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Executive Motivations, Earnings, and Consequent Equity Performance

Robert Tempest Masson

Northwestern University

In this paper the financial incentives of executives are analyzed, theoretically and econometrically, with particular emphasis on the relationship between executive motivations and the sales-maximization hypothesis. Executive financial incentives are found to be primarily related to firm stock market performance. The sales performance of the firm has no consistent positive or negative effect on executive financial return. The structures of individual firms' compensation packages were tested for effects on firm performance. It was found that firms with executives whose financial rewards more closely paralleled stockholders' interests performed better in the stock market over the postwar period. For this sample of firms it was concluded that the hypothesis of present-value maximization better explains firm behavior than the hypothesis of sales maximization. It is the conclusion of this author that the sales-maximization hypothesis does not usefully characterize the "typical oligopolist," as has been asserted by William J. Baumol.

I. Introduction

This paper relates the financial returns of executives to firm performance. The results have important implications for the sales-maximization hypothesis and for the more general topic of the separation of ownership and control in the large corporation. In particular, for the sample of firms tested it was concluded that executives are generally not financially motivated to be sales maximizers. In addition, it was found that firms with executives whose financial interests are more closely parallel to the

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goals of the stockholders and the long-run profitability of the firm do indeed outperform other firms in stock return. More provisionally, the evidence indicates that these firms also perform better with respect to growth of the firm. The theories of the firm which assert management goals other than the maximization of the present value of the firm implicitly or explicitly rely upon the separation of ownership and control of the firm (Monsen, Chiu, and Cooley 1968, p. 435). This work gives more evidence indicating that a primary consideration of business managers is the stock performance of their firms.¹

II. Previous Studies

Baumol (1967, p. 49) asserts that "the typical oligopolist's objectives can usefully be characterized, approximately, as sales maximization subject to a minimum profit constraint." The "sales-maximization hypotheses" has since enjoyed wide popularity, but the evidence given in support of it does not stand up under close scrutiny.

Three types of evidence have been advanced to support the sales-maximization hypothesis: casual empiricism, generalizing from collections of isolated events; inferences from research on managerial discretion; and inferences from empirical work relating executives' financial returns to their firm's performance.

At the level of casual empiricism Baumol proceeds to give examples of some businessmen's reactions to particular sales situations: "For example, I have encountered several firms that were losing money on their sales in markets quite distant from the plant. . . . Another case [occurred where] . . . salesmen's wages were not made up by the total revenues they brought in" (Baumol 1967, p. 47). Baumol's theory and these examples yield the very strong and probably unpalatable conclusion that these firms lose profits (exclusive of opportunity costs) at the margin on *all* product lines in *all* markets.² Indeed, he states that all product lines and sales territories will be apportioned "in a way that the marginal profits from all types of sales are equal" (Baumol 1967, p. 48).

Baumol also asserts, against the model for present-value maximization,

¹ In the literature on the separation of ownership and control there have been two articles which suggest that the owner-controlled firm performs better in terms of profits than the management-controlled firm (Kamerschen 1968; Monsen et al. 1968). In these two studies ownership control was defined by the management of the firm owning more than a certain percentage of the firm's stock. This study suggests an alternative hypothesis—that it is not whether the management owns a great enough proportion of company stock to have control which makes a difference, but whether the management owns enough stock to have a vast proportion of its financial return depend upon stock ownership.

² If the profit-maximization models can be interpreted so narrowly as to exclude these cases from profit maximization (Baumol 1967, p. 48), the sales-maximization model may be interpreted similarly.

that long-run goals are hard to plan by in the diffuse decision-making mechanism of the large corporation (Baumol 1967, p. 52). Anthony (1960, p. 126) presses this type of argument further, dismissing profit maximization as "too hard." Ideally, these objections should be examined empirically (Machlup 1967). The work on managerial discretion indicates that in certain circumstances business managers can afford to pursue nonprofit goals of the firm (Williamson 1963). Two of the circumstances occur when competition from other firms is low (that is, not keen enough to drive profits down to the sales maximizer's target rate of return) and when management control is sufficiently free from ownership control. This is why Baumol refers to his sales-maximization hypothesis in terms of oligopolists, for they are the group most likely to be operating in these circumstances. There appears to be little question that a management that feels safe from market pressures and stockholder pressures need not be as effective a profit maximizer as a management acutely aware of these pressures. The sales-maximization hypothesis fails, however, to account for the higher profit rates of firms in more concentrated industries or in industries with higher barriers to entry (Bain 1965, pp. 182-204; Mann 1966; Kamerschen 1968, p. 432).

