The Determinants of the Choice of Income Type as a Measure of Performance in Bonus Plans

October 1995

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Preface: Purpose and Goals of the Study

This paper tests plausible reasons why firms select different accounting measures of performance when determining executive compensation. The two measures of performance examined are accounting profits after income taxes and accounting profits before income taxes. An identification of the reasons for these differences in plans across firms should facilitate an understanding of why firms place varying levels of importance on strategic tax planning.

Financial information was obtained for 266 firms, 80 with after-tax bonus plans and 186 with before-tax bonus plans. The analysis examined the combined impact of the number of segments, management stock ownership, the degree to which firms are multinational, and firm size on bonus plan type. The results suggest that larger firms that report a larger number of operating segments and those firms that have management stock ownership levels in a range where management is entrenched are more likely to select after-tax rather than before-tax bonus plans.
Introduction

The focus on strategic planning has increased tremendously in recent years. Despite this trend, the integration of tax strategies into the overall planning process has not been consistent across firms (Morrione and Racioppo, 1985), even though firms’ strategic plans cannot be considered complete until the tax implications of their plans are understood. On the other hand, tax planning is not effective unless the consequences of the tax strategy for other business costs is also considered. Once other costs are considered, firms may discover that a plan that minimizes taxes is not the best (Scholes and Wolfson 1992). The optimal strategy will consider taxes and other business costs simultaneously by focusing on the maximization of after-tax income in the strategic planning process.

This paper investigates the manner in which bonus plans are used to facilitate the goal of maximizing after-tax income by certain firms. Although most large U.S. corporations have an earnings-based compensation plan (Fox 1980), many, if not most, bonus and performance plans reward managers based on income before taxes (Newman 1989, 762). Thus, these plans do not necessarily provide managers with an incentive to implement the optimal plan because taxes are ignored in the remuneration process. The purpose of this study is to discover plausible explanations for why some firms reward managers based on before-tax income while others use after-tax income. An identification of the reasons for these differences in plans across firms should facilitate an understanding of why firms place varying levels of importance on strategic tax planning. Once these reasons are identified, opportunities should exist to develop methods to improve the incorporation of tax strategies into the decision-making processes of firms, which should lead to more competitive and efficient firms. The results suggest that larger firms that report a larger number of operating segments and those firms that have management stock ownership levels in a range where management is entrenched are more likely to select after-tax rather than before-tax bonus plans.

The Influence of Bonus Plans on Accounting Choices

1. The Importance of Bonus Plans on Managements’ Incentives

Corporations have increasingly used performance-based schemes as an incentive for corporate executives to better match job performance and rewards. These schemes include stock options, stock appreciation rights, deferred salary payments, insurance plans, and performance and bonus plans (Smith and Watts 1982). The “holy grail” in the development of performance measures is to find a measure that provides a direct link between the creation of shareholder value and performance-based awards (Paulin 1989). Fox (1980) reported that over ninety percent of the one thousand largest U.S. manufacturing corporations had a compensation plan based at least partially on accounting earnings. The two most common earnings-based compensation plans are bonus plans and performance plans. A performance plan is a plan whose payment or value is contingent on the financial performance of the firm over a long period of time (typically three to five years), measured against objectives set at the start of a certain time period (Kanter and Ward 1990). Bonus plans differ in that they usually measure the performance of the
firm over a single year.

The purpose of performance plans could be to provide managers with an incentive to maximize firm value (Watts and Zimmerman 1986, 201), or to reduce the present value of the total amount of taxes that the corporation and its management pays (Miller and Scholes 1980). Regardless of the intended purpose of these plans, if managers' compensation is linked directly to the level of accounting earnings, then managers have additional incentives to select accounting procedures and manage accruals in a manner that will increase their compensation (Watts and Zimmerman 1978).

Early studies investigating bonus plans were not very powerful because they assumed that the mere existence of a bonus plan provided managers an incentive to manage earnings. However, this is not necessarily true. For example, if earnings have exceeded the level at which bonuses are maximized, there is no incentive to increase earnings. Alternatively, if earnings are below the minimum level required for bonuses to be paid, managers may take an "earnings bath" (Watts and Zimmerman 1990).

Recent studies have provided more detailed analyses of bonus plans to provide stronger tests of the bonus plan hypothesis (i.e., that managers will select accounting methods that maximize net income and thereby bonuses). Healy (1985) provided a detailed investigation of the influence of performance plans on managers' accounting decisions by taking into account whether the minimum or maximum earnings level for the payment of bonuses had been met. His results strongly suggest that bonus levels do affect the accounting choices that managers make.

