Analyst and Market Responses to Tax-Motivated Loss Shifting

Merle Erickson
Booth School of Business - University of Chicago

Shane Heitzman
Simon Graduate School of Business – University of Rochester

X. Frank Zhang
Yale School of Management

October 25, 2011

Abstract

This paper examines the implications of tax loss carryback incentives for corporate reporting decisions and capital market behavior. Over a long time period, we find that firms increase losses in order to claim a cash refund of previous tax payments before the option to do so expires. Analysts do not incorporate this tax-motivated loss shifting in their earnings forecasts. As a result, analyst forecast errors are more negative for the firms with tax-induced incentives than for firms without. Holding the unexpected loss constant, however, investors react more positively to losses reported by firms with tax loss carryback incentives. Our evidence has particular importance given trends in takeover defenses and tax policies designed to boost the value of tax losses.

Keywords: Taxes, Net operating losses, Analyst forecasts, Capital markets, Stock returns

JEL: G14, G32, G38, H21, H25, M41, M43

We appreciate comments from workshop participants at the National University of Singapore, Singapore Management University, and Yale University

1. Introduction

Well known asymmetries in the tax code's treatment of profits and losses increase expected tax liabilities. Net operating loss (NOL) carryback provisions reduce this asymmetry by giving firms a valuable option to capture a cash refund of previously paid taxes if they report a tax loss within a few years of incurring the tax. All else equal, maximizing this loss before the option expires reduces the present value of the firm's tax liability, increases firm value, and provides liquidity. In this paper, we examine the implications of this tax loss carryback incentive on reporting decisions, analyst behavior, and equity valuation. Specifically, we investigate a) whether firms appear to increase reported losses to capture a cash refund of prior tax payments, b) whether analysts incorporate these tax-motivated loss shifting incentives into their earnings forecasts, and c) how investors react to earnings news driven by tax-motivated losses.

A corporation that reports a tax loss during the year can "carry back" those losses to obtain a refund of taxes paid on income reported in previous years. But U.S. tax law currently limits the period to which losses can be carried back to two years. Thus, for taxes paid on profits in year t, the ability to claim a refund of those taxes disappears at the end of year $t + 2$; in $t + 3$ the firm is generally unable to recover the taxes paid in year t. A manager interested in reducing the firm's expected tax liability over the life of the firm—and therefore maximizing the firm's after-tax cash flows—will have an incentive to accelerate losses to maximize the tax refund. That is, increasing a loss in $t + 2$ by \$1 will result in a cash refund of taxes paid in year t of $\$1*\tau_c$, where τ_c is the marginal corporate tax rate in year t.

Managers can increase losses through both real actions and accounting choices, but those actions can be costly. Following Maydew (1997) and Scholes et al. (1992) we assume that when a firm accelerates a tax loss it also reports the loss on its GAAP financial statements. That is, we

assume some degree of conformity between GAAP and tax accounting and thus use GAAP earnings figures to proxy for corresponding tax earnings or losses. The potential tax benefits of accelerating a tax loss could go unclaimed if a) the manager perceives that the incremental cost (such as a covenant violation or debt rating downgrade) of increasing the accounting loss exceeds the incremental benefit of the tax refund; b) the manager is concerned about how the taxing authority might view such loss shifting; or c) the loss shifting involves modifying real actions (such as a deferral of sales) where the marginal cost exceeds the marginal tax benefits.[1]

In spite of such non-tax costs, Maydew (1997) finds that firms accelerate corporate losses to increase the value of tax refunds in the face of declining corporate tax rates following the Tax Reform Act of 1986 (TRA86). Maydew analyzes a particularly powerful institutional setting for tax-motivated loss shifting because TRA86 created strong incentives to use current losses to obtain refunds of taxes paid at a previously higher rate (46% vs. 34%). Our evidence extends Maydew's analysis in an attempt to better understand how tax asymmetries influence reporting decisions. When statutory tax rates are constant, a similar incentive is created when the firm must decide between accelerating a loss to secure a refund at a certain tax rate and deferring the loss for an uncertain and discounted tax benefit. The tax incentive we study thus represents a recurring phenomenon with particular importance to capital markets research, but whether it is strong enough to have an effect on reporting decisions and capital markets is an open question.

To address our questions, we first identify a set of firms that have an incentive to monetize their losses by claiming a refund of taxes that would otherwise be unavailable after year-end. These are the firms that a) paid taxes on profits in the earliest carryback year that have not yet been fully refunded, and b) analysts forecast a loss in the current year. We find that firms

[1] There is an extensive literature that analyzes the way in which managers consider the tradeoff between taxes (benefits and costs) and GAAP accounting effects. See for example Matsunaga, Shevlin and Shores (1992), Engel, Erickson and Maydew (1999), Shackelford, Slemrod, and Sallee (2010), and Hanlon and Heitzman (2010).

with the opportunity and incentive to accelerate losses to obtain a refund of past tax payments have larger negative earnings surprises, about -0.51% of stock price, than those firms expected to incur a loss but have no tax payments to recoup. Assuming a price-earnings ratio of 15, this equates to 7.7% lower reported earnings. Thus, consistent with tax-motivated loss shifting incentives playing a role in reporting behavior over time, we find that firms report larger losses in order to claim refunds of past tax payments.

Next, we examine whether analysts incorporate tax-motivated loss shifting incentives into their earnings forecasts. Much of the capital markets literature argues that analysts are sophisticated, and that analyst forecasts are a reasonable proxy for market expectations.[2] Prior research concludes that similar patterns between analyst forecast errors and stock returns support this assumption.[3] But there is evidence that analysts and investors often do not understand the tax disclosures and accounting information in general (Amir and Sougiannis, 1999; Plumlee, 2003). We find that analyst forecast errors are 0.39% (of stock price) more negative for those firms with a tax incentive to increase losses than for comparable firms without such incentives.[4] Further analyses show that analysts do not revise their earnings forecasts when tax loss carryback rules change to create particularly strong incentives for firms to accelerate losses. Taken together, the results suggest that analysts do not anticipate tax-motivated losses when forecasting earnings.

Finally, we evaluate whether the equity market's reaction to a negative earnings surprise depends on the firm's incentives to capture a refund of past tax payments. Unlike analysts, it appears that investors are not surprised by the negative unexpected earnings. If anything, tax-motivated loss shifting is valued by the capital markets, suggesting that equity investors

[2] See for example, Brown et al. (1986), O'Brien (1987), and Doyle et al. (2006).
[3] See Sloan (1996) and Bradshaw et al. (2001) on the accrual anomaly, Zhang (2006a) and Zhang (2006b) on information uncertainty, and La Porta (1996) on the value-growth anomaly.
[4] The analyst forecast error metric is scaled by beginning of period price, so this estimate indicates that analyst forecast errors were about 1.37% of beginning of period stock price.

understand the incentives behind the reported loss. Furthermore, we show that the market reaction to tax-motivated loss shifting is related to management's communication with capital markets. Firms with loss shifting incentives are less likely to issue managerial guidance for future periods. But when these firms choose to issue guidance, they do not guide future earnings lower when missing the current quarter's earnings target, consistent with the view that reported tax-motivated losses are transitory. In contrast, we find a strong positive correlation between negative earnings surprises and managerial guidance on future earnings for firms without such tax-motivated loss shifting incentives.

To put the main results of our paper in context, consider homebuilder Lennar Corporation. In fiscal years 2005 and 2006 Lennar incurred federal and state income tax liabilities of $805 million and $547 million respectively (based on current tax expense figures), thus 2007 was the last year Lennar could claim a refund of the $805 million in tax paid in 2005. Faced with a continuing decline in the homebuilding sector, Lennar took several actions to generate tax losses at the end of 2007. In the final month of the fiscal year, for example, they sold land to a partnership they formed with Morgan Stanley, generating a tax loss for Lennar of about $800 million (Lennar 10-K). Lennar also wrote off $530 million in deposits and pre-acquisition costs for building lots they decided not to pursue. According to the CEO of Lennar, "As a by-product of our strategic fourth quarter moves, we have generated losses that have resulted in the receipt of a cash tax refund of $852 million subsequent to the close of the quarter." (Press release, January 24, 2008). These tax losses were also reflected in Lennar's financial statements. Analysts were forecasting a fourth quarter loss of about $1.01 per share. Lennar surprised analysts by reporting a loss of nearly $7.92 per share. With 159.9 million shares outstanding, this translates to an unexpected accounting loss of over $1.26 billion. But the

market reacted positively to the loss, possibly in part because of management's disclosure about the nature of the loss and the cash flows generated by the refund. Lennar's three-day stock return around the earnings announcement date was over 25%, reflecting an approximately $493 million increase in market value.

We conduct a number of additional analyses to evaluate the sensitivity of our primary results. First, we examine time-series variations in the tax-based incentives to shift reported losses. We find that unexpected earnings are more negative in the period immediately after TRA86 when the decrease in corporate tax rates strengthened the tax incentives to shift income, consistent with Maydew (1997). In 2008, when the liquidity provided by tax refunds became more valuable during the recent financial crisis, we find more pronounced tax-motivated loss shifting.[5] Second, we examine variation in our results across fiscal quarters and find that the impact of loss shifting on analyst forecast errors is much stronger in the third and fourth quarters, consistent with the intuition that firms are more likely to make their income shifting decisions toward year end. Finally, we test alternative specifications of our tax incentive variables and find robust empirical results across different specifications.

This paper makes several contributions. First, we provide evidence that firms across a wide and diverse time period accelerate losses to obtain refunds of past tax payments before the option to do so expires. Unlike tax rate changes, our setting represents a recurring phenomenon for corporations and thus has broad implications for capital markets research. Second, this paper presents an initial examination of the capital market implications of loss carryback incentives. We find that analysts do not incorporate tax loss carryback incentives into their earnings forecasts, yet equity investors do appear to understand how tax incentives influence the firms'

[5] In late 2008 and in 2009 and 2010, various liberalizations in NOL carryback policy and NOL usage policy were enacted. These changes were in part motivated by the desire of the U.S. federal government to provide cash to firms facing difficult economic circumstances.

reporting decisions and firm value. Taken together, our evidence provides new insight on the ability of analyst forecast errors to proxy for earnings surprises. Finally, our evidence is highly relevant to understanding the growing importance of tax losses on firm value. For example, several firms have recently adopted poison pills designed specifically to protect the value of their net operating loss carryforward assets (Erickson and Heitzman, 2010). Moreover, the liquidity benefits of the tax loss carrybacks that we study have played a central role at least two policy attempts to inject liquidity into the business sector during the past decade (Graham and Kim, 2009). Overall, our evidence suggests that the tax-based incentive to accelerate the firm's losses plays a material and persistent role in corporate reporting decisions and capital markets activities.

