

Benefits and Costs of Using After-Tax Earnings
as the Contracting Variable in Bonus Plans

Dan Dhaliwal
Lou Myers Professor of Accounting
Department of Accounting
College of Business and Public Administration
University of Arizona
Tucson, Arizona 85721

Joel Sneed
Assistant Professor
Department of Accounting
Lundquist College of Business
University of Oregon
Eugene, Oregon 97403-1208

Robert Trezevant*
Associate Professor
Leventhal School of Accounting
Marshall School of Business
University of Southern California
3660 Trousdale Parkway
Los Angeles, California 90089-0441
(213) 740-5013
email: bobtrez@hotmail.com
* corresponding author

November 2000

Acknowledgment: We thank Ken Gaver for providing us with the data that is used to identify our sample firms. This paper has benefited greatly from the specific comments and suggestions of Greg Carnes, Steve Matsunaga, and John Phillips, and from comments on this general area of research that were offered by participants in the New Faculty Research Session at the 2000 *Journal of the American Taxation Association Mid-Year Meeting*.

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ABSTRACT

We identify and test the effects of benefits and costs associated with the choice to use after-tax earnings as the contracting variable in bonus plans. We find that benefits arise from tax law provisions for foreign income, permanent differences and rate differentials, from firm profitability, and from the likelihood of entering the wrong tax clientele in the future, and that an important cost is compensation risk. Also, the effect of investment tax credits is not significant. Findings suggest that tax expense is used to tailor the definition of earnings used in bonus plans such that firm value is maximized.

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1. Introduction

Prior research has found that many firms employing an earnings-based bonus plan use a plan that rewards managers based on before-tax earnings, even though a plan based on after-tax earnings would motivate managers to consider more carefully the impact on firm value of income taxes.^{1,2} For example, the use of before-tax earnings is observed by Healy [1985] for 52.7 percent of his sample firms, by Newman [1989] for 66.1 percent of his sample firms, by Gaver, Gaver, and Austin [1995] for 58.1 percent of their sample firms, by Carnes and Guffey [2000] for 69.9 percent of their sample firms, and by Phillips [2000] for 39 percent of his sample firms.

The purpose of this study is to identify and test the effects of factors that are expected to be associated with the choice to use a before-tax or an after-tax bonus plan. This study extends previous research on this issue in several ways.³ First, when examining why incentives are structured as they are, it is important to consider both the benefits and the costs of alternate incentive plans. Prior

¹ For a review of the evolution of annual bonus plans over time, see Holthausen, Larcker, and Sloan [1995]. For a discussion of why earnings-based bonus plans are used to reward managers, see Jensen and Meckling [1976], Demski, Patell, and Wolfson [1984], Murphy [1985], Lambert and Larcker [1987], and Sloan [1993].

² We assume that a decision that maximizes after-tax earnings also maximizes firm value. Thus, when we use the term "impact on firm value", we are also referring to "impact on after-tax earnings".

³ Previous research on this issue includes Newman [1989], Carnes and Guffey [2000], and Phillips [2000]. To summarize the first two studies, firm size, level of foreign operations, capital intensity, and number of operating segments are generally positively associated with the use of an after-tax bonus plan. Phillips [2000] extends prior research by using survey data to examine both CEO and business-unit managers' bonus plans. Phillips finds that the use of after-tax bonus plans for business-unit managers (for CEOs) leads to (does not lead to) lower effective tax rates.

research on the bonus-plan-type decision generally focuses on only the benefits of using an after-tax bonus plan, rather than on the costs, because empirical proxies for these costs are difficult to develop. This study extends the literature by identifying and explicitly testing the effects of the costs that result from the use of after-tax earnings as a bonus plan's contracting variable.

Second, prior research uses variables based on indirect measures of the benefits of using an after-tax bonus plan. The corresponding variables used in this study, which are based on effective tax rate reconciling items disclosed in a firm's tax footnote, provide a more direct measure of these benefits.

Third, our models of the bonus-plan-type decision are more complete than those used in prior research in that they consider several factors affecting this decision that have not been examined previously. Specifically, our models include variables that test the predictions that more profitable firms and firms that are more likely to wind up in the wrong tax clientele relative to their in-place tax planning strategies are more likely to use an after-tax bonus plan.

Our sample consists of 57 firms that use a before-tax earnings-based annual bonus plan and 40 firms that use an after-tax plan. These firms are used to estimate multivariate models of the bonus-plan-type decision, with the following results. First, we find that that the use of an after-tax bonus plan is more likely if a firm reports higher levels of effective tax rate reconciling items related to foreign income, permanent differences, and tax rate differentials. Second, we find that the use of an after-tax bonus plan is less likely, the higher the compensation risk associated with the use of such a plan. Third, we find evidence that a firm is more likely to use an after-tax bonus plan, the larger its profits subject to income taxes, and the more

likely it is that the firm could wind up in the wrong tax clientele relative to its in-place tax planning strategies.

Our results have the following implications. First, our results suggest that the benefits of using an after-tax bonus plan arise from tax law provisions for foreign income, permanent differences, and tax rate differentials, from firm profitability, and from the likelihood that a firm will wind up in the wrong tax clientele relative to its in-place tax planning strategies. Second, our results suggest that a major cost of using an after-tax bonus plan is the compensation risk associated with the use of such a plan. Last, contrary to prior research, our results indicate that the influence of a firm's ability to generate investment tax credits on the bonus-plan-type decision does not appear to be significant.

Our findings add to previous evidence (e.g., Clinch and Magliolo [1993]; Dechow, Huson, and Sloan [1994]; Natarajan [1996]; Gaver and Gaver [1998]) that an advantage to using earnings as a contracting variable in a bonus plan is that the definition of earnings used in the plan can be tailored to match a given firm's characteristics. In this regard, the specific contribution of our findings is that they suggest that income tax expense is one of the factors that is used to tailor the definition of earnings used in a bonus plan such that firm value is maximized.

The study proceeds as follows. We discuss the benefits and costs of after-tax bonus plans in section 2. Section 3 describes sample selection. Section 4 describes models and test variables. Section 5 reports the results of tests. The paper concludes with a summary of its major findings in section 6.

2. Benefits and Costs of After-Tax Bonus Plans

A primary benefit of using after-tax earnings in the calculation of bonuses is that it motivates managers to consider more carefully the impact on firm value of income taxes. However, as discussed next, this benefit applies only to tax law provisions that cause a firm's effective tax rate to differ from the maximum federal rate.

Under the deferred income tax financial accounting rules in effect during our sample period, as long as only timing differences exist, a firm's after-tax earnings are generally equal to its before-tax earnings times a constant factor of one minus the maximum federal corporate marginal tax rate.⁴ In other words, as long as only timing differences exist, decisions that maximize before-tax earnings also maximize after-tax earnings. Given the preceding, an after-tax bonus plan would be ineffective in motivating more careful consideration of tax planning strategies that generate timing differences because bonus payments would not be affected by the creation of these timing differences.

