berkshire Hathaway for years 1993-1997. Similarly, AMR Corp spun off Sabre in 2000, so going forward, tax note details for Sabre were added to AMR Corp for years 2000-2004. We use online firm histories and their 10-Ks to research merger and acquisition information. Two firms were dropped from the sample due to excessive private acquisitions. Nine firms were dropped due to insufficient disclosures; these instances are detailed below.

For the net deferred tax descriptive analysis the main Fortune 50 firm and all of its acquired and divested were combined into a single aggregate firm observation, summing over the deferred tax and liability categories as well as total assets and market values. In the effective tax rate analysis each individual firm-year observation was considered an independent observation since the earnings management decisions examined operate at the firm level.

The following 11 Fortune 50 firms are dropped from our sample:

- | | |
|------------------------|-----------------|
| ▪ Allstate Corporation | ▪ MCI Worldcom |
| ▪ Amoco | ▪ McKesson Corp |
| ▪ Cardinal Health | ▪ Motorola Inc |
| ▪ Chrysler | ▪ State Farm |
| ▪ Fannie Mae | ▪ TIAA-CREF |
| ▪ Freddie Mac | |

The following 74 Fortune 50 "super-firms" are included in our sample:

- | | |
|------------------------------------|-----------------------------------|
| ▪ Aetna Inc | ▪ ConocoPhillips |
| ▪ Albertsons Inc | ▪ Costco Wholesale Corporation |
| ▪ Altria Group | ▪ Dell Computer Corp |
| ▪ American Electric Power Company | ▪ Dow Chemical Co |
| ▪ American International Group Inc | ▪ Duke Energy Co |
| ▪ AmerisourceBergen Corporation | ▪ Dynegy Inc |
| ▪ AMR Corp | ▪ Eastman Kodak |
| ▪ AOL Time Warner Inc | ▪ El Paso Corporation |
| ▪ Aquila Inc | ▪ Enron Corp |
| ▪ AT&T Corp | ▪ Exxon Mobil Corp |
| ▪ Bank of America Corp | ▪ Ford Motor Co |
| ▪ BellSouth Corp | ▪ General Electric Co |
| ▪ Berkshire Hathaway Inc | ▪ General Motors Corp |
| ▪ CenterPoint Energy Inc | ▪ Goldman Sachs Group Inc. |
| ▪ Chevron Texaco Corporation | ▪ Hewlett Packard Company |
| ▪ Cigna Corp | ▪ Home Depot Inc |
| ▪ Citigroup Inc | ▪ Ingram Micro Inc. |
| ▪ Coca-Cola Co | ▪ Intel Corp |
| ▪ Columbia/HCA Health | ▪ International Paper Co |
| ▪ ConAgra Foods Inc | ▪ International Business Machines |

- ITT Industries Inc
- J C Penney Corp Inc
- J P Morgan Chase & Co
- Johnson & Johnson
- Kmart Holding Corporation
- Kroger Co.
- Lockheed Martin Corp
- Loews Corporation
- Lowe's
- Marathon Oil Corp
- Merck & Co Inc
- Merrill Lynch & Co Inc
- MetLife Inc
- Microsoft Corp
- Morgan Stanley
- PepsiCo Inc
- Pfizer Inc
- Procter and Gamble Co
- Prudential Financial Inc
- Safeway Inc
- Sara Lee Corp
- SBC Communications Inc
- Sears Roebuck Co
- Supervalu Inc
- Target Corporation
- The Boeing Company
- United Parcel Service Inc
- United Technologies
- Valero Energy Corp
- Verizon Communications Inc
- Walgreen Co
- Walmart
- Wells Fargo & Co
- Xerox Corp

The following 15 firms are included in our sample as part of another “super-firm”:

- American Stores, included with Albertsons Inc
- Bank One, included with J.P. Morgan Chase & Co
- BankAmerica, included with Bank of America
- Bell Atlantic, included with Verizon
- Chase Manhattan Corp, included with J.P. Morgan Chase & Co
- Citicorp, included with Citigroup Inc
- Compaq Computer, included with Hewlett Packard Company
- Conoco, included with ConocoPhillips
- DuPont E I De Nemours & Co, included with ConocoPhillips
- GTE, included with Verizon
- Lucent, included with AT&T
- Medco Health, included with Merck & Co Inc
- Mobil, included with ExxonMobil
- Prudential Insurance, included with Prudential Financial Inc
- Texaco, included with Chevron Texaco Corporation

Appendix B: Sample Income Tax Disclosure

Excerpt from Coca-Cola Co. 10-K for 12-31-1999

NOTE 14: INCOME TAXES Income before income taxes consists of the following (in millions):