The paper proceeds as follows. Section 2 reviews the prior literature and develops the hypotheses. Section 3 describes the data and provides summary statistics. Section 4 presents the results. Section 5 provides a variety of sensitivity analyses and robustness checks, and Section 6 concludes.

2. Prior literature and hypothesis development

Managers have incentives to reduce the firm's expected tax liability over the life of the firm because a dollar less paid to the taxing authorities is a dollar more for shareholders. Moreover, managers face asymmetric tax treatment of profits and losses: taxes are paid immediately on profits, but taxes are not necessarily refunded on losses. This means that a firm with zero expected pretax income will still have a positive expected tax liability that is increasing in income uncertainty (Scholes et al. 2008, p. 172). Thus, Graham and Smith (1999) show that firms facing such a convex tax schedule have incentives to hedge in order reduce expected tax liabilities. Net operating loss provisions contained in the tax code mitigate this asymmetry, but

only partially. A start up firm facing years of losses cannot claim a refund on taxes not paid. Those losses are carried forward and serve to reduce taxable income if and when the firm becomes profitable. But the longer the firm must wait to use that loss, the lower is the present value of the tax benefit.[6]

In contrast, a firm that paid taxes historically can claim a refund of those taxes if and when it incurs a loss. But their ability to do so disappears after a finite period. Each year the firm pays taxes, it effectively gets an option to claim a refund of those taxes in a future year, and this option expires after T years, where T is the length of the carryback window. This will give some firms an incentive to accelerate their losses to generate cash flow through a refund of prior tax payments, otherwise, the option will expire and the cash paid will not be recoverable. To illustrate this incentive, assume the loss carryback period is two years. If a firm paid taxes on profits in year t and those taxes have not been refunded through losses in year $t + 1$, it will have an incentive to report additional losses in year $t + 2$ in order to maximize a refund of taxes paid in year t. But consistently profitable firms benefit less from accelerating losses because these firms face more symmetric tax treatment (Graham and Smith, 1999). Instead, the present value of the tax benefit from accelerating a loss is strongest if the firm expects to face losses. These firms obtain immediate and certain tax benefits by accelerating the loss to recoup prior tax payments and face uncertain and discounted tax benefits by deferring the loss. As future expected losses increase, the benefit from accelerating those losses to secure a cash refund increases.

The incentives for tax-motivated loss shifting increase when the tax rate during the carryback window exceeds the expected statutory tax rate during current and future periods. Maydew (1997) examines firms' income shifting behavior around TRA86, which reduced the

[6] The tax law (e.g., I.R.C. Section 382) contains limitations on NOL usage if certain events occur.

top statutory corporate tax rate from 46% in 1986 to 34% in 1988. Among all firms reporting tax losses during a ten year window, Maydew finds that firms appear to report larger losses when the relative tax benefit of the carryback, i.e., the difference between tax rates in the current and carryback windows is greater. He finds that these loss shifting actions are evident in both operating income and nonrecurring losses.

We extend Maydew's research to a general setting where statutory tax rates are effectively constant. Maydew (1997) suggests that firms facing losses always have incentives to increase their refund of prior years' taxes for at least two reasons. First, the cash flows from tax refunds are certain, whereas expected cash flows from operations are not. Second, the time value of money provides an incentive to defer income and accelerate deductions.[7] We extend these points by adding the simple observation that the ability to claim a certain refund of cash taxes paid will be permanently lost when the carryback window closes, substantially reducing the present value of reported tax losses.[8] In essence, even in periods of constant statutory tax rates, firms facing a future decline in their effective marginal tax rate will have incentives to accelerate losses.[9] This leads to the following basic prediction:

---

[7] A third reason is that tax refunds represent real cash inflows that help to improve a firm's liquidity. The liquidity reason is likely to be more relevant for loss firms if they experience difficulty in obtaining liquidity from other sources.

[8] Consider the change in NOL carryback period in 2008-2010. The extension of the carryback window from two to five years was motivated by a desire to provide a refund of prior cash taxes paid to firms in a difficult economic climate (Graham and Kim, 2009). Such tax refunds were unavailable to firms prior to the law changes because the carryback period prevented firms from claiming refunds of taxes paid in years outside the then-current carryback window (i.e., two years).

[9] Like Maydew's focus on declining statutory marginal tax rates, our setting can potentially be interpreted as a decline in expected marginal tax rates (holding statutory tax rates largely constant). In other words, a firm that accelerates a loss to claim a refund of taxes paid in a prior year essentially secures a tax benefit at an undiscounted statutory tax rate. But if management decides to wait to report the loss, it is less likely the firm will be able to carry the loss back for an immediate refund, and instead must carry the loss forward to offset income in some future period, reducing the effective tax benefit of the deduction. Direct estimates of the marginal tax rate (such as the simulated tax rates of Shevlin, 1990; Graham, 1996; and Blouin et al., 2010) are not well-suited to our analysis for several reasons. First, they provide an estimate of the expected marginal tax rate for current year profits and losses, but not the expected marginal tax rate in future years. Second, they do not directly address the dollar amount of potential refunds from carrybacks. Third, these measures are endogenous to the reporting decisions we are trying to understand.

H1: Reported earnings are decreasing in tax loss carryback incentives

In testing this hypothesis, we explicitly consider variation in the costs and benefits to firms that execute this strategy. For firms that are persistently profitable and consistently pay taxes, the benefits of accelerating losses to claim a tax refund are either unavailable or too small to make a difference. Thus, more powerful tests of the hypothesized behavior involve comparing the reporting decisions of firms with tax-motivated loss shifting incentives (firms that paid taxes during the earliest year of the carryback window that expect to have losses in the current year) to firms without such incentives (firms with similar expected losses but no taxes payments to recoup). Moreover, book (GAAP) and tax reporting decisions are linked to a large degree, so managers should be expected to weigh the incremental costs of reporting larger GAAP accounting losses against the benefit of cash income tax refunds.

If tax rules create incentives for firms to increase reported losses to capture a refund of past tax payments, a natural question is whether analysts anticipate corporate responses to such incentives when forecasting earnings. Analysts are often viewed as sophisticated users of accounting information, so it seems reasonable to argue that they would incorporate tax-motivated income shifting incentives into their earnings forecasts. However, their forecasts may ignore carryback-based incentives if the tax disclosures are complex or provide noisy signals of true tax status (Dhaliwal et al., 2004). To our knowledge, there is no prior study on the capital market implications of loss carryback incentives. The evidence on other tax-related issues in general is also limited. Amir and Sougiannis (1999), and Plumlee (2003) provide evidence that analysts do not understand the impact of tax incentives and tax disclosures, particularly for more complex issues.[10] Shane and Stock (2006) show that analysts and investors do not incorporate

[10] Moreover, Outslay and McGill (2002) provide evidence that the tax disclosures of some firms are quite difficult to interpret and understand.

income shifting induced by the 1986 tax rate change in their earnings forecasts. Analysts may ignore one-time changes, but loss carryback incentives are recurring and apply to at least some firms every year, making a stronger case for analysts to forecast such information. This reasoning leads to the following hypothesis:

H2: Analyst forecasts do not incorporate the effects of loss carryback incentives.

Finally, we examine the equity market's reaction to tax-motivated loss shifting. If analysts do not incorporate tax-motivated loss shifting in their earnings forecasts, their estimates are likely to be systematically optimistic. Such systematic optimism would lead to negative earnings surprises as reflected in analysts' forecast errors (actual earnings minus forecasted earnings). However, loss shifting that generates cash tax refunds arguably creates value by reducing the present value of taxes paid and providing liquidity, so the market should not react as negatively to losses motivated by tax savings incentives. Firms can disclose the transitory nature of the loss to capital markets through their financial reports, conference calls, and future earnings guidance. This leads to the final hypothesis.

H3: The market reacts less negatively to earnings of firms engaged in tax-motivated loss shifting

3. Sample data and descriptive statistics

Each year, we identify firms that have the incentive to accelerate tax losses to capture refunds by analyzing the time-series of estimated taxable income. [11] Before 1997, a firm could

[11] An alternative research setting is to focus on tax law changes, as does Maydew (1997). He compares firm-years with NOL carrybacks during a period immediately after TRA86 with firm-years with NOL carrybacks in other periods. This alternative setting primarily differs from ours in two ways. First, Maydew tests the additional tax incentives introduced by TRA86, whereas we are more interested in the general phenomenon that firms always have incentives to shift income and carry back NOLs. Second, Maydew conducts an ex post analysis using firm-years with NOL carrybacks. We do not require firms to have NOL carrybacks, because a variable based on realized NOL carrybacks would have a look-ahead bias in our capital market tests. Instead, we focus on an ex ante

carry back its operating losses up to three years, and any unused losses could be carried forward up to 15 years. We first calculate NOL carryback capacity (*NOLC*), which is an estimate of the taxes paid in year $t - 3$ available for refund in year t and is described in the appendix.[12] Unrefunded tax payments in year $t - 3$ will expire if the firm does not claim refund in year t. Thus, our main test variable (*D_NOL*) for the period before 1997 is an indicator variable equal to one if in year t the firm has unrefunded tax payments on income in year $t - 3$ and analysts expect the firm to report a loss in year t. As of 1997, the carryback window was shortened to two years and the carryforward window was extended to 20 years.[13] Thus, our main test variable (again, denoted *D_NOL*) for the period after 1997 is an indicator equal to one if the firm has unrefunded taxes paid on income in year $t - 2$ and is expected to have a loss in year t. The intent of these measures is simply to identify a set of firms that will lose the ability to claim a refund of taxes paid in a prior year (*D_NOL*), and for those firms, to estimate the amount of tax payments at stake (*NOLC*).