On the other hand, an after-tax bonus plan would be effective in motivating more careful consideration of tax law provisions that cause a firm's effective tax rate to differ from the maximum federal rate. Examples are tax law provisions that create permanent differences between book earnings and taxable earnings (e.g., municipal bond interest), special tax rates (e.g., foreign earnings taxed at a rate other than the maximum federal rate), tax credits, and state income taxes. The reason that an after-tax bonus plan would motivate managers to consider more carefully tax law provisions such as those that create

⁴ During our sample period, timing differences were defined as revenue or expense items that, although they are reported at the same dollar amount in book and taxable earnings over time, are reported in book and taxable earnings in different time periods (see *Accounting Principles Board Opinion No. 11* [1967]). Timing differences are similar to temporary differences under SFAS No. 109 (Financial Accounting Standards Board [1992]).

permanent differences is that if such provisions exist, a decision that maximizes before-tax earnings may not maximize after-tax earnings. For example, assume that a firm with a 46 percent marginal tax rate will have \$1,000 of pretax operating earnings, that municipal bonds yield six percent, and that equally risky taxable bonds yield ten percent. If the firm invests \$100 in municipal bonds at the start of the year, before-tax book earnings are \$1,006 and after-tax book earnings are \$546. If the firm invests \$100 in taxable bonds at the start of the year, before-tax book earnings are \$1,010 and after-tax book earnings are \$545.40. In this situation, only an after-tax bonus plan would motivate a manager to choose the after-tax-cash-flow-maximizing investment in municipal bonds.⁵

The implication of the preceding for our tests is as follows. A primary benefit of using after-tax earnings in the calculation of bonuses is that it motivates managers to consider more carefully the impact on firm value of income taxes. However, due to deferred income tax accounting rules, this benefit applies only to tax law provisions that create permanent differences, special tax rates, tax credits, and state income taxes. Thus, as in previous research, our test variables that measure the benefit of using an after-tax bonus plan focus on book-tax reconciling items that relate to permanent differences, special tax rates, tax credits, and state income taxes.

The fact that many firms do not use an after-tax bonus plan suggests that there are costs that offset the benefits of employing

⁵ This example assumes that lower effective tax rates caused by the non-taxability of municipal bond interest are not exactly offset by lower pretax returns (i.e., by higher implicit taxes) on municipal bonds. More generally, if lower (higher) effective tax rates caused by relevant tax law provisions are partially offset by higher (lower) implicit taxes, then it will be more difficult to find an association between variables related to these tax law provisions and type of bonus plan used.

such a plan. One such cost, identified but not extensively tested in previous research, is the additional compensation risk placed on a manager by the use of an after-tax bonus plan. This additional risk arises because a manager's bonus can be affected by changes in income tax rules over which the manager has no control. A contribution of this study is that it includes test variables that explicitly measure the amount of compensation risk that a manager faces, both as a result of using after-tax rather than before-tax earnings as a bonus plan's contracting variable and as a result of the structure of the manager's overall compensation package.

3. *Sample Selection*

The firms in our sample are those used in Gaver et al. [1995]. We thank the authors for providing us with this information. Gaver et al.'s sample consists of firms with (i) 1986 proxy statements that disclose the use of an earnings-based annual bonus plan in 1985 and that explicitly state the formula used to calculate the transfer to the bonus pool in 1985; and (ii) *Compustat* data required for Gaver et al.'s analysis. Among the 107 firms in the dataset provided by Gaver et al., information on whether a firm uses a before-tax or an after-tax bonus plan is indicated for 104 firms in 1985. We gather this information for the three remaining firms in Gaver et al.'s dataset from 1986 proxy statements that are available in our University libraries.

For each of the 107 firms described above, we obtain the firm's income tax footnotes from its 1983, 1984, and 1985 financial statements. 100 of 107 firms have income tax footnotes that contain an effective tax rate reconciliation schedule that identifies in detail the items that cause a firm's effective tax rate to differ from the

maximum federal rate. Among these 100 firms, three firms have negative book earnings in each of the years 1983, 1984, and 1985. These three firms are dropped from the sample because it is likely that they would be more concerned with returning to profitability than with reducing their tax burden.⁶ After removing these three firms from the sample, we are left with the 97 firms used in this study. Among these 97 firms, 57 use a before-tax bonus plan and 40 use an after-tax plan in 1985. Referring to 1984 and 1985 proxy statements, we find that the 57 (40) firms that use a before-tax (after-tax) bonus plan in 1985 also use a before-tax (after-tax) plan in 1983 and 1984.

The years included in our analysis are 1983-85. The year 1983 is the first year included because *Compustat* data required to calculate certain test variables are not available for years prior to 1983. The year 1985 is the last year included because the Tax Reform Act of 1986, TRA 86, changed many of the tax law provisions that cause a firm's effective tax rate to differ from the maximum federal rate. For example, TRA 86 repealed the investment tax credit and the capital gains tax rate differential and it made major changes in the rules governing the current deductibility of foreign tax credits.

Exhibit 1 provides a summary of these sample selection procedures.

4. Models and Test Variables

4.1. MODEL SPECIFICATION

We estimate models of the association of type of bonus plan used with variables that proxy for the benefits and costs of using an after-tax bonus plan and with additional variables that proxy for other factors that we expect affect the bonus-plan-type decision. The first logit model, which includes one overall measure of the benefit

⁶ We draw similar conclusions if these three firms remain in the sample.

achievable from using an after-tax bonus plan, is as follows:

$$BONUS = \alpha_0 + \beta_1 TOTAL + \beta_2 ASSETS + \beta_3 VARATBT + \beta_4 PCTOPT + \beta_5 ROA + \beta_6 VARROA + \epsilon \quad 1a$$

where $BONUS = 1$ if a firm uses an after-tax bonus plan and $BONUS = 0$ if a firm uses a before-tax plan. $TOTAL$ is described in section 4.2. As described in section 4.3, $ASSETS$ is the log of total assets; $VARATBT$ is the variability of after-tax earnings relative to the variability of before-tax earnings; $PCTOPT$ is percentage of executive compensation represented by stock option grants; ROA is return on assets; and $VARROA$ is variability of ROA . For each firm, variables are equal to their mean annual values over the 1983-85 time period.

The second logit model, which includes separate measures of the benefits achievable from using an after-tax bonus plan due to tax law provisions for tax credits, foreign income, permanent differences and tax rate differentials, and state income taxes, is as follows:

$$BONUS = \alpha_0 + \beta_1 CREDIT + \beta_2 FOREIGN + \beta_3 PERM + \beta_4 STATE + \beta_5 ASSETS + \beta_6 VARATBT + \beta_7 PCTOPT + \beta_8 ROA + \beta_9 VARROA + \epsilon \quad 1b$$

where $BONUS$, $ASSETS$, $VARATBT$, $PCTOPT$, ROA , and $VARROA$ are defined following equation 1a. $CREDIT$, $FOREIGN$, $PERM$, and $STATE$ are described in section 4.2. For each firm, variables are equal to their mean annual values over the 1983-85 time period.⁷

4.2. TEST VARIABLES MEASURING THE BENEFITS OF AN AFTER-TAX BONUS PLAN

As discussed earlier, a primary benefit of using an after-tax bonus plan is that such a plan encourages managers to consider more carefully tax law provisions that create permanent differences, special tax rates, tax credits, and state income taxes. This section describes the calculation of and predictions for the variables included in models 1a and 1b that measure this benefit.