A third type of evidence cited by Baumol is that executives' salaries are more closely correlated with sales than with profits (Baumol 1967, p. 46),³ which implies that executive financial returns tend to reward sales maximization. But an early executive motivation study (Taussig and Barker 1925) emphasized the motivational influences of stock ownership and documented the large ownership of company stock by executives. Since that time, and until very recently, the motivational aspects of stock ownership (outside of the ownership and control question) have been virtually ignored.

In the works by McGuire et al. (1968, p. 753), Patton (1966, p. 96), and Roberts (1959), executive compensation is related to the profits and sales of the firm. All of these studies use primarily cross-section data on compensation⁴ and conclude that executive financial motivations in fact drive the executive toward sales as a goal, at the expense of profits. These studies suffer from three flaws: (1) cross-section data are not relevant to a motivational study of an executive in his firm; (2) by including the profits of only one year, the studies examine only short-run profit maximization; and (3) by examining only salary plus bonuses these studies have critically omitted *five-sixths* of the financial return of the average big-firm executive's earnings from his firm.⁵ As Howe (1956) points out in an

³ As substantiation, he cites the work of McGuire, Chiu, and Elbing (1968).

⁴ McGuire et al.'s study (1968, p. 753) used pooled time series and cross-section data. The technique and sample used suppressed the effect of time series on compensation and arrived at cross-section relationships.

⁵ In an extensive study of the top five executives of large industrial corporations Lewellen estimates that on the average 50 percent of an executive's compensation

article on a different subject, cross-section differences in compensation may only be an indication of the opportunity costs to the firm of trying to hire more highly qualified executives for harder jobs.⁶ The differences between the salaries of executives of firms of widely differing sizes can be considered analogous to the differences between the salaries of a top executive and a division head in a single firm. Even when Roberts uses time-series analysis, he excludes any variable to measure changes in the profitability of the firm and uses only the profits of the present period (Roberts 1959, pp. 62–63). Compensation based on short-term profits would yield little incentive to invest in capital equipment that would outlast the executives of the firm. Thus there would be no incentive to maximize net worth. Most important, all of these studies have omitted a full definition of executive compensation, including present-value aspects of stock options and retirement benefits, and they have excluded executive return from stock ownership as well. All of these should be included in a properly specified study of executive motivation.

III. Financial Returns Determined by Firm Performance

The satisfaction that an individual obtains from working in a particular job depends upon many characteristics of that job, for example, the status, the challenge, the salary, the fringe benefits. The owner-entrepreneur who carpets his office or who personally consumes some of the output of his operation is consuming in kind from his operation. The corporation executive who does the same things, however, is considered by many to be dishonest or inefficient. In fact, if he is not deceiving the board of directors, he, too, is receiving compensation in kind (Gordon 1966, p. 331). Executives, like anyone else, have "alternative objective functions"; that is, elements other than pure monetary return are of value to them. If the board of directors is attempting to maximize the present value of the firm, it should explicitly cater to these other elements of executive interest. The board of directors should determine a composite of compensation, both financial and nonfinancial, in such a fashion that costs are minimized when obtaining any particular level of executive satisfaction or utility.⁷ A compensation package arrived at in this way is a package that maximizes present value even if it pays the executive in nonmonetary return, for

package is made up of salary plus bonus (Lewellen 1968, p. 142). In another study he concludes, for the same group of executives, that their after-tax earnings from company stock average three times the present value of their compensation packages (Lewellen 1969, p. 318). This result is found even when executives with very large stockholdings are omitted from the study.