D_NOL is an ex ante measure of the tax incentives to shift losses in the current year, and the ex ante nature of this measure is important when drawing inferences about capital market behavior. All information to construct *D_NOL* is available at the beginning of year t. In this way, we test whether the tax loss carryback incentive measures are associated with firm behavior and with the behavior of analysts and equity market investors. Because we focus on a single year of

---

variable and predict whether firms and the capital market behave in certain ways. Maydew carefully controls for the look-ahead bias issue because he takes firm-years with NOL carrybacks in other periods as the benchmark and examines the impact of additional tax incentives introduced by TRA86.

[12] Ideally, we would incorporate the firm's actual net operating loss carryforwards to calculate tax status. Net operating losses can arise from domestic, foreign, and local tax jurisdictions, but information on the source of the NOL is inconsistently disclosed in financial reports. Moreover, Compustat provides a single data item for net operating losses, and this has been shown to have significant measurement problems (Mills et al., 2003).

[13] Congress temporarily extended NOL carrybacks up to five years in 2001 and 2002 in response to the economic downturn subsequent to the Internet bubble burst. The temporary extension of carryback years should increase firms' incentives to report additional losses in 2001 and 2002 and offer less incentive to report losses in subsequent years. A similar extension was permitted for losses in 2008. We check the time-series variations in NOL carrybacks in Section 5.1.

tax payments and require that the firm have an expected loss for the year, *D_NOL* is a conservative measure of firms with tax incentives to shift income.

We include all firm-quarter observations with non-missing quarterly earnings or analysts' earnings forecasts, resulting a final sample of 314,923 firm-quarter observations from 1984 to 2009. In Table 1, we provide summary statistics of the primary variables used in this study. With regard to financial variables, the average firm in our sample has market value (*MV*) of $2.77 billion and a book to market ratio (*BM*) of about 0.56. The average leverage ratio for sample firms is 23%, while the average *EBITDA* for sample firms is 11% of average total assets. All financial variables are measured as of year $t - 1$.

We find that firms with loss carryback incentives under our definition (*D_NOL* = 1) account for 2.4% of firm-quarter observations in our 1984 through 2009 sample period. We estimate average un-refunded taxes (*NOLC*) for all firms with such unrefunded taxes from the earliest carryback year as 5.5% of beginning of year market value of equity.

4. Empirical evidence

4.1. Evidence of tax-motivated loss shifting based on the time-series earnings model

In the spirit of Maydew (1997), we begin by analyzing whether or not firms shift income (accelerate losses) in response to tax loss carryback incentives. To do so, we first estimate a simple time-series model of expected quarterly earnings (Bernard and Thomas, 1990):

$$E_q = \beta_0 + \beta_1 D\_NEG + \beta_2 E_{q-1} + \beta_3 E_{q-4} + e_q \quad (1)$$

where E is the reported earnings per share scaled by the firm's stock price at quarter-end.[14] *D_NEG* is a dummy variable that takes a value of 1 if analysts' forecasts of year t's earnings are negative, where forecasts are made in the first month following the prior year's earnings announcements and before the earnings announcement of the first quarter of year t. Because *D_NEG* is equal to one for *D_NOL* firms by definition, including *D_NEG* in the estimation controls for the systematic relation between earnings forecasts and realized earnings surprises. $E_{q\text{-}1}$ and $E_{q\text{-}4}$ represent earnings per share values for either one or four quarters prior.

We use the residuals from equation (1) to proxy for unexpected earnings in quarter t and sort firm quarters into two groups by *D_NOL*: those for which *D_NOL* = 1 versus those for which *D_NOL* = 0. [15] In Panel A of Table 2, we find that the mean unexpected earnings for firms with tax-motivated loss shifting incentives is -0.28% (p = 0.05). For firm quarters without this incentive (*D_NOL* = 0), mean unexpected earnings is 0.07% (p < 0.01) and the difference between the groups of -0.35% is significant at the 0.01 level. In the bottom portion of Panel A of Table 2, we compare unexpected earnings across *D_NOL* groups for the period immediately after the effective dates of TRA86 (1987 – 1990). As the table indicates, we observe more pronounced tax-motivated loss shifting in response to TRA86. The results in Panel A of Table 2 are therefore consistent with the conclusion that firms with an NOL carryback incentive increased reported losses in response to that incentive, consistent with Maydew (1997).

To provide a more robust test of whether firms with tax-motivated loss shifting incentives matter, we estimate the following regression that includes additional control variables:

[14] Following the capital markets research, we scale earnings and earnings surprises by stock price. In this way, the deflator is stock price for both stock returns and earnings surprises in the return regressions. As earnings are typically announced one to three months after fiscal quarter-end, the value of the deflator is known to the market prior to earnings announcements.

[15] The results are qualitatively similar if we use the residuals from equation (2).

$$E_q = \beta_0 + \beta_1 D\_NEG + \beta_2 E_{q-1} + \beta_3 E_{q-4} + \beta_4 DE_{q-1} + \beta_5 DE_{q-4} + \beta_6 DE_{q-1} * E_{q-1} + \beta_7 DE_{q-4} * E_{q-4} + \beta_8 \log(MV) + \beta_9 ACC + \beta_{10} RET6 + e_q \quad (2)$$

DE_{q-t} is a dummy variable taking a value of 1 if E_{q-t} is negative and 0 otherwise. *MV* is a firm's market value of equity at prior year-end. *ACC* is total accruals scaled by average assets. *RET6* is the six-month buy-and-hold return up to one month before a firm's fiscal quarter-end. Earnings variables and *ACC* are winsorized at the 1st and 99th percentiles.

In Panel B of Table 2, we add the indicator variable *D_NOL* to three incrementally richer regression models. We expect the coefficient on *D_NOL* to be negative reflecting the hypothesized tax-motivated loss shifting. Because *D_NOL* firms have negative expected earnings for the period by definition, we include *D_NEG* in the regression to ensure that the coefficient on *D_NOL* variable does not pick up any difference in earnings surprises between profit and loss firms (Hayn, 1995). As a result, *D_NOL* implicitly includes the interaction with *D_NEG*, and thus, the coefficient on *D_NOL* essentially captures the incremental loss reported by firms with an option to use losses to generate a cash refund of taxes paid in the earliest carryback year.

As the tabulation indicates, across a variety of specifications of equation (2), the coefficient on *D_NOL* is significantly negative. For example, in column 1 of Panel B, the coefficient on *D_NOL* is -0.508 ($p < 0.01$), indicating that unexpected earnings are about 0.51% of prior-year-end market value lower in quarters when the firm has incentives to accelerate losses to capture a refund of past taxes. Based on a price-earnings ratio of 15, this result translates to a 7.7% (0.508 × 15) reduction in reported earnings compared to similar loss firms without the tax incentives. This result holds up across various specifications with additional controls in columns 2 and 3. Overall, the results in Table 2 provide consistent support for the prediction that firms

engage in tax-motivated loss shifting, and that they do so even when statutory tax rates are constant.

4.2. Do analysts incorporate tax-motivated loss shifting in their earnings forecasts?

If analysts anticipate tax-motivated loss shifting, we expect to find no difference in analyst forecast errors between firms with tax incentives to accelerate losses (*D_NOL* = 1) and those without (*D_NOL* = 0). But if analysts do not anticipate such tax-motivated loss shifting, then their forecast errors should be more negative for firms with incentives to accelerate losses. We conduct both univariate and multivariate analyses on analysts' forecast errors. As indicated in univariate analyses in Panel A of Table 3, the mean analyst forecast error for firms with a tax loss carryback incentive (i.e., *D_NOL* firms), scaled by stock price, is -1.37% ($p < 0.01$). For firms without this carryback incentive, analyst forecast errors average -0.41%.[16] The difference in analyst forecast errors across tax status of -0.98% is highly significant and is consistent with the conclusion that analysts do not anticipate tax-motivated loss shifting behavior.

To control for other factors that could be correlated with both the tax incentives to shift losses and the forecast error, we estimate the following equation:

$$FE_q = \beta_0 + \beta_1 D\_NOL + \beta_2 D\_NEG + \beta_3 LOG(MV) + \beta_4 (COV) + \beta_5 BM + \beta_6 ACC + \beta_7 RET6 + e_q \quad (3)$$

where *FE* is analyst forecast error. If firms increase losses in quarter *t* to capture tax refunds and analysts do not incorporate this in their earnings forecasts, we expect a negative coefficient on *D_NOL*. Again, the coefficient on *D_NOL* represents the effect that is incremental to the

[16] The observed negative forecast errors for *D_NOL* = 0 firms is consistent with the optimistic bias in analysts' earnings forecasts documented in the prior literature (O'Brien, 1987). Analysts' forecast errors are reliably negative when the forecast horizon is long and turn to zero or positive immediately before earnings announcements (Richardson et al., 2004).

association between expected losses and realized forecast errors as reflected by the coefficient on *D_NEG*. Following previous research, we control for other determinants of earnings forecast bias. The literature argues that analysts have incentives to issue optimistic forecasts for firms with poor information environments because they want to please management to secure future access (Francis and Philbrick, 1993; Lim, 2001). We include firm size (*MV*) and analyst coverage (*COV*) to capture a firm's information environment (Atiase, 1987; Zhang, 2006b), and we include the book-to-market ratio (*BM*) to control for growth opportunities. Since the dependent variable is forecast error scaled by price, it is correlated with a firm's book-to-market ratio. Prior literature documents evidence indicating that analysts are not fully rational (see the review by Kothari, 2001). To allow for this possibility, we include *RET_6* to control for analysts' underreaction to the information imbedded in the prior period's stock returns. We further include accruals to control for the possibility that analysts do not fully understand the implication of accruals for future earnings (Bradshaw et al., 2001; Teoh and Wong, 2002).