2. Measuring Income Before-Tax Versus After-Tax

One interesting aspect of the bonus plans analyzed by Healy (1985) is the manner in which "earnings" were defined in those plans. For 52.7 percent of the plans, earnings were defined on a before-tax basis, with the remaining plans using an after-tax definition of income. However, Healy did not investigate possible reasons for these differences.

Various rationales support the choice of either before-tax or after-tax income as a measure of income for bonus and performance plans. One major reason to support the use of after-tax income as a performance measure is that taxes are a major expenditure for all profitable firms. Therefore, it should be cost effective to dedicate some of the firms' resources toward controlling taxes. One efficient means to control taxes is to provide managers with incentives to develop tax planning strategies that maximize after-tax income by rewarding managers based on the level of after-tax income. In so doing, managers would be provided with incentives to recognize that 1) tax planning is a critical part of strategic management, and 2) effective tax planning requires managers to minimize taxes and all other business costs simultaneously (Scholes and Wolfson 1992).

One reason firms may opt for before-tax measures is that corporate tax consequences of particular business strategies may be volatile or even unknown due to continuous changes in the tax laws. Volatility and uncertainty would introduce more risk into managers' compensation processes. Therefore, managers would be more likely to support before-tax income as a measure of performance.

3. Previous Literature

Newman (1989) provided an initial
investment to determine why some firms use income before taxes while others use income after taxes to determine annual bonuses for executives. Newman’s sample consisted of 165 firms in the Fortune 1000 for 1980. The sample consisted of 56 firms using after-tax bonus plans and 109 firms using before-tax bonus plans.

Newman investigated two main hypotheses regarding factors that may influence the selection of income measurement for bonus plans. The first hypothesis is that multinational firms are more likely to use after-tax bonus plans either because multinational firms have a greater opportunity for income tax planning and so are more likely to expect managers to include tax planning in their strategic decisions, or because after-tax income should be less volatile across years for multinational firms since a change in one country’s tax laws affects only a portion of a firm’s worldwide before-tax income. Thus, the compensation risk of measuring performance against after-tax income as opposed to before-tax income should be less for multinational firms than for domestic companies. The degree to which a firm was multinational was measured using five different ratios: foreign sales divided by total sales (each net of intercompany sales) (SFTA), foreign income divided by total income (IFT), intercompany sales divided by total sales after adjusting for intercompany sales (SINT), foreign tax expense divided by total tax expense (TXFT), and the current portion of the provision for foreign income taxes divided by the total current portion of the provision for income taxes (TPFT).

Newman’s second hypothesis was that capital intensive firms would be more likely to use after-tax income-based bonus plans. During the time period of Newman’s study (1970’s) capital investments were eligible for the investment tax credit. Therefore, firms that wished to provide an incentive for their managers to consider the investment tax credit when making capital purchasing decisions (i.e., more capital intensive firms) would be more likely to measure managers’ performance against after-tax income since after-tax income would take the investment tax credit into account. Two measures were used for capital intensity: a three-year, average, investment-to-sales ratio and a three-year, average, sales-to-gross-plant ratio.

Newman’s results provided weak evidence for the relation between bonus plan type and the degree to which the firm is multinational (two of the five ratios were marginally significant), and strong support for the relation between bonus plan type and the capital intensity of a firm. Newman also reported that larger firms were more likely to use an after-tax bonus plan.

Research Issues and Variable Measurement

This study provides a microeconomic investigation of firms’ contractual arrangements with regard to managers’ bonus plans to discover explanations for why firms reward performance based on after-tax income or before-tax income. An understanding of these explanations should help provide a better understanding of the incentives that firms have to incorporate tax planning into the strategic decision-making process. We hypothesize that firms with certain characteristics may have greater incentives to expend resources on strategic tax planning; therefore, these firms are more likely to provide managers with incentives to maximize after-tax income by
developing strategies that minimize taxes and non-tax costs simultaneously (Scholes and Wolfson 1992).