The variables included in models 1a and 1b that measure the benefits achievable from using an after-tax bonus plan are based on

⁷ Results are more significant than those reported if we pool firm-year data. We do not report results using pooled data because a given firm's test variables in different years are not independent.

effective tax rate reconciling items disclosed in a firm's tax footnote. Prior research uses variables based on more indirect measures such as the percentage of sales, income, and taxes generated by foreign operations (a surrogate for tax law provisions for foreign earnings) and the capital expenditures to sales ratio (a surrogate for the investment tax credit). There are several advantages to using variables based on effective tax rate reconciling items. For instance, these variables provide a more direct measure of the benefits achievable from using an after-tax bonus plan than do the variables used in prior research. Moreover, by using variables based on effective tax rate reconciling items, we are able to investigate a greater number of tax planning strategies than in prior research.

To calculate the variables included in models 1a and 1b that measure the benefits achievable from using an after-tax bonus plan, we proceed as follows. For each of the 97 firms in our sample, we classify each individual item used to reconcile the firm's effective tax rate to the maximum federal rate, as disclosed in the firm's effective tax rate reconciliation schedule, into one of four categories: credits other than the foreign tax credit, items related to foreign or export operations, permanent differences and tax rate differentials not included in another category, and state income taxes. Exhibit 2 provides a detailed breakdown of individual items appearing in sample firms' effective tax rate reconciliation schedules in 1985. The most common item classified as a credit is the investment tax credit (reported by 56 percent of firms), the most common item related to foreign or export operations is foreign income taxed at a rate other than the maximum federal rate (reported by 37 percent of firms), the most common permanent difference is amortization of intangibles (reported by 9 percent of firms), and the most common tax rate

differential not included in another category is capital gains taxed at a rate other than the maximum federal rate (reported by 18 percent of firms).

A firm is required to separately disclose an individual reconciling item in its effective tax rate reconciliation schedule if the item's dollar amount, in the current or two preceding years, is greater than or equal to five percent of the income tax that would be due on the firm's pretax book earnings taxed at the maximum federal rate.⁸ Items that are less than this amount are usually combined and reported as a single line item, typically titled "Other", in a firm's effective tax rate reconciliation schedule. Almost 90 percent of the firms in our sample report a line item such as "Other" in their effective tax rate reconciliation schedule. We do not include this item in our tests for two reasons. First, any association observed between "Other" and type of bonus plan used is difficult to interpret because it is not possible to determine whether "Other" is a credit, related to foreign operations, a permanent difference or tax rate differential, state income taxes, or some combination of these four categories of effective tax rate reconciling items. Second, by definition, the items included in "Other" are of a small dollar amount and thus would not be expected to have a major impact on the bonus-plan-type decision.

Items included in the effective tax rate reconciliation schedule can be reported as a dollar amount or as a dollar amount divided by pretax book earnings. For our sample firms, we convert all individual items reported in the effective tax rate reconciliation schedule to the dollar amount of the item divided by pretax book earnings. We then

⁸ For a comprehensive review of these rules, including an example from the 1986 financial statements of Westinghouse, see Weber and Wheeler [1992].

convert this percentage figure to its absolute value because we expect that the benefits achievable from using an after-tax bonus plan result from managers considering more carefully both tax law provisions that increase and those that decrease a firm's effective tax rate.

After converting individual effective tax rate reconciling items to percentage absolute values, we calculate test variables related to these reconciling items as follows. For each firm, the sum of the percentage absolute values of individual items classified as credits other than the foreign tax credit is the variable *CREDIT*; the sum of the percentage absolute values of individual items classified as related to foreign or export operations is the variable *FOREIGN*; the sum of the percentage absolute values of individual items classified as permanent differences or tax rate differentials not included in another category is the variable *PERM*; the percentage absolute value of state income taxes is the variable *STATE*; and the sum of *CREDIT*, *FOREIGN*, *PERM*, and *STATE* is the variable *TOTAL*. To avoid outliers that may unduly influence our test results, if *TOTAL*, *CREDIT*, *FOREIGN*, *PERM*, or *STATE* exceeds the maximum federal corporate marginal tax rate, its value is set equal to this maximum federal rate. Based on this criterion, *TOTAL* is set equal to 46 percent for one sample firm.

The variables *TOTAL*, *CREDIT*, *FOREIGN*, *PERM*, and *STATE* are proxies for the benefits achievable from using an after-tax bonus plan. We expect that the coefficient on *TOTAL* (*CREDIT*; *FOREIGN*; *PERM*; *STATE*) will be positive in the estimate of model 1a (model 1b) for two reasons. First, a larger value of these variables suggests that a firm has relatively more opportunities for tax planning and, as a result, should be more likely to use an after-tax bonus plan. Second, a larger value of these variables suggests that managers consider more carefully the impact on firm value of income taxes, which should be the case for

firms that use an after-tax bonus plan.⁹

4.3. TEST VARIABLES MEASURING COMPENSATION RISK

As described in section 2, a cost of using an after-tax bonus plan is that, relative to a before-tax plan, an after-tax plan places more compensation risk on a manager because the manager's bonus can be affected by changes in income tax rules over which the manager has no control. Models 1a and 1b include three variables that measure this cost. These variables are described next.

The variable *ASSETS*, equal to the log of a firm's total assets, is included in models 1a and 1b because firm size can be viewed as a proxy for the risk that a manager's bonus, if based on after-tax earnings, would be affected by changes in income tax rules over which the manager has no control, with larger firms facing less risk because they are likely to operate in more tax jurisdictions.¹⁰ Firm size could also proxy for omitted variables such as an increase in tax planning opportunities as a firm grows or for economies of scale in tax planning. Newman [1989], Scholes, Wilson, and Wolfson [1992], Mills, Erickson, and Maydew [1998], Carnes and Guffey [2000], and Phillips [2000] provide evidence consistent with these size hypotheses. Based on this evidence, we predict a positive coefficient on *ASSETS* in estimates of models 1a and 1b.

The variable *VARATBT*, five-year variance of after-tax EBDE (earnings before discontinued operations and extraordinary items scaled

⁹ Based on this discussion, we note that positive estimated coefficients on *TOTAL*, *CREDIT*, *FOREIGN*, *PERM*, or *STATE* can be used to infer an association, but not to draw inferences about causality, between the benefits achievable from using an after-tax bonus plan and type of bonus plan used.

¹⁰ Operating in more tax jurisdictions would be associated with less risk because the more jurisdictions that a firm operates in, the smaller is the impact on after-tax earnings of changes in income tax rules in one jurisdiction (Newman [1989]).

by total assets) divided by five-year variance of before-tax EBDE, is included in models 1a and 1b to capture the variability of a firm's after-tax earnings relative to the variability of its before-tax earnings. We expect a negative estimated coefficient on *VARATBT* for two reasons. First, we expect that managers view more variable earnings as a riskier bonus plan contracting variable because more variable earnings would be associated with more variable, and thus more risky, bonus awards over time. Based on this expectation and on the fact that managers would have to be compensated for additional compensation risk (Smith and Watts [1982]), a larger value of *VARATBT* should be associated with a lower likelihood that a firm uses an after-tax bonus plan and, as a result, we expect a negative estimated coefficient on *VARATBT*.

Second, Lambert and Larcker [1987] suggest that the variability of a performance measure over time can be viewed as a proxy for noise in the measure as a signal of performance. Therefore, we expect that managers would view a more variable earnings stream as riskier bonus plan contracting variable because a more variable stream would be associated with more noise in the measure of the manager's performance. This expectation again leads to the prediction of a negative estimated coefficient on *VARATBT*.