Panel B of Table 3 summarizes the results of the forecast error regression. The coefficient on *D_NEG* of -0.4 indicates even when analysts expect the firm to report a loss, they appear systematically surprised by its magnitude. Turning to our variable of interest, the coefficient on *D_NOL* is -0.388 (t = -3.25) and indicates that analysts fail to anticipate the additional losses reported by firms with tax incentives to shift income and that analysts' forecast errors are predictable ex ante. Economically, *D_NOL* firms report about 0.39% greater losses (relative to stock price) than similar firms where the tax incentive to capture a refund of prior taxes is absent. This translates into about $33 billion of tax-induced loss shifting for firms with these incentives between 1984 and 2009.[17]

[17] The economic magnitude of $33 billion is calculated as 0.39% multiplied by the average market value of $1.174 billion and by 7,147 firm-quarter observations with tax incentives.

The results in Table 3 suggest that analysts do not fully incorporate tax-motivated loss shifting in their earnings forecasts. Next we analyze analyst forecast errors around three tax rule change events around which firms have particularly strong incentives to shift losses: (A) The Tax Reform Act of 1986 (TRA86), which was signed into law on Oct 22nd, 1986 and dropped the top marginal tax rate on corporations from 46% to 34%; (B) The Taxpayer Relief Act of 1997 (TRA97), which was signed into law on Aug 5th, 1997 and shortened the carryback window from three years to two years; (C) The Worker, Homeownership, and Business Assistance Act of 2009 (WHBAA2009), which was signed into law on Nov 6th, 2009 and temporarily increased the carryback window from two years to five years.

Each of these events increased the incentives for firms to accelerate losses to capture a refund of prior tax payments. Thus, if analysts incorporate information about the change in loss shifting incentives into their earnings forecasts , we expect analysts' forecast revisions immediately after the passage of the law will be more negative for firms with incentives to shift losses to capture a refund of prior tax payments (our *D_NOL* firms). For each *D_NOL* firm, we select a set of matched firms in which *D_NOL* equals zero by matching firms by year, market value of equity, and earnings yield. Specifically, for each sample firm in which *D_NOL* equals one, we choose a pool of firms with market value of equity between 75% and 125% of the market value of the sample firms in the same year, and then select a control firm with closest earnings yield relative to the sample firm. Table 4 reports analysts' earnings revisions around these three events. In Panels A and B, we find no difference in analysts' earnings revisions between *D_NOL* firms and their matches. In Panel C, the mean analyst revision is more negative for *D_NOL* firms than for matched firms, but the median analyst revision is higher. As the mean and median results go in opposite directions, the evidence is mixed. Overall, we fail to find any

consistent evidence that analysts incorporate information of tax-motivated loss shifting in their earnings forecasts.

4.3. Equity investor response to tax-motivated loss shifting

Finally, we examine the reaction of equity investors to tax-motivated loss shifting. If investors naively follow analysts' earnings forecasts, the equity market may not identify earnings surprises associated with tax-induced loss shifting. On the other hand, if investors understand that analysts' forecast errors are biased due to incomplete adjustment for tax-motivated loss shifting, or if the firm provides sufficient disclosure about the nature of the loss to investors when reporting earnings, then the market reaction should be less sensitive to losses reported by firms with tax incentives to accelerate losses.

Table 5 reports the return regression results, where the dependent variable is the cumulative three-day return centered on the earnings announcement net of the value-weighted market return. We control for firms with expected losses at the beginning of the period using *D_NEG*, as well as size, book-to-market, and prior returns. In the first column, we find that the coefficient on *D_NEG* is -0.679 (t = -5.59) implying that firms with ex ante expected losses also tend to have negative market reactions to reported earnings. However, this market reaction is muted for firms with tax incentives to accelerate the loss. The coefficient on *D_NOL* of 0.281 is positive and statistically significant at the 10% level and suggests that firms with tax-motivated loss shifting incentives get a positive bump in stock price, all else equal. Shareholders apparently value the firm's ability to monetize the loss by generating cash flows through the loss carryback.

In (2), we interact *D_NOL* with forecast error and find that both the mean and the interaction terms have positive coefficients. However, the interaction between *D_NOL* and *FE* is statistically insignificant suggesting that loss shifting incentives does not affect the correlation

between the market reaction and the realized forecast error. Overall, the results in Table 5 are consistent with the conclusion that investors understand the implications of tax-motivated loss shifting for firm value.

The equity market reaction to earnings by firms with tax-motivated loss shifting incentives is intriguing and has at least two possible explanations. First, market prices reflect a more complete information set than what is summarized in analyst forecasts. Second, the firm can effectively communicate the nature of the earnings surprise to the capital market upon the earnings announcement. As firms accelerate losses to claim bigger tax refunds, such incremental losses do not indicate a permanent shock to their earnings. The transitory nature of the loss and the positive cash flow and liquidity impacts can be signaled through financial reports, conference calls, and managerial guidance about future earnings.

We specifically test the managerial guidance explanation next. If negative earnings shocks are permanent, management will be more likely to guide expectations of future earnings lower. This leads to a positive correlation between the errors in analyst forecasts (*FE*) and the revisions in managerial guidance of future earnings (*MREV*), where *MREV* is defined as management guidance less the prevailing analyst consensus forecast of the following quarter's earnings deflated by stock price. On the other hand, if tax-motivated earnings shocks are temporary, future reported earnings should be unaffected and management should not guide future earnings lower, suggesting a zero correlation between analyst forecasts and managerial guidance on earnings expectation revision.

We report empirical results on managerial guidance in Table 6. In Panel A, we examine whether firms with loss shifting incentives are less likely to issue guidance in three increasingly richer logistic regressions. We find the coefficient on *D_NOL* is uniformly negative across three

models, suggesting that firms with tax incentives to shift losses are less likely to issue managerial guidance following the earnings release. One interpretation of this finding is that these firms are less likely to perceive a need to update the market's expectations of future earnings. In Panel B, we examine the correlation between earnings surprises and managerial guidance when firms choose to issue guidance. We find that earnings surprises and managerial guidance are positively correlated for non-*D_NOL* firms. On average, 30% of earnings shocks tend to be permanent, where the percentage is likely to be understated due to measurement errors and managerial optimism.[18] In contrast, earnings surprises and managerial guidance are uncorrelated for *DNOL* firms, suggesting that earnings shocks tend to be transitory so that management does not guide future earnings lower. The negative (yet insignificant) correlation rules out measurement error as an explanation, as measurement errors tend to bias the coefficient towards zero but should not change its sign.

In sum, we find that investors do not naively follow analysts' earnings forecasts. The market reaction to earnings reported by firms with NOL-based tax incentives to shift losses is significantly more positive than the market reaction to earnings without such incentives. This occurs despite the fact that firms with tax incentives to shift losses actually report larger losses using both prior earnings and analyst forecasts as a benchmark and is consistent with these losses being transitory, increasing cash flows, and providing liquidity.[19] Management's effective communication with capital market participants helps to explain the market's relatively positive reaction to earnings surprises for firms with tax loss carryback incentives.

[18] Measurement error in earnings surprises tends to bias the coefficient towards zero. Additionally, to the extent that management is optimistic, management may not fully incorporate permanent shocks in its initial earnings guidance, resulting in an underestimated percentage in our regression.

[19] Our market reaction results are in contrast to Shane and Stock (2006), which shows that investors do not understand income shifting around one-time tax rate change around 1986. We attribute the different results between these two research settings to the recurring nature of loss carrybacks and better firm communication with the market in 1990s and 2000s. Management guidance was virtually non-existent in the 1980s.

5. Sensitivity checks and additional analysis

5.1. The time-series variations in firms' incentives to carry back NOLs

One concern with the results reported above is that *D_NOL* might capture some firm fundamentals unrelated to NOL carrybacks. To address such concerns, we explore the time-series variations in firms' incentives to engage in tax-motivated loss shifting. We predict that firms have particularly strong tax incentives to shift losses around two events.

The first event is the TRA86. As Maydew (1997) shows, TRA86 reduced the corporate tax rate from 46% in 1986 to 34% in 1988, providing firms with stronger incentives to accelerate their losses starting in 1987 in order to generate a refund of taxes paid at the higher rate before the tax change.[20] This suggests that tax-motivated loss shifting should be more pronounced in years immediately after TRA86 than in other years. The second event is the financial crisis in 2008, which largely froze banks' lending activities and had significant adverse effects on debt and equity markets. Such a macroeconomic shock disrupted firms' normal financing activities and potentially rendered tax refunds a more valuable source of liquidity. Consequently, we expect more tax-motivated loss shifting in 2008 than in other years.

To test these predictions, we plot the annual coefficient on *D_NOL* from our forecast error regression (Model 1 of Panel B in Table 3) in Figure 1. First, we notice that the annual coefficient on *D_NOL* is negative for every year except 1986, suggesting that the effect of tax-motivated loss shifting is rather pervasive. Second, two valleys are notable. One is in 1989 and 1990, the last two years that firms can carry back NOLs to claim a pre-TRA86 tax refund at a 46% tax rate, and the other is in 2008, which represents the peak of the financial crisis in which

[20] For example, a firm can claim a $0.46 tax refund for every $1 of NOL carrybacks to pre-1986 years, whereas the tax cost of shifting income forward is $0.34 for every $1 of profit in 1989. As a result, firms can realize a net benefit, ignoring the time value of money, of $0.12 on every $1 shifted from 1989 to later years.

liquidity constraints may have made the tax benefits (refunds) of loss shifting more desirable.[21] Thus, this evidence provides additional support for some of our main conclusions.

5.2. Do results vary by fiscal quarter?

We also examine how the forecast error pattern varies across fiscal quarters. We expect that firms are more likely to incur losses in later quarters as they receive more precise information about expected tax and accounting profits, loss shifting opportunities, and liquidity needs. In Table 7, we present regressions by fiscal quarter (quarter 1, 2, 3, 4) in which the dependent variable is analyst forecast error. As the results indicate, the coefficients on *D_NOL* are more negative in the last two quarters than in the first two quarters, with the largest coefficient in the fourth quarter. A test of difference in the quarterly coefficients indicates that *D_NOL* has a significantly larger impact in the fourth quarter than in the first two quarters.