The specific firm characteristics this study investigates are the number of separate operating segments or divisions within a firm, the level of management stock ownership, the degree to which the firm is multinational, and the size of the firm. The first two variables have not been investigated previously as determinants of the choice of income for bonus plans, while the later two variables are included to replicate the analysis provided by Newman (1989) over a different time period. This replication should be important because 1) different economic conditions were in existence during the time period of Newman’s study and the current study, and 2) the tax law has changed significantly since Newman’s study.2

1. Number of Operating Segments

Firms may take advantage of tax incentives that arise across different economic activities (Wilson 1991). The number of separate operating segments or divisions may provide firms with more tax planning opportunities because the operations from the various divisions can be combined strategically to produce beneficial tax results. The number of strategic options increases as the number of segments increases. Some of the more important options include the following:

- The operating and capital loss carryovers from one segment may be used to shelter the income of other segments;
- Certain deductions and credits can be maximized by using amounts from all segments in computing limitations for items such as the charitable contributions deduction and foreign tax credits;
- The alternative minimum tax (AMT) attributes of all segments can be used in computing alternative minimum taxable income, which could result in the reduction of the adjusted current earnings adjustment and the optimization of other AMT preferences and adjustments;
- The current year operating losses of one segment can be used to defer or reduce the estimated tax payments of the entire corporation. Note that the advantages listed above are usually discussed in the context of consolidated entities (Hoffman 1994, p. 8-7). However, these advantages also exist for organizations that have separate operating segments that are not legally distinct business entities.

It is clear that businesses that have multiple business segments have more opportunities to engage in tax planning than firms that have only one major line of business. Consequently, we expect that as the number of firms' operating segments increases, firms' tax planning opportunities should also increase. Therefore, firms should be more likely to provide their managers with incentives to maximize after-tax income as the number of operating segments increases. The first research hypothesis we test, is:

H1: As the number of firms' operating segments increases, the use of bonus plans based on after-tax income should decrease.

The number of firms' operating segments was collected from their financial statements.

2. Management Stock Ownership

The level of management stock ownership for a firm could also influence the choice of bonus plan. The conver-
gence-of-interest hypothesis for management stock ownership states that the
agency costs of deviation from firm value-maximization should decline as management ownership increases (Jensen and Meckling 1976). On the other hand, Fama and Jensen (1983) have noted that as management ownership increases, management may become entrenched in the corporation.

Morck et al. (1988) provide evidence concerning the entrenchment effect by investigating the relationship between management stock ownership and the market valuation of the firm as measured by the ratio of the market value of the firm to the replacement cost of the firm's assets. They first document that the interests of shareholders and management converge as management stock ownership increases at lower levels. Second, they note that the conditions necessary for entrenchment appear as ownership increases to within the 5 to 25% range. In this range, management has enough power to divert resources to themselves so that the entrenchment effect dominates the convergence effect. However, as management stock ownership increases above the 25% level, the managers own such a large percentage of the firm that it becomes in their own best interest to maximize the value of the firm. Consequently, at higher levels of management stock ownership, the convergence-of-interest effect dominates the entrenchment effect.

In the context of this study, firms have two competing interests when selecting a bonus plan. Firms desire to hire the best managerial talent available, and since managers are averse to after-tax performance measures because of their volatility and uncertainty, firms have an incentive to use before-tax bonus plans to attract managerial talent. However, before-tax plans produce two costs to firms. First, before-tax plans do not encourage managers to consider tax effects in the strategic planning process, so optimal strategic plans are not rewarded. Second, managers have more control over before-tax income, so before-tax bonus plans provide managers with more opportunity to manage income and divert resources to themselves. Therefore, firms must weigh the costs and benefits of using a particular plan. Integrating the results of Morck et al. (1988), firms are most at risk of having value diverted from the firm to managers when management is entrenched. Consequently, in the entrenchment range of management stock ownership, firms have the most incentive to place controls on management to prevent them from diverting resources to themselves (Fama and Jensen 1983).

Since firms have the greatest incentive to use after-tax bonus plans in the entrenchment range, and the least incentive to use after-tax plans at either extreme of the management stock ownership spectrum, the relationship between bonus-plan type and management stock ownership is expected to be nonmonotonic. To capture the expected nonmonotonic relationship between management stock ownership (MSO) and the choice of bonus plan, MSO and MSO^2 are used in the regression models. Therefore, the second research hypothesis is:

H2: Management stock ownership is not related to the choice of after-tax income as a benchmark for bonus plans.

Bonus plan type is defined as one for after-tax plans and zero for before-tax plans. Therefore, if firms have the greatest incentive to use after-tax plans in the entrenchment range of Management Stock Ownership, then the coefficient on
MSO should be positive and the coefficient on MSO2 should be negative. MSO is measured as the percentage of ownership by officers and directors as a group.

