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STOCK OPTIONS

A stock option granted by a corporation to one of its executives stipulates that he may purchase from the firm, at any time within a stated period, a given number of shares of its stock at a price fixed on the date of granting. Since the economic benefit the executive ultimately derives from such an arrangement depends directly on the future price behavior of his company's stock, the option has associated with it a high degree of uncertainty and is, for that reason, particularly difficult to analyze. A "current equivalent" can once again be developed, but it necessarily will differ in several major respects from those created for forms of reward whose contingencies are more readily treated.

Orientation

For the moment, attention is directed solely toward the remunerative aspects of the stock option, i.e., its actual monetary value to the executive and a translation of that value into current income figures. The proclaimed ability of the device to elicit a certain kind of effort from executives and to induce them to acquire a more substantial ownership interest in their companies will be considered here only to the extent that such factors bear upon the worth of the option and upon the appropriateness of the alternative suggested for it. A comparison of the costs of a stock option and its "current equivalent" will also be postponed to a later discussion.¹ While these matters are important in a number of connections, an appraisal of the purely financial attributes of the option is an essential first step.

¹ Appendix M.

Tax Treatment

Stock options have, in one form or another, been used to reward executives for a good many years. Their real popularity, however, dates from 1950 when legislation was enacted providing them with favorable—and assured—tax treatment and establishing definite ground rules for their design.² Since then, virtually all option agreements have conformed to those guidelines.

The law specified that, as long as the option price set was at least 95 per cent of the market price of the stock on the day the option was granted, any income accruing to the executive as a result of the purchase and later resale of such stock would be considered a gain on the sale of a capital asset and taxed at the rates applicable thereto.³ In order to qualify for this treatment, the option also had to be nontransferable and of no more than ten years' duration. In addition, any stock acquired could not be resold by the optionee until two years after the date of granting nor until six months after the date of exercise. Since these were relatively mild requirements, however, the capital gains tax feature made stock options especially attractive to executives in view of the high marginal rates on their salary and bonus earnings.

Typical Instruments

Within the general framework indicated, an option plan could be designed quite flexibly to fit the needs of both the individual executive and his firm. In most cases the maximum period permitted under the law

² Revenue Act of 1950, Section 218. A discussion of the checkered tax history and utilization of stock options prior to 1950 is contained in George T. Washington and V. Henry Rothschild, *Compensating the Corporate Executive*, New York, 1951, pp. 121-135.

³ Options with prices as low as 85 per cent of market price were sanctioned, but their tax treatment was less sympathetic and they were granted infrequently. In Appendix G a full description of the relevant statutes is presented, including the changes made by the Revenue Act of 1964. Since the empirical portion of this study will include data on executives only through the end of 1963, the pre-1964 tax law is the relevant one. The valuation procedures to be developed can be adapted to the features of the new statutes, however, as Appendix G indicates. That discussion is most profitably referred to after reading the present chapter in its entirety.

was taken advantage of and the option stipulated to be exercisable, at the optionee's discretion, any time up to ten years from the date it was granted, either in a single bloc or in several installments. Depending on the corporation's objectives, a shorter time limit was occasionally adopted, and provision was sometimes made for a fixed sequence of exercises. For example, one-tenth of the total number of optioned shares might be eligible for purchase by the executive during the first year of the agreement, a second one-tenth during the following year, and so on. The large majority of plans, however, simply specified the maximum allowable ten-year term and did not insist on any particular pattern of exercise.

Option prices were seldom set at less than the tax-encouraged 95 per cent of market. That figure and full market price on the date of granting were by far the predominant choices, with 95 per cent being somewhat the more common.

The other elements of option plans were not as uniformly designed. The number of executives receiving options, the proportionate ownership share of the firm earmarked for option grants, the formula by which those grants were made to individual executives, the restrictions, either express or implied, placed on the resale of stock acquired under option, the disposition of unexercised options upon the death, retirement, or resignation of the executive, and the extent of any reciprocal obligation on the part of the optionee to remain in the employ of the issuing corporation varied, and still vary, substantially from plan to plan. Fortunately, most of these characteristics are important primarily from the viewpoint of the internal compensation administrator and need not be examined in great detail in order to determine the worth of a stock option and to develop a current equivalent for it. The duration of the option and its price are the significant factors for that interest.