As a final measure of compensation risk, we include the variable *PCTOPT*, the percentage of annual executive compensation represented by stock option grants. We expect a negative coefficient on *PCTOPT* in estimates of models 1a and 1b for two reasons. First, the larger the value of *PCTOPT*, the more compensation risk that is placed on managers as a result of general price movements in the stock market. This factor, in conjunction with the reasonable assumption that incremental compensation paid for additional compensation risk rises as the level

of compensation risk increases, implies that the additional compensation necessary to cause managers to accept an after-tax bonus plan would be larger at higher levels of *PCTOPT*. As a result, it should be the case that the larger the value of *PCTOPT*, the less likely it is that a firm uses an after-tax bonus plan. Hence, we expect a negative estimated coefficient on *PCTOPT*.

Second, a larger value of *PCTOPT* should be associated with managers considering more carefully how their actions, including those involving income taxes, affect firm value (and hence stock price). Since firms use after-tax bonus plans to motivate managers to consider more carefully the impact on firm value of income taxes (at the cost of the additional compensation necessary to offset the compensation risk associated with an after-tax plan), and since a larger value of *PCTOPT* is associated with managers already considering more carefully this impact regardless of type of bonus plan used, we again expect a negative estimated coefficient on *PCTOPT*.¹¹

4.4. OTHER TEST VARIABLES

The variable *ROA*, a firm's return on assets, is included in models 1a and 1b to capture a firm's profitability. Pretax earnings are used to compute *ROA* because it is taxes on pretax earnings that are subject to reduction using tax planning strategies. If a firm is relatively more profitable, it seems reasonable that the firm has a relatively larger incentive for implementing tax planning strategies because there is more income potentially subject to income taxes. This argument suggests that the more profitable a firm is, the more likely it is that the firm uses an after-tax bonus plan because an after-tax plan would

¹¹ This argument implies that two means of motivating a manager to maximize firm value at the cost of additional compensation risk, offering stock options and offering an after-tax bonus plan, are substitutes for each other.

encourage managers to consider and implement relatively more necessary tax planning strategies. Based on this line of reasoning, we predict a positive coefficient on *ROA* in estimates of models 1a and 1b.

Many tax planning strategies are costly to unwind. As a result, firms with variable earnings must be careful in choosing their tax planning strategies because some strategies that make sense in a high-tax (low-tax) year may not make sense in a future low-tax (high-tax) year (Scholes and Wolfson [1992]). In other words, firms with variable earnings must be careful in choosing their tax planning strategies so that they avoid winding up in the wrong tax clientele in future years. Based on this "being in the wrong tax clientele" argument, we expect that the more variable a firm's earnings are, the more likely it is that the firm uses an after-tax bonus plan because an after-tax plan would encourage managers to be more careful in choosing their tax planning strategies. *VARROA*, the variance of a firm's *ROA* over the current and four preceding years, is included in models 1a and 1b to capture the variability of a firm's earnings. We predict a positive coefficient on *VARROA* in estimates of models 1a and 1b.

Exhibit 3 provides a summary of the data sources and rules used to calculate the test variables described in sections 4.2 to 4.4.

4.5. DESCRIPTIVE DATA FOR MODEL VARIABLES

As seen in panel A of table 1, for firms with a before-tax (after-tax) bonus plan, mean *CREDIT* is 5.5 (4.8) percent, mean *FOREIGN* is 2.8 (7.8) percent, mean *PERM* is 3.0 (6.5) percent, mean *STATE* is 2.8 (2.2) percent, and mean *TOTAL* is 14.1 (18.9) percent. Recalling that the denominator of *CREDIT*, *FOREIGN*, *PERM*, *STATE*, and *TOTAL* is pretax book earnings, these results indicate that effective tax rate reconciling items are economically large.

A comparison of the mean values of test variables included in models 1a and 1b for firms that use an after-tax bonus plan with those for firms that use a before-tax plan, reported in panel A of table 1, indicates that, as predicted, mean *TOTAL* is larger for firms with an after-tax bonus plan at the .009 one-tail significance level; mean *FOREIGN* is larger for firms with an after-tax bonus plan at the .001 one-tail significance level; mean *PERM* is larger for firms with an after-tax bonus plan at the .016 one-tail significance level; mean *ASSETS* is larger for firms with an after-tax bonus plan at the .031 one-tail significance level; and mean *PCTOPT* is smaller for firms with an after-tax bonus plan at the .020 one-tail significance level. These results are not discussed in detail here because the inferences that can be drawn are the same as those that are drawn later from estimating models 1a and 1b.

Panel B of table 1 reports pairwise correlations between the independent variables included in models 1a and 1b. Among the variables based on effective tax rate reconciling items, the correlations between *TOTAL* and *CREDIT*, *TOTAL* and *FOREIGN*, and *TOTAL* and *PERM* are, by construction, positive and significant at better than the .01 two-tail level. Moreover, the negative correlations between *ROA* and *CREDIT*, *ROA* and *PERM*, *ROA* and *TOTAL*, and *ASSETS* and *VARROA* are significant at better than the .01 two-tail level, and the positive correlation between *ASSETS* and *FOREIGN* is significant at better than the .01 two-tail level. These results suggest the following. First, the negative correlations between *ROA* and *CREDIT*, *ROA* and *PERM*, and *ROA* and *TOTAL* suggest that having more effective tax rate reconciling items, especially those related to credits and permanent differences and tax rate differentials, is associated with smaller pretax profitability. This finding can be interpreted as consistent with the

observation that utilizing tax law provisions that create effective tax rate reconciling items often comes at the cost of earning a lower pretax return (e.g., municipal bonds have a lower pretax return than fully taxable bonds). Second, the negative correlation between *ASSETS* and *VARROA* is consistent with the idea that larger firms have more diversity of operations across operating and/or geographic segments, which reduces the variability of return on assets. Third, the positive correlation between *ASSETS* and *FOREIGN* is consistent with the notion that larger firms are more geographically diversified.

5. Model Estimation Results

5.1. ESTIMATION OF MODELS 1a AND 1b

Table 2 displays the estimates of models 1a and 1b. In the estimate of model 1a, the coefficient on *TOTAL* is positive and significant at the .005 one-tail level. This result is consistent with the conclusion that the larger the benefits achievable from using tax law provisions that cause a firm's effective tax rate to differ from the maximum federal rate, the more likely it is that a firm uses an after-tax bonus plan.

When *TOTAL* is broken down into its components *CREDIT*, *FOREIGN*, *PERM*, and *STATE* in model 1b, the estimated coefficients on *FOREIGN* and *PERM* are positive, as predicted, and significant at the .030 and .012 one-tail levels, respectively. Also, the estimated coefficient on *CREDIT* is positive but significant at only the .472 one-tail level. This result is somewhat surprising given the strong evidence in Newman [1989] that the more opportunities that a firm has for tax planning using the investment tax credit, the more likely it is that the firm uses an after-tax bonus plan. We return to this result in section 5.3 below. Finally, the estimated coefficient on *STATE* is not significant

at conventional levels. Our ex-post interpretation of this result is that there may not be enough variation between firms in their state income taxes to allow us to econometrically observe a significant association between *STATE* and *BONUS*.