Year Ended December 31,	1999	1998	1997
United States	\$ 1,504	\$ 1,979	\$ 1,515
International	2,315	3,219	4,540
	\$ 3,819	\$ 5,198	\$ 6,055

Income tax expense (benefit) consists of the following (in millions):

Year Ended December 31,	United States	State & Local	International	Total
1999				
Current	\$ 395	\$ 67	\$ 829	\$ 1,291
Deferred	182	11	(96)	97
1998				
Current	\$ 683	\$ 91	\$ 929	\$ 1,703
Deferred	(73)	28	7	(38)
1997				
Current	\$ 240	\$ 45	\$ 1,261	\$ 1,546
Deferred	180	21	179	380

We made income tax payments of approximately \$1,404 million, \$1,559 million and \$982 million in 1999, 1998 and 1997, respectively.

A reconciliation of the statutory U.S. federal rate and effective rates is as follows:

Year Ended December 31,	1999	1998	1997
Statutory U.S. federal rate	35.0%	35.0%	35.0%
State income taxes-net of federal benefit	1.0	1.0	1.0
Earnings in jurisdictions taxed at rates different from the statutory U.S. federal rate	(6.0)	(4.3)	(2.6)
Equity income or loss	1.6	-	(.6)
Other operating charges	5.3	-	-
Other-net	(.6)	.3	(1.0)
	36.3%	32.0%	31.8%

Our effective tax rate reflects the tax benefit derived from having significant operations outside the United States that are taxed at rates lower than the U.S. statutory rate of 35 percent, partially offset by the tax impact of certain gains recognized from previously discussed bottling transactions. These transactions are generally taxed at rates higher than our Company's effective tax rate on operations.

In 1999, the Company recorded a charge of \$813 million, primarily reflecting the impairment of certain bottling, manufacturing and intangible assets. For some locations with impaired assets, management concluded that it was more likely than not that no local tax benefit would be realized. Accordingly, a valuation allowance was recorded offsetting the future tax benefits for such locations. This resulted in an increase in our effective tax rate for 1999. Excluding the impact, the Company's effective tax rate for 1999 would have been 31.0 percent.

We have provided appropriate U.S. and international taxes for earnings of subsidiary companies that are expected to be remitted to the parent company. Exclusive of amounts that would result in little or no tax if remitted, the cumulative amount of unremitted earnings from our international subsidiaries that is expected to be indefinitely reinvested was approximately \$3.4 billion on December 31, 1999. The taxes that would be paid upon remittance of these indefinitely reinvested earnings are approximately \$1.2 billion, based on current tax laws.

The tax effects of temporary differences and carryforwards that give rise to deferred tax assets and liabilities consist of the following (in millions):

December 31,	1999	1998

Deferred tax assets:		
Benefit plans	\$ 311	\$ 309
Liabilities and reserves	169	166
Net operating loss carryforwards	196	49
Other operating charges	254	-
Other	272	176

Gross deferred tax assets	1,202	700
Valuation allowance	(443)	(18)

	\$ 759	\$ 682

Deferred tax liabilities:		
Property, plant and equipment	\$ 320	\$ 244
Equity investments	397	219
Intangible assets	197	139
Other	99	320

	\$ 1,013	\$ 922

Net deferred tax asset (liability){1}	\$ (254)	\$ (240)

{1} Deferred tax assets of \$244 million and \$184 million have been included in the consolidated balance sheet caption "Marketable securities and other assets" at December 31, 1999 and 1998, respectively.

On December 31, 1999 and 1998, we had approximately \$233 million and \$171 million, respectively, of gross deferred tax assets, net of valuation allowances, located in countries outside the United States.

On December 31, 1999, we had \$608 million of operating loss carryforwards available to reduce future taxable income of certain international subsidiaries. Loss carryforwards of \$320 million must be utilized within the next five years; \$288 million can be utilized over an indefinite period. A valuation allowance has been provided for a portion of the deferred tax assets related to these loss carryforwards.

Appendix C: Sub-Categories Into Which Tax Aggregates are Classified

Every deferred tax asset or liability category listed in a firm's 10-K tax footnote is classified into one of the following aggregate categories:

- Allowances for doubtful accounts
- Employee benefits
- Other (non-pension) post-employment benefits
- Pensions
- Foreign tax credit carryforwards
- NOL carryforwards
- Tax credits and other carryforwards
- International activity-related
- Inventory
- Available for Sale Securities
- Other Mark-to-Market adjustments
- Merger & acquisitions-related
- Oil & Gas-related
- Intangible assets
- Leases
- Property, Plant & Equipment
- Regulated accruals and deferrals
- Revenue-related
- U.S. State tax related
- Subsidiary-related

Items that did not naturally fall into one of the above categories were classified as Other Assets and Other Liabilities depending on the sign of the entry. Valuation allowances, where applicable, were considered a separate category.