The Reward Obtained from an Option

The essence of a stock option is, of course, the opportunity it provides for its recipient to purchase marketable securities at a discount. He is placed in a position where he can do something other investors cannot and is thereby able to employ his investible funds in a superior manner.

There are, however, two possible conceptual approaches to measuring the extent of the advantage which he enjoys.

The first is to treat the option as, in effect, a long-term "call" option and therefore to fix its value to the executive as of the date it is granted. The argument would be that the right to purchase shares of stock at an established price anytime within a period of up to ten years is clearly worth something in and of itself at the time it is created regardless of the actual results subsequently obtained from its exercise. Put another way, it would be possible in terms of the objectives of the current study to conceive of the executive involved being able to specify in advance the magnitude of the salary increase he would be willing to accept as a substitute for any given option, i.e., as its current income equivalent. While conceptually this line of reasoning is persuasive, it does have some important drawbacks.

For one thing, the computational problems it raises are severe. Even though there is an active market in call options which provides some prices that could be used as general guides to the ex ante value of executives' stock options, the contracts which are sold in that market are of no more than a year in duration, whereas every stock option issued by the fifty firms in the present sample had a term of at least three years. Actual prices cannot therefore be observed for the relevant arrangements, and it would be necessary to rely instead on a theoretical model of option valuation. While such models exist,⁴ they not only require that a substantial amount of historical stock price information be collected and summarized each time an estimate of the worth of a new option is desired, but the discussions surrounding them have thus far left open some key issues concerning their implementation: the length of the time period over which historical data should be compiled, the relative weights to be given different portions of that data, whether the behavior of external economic indicators can be used to improve the models' predictive ability, and so on. In short, a fairly sizeable security

⁴ See, for example: A. James Boness, "Elements of a Theory of Stock Option Value," *Journal of Political Economy*, No. 2, April 1964, pp. 163-175; G. Giguere, "Warrants: A Mathematical Method of Evaluation," *Analysis Journal*, No. 14, 1958, pp. 17-25; Paul A. Samuelson, "Rational Theory of Warrant Pricing," *Industrial Management Review*, Vol. 6, No. 2, Spring 1965, pp. 13-32. A comprehensive general reference in this area is Paul H. Cootner, ed., *The Random Character of Stock Market Prices*, Cambridge, Mass., 1964.

valuation effort would be called for if this approach were adopted. A commitment to that sort of an undertaking does not seem appropriate within the framework of the present study, especially since it would—if properly executed—almost certainly overwhelm the original concern with the compensation package itself.⁵

A second point concerns the applicability of such a procedure to actual compensation situations—an issue which has been stressed in connection with the current income equivalents of other rewards. Given the difficulties involved in estimating future stock prices, it seems unlikely that any predictive formula adopted here would be widely accepted by businessmen or, even where accepted, that its parameters could be agreed upon in practice by both parties to particular compensation transactions. Thus, one can imagine the difficulty that would be encountered by a corporate compensation administrator in attempting to reach agreement with his company's executives on the ex ante value of their proposed stock options. Now, it is true that the current equivalents developed above for pension and deferred compensation arrangements have some ex ante elements—the use of a discount for mortality in determining present values, for example. But it is also true that the relevant contingencies have been analyzed so extensively with the aid of large amounts of data that the necessary conceptual framework (actuarial science) and its empirical implementation (the mortality table) are no longer subjects of controversy. Whenever an appraisal of such contingencies is called for, then, it can be made with both confidence and precision. A similar claim is not yet possible for ex ante stock price estimates.