5.3. Alternative specifications of NOLC and D_NOL

We consider the following alternative specifications of *NOLC* and *D_NOL*.[22] In the first alternative specification, we replace expected losses proxied by analysts' forecasts with those based on a time-series earnings models in which we regress current year's earnings on last year's earnings and earnings in the year before. Then we use coefficient estimates based on historical data and the most recent set of earnings data to calculate forecasted earnings for the next year. *D_NOL* is equal to 1 if *NOLC* is positive and forecasted earnings are negative. In the second alternative specification, we drop the requirement of expected losses. Rather, we require taxable

[21] Note that the coefficient on *D_NOL* captures the incremental forecast errors for *D_NOL* firms relative to non *D_NOL* firms. In 2008, analysts might be surprised by how bad things were in the financial crisis or be slow to update their forecasts, but such negative forecast errors apply to all firms and thus are captured by the intercept in the regression.

[22] The detailed codes of this alternative specification are available from the authors upon request.

income to be positive in year $t - 2$ and to be negative in year $t - 1$ in the post-1997 period. In the pre-1997 period, we require taxable income to be positive in year $t - 3$ and to be negative in years $t - 2$ and $t - 1$. In both cases, we require that tax paid in the first year of the NOL carryback window has not been fully refunded. We find robust empirical results across these two alternative specifications (results not tabulated).

6. Conclusion

We identify a set of firms that have an incentive to exercise an option to secure a refund of prior tax payments—an option would otherwise expire at the end of the year. Over a long time period of relatively stable statutory tax rates, we find that firms appear to increase losses to claim a refund of cash tax payments. This evidence on the relation between tax incentives and reporting decisions suggests that such tax-based incentives have pervasive effects on reporting decisions across time—even when statutory tax rates are stable—and thus have broad implications for capital markets research.

Our evidence also suggests that analysts do not incorporate tax-motivated reporting incentives into their earnings forecasts: analyst forecast errors are significantly more negative for firms with tax-motivated loss reporting incentives. This evidence serves as a counter-example to the popular view that analyst forecast errors proxy for earnings surprises. Despite the relatively larger unexpected losses, the stock market reacts in ways that suggest investors value tax-motivated loss shifting. Holding the size of the reported loss fixed, the stock returns of firms with incentives to accelerate a loss to capture a refund are significantly larger than firms with no such tax-based incentive.

Our evidence is highly relevant to understanding the growing importance of tax losses on firm value. For example, recent innovations in takeover defenses are designed specifically to protect the value of tax losses, and within the last decade, Congress has used temporary changes in tax loss carryback rules to inject liquidity into the business sector. Taken together, our evidence suggests that the incentive to carry back tax losses plays a material and persistent role in corporate reporting decisions and capital markets activities.

References

Atiase, R., 1987. Market implications of predisclosure information: size and exchange effects. *Journal of Accounting Research* 25, 168-176.

Amir E., and T. Sougiannis, 1999. Analysts' interpretation and investors' valuation of tax carryforwards. *Contemporary Accounting Research* 16, 1-33.

Bernard, V., and J. Thomas, 1990. Evidence that stock prices do not fully reflect the implications of current earnings for future earnings. *Journal of Accounting and Economics* 13, 305-340.

Blouin, J., J. Core, and W. Guay. 2010. Have the tax benefits of debt been overestimated? *Journal of Financial Economics*, 195-213.

Bradshaw, M., S. Richardson, and R. Sloan, 2001. Do analysts and auditors use information in accruals? *Journal of Accounting Research* 39, 45–74.

Brown, L., R. Hagerman, P. Griffin, and M. Zmijewski, 1986. Security analyst superiority relative to univariate time-series models in forecasting quarterly earnings. *Journal of Accounting and Economics* 9, 61-87.

Dhaliwal, D., C. Gleason, and L. Mills, 2004. Last-chance earnings management: using the tax expense to achieve analysts' forecasts. *Contemporary Accounting Research* 21, 431-459.

Doyle, J., R. Lundholm, and M. Soliman, 2006. The extreme future stock returns following extreme earnings surprises. *Journal of Accounting Research* 44, 849-887.

Engel, E., M. Erickson, and E. Maydew, 1999. Debt-equity hybrid securities. *Journal of Accounting Research* 37, 249-274.

Erickson, M., and S. Heitzman, 2010. NOL Poison Pills: Selectica v. Versata et al. *Tax Notes* (June 23rd).

Francis, J., and D. Philbrick, 1993. Analysts' decisions as products of a multi-task environment. *Journal of Accounting Research* 31, 216-230.

Graham, J. 1996. Proxies for the corporate marginal tax rate. *Journal of Financial Economics* 42, 187-221.

Graham, J., and H. Kim, 2009. The effects of the length of the tax-loss carryback period on tax receipts and corporate marginal tax rates. *National Tax Journal* 52, 413-427.

Graham, J., and C. Smith, 1999. Tax incentives to hedge. *Journal of Finance* 54, 2241-2262.

Hanlon, M., 2003. What can we infer about a firm's taxable income from its financial statements? *National Tax Journal* 56, 831-863.

Hanlon, H., and S. Heitzman, 2010. A review of tax research. *Journal of Accounting and Economics* 50, 127-178.

Hayn, C., 1995. The information content of losses. *Journal of Accounting and Economics* 20, 125-153.

Kothari, S.P., 2001. Capital markets research in accounting. *Journal of Accounting and Economics* 31, 105-231.

LaPorta, R., 1996. Expectations and the cross-section of stock returns. *The Journal of Finance* 51, 1715-1742.

Lim, T., 2001. Rationality and analysts' forecast bias. *The Journal of Finance* 56, 369-385.

Maydew, E., 1997. Tax-induced earnings management by firms with net operating losses. *Journal of Accounting Research* 35, 83-96.

Matsunaga, S., T. Shevlin, and D. Shores, 1992. Disqualifying dispositions of incentive stock options: tax benefits versus financial report costs. *Journal of Accounting Research* 30(supplement), 37-68.

Mills, L., K. Newberry, and G. Novack, 2003. How well do Compustat NOL data identify firms with U.S. tax return loss carryovers? *Journal of the American Taxation Association* 25, 1-17.

O'Brien, P., 1987. Analysts' forecast as earnings expectations. *Journal of Accounting and Economics*, 53-83.

Outslay, E., and G. McGill. 2002. Did Enron pay taxes? Using accounting information to decipher tax status. *Tax Notes*, August 19, 2002.

Plumlee, M., 2003. The effect of information complexity on analysts' use of that information" *The Accounting Review* 78, 275-296.

Richardson, S., S. Teoh, and P. Wysocki. 2004. The walkdown to beatable analyst forecasts: The roles of equity issuance and insider trading incentives. *Contemporary Accounting Research* 21, 885-924.

Scholes, M., P. Wilson, and M. Wolfson, 1992. Firms' responses to anticipated reductions in tax rates: the Tax Reform Act of 1986. *Journal of Accounting Research* 30 (supplement), 161-185

Scholes, M., M. Wolfson, M. Erickson, E. Maydew, and T. Shevlin, 2008. *Taxes and Business Strategy: 4th Edition* (Prentice Hall).

Shackelford, D., J. Slemrod, and J. Sallee, 2010. Financial reporting, tax, and real decisions: Toward a unifying framework. Working paper, University of Michigan.

Shane, P., and T. Stock, 2006. Security analyst and stock market efficiency in anticipating tax-motivated income shifting. *The Accounting Review* 81, 227-250.

Shevlin, T., 1990. Estimating corporate marginal tax rates with asymmetric treatment of gains and losses. *Journal of the American Taxation Association* 11, 51-67.

Sloan, R., 1996. Do stock prices reflect information in accruals and cash flows about future earnings? *The Accounting Review* 71, 289-315.

Teoh, S.H., and T. J. Wong, 2002. Why new issues and high-accrual firms underperform: The role of analysts' credulity. *Review of Financial Studies* 15, 869-900.

Zhang, F. X., 2006a. Information uncertainty and stock returns. *Journal of Finance* 61, 105-137.

Zhang, F. X., 2006b. Information uncertainty and analyst forecast behavior. *Contemporary Accounting Research* 23, 565-590.

Appendix

Variable Definitions

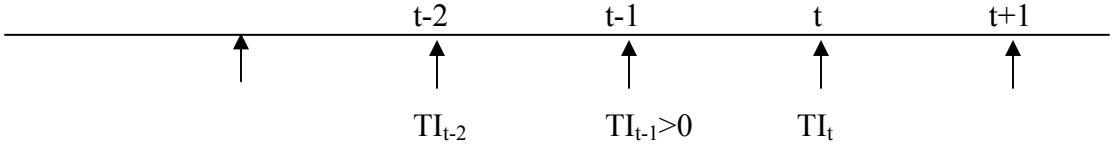
FE	Analyst forecast error, defined as $(E\text{-}F)/P_{t-1}$, where E is reported quarterly earnings per share from I/B/E/S, F is the median analysts' earnings-per-share forecast made in the last month of a firm's fiscal quarter, and P_{t-1} is stock price at the forecast date.
ARET	Earnings announcement return, defined as raw returns minus value-weighted market returns over the three-day [-1, 1] period, where day 0 is the earnings announcement date.
NOLC	Net operating loss carry back capacity (see the estimation process below for details), indicating a firm's tax paid in the earliest year of the NOL carryback window that has not been refunded yet.
D_NOL	*D_NOL* is a dummy variable with the value of 1 if *NOLC* is positive for a firm in an expected loss position and 0 otherwise.
D_NEG	*D_NEG* is a dummy variable with the value of 1 if analysts' forecasts of year t's earnings are negative, where forecasts were made in the first month after last year's earnings announcements but before the earnings announcement of the first quarter of year *t*.
MV	The market value of equity at the end of year $t - 1$.
COV	The number of analysts following the company at the forecast date.
BM	The book-to-market ratio, measured as the book value of equity divided by its market value, at the end of year $t - 1$.
RET_6	Trailing six-month stock return up to one month before a firm's fiscal quarter-end.
ACC	Total accruals in year $t - 1$, measured as $(\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) -$ DEPEXP scaled by average total assets, where ΔCA = change in current assets, $\Delta Cash$ = change in cash and cash equivalents, ΔCL = change in current liabilities, ΔSTD = change in debt in current liabilities, and DEPEXP = depreciation and amortization expense.
LEV	The leverage ratio, measured as total debt divided by total assets, at the end of year $t - 1$.
EBITDA	The ratio of earnings before interests, taxes, depreciation and amortization scaled by average total assets, measured in year $t - 1$.
MREV	Managerial guidance on earnings expectation revision, defined as management guidance on the following quarter' earnings minus prevailing analyst consensus forecast deflated by stock price at the analyst forecast date. Managerial guidance on the following quarter's (quarter $q + 1$) earnings is made on or after the firm announces quarter q's earnings.