⁶ This does not imply that smaller firms necessarily have lower-quality executives; some excellent executives prefer, and derive utility from, working for smaller firms.

⁷ This may be built explicitly into a model in which the firm minimizes the sum of direct costs and opportunity costs—that is, profits forgone—in a cost-function analysis, given any specific executive indifference curve (Masson 1969).

example, permits the overexpansion of sales to afford some (executive) prestige value.

The compensation package maximizing present value engenders both utility tradeoffs for the executives and cost tradeoffs for the firm. If executives wish to increase sales of the firm past the point where the present value of the firm would be maximized, holding executive compensation constant, the compensation package that maximizes present value will engender a tradeoff between sales goals and compensation. Compensation should, *ceteris paribus*, fall with increased sales past this point. Evidence that compensation does not fall with increasing sales, *ceteris paribus*, indicates either that there is no utility value to executives of expanded sales or that the compensation function is not calculated to maximize firm present value. Indeed, a compensation package which is increasing at the margin with sales would indicate an even greater preoccupation with sales by the board of directors than by the executives.

This argument is of course based on the assumption that there are costs involved in changing executives between firms, both to the executives and to the firms involved. The transactions costs to the firm of hiring a new executive and to the departing executive of leaving the firm for another dictate a degree of independence between the executive market as a whole and the market in which the executive is selling his services to his own firm. In the absence of these transactions costs, the compensation package of an executive would be determined by the "going price" of executive services in the whole executive market, not by his own firm's performance. These same transactions costs determine a bargaining range within which the executive's salary may vary without creating an incentive for the firm to let the executive go and without inducing the executive to leave. Work on the subject which has indicated that executive mobility has been low (Newcomer 1955, p. 130) helps to support the presumption that executive compensation may vary with firm performance instead of being determined solely by external market opportunities.

In a study of executive motivation one must consider earnings from company stock as well as compensation. The board of directors maximizing present value should most certainly be cognizant of this when formulating the compensation package, and the executive should likewise take this into account when making his decisions. Consider, for example, an executive, age sixty-three, who will retire in two years and who must decide upon an investment this year which will yield returns to the firm over the next ten years. Particularly with accelerated depreciation schedules, an executive whose financial returns are totally based upon compensation related to current profits and sales will have little incentive to undertake the investment. If, on the other hand, he owns stock options or company stock, the increased stock value (as the expected return from the investment becomes capitalized by the stock market) will yield a financial incentive for the executive to invest in the project. Thus the *total* present

value of financial returns to executives should be included in an accurate motivational study.

The first step in relating executive returns to firm performance is to estimate the value to the executive of his current and promised future returns. Here the present value to each executive of all his financial returns accruing each year is calculated for each of the years 1947–66. The present value of salary plus bonuses is the after-tax earnings from these categories. Deferred compensation and retirement benefits are computed on the basis of accrued present value, including contingency elements, and are allocated among the years that the executives must stay employed by the firm to qualify for the benefits.⁸ These and most other elements of the compensation package are estimated in a fashion similar to that used by Lewellen (1968, pp. 1–106) in obtaining his estimates of executive compensation, and a more complete explanation may be obtained from the present author upon request. Stock options are calculated on a present-value basis net of opportunity cost of exercise of option, and stock value is estimated on the change in present value of price change and dividends accrued each year. All calculations are estimated after-tax values.

The data come from a sample of the top three to five executives of thirty-nine electronics, aerospace, and chemical companies for the years 1947–66. The firm data are from the Standard and Poor's Compustat tape and the compensation data from proxy statements and Securities and Exchange Commission 10-K forms. A small sample of firms was chosen because gathering the required data necessitated a restricted sample size for this pilot study. To assure comparability between firms the number of industries studied was minimized. These industries were chosen because any small set of industries would yield small sample bias and decrease the range of statistical generalization. Consequently, industries that were major elements in the postwar expansion were chosen partly because of their importance and partly because of the low collinearity of variables of firm performance engendered by their sporadic, technologically intensive growth. Collinearity has, in previous studies, created a major barrier to estimation of the relationships between compensation and performance (Roberts 1959, pp. 62–63). The present sample reduces this statistical problem, admittedly at the expense of some ability to generalize from the results.