Referring to table 2, the estimated coefficients on all three proxies for the compensation risk associated with the use of an after-tax bonus plan are in the predicted direction and significant at conventional levels. Specifically, in estimates of models 1a and 1b, the coefficient on the log of a firm's total assets, *ASSETS*, is positive and significant at the .014 or less one-tail level; the coefficient on the variance of a firm's after-tax earnings divided by the variance of its before-tax earnings, *VARATBT*, is negative and significant at the .086 or less one-tail level; and the coefficient on the percentage of executive compensation represented by stock option grants, *PCTOPT*, is negative and significant at the .014 or less one-tail level.¹² These results are consistent with the notion that a reason that all firms do not use an after-tax bonus plan, even though such a plan would motivate managers to consider more carefully the impact on firm value of income taxes, is that an after-tax plan places more compensation risk on a manager.

The estimated coefficient on a firm's return on assets, *ROA*, is positive and significant at the .022 or less one-tail level. This result is consistent with the notion that being more profitable creates a larger incentive for implementing tax planning strategies which, in turn, implies a higher likelihood of observing the use of an after-tax bonus plan.

¹² If we augment our models with an additional measure of the compensation risk placed on managers as a result of general price movements in the stock market, the percentage of outstanding shares held by directors and officers as a group (*INSIDE*), the estimated coefficient on *INSIDE* is, as predicted, negative and

Also, the estimated coefficient on the variability of a firm's *ROA*, *VARROA*, is positive and significant at the .044 or less one-tail level. This result is consistent with the argument that a more variable earnings stream implies that more care must be exercised in choosing tax planning strategies which, in turn, implies a higher probability of observing the use of an after-tax bonus plan.

5.2. IMPLICATIONS OF RESULTS FOR MODELS 1a AND 1b

The findings in section 5.1 have the following implications. First, our results suggest that the benefits of using an after-tax bonus plan arise from tax law provisions for foreign income, permanent differences, and tax rate differentials, from firm profitability, and from the likelihood that a firm will wind up in the wrong tax clientele relative to its in-place tax planning strategies. Second, our results suggest that a major cost of using an after-tax bonus plan is the compensation risk associated with the use of such a plan.

These findings help explain why earnings are often used as a contracting variable in compensation plans. Specifically, these findings add to previous evidence (e.g., Clinch and Magliolo [1993]; Dechow et al. [1994]; Natarajan [1996]; Gaver and Gaver, [1998]) that an advantage to using earnings as a contracting variable in a bonus plan is that the definition of earnings used in the plan can be tailored to match a given firm's characteristics. In this regard, the specific contribution of our findings is that they suggest that an advantage to using earnings as a contracting variable in bonus plans is that firms for which the increase in firm value from using an after-tax plan exceeds the additional compensation necessary to offset the compensation risk associated with an after-tax plan can employ after-

significant at .088 or less one-tail level.

tax earnings in the calculation of bonuses. On the other hand, firms for which the decrease in firm value from using a before-tax plan is less than the compensation expense avoided by using a before-tax plan can employ before-tax earnings in the calculation of bonuses.

5.3. ESTIMATION OF MODELS BASED ON NEWMAN [1989]

In this section, we use our sample firms to estimate the models used in Newman's [1989] study of the bonus-plan-type decision. The reason for this analysis is that, by comparing estimates of Newman's models with the estimate of model 1b, we are able to reexamine the results reported in Newman. The logit models estimated by Newman are as follows:¹³

$$BONUS = \alpha_0 + \beta_1 SFTA + \beta_2 I/S + \beta_3 SALES + \varepsilon \quad 2a$$

$$BONUS = \alpha_0 + \beta_1 IFT + \beta_2 I/S + \beta_3 SALES + \varepsilon \quad 2b$$

$$BONUS = \alpha_0 + \beta_1 TXFT + \beta_2 I/S + \beta_3 SALES + \varepsilon \quad 2c$$

$$BONUS = \alpha_0 + \beta_1 TPFT + \beta_2 I/S + \beta_3 SALES + \varepsilon \quad 2d$$

where *BONUS* is described earlier; *SFTA* (*IFT*; *TXFT*; *TPFT*) is the percentage of sales (income; current and deferred taxes; current taxes) generated by foreign operations; *I/S* is the capital expenditures to sales ratio; and *SALES* is the log of sales.

Exhibit 3 provides details on the calculation of these variables.

Each of the preceding models includes a variable (i.e., *SFTA*; *IFT*; *TXFT*; *TPFT*) measuring the intensity of a firm's foreign operations. As expected, an inspection of panel A of table 3 indicates that these four proxies for the intensity of foreign operations and *FOREIGN* are highly correlated with each other. Based on the argument that the greater the intensity of a firm's foreign operations, the more opportunities it has for tax planning, positive estimated coefficients are expected on *SFTA*, *IFT*, *TXFT*, and *TPFT*. Each of the preceding models also includes a

¹³ Newman estimates a fifth model in which intensity of foreign operations is measured as $SINT = (STB - STA)/STA$, where *STB* (*STA*) is sales before (after) intercompany eliminations. We do not estimate this model because *SINT* can be

firm's capital expenditures to sales ratio, I/S . Based on the argument that the more capital intensive a firm is, the more opportunities it has for tax planning using the investment tax credit, a positive estimated coefficient on I/S is expected. Finally, each of models 2a to 2d uses sales as a proxy for firm size and, as discussed previously, a positive estimated coefficient is expected on the firm size variable.

As reported in panel B of table 3, when we estimate models 2a to 2d, the intensity of foreign operations variable is significant at better than the .05 one-tail level in models 2a and 2b, the capital intensity variable is significant at better than the .10 one-tail level in all four models, and the firm size variable is significant at better than the .10 one-tail level in models 2c and 2d. Overall, these results offer modest support for the hypothesis that the more foreign operations that a firm has, the more likely it is that the firm uses an after-tax bonus plan. Moreover, these results offer strong support for the hypothesis that the more capital intensive a firm is, the more likely it is that the firm uses an after-tax bonus plan.

The capital intensity variable I/S in models 2a to 2d and *CREDIT* in model 1b each attempt to measure the benefits achievable from using an after-tax bonus plan due to the investment tax credit. Comparing the estimates of models 2a to 2d with the estimate of model 1b, the results for the coefficients on I/S in the estimates of models 2a to 2d (positive and significant at better than the .10 one-tail level in all four models) are markedly stronger than the result for the coefficient on *CREDIT* in the estimate of model 1b (significant at the .472 one-tail level). Taken in conjunction with the low correlation (i.e., .065) between *CREDIT* and I/S observed in panel A of table 3, we interpret this finding as suggesting that capital intensity captures factors

calculated for only approximately 30 percent of our sample firms.

other than the benefits achievable from using an after-tax bonus plan due to the investment tax credit. One such factor could be that, as argued by Mills et al. [1998], more capital intensive firms have greater opportunities for tax planning using strategies related to, for example, the timing of the acquisition and disposition of fixed assets.

6. *Summary and Implications*

This study's major findings are as follows. First, we find that that the use of an after-tax bonus plan is more likely if a firm reports higher levels of effective tax rate reconciling items related to foreign income, permanent differences, and tax rate differentials. Second, we find that the use of an after-tax bonus plan is less likely, the higher the compensation risk associated with the use of such a plan. Last, we find that a firm is more likely to use an after-tax bonus plan, the larger its profits subject to income taxes, and the more likely it is that the firm could wind up in the wrong tax clientele relative to its in-place tax planning strategies.