3. Degree to Which a Firm is Multinational

Firms also have an opportunity to take advantage of tax incentives that arise across different jurisdictions (Wilson 1991). Newman (1989) hypothesized that multinational firms have greater opportunity to engage in tax planning since they can lower tax expense by 1) manipulating transfer pricing policies, 2) selecting locations for subsidiaries where tax rates are favorable, and 3) managing the payment of dividends. Newman measured the degree to which a firm is multinational using the five ratios described previously; he reported marginally significant results for two of these five measures. We included these five variables in the current study to test Newman's hypothesis in a different time period. However, note that firms are presented with more tax planning opportunities by the mere existence of segments, as described above, regardless of whether the segment or division is foreign based. Therefore, Newman's subsidiary measure may have been too narrow to produce significant results and we expect stronger results for the operating segments variable than for the multinational variables. Research hypothesis three, is as follows:

H3: As firms become more multinational, the use of bonus plans based on after-tax income should decrease.

The degree to which a firm is multinational is measured using the five proxies developed by Newman (1989), as well as one additional measure. Statement of

Financial Accounting Standards Number 14 (FASB 14) requires firms to disclose foreign geographical segments if either sales by foreign operations to unaffiliated customers are at least 10 percent of consolidated revenue or assets identified with the foreign operations are at least 10 percent of consolidated assets. That is, any geographical segments meeting the 10-percent test must be reported separately from the others; the others may be combined for reporting purposes. Therefore, an alternative measure which is used for the degree to which a firm is multinational is the number of geographical areas reported (GEOAREA).

4. Firm Size

Newman (1989) also reported that firm size affects the choice of after-tax and before-tax plans. However, it is difficult to defend any one explanation for the significance of firm size since size can proxy numerous corporate attributes. Therefore, firm size is included in the analysis as a control variable. Firm size is measured as the logarithm of total assets.

Results and Conclusion

The purpose of this paper was to provide additional investigation into why some firms reward managers based on before-tax income while others prefer to use after-tax income. Managers should be provided with the proper incentives to minimize taxes and other business costs simultaneously, because both costs are so substantial that to ignore either would lead to sub-optimal decisions.

Our results largely support the developing theory on the choice of bonus plan. As expected, firm size is a very important factor in determining whether a firm defines income on an after-tax or before-tax basis for bonus plans, with larger firms
more likely to use an after-tax bonus plan. There is, of course, nothing about firm size per se that should affect bonus plan choice, so it would appear that the firm size variable is functioning as a proxy for some other effect related to firm size, such as the greater ability of larger firms to engage in tax planning.

The analysis indicates that multinational firms are not likely to use after-tax plans after allowing for the effects of firm size. For example, if there are two firms of identical size and one firm is solely domestic and the other is multinational, then the two firms are equally likely to use after-tax plans. While whether a firm is multinational or not does not matter, the analysis strongly suggests that firms with more operating segments are more likely to use after-tax bonus plans, even after controlling for firm size. In other words, given two firms of identical size, if one firm has few operating segments and the other has many, then the firm with many segments is more likely to use after-tax plans.

Finally, the kind of management ownership is also important in determining the type of bonus plan. The analysis indicates strong support for the notion that as the level of management stock ownership rises, the inclination of management to maximize after-tax firm value grows, which is expressed by the positive effect of management ownership on the likelihood of using after-tax bonus plans. The analysis also suggests, however, that this confluence-of-interest effect may be reduced or even eliminated over a certain range of management ownership (namely, the 5 to 25% range), where management is more likely to prefer bonus plans measured in before-tax terms.

Overall, the analysis suggests that systematic differences do exist between firms that reward strategic tax planning and those that do not. An understanding of the reasons for these differences in reward structure should help provide a better understanding of the decision-making processes of firms with regard to strategic tax planning. For example, while it appears that it is productive for firms with more business segments to encourage strategic tax planning, it is not clear that it is desirable for the level of management stock ownership to influence the manner in which management is evaluated and compensated.