The form of the estimating equation that related executive financial return to individual firm performance was:

⁸ The present value of deferred compensation is calculated by computing the present value of the income stream generated at an 8 percent rate of interest. This is weighted by mortality tables and the value of death benefits and is valid in the light of the fact that an executive may borrow against death benefits as well as against other income. The present value of retirement benefits is approximated by the costs of buying an equivalent annuity from an insurance company adjusted for the difference in death benefits (Masson 1969, pp. 150–56).

$$(\% \Delta EC_t)^{2/3} = b_0 + b_1(\% \Delta S_t) + b_2(\% \Delta S_{t-1}) + b_3(\% \Delta EPS_t) \\ + b_4(\% \Delta EPS_{t-1}) + b_5(\% \Delta NW_t) + b_6(\% \Delta NW_{t-1}),$$

where

$(\% \Delta EC_t)^{2/3}$ = percentage change in total executive financial return weighted by compensation levels of individual executives for the year, all to the two-thirds power;⁹

$\% \Delta S_t$ = percentage change in firm sales for year t ;

$\% \Delta EPS_t$ = percentage change in firm's earnings allocated to share of stock owned at beginning of year t , earnings per share having been adjusted for stock splits and dividends;

$\% \Delta NW_t$ = rate of return on share of stock for year t .

The lack of degrees of freedom in the estimating equation of the individual firm resulted in generally statistically insignificant results for firms viewed individually. On the other hand the aggregate data for firms yield strong results. The form of the compensation function does not specify the absolute values of the estimated coefficients in the above relationship, only the relationships between the coefficients. For this reason pooled regression could not be used to aggregate the firms in analysis. The statistical aggregation technique used is the "zero test" which assesses the degree of confidence the investigator may have that a random sample of positive and negative numbers was not drawn from a distribution with equal probability of positive and negative numbers. Take as an example the hypothesis that $b_5 + b_6$ is greater than zero for firms in general. This hypothesis states that executives gain financially when stock value increases. The null hypothesis states that $b_5 + b_6$ is equal to zero. If the estimated value of the sum is unbiased, there is a fifty-fifty chance that, given the null hypothesis, the sum will be greater than zero for an individual firm. The fact that for thirty of the thirty-nine firms the estimated value of $b_5 + b_6$ is positive shows that the null hypothesis is probably false. The probability of drawing thirty of thirty-nine positive numbers from a sample of half-positive and half-negative numbers is less than .01. Thus the zero test indicates that the null hypotheses may be rejected at the .99 confidence level.

The hypotheses tested were:

1. $b_5 + b_6 > 0$: Executives obtain positive rewards for increasing stock

⁹ The power on the term $\% \Delta EC_t$ is used to compensate for the diminishing marginal utility of current income in the income-leisure tradeoff. The results are insensitive to the choice of the powers two-thirds or one. Of the hypotheses presented below, numbers 1, 4, and 5 are accepted and 7 rejected at the 98 percent confidence level if the power one is used instead. The choice of the power less than one was arbitrary. The equation is presented with the power two-thirds to give all empirical results in the form originally tested.