Our results have the following implications. First, our results suggest that the benefits of using an after-tax bonus plan arise from tax law provisions for foreign income, permanent differences, and tax rate differentials, from firm profitability, and from the likelihood that a firm will wind up in the wrong tax clientele relative to its in-place tax planning strategies. Second, our results suggest that a primary cost of using an after-tax bonus plan is the compensation risk associated with the use of such a plan. Third, our evidence helps to explain why earnings are often used as a contracting variable in compensation plans. In particular, our findings suggest that income tax expense is one of the factors that is used to tailor the definition of earnings used in a bonus plan such that firm value is maximized.

Last, a comparison of our test results with those of prior research suggests that, contrary to prior research, the influence of a firm's ability to generate investment tax credits on the bonus-plan-type decision does not appear to be significant.

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EXHIBIT 1
Sample Selection

	Type of Bonus Plan		
	All Firms	Before-Tax	After-Tax
Firms in Gaver, Gaver, and Austin [1995] dataset with necessary data	104	62	42
Firms in Gaver <i>et al.</i> dataset with missing data that were retrieved from proxy statements	3	1	2
Firms with no detailed effective tax rate reconciliation schedule in their financial statements	(7)	(4)	(3)
Remaining firms with negative earnings in 1983, 1984, and 1985	<u>(3)</u>	<u>(2)</u>	<u>(1)</u>
Firms in the final sample	97	57	40

EXHIBIT 2

Effective Tax Rate Reconciling Items Appearing in 1985 Tax Footnotes¹

Effective Tax Rate Reconciling Item	All Firms	Type of Bonus Plan	
		Before-Tax	After-Tax
Credits Other Than Foreign Tax Credits			
Investment tax credit	54 (56%)	33 (58%)	21 (53%)
R&D credit	8 (8%)	7 (12%)	1 (3%)
Combined credits (e.g., ITC & R&D)	13 (13%)	10 (18%)	3 (8%)
Items Related to Foreign and Export Operations			
Differential foreign tax rate	36 (37%)	20 (35%)	16 (40%)
DISC/FSC income	12 (12%)	9 (16%)	3 (8%)
Foreign tax credit	9 (9%)	6 (11%)	3 (8%)
Foreign income reinvested	3 (3%)	0 (0%)	3 (8%)
Permanent Differences and Tax Rate Differentials			
Capital gain tax rate differential	17 (18%)	9 (16%)	8 (20%)
Amortization of intangibles	9 (9%)	6 (11%)	3 (8%)
Differential basis of acquired assets	7 (7%)	3 (5%)	4 (10%)
Gain/loss on disposals	6 (6%)	4 (7%)	2 (5%)
Depletion-related	5 (5%)	4 (7%)	1 (3%)
Dividend received deduction	5 (5%)	3 (5%)	2 (5%)
Equity method-related	5 (5%)	4 (7%)	1 (3%)
Tax-exempt interest	4 (4%)	1 (2%)	3 (8%)
Insurance-related	4 (4%)	3 (5%)	1 (3%)
Nondeductible expenses	4 (4%)	1 (2%)	3 (8%)
Tax settlement	2 (2%)	1 (2%)	1 (3%)
State Income Taxes			
State income taxes	69 (71%)	43 (75%)	26 (65%)

¹ Sample selection is described in exhibit 1. The tax footnotes of sample firms are examined to identify items reconciling maximum federal corporate marginal tax rate to effective tax rate. The numbers reported in this exhibit [e.g., 54 (56%)] are the number of (percentage of) sample firms that report a given reconciling item. Items appearing in the tax footnote of only one sample firm are not included in this exhibit.

EXHIBIT 3*Test Variable Definitions***Test Variables Calculated Using Tax Footnote Data¹**

$$CREDIT = \sum_{i=1}^n ABS (x_i / \text{pretax book earnings})$$

where x is one of n effective tax rate reconciling items related to tax credits other than the foreign tax credit.

$$FOREIGN = \sum_{i=1}^n ABS (x_i / \text{pretax book earnings})$$

where x is one of n effective tax rate reconciling items related to foreign or export operations.

$$PERM = \sum_{i=1}^n ABS (x_i / \text{pretax book earnings})$$

where x is one of n effective tax rate reconciling items related to permanent differences and tax rate differentials not included in *CREDIT*, *FOREIGN*, or *STATE*.

$$STATE = ABS (x / \text{pretax book earnings})$$

where x is the effective tax rate reconciling item state income taxes.

TOTAL is the sum of *CREDIT*, *FOREIGN*, *PERM*, and *STATE*.

Additional Test Variables Used to Estimate Models 1a and 1b²

$$ASSETS = \log \text{ of total assets (\#6)}$$

$$VARATBT = \frac{\text{variance of after-tax EBDE (earnings before discontinued operations and extraordinary items scaled by total assets over the current and four preceding years) (\#170 - \#16) / \#6}{\text{variance of before-tax EBDE (\#170) / \#6}}$$

$$PCTOPT = \frac{\text{Black Scholes value of stock options granted to executive officers during the year (BSV)}}{\text{BSV + annual cash compensation paid to executive officers}^3}$$

$$ROA = \frac{\text{pretax operating income after depreciation (\#13 - \#14)}}{\text{average total assets (\#6)}}$$

$$VARROA = \text{variance of ROA over the current and four preceding years}$$

Exhibit 3 continues on the following page

EXHIBIT 3 (continued)*Test Variable Definitions***Test Variables Used to Estimate Models 2a to 2d²**

$$SFTA = \frac{\text{foreign sales}}{\text{total sales}}$$

Calculated using segment footnote data from firms' financial statements. If a firm has at least one foreign subsidiary reported in item 4 of its Form 10-K but foreign sales are not reported in its segment footnote, *SFTA* is set equal to five percent (i.e., the midpoint between zero percent and the ten percent materiality requirement for segment footnote disclosure of foreign geographic segment information).

$$IFT = \frac{\text{pretax income from foreign operations (\#273)}}{\text{pretax income from foreign and domestic operations (\#272 + \#273)}}$$

If a firm has at least one foreign subsidiary reported in item 4 of its Form 10-K but income from foreign operations is not reported, *IFT* is set equal to five percent. If *IFT* is less than zero, it is set equal to its absolute value.⁴

$$TXFT = \frac{\text{total foreign tax expense (\#64 + \#270)}}{\text{total worldwide tax expense (\#16)}}$$

If total foreign tax expense is not reported but the current portions of both foreign and worldwide tax expense are, *TXFT* is set equal to *TPFT*. If a firm has at least one foreign subsidiary reported in item 4 of its Form 10-K but the data necessary to compute *TXFT* are not reported, *TXFT* is set equal to five percent. If *TXFT* is less than zero, it is set equal to its absolute value.⁴

$$TPFT = \frac{\text{current portion of foreign tax expense (\#64)}}{\text{current portion of worldwide tax expense (\#16 - \#50)}}$$

If the current portion of foreign tax expense is not reported but total foreign tax expense is, *TPFT* is set equal to *TXFT*. If a firm has at least one foreign subsidiary reported in item 4 of its Form 10-K but the data necessary to compute *TPFT* are not reported, *TPFT* is set equal to five percent. If *TPFT* is less than zero, it is set equal to its absolute value.⁴

$$I/S = \frac{\text{capital expenditures (\#128)}}{\text{sales (\#12)}}$$

$$SALES = \log \text{ of sales (\#12)}^4$$

EXHIBIT 3 (continued)*Test Variable Definitions*

¹ Variables are calculated for each of the sample firms identified in exhibit 1. Variables for each firm are first calculated in 1983, 1984, and 1985. Next, for each firm, the mean of each variable over the 1983-85 test period is calculated and used in our tests. One firm is missing required data to compute all test variables in 1983. For this firm, test variables are computed using 1984-85 data. Data required to calculate *CREDIT*, *FOREIGN*, *PERM*, and *STATE* are drawn from the effective tax rate reconciliation schedule provided in the tax footnote of each sample firm's financial statements. If *CREDIT* (*FOREIGN*; *PERM*; *STATE*; *TOTAL*) exceeds the maximum federal corporate marginal tax rate of 46 percent, it is set equal to 46 percent. Based on this criterion, *TOTAL* is reset to 46 percent for one firm.