Future research could focus on several promising avenues in this area because this research stream is at such an early stage of development. For example, it would be interesting to determine whether firms that encourage strategic tax planning are more successful than those that do not. Additionally, future research should attempt to determine why larger firms are more likely to use after-tax bonus plans, as well as investigate other firm characteristics that may encourage certain firms to include tax strategies in the overall firm planning process.
APPENDIX

1. Methodology

Research Methods

Logistic regression is used to determine whether bonus plan type varies systematically based on the characteristics described above. The following logistic regression model is estimated:

\[ \text{BONUS} = b_0 + b_1 \text{SEGMENT} + b_2 \text{MSO} + b_3 \text{MSO}^2 + b_4 \text{MULTI} + b_5 \text{SIZE} + e \]

where,

- \( \text{BONUS} \) = one if the firm uses an after-tax plan and zero if the firm uses a before-tax plan,
- \( b_0 \) = the intercept coefficient,
- \( b_1 \) - \( b_5 \) = the slope coefficients,
- \( \text{SEGMENT} \) = the number of reportable operating segments for a firm,
- \( \text{MSO} \) = management stock ownership,
- \( \text{MULTI} \) = a proxy for the degree to which the firm is multinational,
- \( \text{SIZE} \) = firm size, and
- \( e \) = the residual term.

The expected sign for each variable is also shown beneath the model.

Sample

An initial sample of 345 firms was identified by a key-word search of the National Automated Accounting Research System (NAARS). Proxies were reviewed on NAARS for the 1991 and 1992 fiscal year-ends to determine if a firm had a bonus plan, and (if it did) to determine whether the plan measured performance using an after-tax or before-tax definition of income. The initial sample had 90 firms with after-tax bonus plans, 243 firms with before-tax bonus plans, and 12 firms with hybrid bonus plans. A hybrid bonus plan used both before-tax and after-tax definitions of income to measure performance.

Financial information was requested from each of the firms identified through the NAARS search. The financial information requested included annual reports and 10-Ks for the three fiscal years ending in the year for which the firm was identified on NAARS, as well as a copy of recent proxy statements. The necessary information was received from 266 firms, an overall response rate of 77.10% (266/345). Table 1 provides a reconciliation of the initial sample of firms with the final sample of firms.

### Table 1
Reconciliation of Initial Sample of Firms with Final Sample of Firms

<table>
<thead>
<tr>
<th></th>
<th>After-Tax Bonus Plan</th>
<th>Before-Tax Bonus Plan</th>
<th>Hybrid Bonus Plan</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Firms Initially Identified by Key Word Search on the NAARS Database</td>
<td>90</td>
<td>243</td>
<td>12</td>
<td>345</td>
</tr>
<tr>
<td>Requests Returned Marked &quot;Not Forwardable&quot; by Postal Service</td>
<td>(0)</td>
<td>(13)</td>
<td>(0)</td>
<td>(13)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>90</td>
<td>230</td>
<td>12</td>
<td>332</td>
</tr>
<tr>
<td>No Response to Request</td>
<td>(16)</td>
<td>(38)</td>
<td>(0)</td>
<td>(54)</td>
</tr>
<tr>
<td></td>
<td>74</td>
<td>192</td>
<td>12</td>
<td>278</td>
</tr>
<tr>
<td>Firm Unusable Because of Merger, Bankruptcy, Supplied Information for Wrong Fiscal Year, etc.</td>
<td>(4)</td>
<td>(6)</td>
<td>(2)</td>
<td>(12)</td>
</tr>
<tr>
<td>Final Totals</td>
<td>70</td>
<td>186</td>
<td>10</td>
<td>266</td>
</tr>
</tbody>
</table>

Overall Response Rate = 77.10% (266/345)
Results and Discussion

1. Correlation Analyses

Since six proxies are being used to measure the degree to which a firm is multinational, it is reasonable to expect some correlation between these measures. The six measures that are used are the five proxies developed by Newman (1989) and the number of geographic areas (GEOAREA).

Table 2 presents the correlation coefficients between the six proxies for multinational status. All the pairwise correlations between the six proxies are positive, indicating a direct relationship, and are significant at the .0001 level. Furthermore, seven of the fifteen correlation coefficients are greater than 0.50. This suggests that the six proxies are measuring a common characteristic or trait. These relationships are consistent with those reported by Newman (1989). The proxy GEOAREA, which was not used by Newman, is highly correlated with the other five proxies. Three of the five correlations are over 0.50, with the lowest correlations being for IFT (0.4470) and TXFT (0.4539). Therefore, it appears that GEOAREA is a reasonable proxy for the multinational variable.