- value; positive in thirty of thirty-nine cases yielding a confidence level of .999.
2. $b_1 + b_2 < 0$: Firms create a disincentive for sales maximization per se; negative in twenty-one cases yielding an insignificant confidence level of .63.
 3. $b_3 + b_4 \leq 0$: If profits have an effect on compensation *independent of their net worth effect*, it is probably because there is status value to executives, and the firm maximizing present value should create a disincentive for the expansion of profits at the expense of net worth; negative in twenty-three cases yielding an insignificant confidence level of .84.
 4. $b_5 + b_6 > b_1 + b_2$: Executive financial interests are more positively related to stock return than to sales changes (the comparability of the parameters on different performance characteristics is obtained by measuring all the performance characteristics in percent changes); positive in twenty-eight cases yielding a confidence level of .99.
 5. $b_5 + b_6 > b_3 + b_4$: Executive financial interests are more positively related to stock return than to profit changes; positive in thirty cases yielding a confidence level of .999.
 6. $b_5 + b_6 > b_1 + b_2$ and $b_5 + b_6 > b_3 + b_4$: Executive financial interests are more positively related to stock return than to *both* of the other performance characteristics; positive in twenty-four cases yielding a confidence level of .91.
 7. $b_1 + b_2 > b_3 + b_4$, and $b_1 + b_2 > b_5 + b_6$: Executives are paid to expand sales at the expense of net worth, an assertion made by others (Baumol 1967, p. 46; McGuire et al. 1962, p. 753; Patton 1966, p. 96); positive in seven cases yielding a *rejection* of this hypothesis at the .999 confidence level.

The first conclusion is that a significant number of firms *do have* stock market return as an important determinant of executive compensation. Second, there *may* be a tendency for firms to pay their executives not to emphasize sales or profits performance at the expense of stock market performance, from which it follows that executives *may* derive utility value from current sales and profits figures. From hypothesis 6 it appears that stock market performance *may* be the most important determinant of executive returns. *Finally, the hypothesis can be rejected that firms pay their executives primarily for sales maximization.*

IV. Incentives and Firm Performance

In the Section III the form of an executive compensation package maximizing present value was hypothesized. Firms were classified according to how closely their structures of executive returns approximated this form. The

finding that, in general, firms have compensation packages that approximate the hypothesized package maximizing present value is of little interest, however, if financial incentives are not effective or if the hypothesized compensation structure does not in fact lead to the maximization of firm present value. To complete the analysis, therefore, the structure of executive financial returns is analyzed to determine whether firm performance over long periods is consistent with the hypothesized structure of a compensation package maximizing present value.

Start by assuming that the structure of financial returns to executives can affect their actions. If the executives' returns are related only to short-term goals like short-term profits or short-term sales (or growth) and some executives retire over longer periods of time, it is unlikely that the long-term objectives of the firm (long-term growth or profits) and the short-term objectives of its executives will coincide. Although Baumol asserts that the goal of sales maximization requires profit maximization for any fixed level of sales growth, this is not true in the long run. Growth maximization *over a long period* (that is, maximizing the difference between final sales and original sales given a present-value constraint) does coincide with present-value maximization over the same period, given the determined growth. But if the growth incentive has a shorter time horizon, owing to executive turnover, the present value, at the determined growth rate, will not be maximized over this longer period. This is a crucial flaw in the incentive to maximize sales because it will create an incentive for faster growth in the earlier periods. The financial standing of the firm will be less conducive to further growth as executives retire. Because of its inherently short-term character, an emphasis on sales maximization may in fact result in less growth for the firm over the longer term than some alternative form of incentive structure. This argument is also true for profit maximization. If executives receive a bonus based on firm profits, they must consider present-value aspects of the firm as well because the bonus structure will yield them return in their future employment, but because of executive turnover their incentives will be geared to a shorter time horizon than the long-term present value of the firm.

The question then is, How do sales incentives, profits incentives, and present-value incentives affect the firm's performance over long periods? The structure of the compensation package was hypothesized as determining the firm's growth, present value of profits, and stock return in the postwar period. The primary hypotheses tested were (1) that firms with structures of executive financial returns more closely related to stockholder returns performed better in terms of stock performance, and (2) that they performed better in terms of profits performance in this period. The relationship between the structure of executive financial returns and the firm's stock performance merits further explanation. A structure of executive financial returns which emphasizes the stock market return