If these strictures are accepted, the clear alternative is to value the option according to the events which, in fact, follow from its employment. This can easily be done by considering the cost to the executive of purchasing his firm's stock if he were not the beneficiary of an option grant,

⁵ It should also be noted that the question of the shape of executives' wealth-utility functions would be raised by an ex ante stock option valuation procedure. Thus, in order to determine what salary increase the executive would be willing to accept in place of an option before knowing what will happen to the price of his firm's stock, the strength of his aversion to "gambling" on the option as compared with receiving a guaranteed series of salary payments would have to be considered. This again is an issue which requires for its resolution more of an analytical digression than seems desirable in the present circumstances.

i.e., he would have to pay the full market price for the shares in question. On that basis, the difference between the option price to which he is entitled and the actual market price of the shares as of the date the option is *exercised* measures the extent of the advantage vis-à-vis other investors which he ultimately turns out to enjoy. That difference is taken here to be the most practicable index of the worth of a stock option to its recipient. It removes any need for speculation about future stock prices and renders our measurements independent of the attitudes of the executive and the company at the time the option is granted.⁶ It also implies that the resulting current income equivalent will embody the same sort of incentive features as the option itself.

Thus, it is often claimed that stock options are designed to encourage behavior on the part of executives which will bring about an increase in the price of their firms' stock.⁷ While an appraisal of such arguments is not our main concern here, there is some merit in developing a valuation procedure which—as does that proposed—gives rise to a current equivalent whose magnitude depends on *actual* stock price movements subsequent to the date the option is granted. If, then, there is any truth in the claims advanced, a stream of salary payments having this characteristic would, as a substitute for the option, provide a similar degree of encouragement to its recipient to identify himself with the position of his firm's shareholders. An entirely *ex ante* approach to stock option valuation would have none of that flavor.

It would be wrong, however, to carry this line of reasoning to the conclusion that the compensation provided by an option ought to be measured on the day the optionee eventually disposes of his stock and thereby realizes his profits. That procedure would fail to draw the necessary distinction between the option transaction, on the one hand, and the investment decision which follows, on the other. The day the executive exercises his right to purchase certain shares of stock at a discount, the action which was singularly open to him because he was granted a stock option is formally completed. At that time his advantage over the market is claimed, and he stands thereafter on the same basis with regard to in-

⁶ We cannot, of course, be sure that any valuation procedure when applied empirically to executives' past option experiences will furnish a reliable guide to future developments. See especially the discussion in Chapter 8.

⁷ See, for example: Henry Ford II, "Stock Options Are in the Public Interest," *Harvard Business Review*, July-August, 1961.

creases and decreases in the value of his asset holdings as does the rest of the investment community.² The worth of an option is therefore correctly determined, ex post, by market events, but only up to that event which signifies the exhaustion of the special privileges it confers.³ The mechanics of translating the value thus obtained into a stream of current income equivalent payments are outlined below.

After-Tax Rewards

While not so labeled, the foregoing discussion has, in fact, been concerned with identifying and measuring before-tax remuneration. When the executive ultimately resells stock acquired under option, of course, he is assessed a capital gains tax on the difference between its value at that time and its original cost to him. Since whatever the magnitude of that difference, one of its components is the discount from market price which was obtained on the day the option was exercised, this discount should be considered a before-tax reward and the amount of tax attributable thereto subtracted in order to convert it to an after-tax measure. The executives with whom we shall be concerned (those for whom data are available from proxy statements) had incomes large enough to make it advantageous for them to choose to be taxed at the 25 per cent flat capital gains rate on any profits realized. Therefore, as a first approximation, the stock option's after-tax reward can be defined simply as 75 per cent of the difference between option price and market price on the date of exercise.

² Including the necessity of waiting six months before selling any shares in order to qualify for capital gains tax treatment. The reader is reminded again that the pre-1964 tax law is the relevant one for the present discussion.

³ Of course, along with those "special privileges" may also go some special constraints. Because of pressures exerted on them either formally or informally by their companies, for instance, most executives are likely to be reluctant to resell shares acquired through the exercise of stock options even when market conditions would ordinarily lead them to do so. Such sales may be interpreted as an expression of lack of confidence in the company's prospects and be frowned on—and effectively deterred—for that reason. As a result, the executive might be induced by a stock option to hold a larger proportion of his personal investment portfolio in the form of the common stock of his employer than considerations of efficient diversification would dictate. In some sense, then, the option is really worth less in such situations than the discount from market price it provides would suggest. However, since both the extent of that loss and the frequency of its occurrence are almost impossible to quantify, they will necessarily be ignored here.