.

Estimate net operating loss carryback capacity (*NOLC*)

NOLC is meant to capture tax paid in the earliest year of the NOL carryback window that has not been refunded by the beginning of year t+1. We estimate net operating loss carryback capacity (*NOLC*) depending on the time period of the loss. Before 1997, firms could carry back NOLs up to three years and carry forward NOLs up to 15 years. Since 1997, firms can carry back NOLs up to two years and carry forward NOLs up to 20 years.

The post-1997 period (fiscal year-end in August 1998 and thereafter). Firms can carry back NOLs up to two years.



Our main test is whether firms have incentives to report larger losses in year t+1 based on whether the firm can carry back losses against income in the earliest carryback year (t – 1). We define taxable income (TI) as current tax expense divided by the top statutory tax rate. We calculate *NOLC* as follows:

$$NOLC = \text{MAX}\{0, TI_{t-1} + \text{MIN}[0, TI_t + \text{MAX}(0, TI_{t-2})]\} \quad \text{(A1)}$$

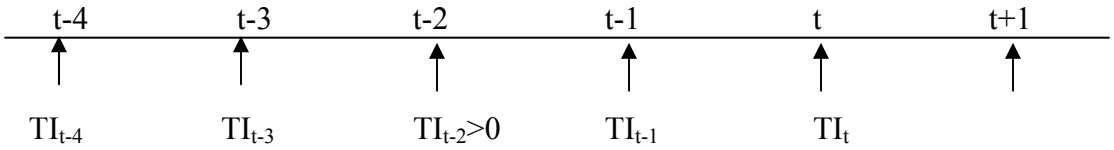
In words, A1 defines the capacity to carryback losses (*NOLC*) in t+1 as the amount of taxable profits in t-1 that has not been used to claim a refund from tax losses in year t. If the firm did not generate a taxable profit in t-1 ($TI_{t-1} \leq 0$) there is no tax available for refund and the outside maximization function ensures that *NOLC* will simply equal zero. But if the firm has taxable profits in t - 1 ($TI_{t-1} > 0$) then we must first determine how much of those taxable profits in t - 1 were offset through tax losses in year t. This adjustment is given by $\text{MIN}[0, TI_t + \text{MAX}(0, TI_{t-2})]$ in eq. (A1). If the firm has a taxable profit in year t, this adjustment equals zero and the full amount of t-1 taxes paid is available for refund. If the firm had taxable losses in year t ($TI_t < 0$), we must ask whether the firm had taxable income in t-2. A loss in year t will first be carried back against profits in year t-2, and the profits available for offset by year t losses are presented by $\text{MAX}(0, TI_{t-2})$. If the year t loss exceeds the year t-2 income (if any) then the excess loss is taken against t–1 income, and this is the adjustment given by $\text{MIN}[0, TI_t + \text{MAX}(0, TI_{t-2})]$.

To illustrate the potential values of *NOLC* as a function prior taxable profit and loss patterns, consider the cases in the following table:

Case	Taxable profits/losses in earliest carryback year **TI_{t-1}** (1)	Taxable profit/loss in year t **TI_t** (2)	Taxable profits in year t-2 available to offset year t losses **$MAX(0,TI_{t-2})$** (3)	Amount of year t loss not covered by profits in t-2 **$MIN[0,TI_t+MAX(0,TI_{t-2})]$** (4)	Max. amount of loss in year t+1 that can be carried back to obtain refund of t-1 taxes ***NOLC*** (5)
1.	10	0	20	0	10
2.	5	5	10	0	5
3.	10	-10	10	0	10
4.	10	-20	10	-10	0
5.	10	-15	10	-5	5
6.	-10	0	0	0	0

Cases 1 through 5 represent firms with taxes paid on profits in the earliest carryback year. Cases 1 and 2 represent firms with no tax loss in t (and hence no offset of t-1 profits). Case 3 provides an example of a firm whose tax loss in year t was offset entirely against profits in year t-2, preserving the entire capacity of t-1 profits to offset losses in t+1. Case 4 represents the case where a loss in t consumed both t-2 and t-1 profits, while in Case 5, only a portion of the profits in t-1 are used up to offset losses in t. The remainder in Case 5 is the amount available for use against losses in t+1. The final case simply illustrates that firm that paid no taxes in t-1 (or reported a loss) will have no capacity for carryback of t+1 losses regardless of what happens in year t or t-2.

The pre-1997 period. Firms can carry back NOLs up to three years.



Here, we calculate *NOLC* as follows:

$$NOLC = MAX\{0,TI_{t-2}+MIN[0,TI_{t-1}+MAX(0,TI_{t-4})+MAX(0,TI_{t-3})] + MIN[0,TI_t+MAX(0,TI_{t-3}+MIN(0,TI_{t-1}+MAX(0,TI_{t-4})))]\} \quad (A2)$$

Due to the dynamics involved with three carryback years, the formula is more complex. But the intuition and results are similar as in A1. Numerical examples using this formula are available from the authors upon request, but can be easily replicated.

D_NOL

D_NOL is a dummy variable that takes a value of 1 if *NOLC* is positive for a firm in an expected loss position, and 0 otherwise. Firms with expected losses are those with negative

analysts' consensus (median) forecasts made in the first month between the earnings announcements of the fourth quarter of year t and the first quarter of year t+1.

Our *NOLC* (and hence *D_NOL*) measure is subject to a number of measurement errors. First, taxable income includes both operating income/loss and capital gain/loss, which have different carryback and carry-forward rules. We do not make such distinction because the carryback periods are largely similar and because we can only estimate taxable income. Second, measurement errors arise because the average tax rate is not equal to the top statutory tax rate owing to progressive tax schedules. Third, current tax expense does not reflect the tax benefits from the exercise of nonqualified employee stock options (reflected as a reduction in current tax liability) and is reported net of tax cushions and tax credits (Hanlon, 2003). Third, we do not incorporate the magnitude of expected losses related to previous years' profits, as analysts' earnings forecasts are just a noisy proxy for a firm's tax profits/losses. Incorporating the magnitude of expected losses would make our NOLC formula too complicated. Finally, we do not incorporate the information of net operating loss carryforward on the balance sheet because of jurisdictional differences and the impact of NOLs acquired in mergers and acquisitions. Moreover, research by Mills et al., (2003) raises a number of additional concerns using Compustat data to infer net operating loss positions. We hand-checked a number of cases and find that many firms were able to claim tax refunds when reporting non-missing NOL carryforwards in their financial statements.

Table 1
Descriptive Statistics

Panel A: Univariate statistics

Variable	Mean	St. dev.	Min.	Q1	Median	Q3	Max.
FE	-0.004	0.025	-0.180	-0.003	0.000	0.002	0.047
ARET	0.001	0.088	-0.934	-0.034	0.000	0.034	2.876
D_NOL	0.024	0.154	0	0	0	0	1
MV	2771.4	13645.4	0.47	99.03	323.80	1183.15	508329
BM	0.56	0.44	-0.31	0.27	0.47	0.74	2.46
RET_6	0.06	0.47	-0.99	-0.15	0.03	0.21	31.10
ACC	-0.03	0.09	-0.31	-0.08	-0.04	0.00	0.29
LEV	0.23	0.22	0.00	0.05	0.19	0.35	11.79
EBITDA	0.11	0.26	-5.00	0.07	0.13	0.19	21.85
COV	5.49	5.03	1	2	4	7	44

Panel B: Correlation matrix

	FE	*ARET*	*D_NOL*	*MV*	*BM*	*COV*	*RET_6*
FE	1						
ARET	0.125**	1					
D_NOL	-0.058**	-0.006**	1				
MV	0.032**	0.001	-0.018**	1			
BM	-0.121**	0.017**	0.091**	-0.095**	1		
COV	0.076**	0.009**	-0.014**	0.360**	-0.195**	1	
RET_6	0.145**	0.012**	-0.010**	-0.006**	-0.002	-0.012**	1

** Significant at the 1% level.

Forecast error, *FE*, is calculated as the difference between the actual earnings and the median analyst forecast from the last month of a firm's fiscal quarter, scaled by stock price at the forecast date. *ARET* is earnings announcement return, measured as raw returns minus value-weighted market returns over the three-day [-1, 1] period, where day 0 is earnings announcement date. *NOLC* is net operating loss carryback capacity limit (see the Appendix for variable measurement). *D_NOL* is a dummy variable with the value of 1 if *NOLC* is positive and 0 otherwise, indicating a firm's incentives to carry back NOLs and to claim tax refunds. *MV* is a firm's market value of equity at prior year-end. *BM* is the book-to-market ratio at the end of prior year. *RET_6* is the six-month buy-and-hold return up to one month before a firm's fiscal quarter-end. *COV* is the number of analysts covering the firm at the forecast date. *ACC* is total accruals scaled by average assets. *LEV* is the leverage ratio. *EBITDA* is earnings before interests, taxes, depreciation and amortization scaled by average total assets Please see the Appendix for detailed variable definitions. The sample includes 314,923 firm-quarter observations with non-missing observations of *FE* or quarterly earnings from 1984 to 2009. In all columns, *t*-statistics in parentheses are based on the Fama-MacBeth regression approach. *FE*, *BM*, and *ACC* are winsorized at the 1st and 99th percentiles.