of the firm should have two benefits. First, the executives of the firm should be working in the interests of the owners of the firm, the stockholders. Second, the executives should be emphasizing the present value of profits of the firm because the stock market is generally doing a reasonably efficient job of capitalizing the value of the discounted future profits of the firm (Green 1968). If in the year 1947 all the firms had had compensation structures that had not changed for several years and if investors had known the incentive value of the compensation structures, all firms should have performed equally well on the stock market over the next period of years unless they had changed the structure of their compensation packages.¹⁰ A firm with a structure of executive financial returns less oriented to the stock market would have performed less efficiently than other firms, but investors would have anticipated this and would not have been willing to pay as much for the firm's stock in 1947. The incentive value of the compensation package would have been capitalized. If this had been the case, structures of financial returns would not have differentially affected stock market performance unless they had been changed during the period. To combat the problem of already capitalized compensation structures, the early postwar period was used as a base period for this study. At that time compensation packages of executives had just gone through a period of almost two decades in which the structures of compensation were vastly different from what would follow. During the depression executive services were in the class of overhead labor. This is indicated by Baker (1938, pp. 14, 25), who shows that executive compensation was much less affected than the earnings of production workers by the onset of the depression. Lewellen's (1968, p. 189) data show, similarly, that executive compensation increased relatively less than production workers' earnings as the economy left the depression.¹¹

Just after the war the compensation functions of executives underwent a major change. Elements other than direct salary plus bonuses for the first time became a major segment of the executive compensation package (Lewellen 1968, p. 143). In 1947 these new compensation packages were untried and their value unknown. For these reasons the incentive values of the new compensation structures of the various companies were probably not capitalized in the stock value of the firms in 1947. Unfortunately, one element of financial returns probably was capitalized; this was executive stock *ownership* of the firms in 1947.¹² Still, the companies which at

¹⁰ Note that investment and other variables frequently used to predict stock performance are left out of this argument and the estimating equation as well. This is because compensation structure is viewed as determining investment and other things which in turn determine stock performance.

¹¹ The figures substantiating this may be found in Masson (in press).

¹² This is not to be confused with the term "ownership" as used in the literature on ownership and control. For the present argument there is no critical level of stock ownership necessary.

this time chose the compensation packages most likely to promote firm present value should have had a greater increase in stock value over the period of observation.

The form of the estimating equations used to examine these relationships is:¹³

$$P = a_0 + a_1X_S + a_2X_{EPS} + a_3X_{NW} + a_4SC + a_5D_1 + a_6D_2,$$

where P is the firm's performance over the postwar period.

Three measures of P are used:

1. *PSTR*: present value of dividends plus capital gains from a shareholder's purchase of three shares of stock bought in 1948, 1949, and 1950 and sold in 1963, 1964, and 1965, discounted by 6 percent, as a proportion of the initial investment. Thus 100 *PSTR* is the percentage by which the stock outperformed 6 percent bonds bought and sold in the same years.
2. *PP*: amount that discounted (at 6 percent) profits increased over the period 1950–65 as a proportion of profits in 1950–55.
3. *PS*: change of sales between 1950, 1951, and 1952 and 1963, 1964, and 1965 as a proportion of sales in 1950, 1951, and 1952.

The terms X_S is the proportional reliance of the compensation package on sales,

$$X_S = (b_1 + b_2) / (|b_1 + b_2| + |b_3 + b_4| + |b_5 + b_6|),$$

where the b_i 's are the b_i 's estimated in Section III. The term X_{EPS} is the proportional reliance of the compensation package on profits,

$$X_{EPS} = (b_3 + b_4) / (|b_1 + b_2| + |b_3 + b_4| + |b_5 + b_6|).$$

The term X_{NW} is the proportional reliance of the compensation package on stock performance,

$$X_{NW} = (b_5 + b_6) / (|b_1 + b_2| + |b_3 + b_4| + |b_5 + b_6|).$$

The term SC is the average scale of the enterprise in 1947–50, measured in sales volume, and D_1 and D_2 are industry dummy variables.