Table 2

Correlations Between the Six Measures of Degree to Which Firms are Multinational and Level of Significance

<table>
<thead>
<tr>
<th></th>
<th>SINT</th>
<th>TXFT</th>
<th>TPFT</th>
<th>SFTA</th>
<th>IFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TXFT</td>
<td>0.3219</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPFT</td>
<td>0.4423</td>
<td>0.5880</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFTA</td>
<td>0.6308</td>
<td>0.5562</td>
<td>0.6627</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IFT</td>
<td>0.2497</td>
<td>0.3835</td>
<td>0.4470</td>
<td>0.4450</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td></td>
</tr>
<tr>
<td>GEOAREA</td>
<td>0.6302</td>
<td>0.4539</td>
<td>0.5554</td>
<td>0.7859</td>
<td>0.4470</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
</tbody>
</table>

1$SINT = \text{intercompany sales/total sales, after eliminations}$

$TXFT = \text{foreign tax expense/total tax expense}$

$TPFT = \text{current portion of the provision for foreign income taxes/total current portion of the provision for income taxes}$

$SFTA = \text{foreign sales/total sales, after intercompany eliminations}$

$IFT = \text{foreign income/total income}$

$\text{GEOAREA = number of geographical areas reported}$
Correlations are also reported for the independent variables used in the study to determine if multicollinearity may be a problem. For example, it is possible that larger firms may have more segments, may be more multinational, and may have lower levels of management ownership. Likewise, firms that are multinational may have more reportable segments. The correlation coefficients are reported in Table 3. Note that since six proxies are used to measure the multinational status of firms, only the highest correlation coefficient between any of the six multinational proxies and the other variables is reported in Table 3. For example, the 0.3546 correlation reported between multinational (MULTI) and the number of operating segments (SEGMENT) is the largest correlation coefficient between any of the six proxies for multinational status and the number of operating segments. None of the correlation coefficients reported in Table 3 are greater than 0.40, while only three of the six correlation coefficients exceed 0.30. Therefore, multicollinearity does not appear to be a serious problem for the multivariate analysis.

2. Univariate Tests

Table 4 presents mean values, standard deviations, and univariate t-tests (across bonus plan type) for the variables investigated by this study. While the results of the univariate tests should be interpreted cautiously since they do not control for the effects of other factors on the dependent variable, they do provide an exploratory analysis of the data.

The data indicates that firms using after-tax bonus plans have a larger number of reportable segments than before-tax bonus plan firms (p=.0007). Also, the

### Table 3

**Correlations Between the Degree to Which Firms are Multinational, Size, Number of Segments Reported, and Management Stock Ownership**

<table>
<thead>
<tr>
<th></th>
<th>MULTI</th>
<th>SEGMENT</th>
<th>MSO</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEGMENT</td>
<td>0.3546 (0.0001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSO</td>
<td>-0.1264 (0.0394)</td>
<td>-0.1461 (0.0171)</td>
<td></td>
</tr>
<tr>
<td>SIZE</td>
<td>0.3437 (0.0001)</td>
<td>0.2888 (0.0001)</td>
<td>-0.3072 (0.0001)</td>
</tr>
</tbody>
</table>

1MULTI = the largest correlation found between any of the six proxies for multinational reported in Table 2 and capital intensity, number of segments, management stock ownership, and firm size.

SEGMENT = number of segments reported.

MSO = percentage of firm owned by top management and the board of directors.

level of management stock ownership is greater for before-tax firms than after-tax firms, but this difference is not statistically significant. For the multinational measures, five of the six proxies are larger for after-tax firms than before-tax firms. However, only three (SINT, SFTA, and GEOAREA) are statistically significant at the .05 level. For firm size, the results strongly indicate that firms using an after-tax bonus plan are larger than those using before-tax bonus plans (p=.0001). Therefore, size should be included as a control variable in the multivariate analysis.