This procedure might, however, be open to criticism on several counts. First, the optionee may retain possession of his stock until he dies and thereby avoid entirely the payment of taxes on its appreciation in value. To the extent that this occurs, and it is probably not uncommon, a 25 per cent tax rate assumption will overstate the true average liability and understate the over-all after-tax compensation generated by options. Even though there is no information currently available which indicates how often this situation arises, a bias will clearly exist unless some offset is provided. Accordingly the convention here will be that a tax rate of 20 per cent is a more appropriate figure to use. While arbitrary—and quite unverifiable—the resulting adjustment does at least operate to change the imputed tax liabilities in the proper direction. It is certain that, on average, 25 per cent is incorrect and the lower rate should be regarded simply as an approximation of the “right” figure.

A second point concerns the deferral rather than the complete elimination of the capital gains tax. Even if optioned stock is actually resold by the optionee, there is a time lag between its purchase and that sale, which suggests that the amount of the associated tax payment should be diminished in present value terms to reflect its postponement relative to the date the option is exercised. For simplicity—and once again for lack of pertinent data—the assumption will be that the necessary adjustment for this factor is also included in the reduction of the applicable tax rate to 20 per cent.

Finally, there is the matter of the deductions from taxable income which may be generated by option profits. If the optionee is induced to increase his charitable contributions or, perhaps, is forced to borrow and incur deductible interest charges in order to obtain funds to exercise his options, his taxable income will be lowered. Since capital gains are taxed at a flat rate, any additional deductions so created will be subtracted by him from income which is taxable at “ordinary income” rates. The question, therefore, is whether stock option profits, some of which may exist only on paper, have a significant influence on deductible expenditures. Certainly, there should be some impact as long as the optionee is not completely insensitive to the fact that he has become a wealthier man. On the other hand, the timing of such expenditures is uncertain. They may occur even before exercise, as potential option profits accumulate; they may coincide with exercise; or they may

follow later. In effect, the same problem is confronted as in the case of executives who may hold their optioned stock until they die and thus avoid the capital gains tax: some adjustment is necessary, but there is really no way of knowing just how large it should be.¹⁰ For that reason, a similar solution will be adopted. The effective tax rate assumed on stock option income will be lowered another 5 per cent to 15 per cent. This reduction is intended to approximate, or at least have the same qualitative effect as, the tax saving on current income which might ensue from the extra deductions encouraged by a profitable stock option. Again, the intent of the assumption is simply to remove in a convenient way some part of what would otherwise be a persistent understatement of the value of an option.¹¹

The After-Tax Current Equivalent

Having decided upon a method by which to measure the after-tax reward provided by an option, we may now consider the design of a technique to compare it with the other components of the pay package. To that end, the approach taken previously in connection with pensions and deferred compensation plans, whereby an "after-tax current equivalent" was constructed, can be repeated. Accordingly, the question will be posed: How much of an increase in the optionee's annual after-tax salary would be necessary were he to be as well rewarded by that increase as he is by his stock option?

There are, of course, several dimensions to a full description of such a device. One is the standard by which equality of reward is to be judged.

¹⁰ There is, however, some evidence to indicate that the tax savings may be quite substantial—as much as one-half the 25 per cent capital gains tax—if the deductions associated with capital gains are proportionately the same as those pertaining to ordinary income. See D. M. Holland and W. G. Lewellen. "Probing the Record of Stock Options," *Harvard Business Review*, March-April 1962.

¹¹ In principle, the correct procedure would be to estimate the additional deductions at some percentage of option profits, to allocate those amounts to the various years in which they are considered likely to be claimed by the executive, and then to calculate the resulting tax savings according to the actual salary, bonus, and "outside income" received by him during those years. Obviously, this would become a rather demanding process, but because of the necessity to make a number of assumptions without much supporting evidence, it would not yield the compensating benefit of a great improvement in the accuracy of the results obtained.