The two hypotheses tested were (1) that companies with compensation packages that emphasized stock market value and de-emphasized sales and profits performance would perform better in stock market performance, *PSTR*, over the postwar period; and (2) that these same firms would perform better in profits performance, *PP*, over the same period. The first hypothesis is a joint hypothesis about the coefficients a_1 , a_2 , and a_3 . If the estimating equation is regressed with *PSTR* as the dependent variable (that is, replace P in the estimating equation by *PSTR* and re-

¹³ The author's reasons for feeling that simultaneous equation bias between Sections II and III will not affect the estimation are presented in Appendix A.

gress cross-sectionally across firms), this hypothesis implies that $a_3 > a_1 + a_2$. *This hypothesis may be accepted at the 95 percent level.*¹⁴ The estimated equation was:

$$PSTR = 1.61 - 1.23 X_S - 1.89 X_{EPS} + 0.25 X_{NW} - 0.003 SC \\ (1.00) \quad (1.86)^* \quad (0.18) \quad (0.87) \\ + 1.356 D_1 - 0.158 D_2,$$

$$R^2 = 0.234.$$

(Numbers in parentheses are *t*-statistics, and an asterisk indicates a 95 percent confidence level.)

The acceptance of the hypothesis at a 95 percent confidence level *validates the proposition that incentives do affect performance and the proposition that a compensation package that emphasizes stock return and de-emphasizes other firm performance aspects is in the interests of the stockholders of the firm.*¹⁵

The second hypothesis, that firms with structures of financial returns consistent with the maximization of stock value will perform better in discounted profits, was tested similarly. The estimating equation was fitted cross-sectionally with the variable *PP* as the dependent variable. The result of testing $a_3 > a_1 + a_2$, although with the expected sign, was not significant at a 95 percent confidence level. The estimated equation was

$$PP = 1905 - 370 X_S - 448 X_{EPS} + 573 X_{NW} - 2 SC \\ (0.43) \quad (0.67) \quad (0.64) \quad (1.00) \\ + 607 D_1 - 464 D_2,$$

$$R^2 = 0.118.$$

(Numbers in parentheses are *t*-statistics.)

The second hypothesis was neither confirmed nor rejected, although the signs of the parameters were consistent with the hypothesis.

Finally, the relationship between firm growth and the structure of financial incentives was examined. The variable *PS* was used in the estimating equation. The results were as follows:

$$PS = 282 - 125 X_S - 47 X_{EPS} + 404 X_{NW} - SC + 389 D_1 - 98 D_2, \\ (0.37) \quad (0.18) \quad (1.13) \quad (1.26)$$

$$R^2 = 0.175.$$

(The numbers in parentheses are *t*-statistics.)

The conclusions are that stock-oriented executive incentives are better

¹⁴ The sum of a_1 and a_2 was negative at the 95 percent level, and only a_2 was significant by itself at the 95 percent level.

¹⁵ The potential impact of changes in the structure of financial returns to executives is shown in Appendix B.

able to benefit the stockholder than profit incentives or sales incentives. Although tax law changes were in large part responsible for the postwar growth of stock options at the expense of profit bonus plans, it appears that many companies have learned the incentive lesson from the stock option plans. With the Tax Reform Act of 1969 stock options again became less advantageous, but many companies have been substituting "phantom stock" for usual stock options since then (Louis 1970, p. 101).¹⁶ Phantom stock is more likely to encourage executives to maximize long-term stock performance of their firm than are profit bonus plans. It appears that firms recognize the incentive value of stock-oriented programs and are shifting to phantom stock to replace the now less valuable stock options.

These results are also consistent with the hypothesis that firms will have better-discounted profits performance if the firm's executives' financial returns are more closely related to stock market performance than to profits performance. Finally, the estimation of the determinants of firm growth from executive motivations *may* indicate that long-term firm growth is not encouraged by encouraging executives to maximize sales subject to constraints. This may occur because individual executives may have a shorter-term time horizon than the owners of the firm.