Table 2
Analysis of unexpected earnings based on time-series models

Panel A: Unexpected earnings for firms with or without a tax-motivated loss shifting incentive

	Firm quarters for which *D_NOL* = 1	Firm quarters for which *D_NOL* = 0	Difference
	Entire sample		
Average unexpected earnings (*p*-value)	-0.28% (0.05)	0.07% (<0.01)	-0.35% (<0.01)
	1987 – 1990		
Average unexpected earnings (*p*-value)	-1.06% (0.04)	0.08% (<0.01)	-1.14% (<0.01)

Panel B: Multivariate regressions of quarterly earnings (E_q)

	(1)	(2)	(3)
Intercept	-0.494 (-4.39)	0.344 (9.33)	-1.303 (-14.17)
D_NOL	-0.508 (-2.15)	-0.579 (-2.36)	-0.559 (-2.21)
D_NEG	-1.910 (-9.26)	-1.199 (-4.61)	-1.231 (-5.17)
E_{q-1}	0.592 (25.44)	0.138 (5.80)	0.117 (6.56)
E_{q-4}	0.319 (22.10)	0.398 (18.14)	0.434 (18.32)
D_E_{q-1}		-1.517 (-7.64)	-0.992 (-6.16)
D_E_{q-4}		-0.415 (-4.13)	-0.329 (-3.41)
E_{q-1}*D_E_{q-1}		0.458 (12.64)	0.421 (14.02)
E_{q-4}*D_E_{q-4}		-0.132 (-4.45)	-0.156 (-4.83)
Log(MV)			0.233 (15.23)
ACC			-0.141 (-0.64)
RET_6			3.057 (11.93)
Adj. R^2	0.355	0.366	0.380

Panel A reports univariate results on unexpected earnings for firms with or without a tax-motivated loss shifting incentive, where unexpected earnings are the residual from the time-series model (model 1 in Panel B). Panel B reports multivariate regression results. *E* is quarterly Compustat earnings per share scaled by stock price at a firm's quarter-end. D_E_{q-1} (D_E_{q-4}) is a dummy variable with the value of 1 if E_{q-1} (E_{q-4}) is negative and 0 otherwise. *NOLC* is net operating loss carryback capacity limit (see the Appendix for variable measurement). *D_NOL* is a dummy variable with the value of 1 if *NOLC* is positive and 0 otherwise, indicating a firm's incentives to carry back NOLs and to claim tax refunds. *D_NEG* is a dummy variable with the value of 1 if analysts' forecasts of year t's earnings are negative, where forecasts were made in the first month after last year's earnings announcements but before the earnings announcement of the first quarter of year t. *MV* is a firm's market value of equity at prior year-end. *ACC* is total accruals scaled by average assets. *RET_6* is the six-month buy-and-hold return up to one month before a firm's fiscal quarter-end. Please see the Appendix for detailed variable definitions. The sample includes 295,551 firm-quarter observations with non-missing earnings variables (E_q, E_{q-1}, and E_{q-4}) from 1984 to 2009. In panel B, *t*-statistics in parentheses are based on the Fama-MacBeth regression approach. Earnings variables and *ACC* are winsorized at the 1st and 99th percentiles.

Table 3
Analyst forecast error properties

Panel A: Analyst forecast errors for firms with and without tax-motivated loss shifting incentives

	Firm quarters for which *D_NOL* = 1	Firm quarters for which *D_NOL* = 0	Difference
	Entire sample		
Average unexpected earnings	-1.37%	-0.41%	-0.98%
(*p*-value)	(<0.01)	(<0.01)	(<0.01)
	1987 – 1990		
Average unexpected earnings	-2.73%	-0.75%	-1.98%
(*p*-value)	(<0.01)	(<0.01)	(<0.01)

Panel B: Multivariate regressions of analyst forecast errors (FE_q)

	Dep var. = FE
Intercept	-1.077 (-6.12)
D_NOL	-0.388 (-3.25)
D_NEG	-0.400 (-3.55)
Log(MV)	0.130 (5.00)
Log(COV)	0.069 (2.60)
BM	-0.468 (-4.42)
RET_6	1.363 (9.98)
ACC	0.017 (0.18)
Adj. R^2	0.069

Forecast error, *FE*, is calculated as the difference between I/B/E/S actual earnings and the median analyst forecast made in the last month of a firm's fiscal quarter, scaled by stock price at the forecast date. *NOLC* is net operating loss carryback capacity limit (see the Appendix for variable measurement). *D_NOL* is a dummy variable with the value of 1 if *NOLC* is positive and 0 otherwise, indicating a firm's incentives to carry back NOLs and to claim tax refunds. *D_NEG* is a dummy variable with the value of 1 if analysts' forecasts of year t's earnings are negative, where forecasts were made in the first month after last year's earnings announcements but before the earnings announcement of the first quarter of year t. *MV* is a firm's market value of equity at prior year-end. *COV* is the number of analysts covering the firm at the forecast date. *BM* is the book-to-market ratio at the end of the prior year. *RET_6* is the six-month buy-and-hold return up to one month before a firm's fiscal quarter-end. *ACC* is total accruals scaled by average assets. Please see the Appendix for detailed variable definitions. The sample includes 264,015 firm-quarter observations with non-missing *FE* from 1984 to 2009. In all columns, *t*-statistics in parentheses are based on the Fama-MacBeth regression approach. *FE*, *BM*, and *ACC* are winsorized at the 1st and 99th percentiles.

Table 4
Do analysts incorporate changes in the incentives to shift losses following tax legislation?

Panel A: TRA86

	REV86		MV		Earnings Yield	
	Mean	Median	Mean	Median	Mean	Median
D_NOL firms	-1.92%	0	94.19	39.49	-0.837	-0.141
Matched firms	-1.98%	0	88.24	40.18	-0.634	-0.136
Difference	0.06%	0.00%	5.95	-0.69	-0.203	-0.005
(*t*- or *z*-stat)	(0.05)	(0.09)	(0.13)	(-0.27)	(-0.50)	(-0.27)

Panel B: TRA1997

	REV97		MV		Earnings Yield	
	Mean	Median	Mean	Median	Mean	Median
D_NOL firms	-0.99%	-0.04%	1277.8	103.9	-0.289	-0.109
Matched firms	-0.52%	0	1290.0	103.6	-0.244	-0.115
Difference	-0.47%	-0.04%	-12.2	0.3	-0.045	0.006
(*t*- or *z*-stat)	(-0.88)	(-1.57)	(-0.02)	(0.00)	(0.44)	(0.00)

Panel C: WHBAA2009

	REV09		MV		Earnings Yield	
	Mean	Median	Mean	Median	Mean	Median
D_NOL firms	-1.63%	0.13%	797.0	214.4	-0.712	-0.152
Matched firms	-0.28%	-0.05%	786.4	222.0	-0.645	-0.150
Difference	-1.35%**	0.18%**	10.6	-6.60	-0.067	-0.002
(*t*- or *z*-stat)	(-2.08)	(2.21)	(0.05)	(-0.11)	(-0.41)	(-0.11)

** significant at the 5% level.

This table reports analysts' forecast revisions around tax rule changes between *NOLC* firms and matched firms. We explore three events of tax rule changes: (A) Tax Reform Act of 1986 (TRA86), which was signed into law on Oct 22nd, 1986, (B) The Taxpayer Relief Act of 1997 (TRA97), which was signed into law on Aug 5th, 1997,, and (C) The Worker, Homeownership, and Business Assistance Act of 2009 (WHBAA2009), which was signed into law on Nov 6th, 2009.In Panel A, we calculate analysts' forecast revision between September and November for fiscal year earnings of 1986 (REV86), scaled by stock price in Sep 1986. In Panel B, we calculate analysts' forecast revision between July and September for earnings of fiscal year 1997 (REV97), scaled by stock price in July 1997. In Panel C, we calculate analysts' forecast revision between October and December for earnings of fiscal year 2009 (REV09), scaled by stock price in Oct 2009. *MV* is a firm's market value of equity at prior year-end. *Earnings Yield* is earnings before extraordinary items scaled by the market value of equity at prior year-end. *D_NOL* firms are those with tax incentives to carry back NOLs (*D_NOL*=1). We match *D_NOL* firms by year, *MV*, and *Earnings Yield*. Specifically, for each *D_NOL* firm, we choose a pool of firms with *MV* between 75% and 125% of the market value of *D_NOL* firms in the same year, and then select the firm with cloest *Earnings Yield* relatve to the *D_NOL* firm. The sample includes 54, 104, and 460 *D_NOL* firms in Panels A, B, and C, respectively. Each year, analyst forecast revisions are winsorized at 1st and 99th percentiles.

Table 5
Regressions of earnings announcement stock returns

	ARET	
	(1)	(2)
Intercept	-0.181 (-1.24)	0.694 (2.99)
FE		0.801 (11.52)
D_NOL	0.281 (1.69)	0.361 (1.90)
*D_NOL*FE*		0.133 (1.61)
D_NEG	-0.679 (-5.59)	-0.834 (-5.36)
*D_NEG*FE*		-0.441 (-7.29)
Log(MV)	0.022 (1.37)	-0.141 (-1.91)
BM	0.227 (2.96)	0.679 (2.26)
RET_6	0.456 (3.85)	-0.041 (-0.18)
Adj. R^2	0.005	0.032

ARET is earnings announcement return, measured as raw returns minus value-weighted market returns over the three-day [-1, 1] period, where day 0 is earnings announcement date. Forecast error, *FE*, is calculated as the difference between I/B/E/S actual earnings and the median analyst forecast made in the last month of a firm's fiscal quarter, scaled by stock price at the forecast date. *NOLC* is net operating loss carryback capacity limit (see the Appendix for variable measurement). *D_NOL* is a dummy variable with the value of 1 if *NOLC* is positive and 0 otherwise, indicating a firm's incentives to carry back NOLs and to claim tax refunds. *D_NEG* is a dummy variable with the value of 1 if analysts' forecasts of year t's earnings are negative, where forecasts were made in the first month after last year's earnings announcements but before the earnings announcement of the first quarter of year t. *MV* is a firm's market value of equity at prior year-end. *BM* is the book-to-market ratio at the end of prior year. *RET_6* is the six-month buy-and-hold return up to one month before a firm's fiscal quarter-end. Please see the Appendix for detailed variable definitions. . The sample includes 264,015 firm-quarter observations with non-missing observations of *FE* from 1984 to 2009. In all columns, *t*-statistics in parentheses are based on the Fama-MacBeth regression approach. *FE* and *BM* are winsorized at the 1st and 99th percentiles.