² *Compustat* item numbers are indicated in parentheses. Variables are calculated for each of the sample firms identified in exhibit 1. Variables for each firm are first calculated in 1983, 1984, and 1985. Next, for each firm, the mean of each variable over the 1983-85 test period is calculated and used in our tests. One firm is missing required data to compute all test variables in 1983. For this firm, test variables are computed using 1984-85 data. If a required *Compustat* item is missing, it is hand gathered from a firm's financial statements. For each variable, we compare the most extreme positive (negative) value X (A) of a variable to the next most extreme positive (negative) value Y (B). If $X > 3*Y$ ($A < 3*B$), then X (A) is defined as an outlier. No variables have outliers as defined here.

³ Annual compensation for all executive officers as a group is drawn from proxy statements and is equal to the sum of cash compensation (including cash incentives such as bonuses) plus the value of stock option grants. Approximately 13 percent of the time, stock option grants are reported over a disclosed range that does not equal one year (typically five years); in these cases annual stock option grants are approximated as grants over the disclosed range divided by the number of years in the disclosed range. Stock option grants are valued using the Black-Scholes option valuation formula modified to incorporate continuous dividend payments (e.g., Murphy, 1999) using the following inputs: grant date stock price = stock price as of June 30 in year of grant; exercise price = grant date stock price; expiration term = ten years; dividend yield = annualized yield for year of grant; annual stock price volatility is based on monthly returns over the past 36 months (due to data availability, for one firm in 1983, 1984, and 1985 volatility is based on monthly returns over the past 24 months, and for one firm in 1983 and 1984 volatility is based on monthly returns over the past 12 months); and risk-free interest rate = five percent. Sensitivity analyses using other reasonable inputs do not change the conclusions that we draw.

⁴ Newman [1989] eliminates *TXFT* and *TPFT* observations that have a positive numerator and a negative denominator. We retain these observations so that the same firms that were used to estimate model 1b are used to estimate models 2a to 2d. Unlike Newman, if *IFT*, *TXFT*, or *TPFT* is less than zero, we set it equal to its absolute value to remain consistent with our rules for calculating *CREDIT*, *FOREIGN*, *PERM*, and *STATE*. Our conclusions remain unchanged if we estimate models 2a to 2d using Newman's rules to handle negative *IFT*, *TXFT*, and *TPFT*. Newman sets *SALES* equal to unlogged sales. We use the log of sales to allow comparability with *ASSETS* in estimates of model 1b.

TABLE 1

Descriptive Data for Variables Used to Estimate Models

Variable ¹	Before-tax bonus plan				After-tax bonus plan				t-tests of difference in means
	Mean	Std.Dev.	Median	% Nonzero	Mean	Std.Dev.	Median	% Nonzero	
<i>TOTAL</i>	0.141	0.087	0.110	100.0%	0.189	0.108	0.169	100.0%	0.009*
<i>CREDIT</i>	0.055	0.055	0.038	91.2%	0.048	0.045	0.035	90.0%	0.254
<i>FOREIGN</i>	0.028	0.053	0.002	56.1%	0.078	0.096	0.026	72.5%	0.001
<i>PERM</i>	0.030	0.059	0.004	54.4%	0.065	0.097	0.021	67.5%	0.016
<i>STATE</i>	0.028	0.032	0.025	79.0%	0.022	0.025	0.018	72.5%	0.148
<i>ASSETS</i>	6.067	1.583	6.165	100.0%	6.769	2.072	7.180	100.0%	0.031
<i>VARATBT</i>	0.575	0.125	0.558	100.0%	0.552	0.115	0.539	100.0%	0.174
<i>PCTOPT</i>	0.244	0.194	0.191	91.2%	0.169	0.142	0.157	87.5%	0.020
<i>ROA</i>	0.110	0.067	0.110	100.0%	0.115	0.080	0.114	100.0%	0.366
<i>VARROA</i>	0.038	0.032	0.029	100.0%	0.045	0.039	0.037	100.0%	0.170
<i>SFTA</i>	0.113	0.133	0.073	64.9%	0.188	0.168	0.150	80.0%	0.008
<i>IFT</i>	0.080	0.135	0.050	66.7%	0.206	0.298	0.069	82.5%	0.003
<i>TXFT</i>	0.137	0.288	0.050	68.4%	0.235	0.298	0.097	82.5%	0.054
<i>TPFT</i>	0.248	0.638	0.033	57.9%	0.426	0.529	0.159	75.0%	0.075
<i>I/S</i>	0.065	0.056	0.047	98.3%	0.086	0.075	0.066	100.0%	0.059
<i>SALES</i>	6.229	1.539	6.082	100.0%	6.947	2.073	7.225	100.0%	0.026

* One-tail significance levels of t-tests comparing the mean value of a variable for firms with an after-tax plan to the mean value of that variable for firms with a before-tax plan are reported in this column.

Table 1 continues on the following page

TABLE 1 (continued)

Descriptive Data for Variables Used to Estimate Models

Panel B: Pearson Correlation Matrix: Independent Variables Used to Estimate Models 1a and 1b; * (**)
Denotes Significance at Less Than .01 (.05) Two-Tail Level

	<i>CREDIT</i>	<i>FOREIGN</i>	<i>PERM</i>	<i>STATE</i>	<i>TOTAL</i>	<i>ASSETS</i>	<i>VARATBT</i>	<i>PCTOPT</i>	<i>ROA</i>	<i>VARROA</i>
<i>CREDIT</i>	1.000	0.109	0.083	0.089	0.442*					
<i>FOREIGN</i>		1.000	0.257**	-0.155	0.684*					
<i>PERM</i>			1.000	0.118	0.673*					
<i>STATE</i>				1.000	0.189					
<i>ASSETS</i>	-0.147	0.277*	0.072	-0.108	0.125	1.000	-0.030	0.149	-0.057	-0.405*
<i>VARATBT</i>	-0.048	-0.076	0.145	0.052	0.042		1.000	0.039	-0.076	0.123
<i>PCTOPT</i>	0.030	-0.115	0.031	0.093	-0.064			1.000	0.001	-0.076
<i>ROA</i>	-0.322*	-0.082	-0.376*	0.034	-0.457*				1.000	-0.179
<i>VARROA</i>	0.020	0.056	0.084	-0.070	0.057					1.000