The most striking results from this sample of industries is that the firms in these industries do not pay their executives for sales maximization, that the financial incentives of the executives do indeed affect firm stock market performance, and that the coincidence of executive financial return with the stock performance of the firm benefits the stockholders. These results are weakened by the nonrandom character of the sample of industries studied, but the author feels that as a first approximation these results should be relevant to most types of American industry. This feeling is strengthened by Lewellen's finding of a ratio of compensation based on executive stock and stock options to other compensation of about 5 to 1 for a sample of large manufacturing corporations (Lewellen 1969, p. 318). Lewellen's findings and this study both suggest that the separation of ownership and control in the large corporation need not lead to managerial objectives widely divergent from present-value maximization. Further work should help to substantiate this finding for wider industry groupings.

Appendix A

Factors Mitigating Simultaneous Equation Bias in the Estimation Procedure

The author feels that the problems of simultaneous equation bias between the estimation of compensation functions presented in Section II and the performance determination as presented in Section III is likely to have little

¹⁶ Phantom stock is the name for bonus plans which pay bonuses proportional to the performance of company stock rather than to the performance of company profits.

effect on the results because the effects of performance on executives' earnings must by its very nature be very short run. Compensation changes that lag very far behind performance changes will not have a proper incentive effect on executives who will not be with the firm for extended periods of time. Since the importance of an executive to his firm increases with his length of stay with that firm (for example, a president's decisions are more likely to affect firm performance than a vice-president's), companies cannot afford to have long performance-compensation lags. Executive turnover also reduces to nearly zero the specification error that might have been introduced if firms had issued stock options directly before periods when stock value was expected to increase faster than the market as a whole. If the executives (as insiders) know when the stock price is going to increase faster than the stock market as a whole, they may issue stock options, but over a long period of time this phenomenon cannot exist. If a company has increasing profitability that increases faster than the profitability of other companies, eventually this will become capitalized, and the stock value will not increase faster than that of other stocks, options will decrease, and the compensation package will stress stock return less than before. If on the other hand this increase in stock value is not realized even over a long period of time, the options themselves are worth no more than options of companies without this expected increase. Thus companies with profitability increasing faster than that of firms in general will initially have a burst of stock options, but after the trend in profits is capitalized there will be much less incentive to grant options. Companies whose executives anticipate the increase in profitability will have in the future less incentive to grant options until the gain is imminent, for otherwise the option is no more valuable than an option in any other company. The only companies that will have many more and much higher valued stock options based upon anticipated increases of company stock value known only to the executives of the company will be those companies that consistently perform better than investors expect, with the executives of the company consistently outguessing the market. The author does not feel this type of condition holds for enough companies over long enough time periods to affect the results presented here.

Appendix B

Stock Market Performance Response to Changes in the Compensation Package: An Example

Consider the case of an average firm with a change in the compensation package calculated to make stock market performance a more important part of executive earnings. Since X_S , X_{EPS} , and X_{NW} are interdependent (each has elements of the others' numerators in its own denominator), the possible impacts of changes in the compensation structure are best examined by looking at a joint change of all three variables. The estimated values of all three variables range from about -0.6 to $+0.8$. A change in X_{NW} of $+0.1$ may be composed of both X_S and X_{EPS} falling by 0.05 . What would the resultant increase of 0.19 in $PSTR$ mean? The value $100 PSTR$ is the percentage the stock market had undervalued the present value of a firm in the late 1940s, given a 6 percent interest rate and given that the stock would be held until the middle 1960s. The actual values of $PSTR$ ran over a range of -0.58 to 13.1 . Thus if an investor of the late 1940s had put a dollar in a firm with a $PSTR$ of 0.95 (the median value of $PSTR$) and a dollar in a 6 percent bond with an eighteen-year duration, he would have received 95 percent more from holding the stock for

eighteen years than from the bond. This implies that if the investor had invested in a similar firm with X_{NW} higher by 0.1 and X_S and X_{EPS} lower by 0.05, his investment would have performed 114 percent better than the bond and 20 percent better than the stock of the median firm. Since such a change in the compensation function should be easy to make, it appears that actual performance should be easily changed by changes in compensation practices.

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