Table 6
Analysis of managerial guidance

Panel A: Logistic regressions of managerial guidance

	(1)	(2)	(3)
Intercept	-1.388 (-14.00)	-2.402 (-14.93)	-2.249 (-13.02)
D_NOL	-1.813 (-3.98)	-1.540 (-3.51)	-1.360 (-3.11)
Neg_FE		-0.448 (-8.71)	-0.384 (-7.70)
E			7.995 (8.22)
Log(MV)		0.089 (4.29)	0.061 (2.82)
Log(COV)		0.552 (15.84)	0.553 (15.54)
BM		0.118 (3.14)	0.122 (3.67)
RET_6		0.194 (3.47)	0.039 (0.71)
ACC		1.962 (12.14)	1.724 (10.48)

Panel B: Regressions of managerial guidance on earnings expectation revision

	Non-*D_NOL* firms		*D_NOL* firms	
	(1)	(2)	(3)	(4)
Intercept	-0.002 (-7.51)	-0.004 (-5.82)	0.001 (0.21)	0.071 (1.42)
FE	0.290 (8.59)	0.305 (8.93)	-0.088 (-0.90)	-0.135 (-1.10)
Log(MV)		0.001 (5.45)		-0.020 (-1.60)
Log(COV)		0.000 (0.13)		0.026 (1.10)
BM		-0.002 (-4.22)		0.005 (0.89)
RET_6		0.004 (6.21)		0.000 (0.22)
ACC		-0.000 (-0.86)		-0.042 (-0.85)
Adj. R^2	0.131	0.206	0.152	0.212

Panel A reports logistic regressions of managerial guidance, where the dependent variable is an indicator variable

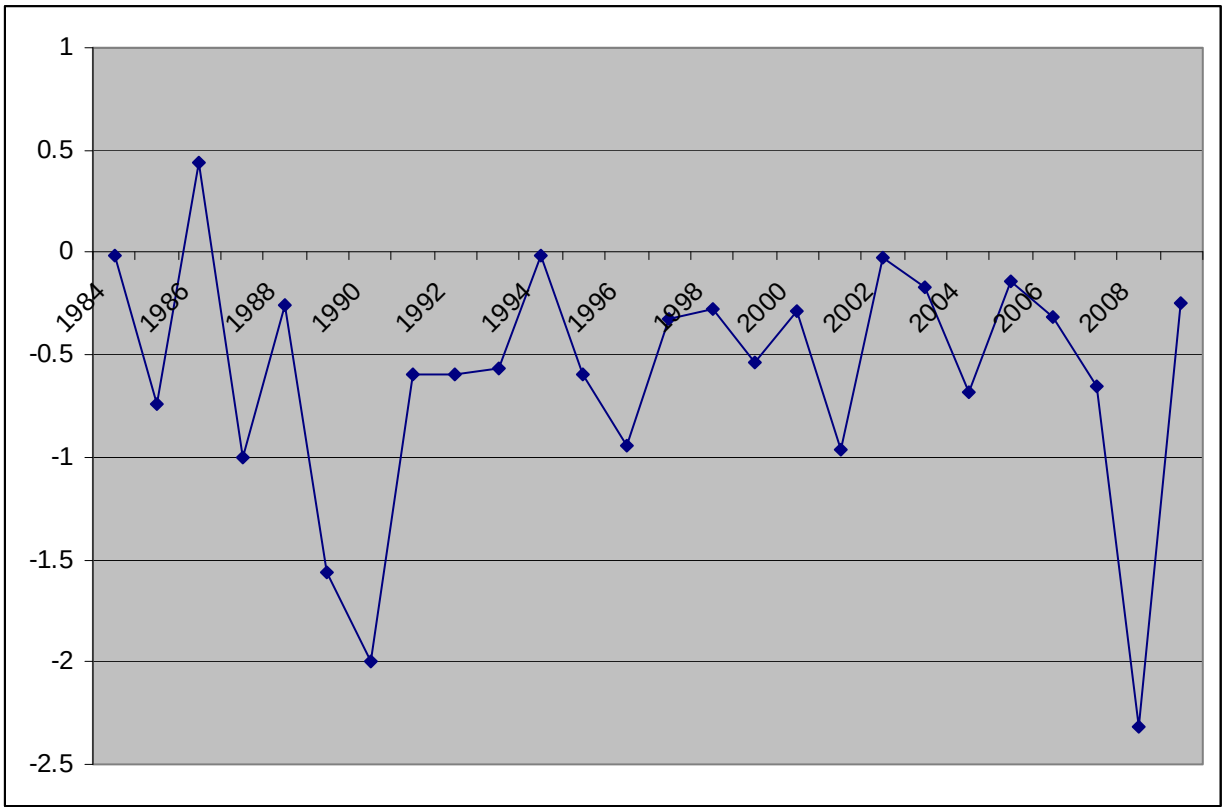
with the value of 1 if management issues earnings guidance and 0 otherwise. Panel B reports regression results of managerial guidance on earnings expectation revision. The dependent variable is managerial guidance on earnings expectation revision (MREV), defined as management guidance minus prevailing analyst consensus forecast of the following quarter' earnings deflated by stock price at the analyst forecast date. *NOLC* is net operating loss carryback capacity limit (see the Appendix for variable measurement). *D_NOL* is a dummy variable with the value of 1 for firms with positive *NOLC* and 0 otherwise, indicating a firm's incentives to carry back NOLs and to claim tax refunds. Forecast error, *FE*, is calculated as the difference between I/B/E/S actual earnings and the median analyst forecast made in the last month of a firm's fiscal quarter, scaled by stock price at the forecast date. Neg_FE is a dummy variable with the value of 1 if FE is negative and 0 otherwise. E is quarterly earnings per share scaled by stock price at the end of the fiscal quarter. *MV* is a firm's market value of equity at prior year-end. *COV* is the number of analysts covering the firm at the forecast date. *BM* is the book-to-market ratio at the end of the prior year. *RET_6* is the six-month buy-and-hold return up to one month before a firm's fiscal quarter-end. *ACC* is total accruals scaled by average assets. Please see the Appendix for detailed variable definitions. *D_NOL* firms are those with tax incentives to carry back NOLs (*D_NOL*=1). The sample includes 14,376 firm-quarter observations with non-missing observations of *MF* from 2000 to 2009. *MREV* data are widely available for both *D_NOL* and non-*D_NOL* firms since 2000. In all columns, *t*-statistics in parentheses are based on the Fama-MacBeth regression approach. *MREV*, *FE*, *BM*, and *ACC* are winsorized at the 1st and 99th percentiles.

Table 7
Regressions of analyst forecast errors by fiscal quarter

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Intercept	-0.202 (-5.29)	-0.359 (-6.58)	-0.442 (-8.95)	-0.709 (-7.40)	-0.718 (-6.62)	-0.464 (-1.03)	-1.654 (-3.47)	-1.459 (-10.35)
D_NOL	-0.434 (-1.97)	-0.115 (-0.34)	-0.824 (-3.87)	-0.849 (-4.03)	-0.166 (-0.71)	-0.003 (-0.02)	-0.666 (-2.64)	-0.709 (-2.81)
D_NEG	-0.531 (-2.95)	-0.870 (-3.15)	-0.533 (-3.12)	-0.964 (-4.14)	-0.362 (-1.88)	-0.582 (-1.82)	-0.119 (-0.96)	-0.534 (-2.45)
Log(MV)					0.096 (6.75)	0.043 (0.53)	0.209 (3.83)	0.170 (7.72)
Log(COV)					-0.001 (-0.07)	0.096 (1.04)	0.032 (1.68)	0.144 (3.74)
BM					-0.204 (-3.31)	-0.685 (-2.81)	-0.209 (-0.69)	-0.762 (-6.07)
RET_6					0.940 (5.84)	0.877 (9.04)	1.494 (4.04)	2.125 (7.05)
ACC					0.100 (0.58)	-0.050 (-0.34)	0.148 (0.80)	-0.125 (-0.47)
Adj. R^2	0.008	0.014	0.007	0.008	0.055	0.059	0.077	0.083

Q1, Q2, Q3, and Q4 are the first, second, third, and fourth quarter, respectively. Forecast error, *FE*, is calculated as the difference between I/B/E/S actual earnings and the median analyst forecast made in the last month of a firm's fiscal quarter, scaled by stock price at the forecast date. *NOLC* is net operating loss carryback capacity limit (see the Appendix for variable measurement). *D_NOL* is a dummy variable with the value of 1 if *NOLC* is positive and 0 otherwise, indicating a firm's incentives to carry back NOLs and to claim tax refunds. *D_NEG* is a dummy variable with the value of 1 if analysts' forecasts of year t's earnings are negative, where forecasts were made in the first month after last year's earnings announcements but before the earnings announcement of the first quarter of year t. *MV* is a firm's market value of equity at prior year-end. *COV* is the number of analysts covering the firm at the forecast date. *BM* is the book-to-market ratio at the end of prior year. *RET_6* is the six-month buy-and-hold return up to one month before a firm's fiscal quarter-end. *ACC* is total accruals scaled by average assets. Please see the Appendix for detailed variable definitions. The sample includes 264,015 firm-quarter observations with non-missing observations of *FE* from 1984 to 2009. In all columns, *t*-statistics in parentheses are based on the Fama-MacBeth regression approach. *FE*, *BM*, and *ACC* are winsorized at the 1st and 99th percentiles.

Figure 1
The coefficient on *D_NOL* by year in the forecast error regression



The coefficient on *D_NOL* represents the difference in analyst forecast error between *D_NOL* firms and non-*D_NOL* firms. Specifically, we regression *FE* on *D_NOL* and *D_NEG* each quarter and plot the coefficients on *D_NOL* by year. Annual coefficient is the average of four quarterly coefficients on *D_NOL* from quarterly regressions. Forecast error, *FE*, is calculated as the difference between I/B/E/S actual earnings and the median analyst forecast made in the last month of a firm's fiscal quarter, scaled by stock price at the forecast date. *D_NOL* is the dummy variable indicating a firm's incentives to carry back NOLs. *D_NEG* is a dummy variable with the value of 1 if analysts' forecasts of year t's earnings are negative, where forecasts were made in the first month after last year's earnings announcements but before the earnings announcement of the first quarter of year t. Please see the Appendix for detailed variable definitions. The sample includes 264,015 firm-quarter observations with non-missing observations of *FE* and *D_NOL* from 1984 to 2009. *FE* is winsorized at the 1st and 99th percentiles.