¹ *CREDIT* is the sum of the absolute values of individual effective tax rate reconciling items classified as credits other than the foreign tax credit divided by pretax book earnings;
FOREIGN is the sum of the absolute values of individual effective tax rate reconciling items classified as related to foreign or export operations divided by pretax book earnings;
PERM is the sum of the absolute values of effective tax rate reconciling items classified as permanent differences and tax rate differentials not included in *CREDIT*, *FOREIGN*, or *STATE* divided by pretax book earnings;
STATE is the absolute value of state income taxes divided by pretax book earnings;
TOTAL is the sum of *CREDIT*, *FOREIGN*, *PERM*, and *STATE*;
ASSETS is the log of total assets;
VARATBT is variance of after-tax EBDE (earnings before discontinued operations and extraordinary items scaled by total assets over the current and four preceding years) divided by variance of before-tax EBDE;
PCTOPT is the Black Scholes value of stock options granted to executive officers (BSV) divided by the sum of BSV plus cash compensation paid to executive officers;
ROA is pretax return on assets;
VARROA is variance of *ROA* over the current and four preceding years;
SFTA (*IFT*; *TXFT*; *TPFT*) is the percentage of sales (income; current and deferred taxes; current taxes) generated by foreign operations;
I/S is the capital expenditures to sales ratio;
SALES is the log of sales.
Exhibit 3 provides additional detail on the calculation of the preceding variables.

TABLE 2

Estimated Coefficients from Models 1a and 1b that Test the Association of Type of Bonus Plan Used with Effective Tax Rate Reconciling Items, Firm Size, After-Tax Divided by Before-Tax Earnings Variability, Executive Compensation Represented by Stock Option Grants, Profitability, and Earnings Variability¹

MODEL	Intercept	TOTAL	CREDIT	FOREIGN	PERM	STATE	ASSETS	VARATBT	PCTOPT	ROA	VARROA
		(+)	(+)	(+)	(+)	(+)	(+)	(-)	(-)	(+)	(+)
1a	-3.740 (.018)	0.079 (.005)					0.437 (.003)	-2.897 (.086)	-3.529 (.014)	0.084 (.019)	0.179 (.016)
1b	-2.354 (.104)		0.004 (.472)	0.071 (.030)	0.101 (.012)	-0.040 (.319)	0.373 (.014)	-3.232 (.073)	-3.893 (.013)	0.083 (.022)	0.147 (.044)

* One-tail significance levels are in parentheses

¹ The logit models estimated are as follows (firm subscripts are suppressed):

$$BONUS = \alpha_0 + \beta_1 TOTAL + \beta_2 ASSETS + \beta_3 VARATBT + \beta_4 PCTOPT + \beta_5 ROA + \beta_6 VARROA + \epsilon \quad 1a$$

$$BONUS = \alpha_0 + \beta_1 CREDIT + \beta_2 FOREIGN + \beta_3 PERM + \beta_4 STATE + \beta_5 ASSETS + \beta_6 VARATBT + \beta_7 PCTOPT + \beta_8 ROA + \beta_9 VARROA + \epsilon \quad 1b$$

BONUS = 1 (0) if a firm uses an after-tax (before-tax) bonus plan.

CREDIT is the sum of the absolute values of individual effective tax rate reconciling items classified as credits other than the foreign tax credit divided by pretax book earnings;

FOREIGN is the sum of the absolute values of individual effective tax rate reconciling items classified as related to foreign or export operations divided by pretax book earnings;

PERM is the sum of the absolute values of effective tax rate reconciling items classified as permanent differences and tax rate differentials not included in *CREDIT*, *FOREIGN*, or *STATE* divided by pretax book earnings;

STATE is the absolute value of state income taxes divided by pretax book earnings;

TOTAL is the sum of *CREDIT*, *FOREIGN*, *PERM*, and *STATE*;

ASSETS is log of total assets;

VARATBT is variance of after-tax EBDE (earnings before discontinued operations and extraordinary items scaled by total assets over the current and four preceding years) divided by variance of before-tax EBDE;

PCTOPT is the Black Scholes value of stock options granted to executive officers (BSV) divided by the sum of BSV plus cash compensation paid to executive officers;

ROA is pretax return on assets;

VARROA is variance of *ROA* over the current and four preceding years.

Exhibit 3 provides additional detail on the calculation of the preceding variables.

TABLE 3

Correlation Matrix and Estimated Coefficients from Newman [1989] Models that Test the Association of Type of Bonus Plan Used with Intensity of Foreign Operations, Capital Intensity, and Firm Size¹

Panel A: Pearson Correlation Matrix: FOREIGN, CREDIT, and Related Newman [1989] Variables; * Denotes Significance at Less Than .01 Two-Tail Level

	<i>FOREIGN</i>	<i>SFTA</i>	<i>IFT</i>	<i>TXFT</i>	<i>TPFT</i>	<i>I/S</i>
<i>FOREIGN</i>	1.000	0.411*	0.662*	0.380*	0.415*	
<i>SFTA</i>		1.000	0.394*	0.525*	0.359*	
<i>IFT</i>			1.000	0.477*	0.339*	
<i>TXFT</i>				1.000	0.790*	
<i>CREDIT</i>						0.065

Panel B: Model Estimation Results (One-Tail Significance Levels in Parentheses)

MODEL	<i>Intercept</i>	<i>SFTA</i>	<i>IFT</i>	<i>TXFT</i>	<i>TPFT</i>	<i>I/S</i>	<i>SALES</i>
		(+)	(+)	(+)	(+)	(+)	(+)
2a	-2.147 (.008)	2.558 (.047)				4.943 (.079)	0.158 (.111)
2b	-1.882 (.018)		2.532 (.030)			4.529 (.093)	0.132 (.156)
2c	-2.125 (.008)			0.695 (.192)		5.091 (.066)	0.192 (.070)
2d	-2.202 (.006)				0.325 (.199)	4.997 (.071)	0.207 (.048)

Table 3 continues on the following page

TABLE 3 (continued)

Correlation Matrix and Estimated Coefficients from Newman [1989] Models that Test the Association of Type of Bonus Plan Used with Intensity of Foreign Operations, Capital Intensity, and Firm Size¹

¹ The logit models estimated are as follows (firm subscripts are suppressed):

$$BONUS = \alpha_0 + \beta_1 SFTA + \beta_2 I/S + \beta_3 SALES + \epsilon \quad 2a$$

$$BONUS = \alpha_0 + \beta_1 IFT + \beta_2 I/S + \beta_3 SALES + \epsilon \quad 2b$$

$$BONUS = \alpha_0 + \beta_1 TXFT + \beta_2 I/S + \beta_3 SALES + \epsilon \quad 2c$$

$$BONUS = \alpha_0 + \beta_1 TPFT + \beta_2 I/S + \beta_3 SALES + \epsilon \quad 2d$$

BONUS = 1 (0) if a firm uses an after-tax (before-tax) bonus plan;

SFTA (*IFT*; *TXFT*; *TPFT*) is the percentage of sales (income; current and deferred taxes; current taxes) generated by foreign operations;

I/S is the capital expenditures to sales ratio;

SALES is the log of sales;

CREDIT is the sum of the absolute values of individual effective tax rate reconciling items classified as credits other than the foreign tax credit divided by pretax book earnings;

FOREIGN is the sum of the absolute values of individual effective tax rate reconciling items classified as related to foreign or export operations divided by pretax book earnings.

Exhibit 3 provides additional detail on the calculation of the preceding variables.