3. Logistic Regression Model

Logistic regression analysis was used to examine the combined impact of number of segments, management stock ownership, the degree to which firms are multinational, and firm size on bonus plan type. Only one of the six multinational measures is included in any one model because of the high degree of multicollinearity among these measures. The results for these models are pre-

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**Table 4**

**Mean Values, Standard Deviations, and Univariate t-tests**

<table>
<thead>
<tr>
<th></th>
<th>Total Sample (n=266)</th>
<th>After-Tax (n=80)</th>
<th>Before-Tax (n=186)</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TXFT</td>
<td>0.0941 (0.2566)</td>
<td>0.1110 (0.3033)</td>
<td>0.0869 (0.2342)</td>
<td>-0.6343</td>
<td>0.5271</td>
</tr>
<tr>
<td>SINT</td>
<td>0.0192 (0.0464)</td>
<td>0.0296 (0.0554)</td>
<td>0.0148 (0.0414)</td>
<td>-2.1446</td>
<td>0.0340</td>
</tr>
<tr>
<td>TPFT</td>
<td>0.1011 (0.2595)</td>
<td>0.1218 (0.2701)</td>
<td>0.0922 (0.2550)</td>
<td>-0.8523</td>
<td>0.3948</td>
</tr>
<tr>
<td>SFTA</td>
<td>0.1030 (0.1606)</td>
<td>0.1385 (0.1804)</td>
<td>0.0877 (0.1492)</td>
<td>-2.2148</td>
<td>0.0286</td>
</tr>
<tr>
<td>IFT</td>
<td>0.0726 (0.1930)</td>
<td>0.0585 (0.2181)</td>
<td>0.0786 (0.1815)</td>
<td>0.7257</td>
<td>0.4693</td>
</tr>
<tr>
<td>GEOAREA</td>
<td>1.7256 (1.1927)</td>
<td>2.1250 (1.5042)</td>
<td>1.5538 (0.9863)</td>
<td>-3.1204</td>
<td>0.0023</td>
</tr>
<tr>
<td>SEGMENT</td>
<td>1.8609 (1.1941)</td>
<td>2.2875 (1.4159)</td>
<td>1.6774 (1.0362)</td>
<td>-3.4743</td>
<td>0.0007</td>
</tr>
<tr>
<td>MSO</td>
<td>0.2248 (0.2455)</td>
<td>0.2055 (0.2255)</td>
<td>0.2332 (0.2538)</td>
<td>0.8423</td>
<td>0.4004</td>
</tr>
<tr>
<td>SIZE</td>
<td>19.6683 (2.0285)</td>
<td>20.3854 (2.1284)</td>
<td>19.3607 (1.9088)</td>
<td>-3.8689</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

1Standard deviations in parenthesis.
sented in Table 5, and are consistent with the results reported for the univariate t-tests. The model chi-square statistics indicate that all six models significantly explain the variation in the choice of bonus plan type at the .01 level.

The number of operating segments reported is positive and significant at the .01 level in five of the six models, and significant at the .05 level in the remaining model. Therefore, hypothesis one is rejected because the results strongly suggest that firms that report more operating segments are more likely to use after-tax bonus plans. To test a predicted nonmonotonic relationship between bonus plan type and management stock ownership, we examined the signs of the coefficients on MSO and MSO^2. Because both variables are signed as hypothesized and significant at the .05 level for all six models, hypothesis two is also rejected. These results indicate that the level of management stock ownership may have a strong influence over the choice of income measure used in bonus plans. When the management ownership percentage is high enough for management to be entrenched, firms appear to be more likely to use after-tax bonus plans to prevent managers from diverting resources to themselves. Firms may be less likely to use after-tax bonus plans when management is not entrenched because managerial talent is more attracted to before-tax bonus plans.

Our investigation of the multinational variables explored by Newman (1989) produced results consistent with his. We found very little evidence to suggest that the degree to which a firm is multinational affects the type of bonus plan used for our sample of firms. The multinational proxies were not significant, with the exception of IFT which was significant at the .05 level but did not have the predicted sign. Consequently, hypothesis three cannot be rejected. Newman reported weak results for the relation between multinational status and bonus plan type. Considered jointly, the results of these two studies strongly suggest that the degree to which a firm is multinational has little influence on the choice of income measure for bonus plans.

Firm size was included in the model as a control variable. SIZE is positive and significant at the .01 level for all six models. Therefore, firm size does appear to be an important factor in assessing why firms define income on an after-tax or before-tax basis for bonus plans. Larger firms are more likely to use an after-tax bonus plan. Size could be a proxy for some omitted variable that is a factor in a firm's choice of bonus plans. For example, size could be a proxy for economies of scale in tax planning, or it could proxy for additional opportunities for tax planning as a firm grows (Newman 1989).
Table 5
Summary of Cross-Sectional Analysis of Bonus Plan Type Using Logistic Regression

$\text{Bonus}^1 = b_0 + b_1 \text{SEGMENT} + b_2 \text{MSO} + b_3 \text{MSO}^2 + b_4 \text{MULTI} + b_5 \text{SIZE} + e$

<table>
<thead>
<tr>
<th>Measure Used for Multinational Proxy (n=sample size)</th>
<th>Intercept</th>
<th>Number of Segments (SEGMENT)</th>
<th>Management Stock Ownership (MSO)</th>
<th>Management Stock Ownership Squared (MSO$^2$)</th>
<th>Multinational Proxy (MULTI)</th>
<th>Size Proxy (SIZE)</th>
<th>Model Chi-Square Statistic with 5 Degrees of Freedom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Tax Expense (TXFT) (n=266)</td>
<td>-7.2631</td>
<td>0.3604</td>
<td>4.9762</td>
<td>-6.5830</td>
<td>0.0629</td>
<td>0.2668</td>
<td>27.89*</td>
</tr>
<tr>
<td></td>
<td>(17.96)*</td>
<td>(8.99)**</td>
<td>(5.34)**</td>
<td>(4.70)**</td>
<td>(0.01)</td>
<td>(10.64)*</td>
<td></td>
</tr>
<tr>
<td>Intercompany Sales</td>
<td>-7.0348</td>
<td>0.3362</td>
<td>4.8907</td>
<td>-6.3500</td>
<td>3.0147</td>
<td>0.2548</td>
<td>28.91*</td>
</tr>
<tr>
<td>Total Sales After Intercompany Eliminations (SINT) (n=266)</td>
<td>(16.78)*</td>
<td>(7.59)**</td>
<td>(5.09)**</td>
<td>(4.56)**</td>
<td>(1.06)</td>
<td>(9.68)*</td>
<td></td>
</tr>
<tr>
<td>Current Portion of the Provision for Foreign Income Taxes (TPFT) (n=266)</td>
<td>-7.3890</td>
<td>0.3738</td>
<td>4.9152</td>
<td>-6.2933</td>
<td>0.3315</td>
<td>0.2735</td>
<td>28.20*</td>
</tr>
<tr>
<td></td>
<td>(18.22)*</td>
<td>(9.25)**</td>
<td>(5.21)**</td>
<td>(4.64)**</td>
<td>(0.32)</td>
<td>(10.95)*</td>
<td></td>
</tr>
<tr>
<td>Foreign Sales</td>
<td>-7.0488</td>
<td>0.3377</td>
<td>5.0778</td>
<td>-6.5495</td>
<td>0.7792</td>
<td>0.2533</td>
<td>28.61*</td>
</tr>
<tr>
<td>Total Sales, after Intercompany Eliminations (SFTIA) (n=266)</td>
<td>(16.78)*</td>
<td>(7.60)**</td>
<td>(5.49)**</td>
<td>(4.91)**</td>
<td>(0.75)</td>
<td>(9.44)*</td>
<td></td>
</tr>
<tr>
<td>Foreign Income</td>
<td>-7.9596</td>
<td>0.4447</td>
<td>4.6564</td>
<td>-6.0773</td>
<td>2.0116</td>
<td>0.3021</td>
<td>34.15*</td>
</tr>
<tr>
<td>Total Income (IFT) (n=266)</td>
<td>(20.51)*</td>
<td>(12.17)**</td>
<td>(4.57)**</td>
<td>(5.81)**</td>
<td>(13.08)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Geographical Areas Reported (GEOAREA) (n=266)</td>
<td>-6.8313</td>
<td>0.3096</td>
<td>4.9285</td>
<td>-6.3759</td>
<td>0.1942</td>
<td>0.2327</td>
<td>30.34*</td>
</tr>
<tr>
<td></td>
<td>(15.66)*</td>
<td>(6.20)**</td>
<td>(5.18)**</td>
<td>(4.68)**</td>
<td>(2.47)</td>
<td>(7.70)*</td>
<td></td>
</tr>
</tbody>
</table>

$^1$ Bonus = 1 if the firm uses an after-tax bonus plan and zero if the firm uses a before-tax bonus plan.

* Significant at the .01 level

** Significant at the .05 level

*** Significant at the .10 level
References


Endnotes

1 See Watts and Zimmerman (1986, chapter 11) for a review.

2 Capital intensity is not investigated because Newman's hypothesis for this variable was driven by the existence of the investment tax credit. However, during the time period we investigate the investment tax credit was no longer applicable because it had been repealed as part of the *Tax Reform Act of 1986*.