Consistent with the principle established earlier, the after-tax present value of each current equivalent will be matched with that of the option whose substitute it is intended to represent. A second element is the period over which the current equivalent should be spread. In the absence of any support for a different convention, it seems reasonable to specify the same term of years that is provided in the option agreement. Thus, if the option is exercisable at any time within ten years from the day it is granted, its replacement will consist of a stream of ten annual salary payments.¹²

Even if these propositions are accepted, however, the features of what might be a sensible current equivalent are not as evident in the case of a stock option as they are for other forms of compensation. The difficulty lies in the peculiar nature of the device which led above to the view that its remunerative achievements can be properly assessed only after some action is taken by the optionee. The contingencies associated with a pension plan were seen to be well defined, and an almost identical instrument is available to the executive elsewhere on an individual basis. These conditions, which gave rise to a very clear "anticipatory" current income counterpart of the pension, are not met by a stock option. The ex post character of the reward in question causes a real problem in constructing a current equivalent which will (1) span the full term of the option it replaces, (2) be as valuable without perfect foresight, and (3) have some operational possibilities—and attractions—for the corporation. Unless the current equivalent exhibits all three qualities, it is not, in the view here, a truly satisfactory vehicle for expressing the relationship between the option and the remainder of the executive's compensation.

By that standard, the following procedure seems to accomplish, as well as any of the wide range of available alternatives, the objective desired. At the end of each calendar year after an option is granted, its prospective after-tax worth is estimated—by assuming it to be 85 per

¹² Despite the fact that a stock option is necessarily exercised at a particular point in time, it would be misleading to attribute the entire financial gain which results to the day—or even the year—of exercise. That gain is realized because of a history of stock price changes and the wide discretion enjoyed by the executive in choosing when to take advantage of his rights. Thus, while the exercise of an option is a discrete event, the benefits it confers depend on and accrue because of developments and decisions which are related to some *interval* of time.

cent of the difference between the option price and the stock's market price at that time. Beginning in the succeeding year and continuing through the final year of the option's term, the optionee's annual after-tax salary is increased by an amount such that the resulting series of payments has a present value equal to the estimate obtained. This process is repeated annually until the end of the calendar year in which the executive exercises his option—and therefore determines the actual magnitude of his reward. Thus, in each year an *additional* stream of salary payments is begun whose after-tax present value is equal to the *change* in the estimated after-tax value of the option during the year. The outcome of all this is a current equivalent which resembles that described for a pension arrangement: a series of "layers" of salary increases, each one corresponding to an increment in the (expected) value of the executive's compensation. At the end of the year of exercise, the interest-accumulated total of the salary payments made in anticipation of the now-measurable option gain is subtracted from that gain, and the difference is adjusted for by awarding the optionee a final series of additions to salary—these to replace all others and have a present value equal to the difference indicated. In effect, the current equivalent varies in size according to the developing experience under the option—i.e., the pattern of stock price changes—up to the point when the option is exercised, at which time its remaining components are fixed.

Consider the following example: On August 1, 1952, an executive is granted an option to purchase, at any time within the next four years, ten thousand shares of his company's stock at a price of \$95 per share. On the day of granting, the market price of the stock is \$100, and by December 31, 1952, it has risen to \$105 per share. The option would therefore be worth, after taxes, 85 per cent of $(10,000)(\$105 - \$95)$, or \$85,000 if it were exercised at that time. In the expectation of an eventual exercise, a series of four annual increments to the optionee's salary is initiated. For convenience, let us suppose that the promise of an extra \$24,000 after taxes per year in each of the years 1953 through 1956 would have a present value equal to \$85,000.¹³ Accordingly, \$24,000 is attributed to the executive, as the first portion of his current equivalent, in 1953. On December 31 of that year, a second appraisal

¹³ The question of an appropriate interest rate and the mechanics of its use are discussed below.

of the situation is made. If the market price of the stock involved has climbed to \$125 per share, an additional \$170,000 in potential after-tax reward will have been generated. To reflect this change, an increase in the man's current equivalent is necessary. Again for the sake of numerical simplicity, let us assume that three annual payments, in this case for 1954, 1955, and 1956, of \$60,000 each have a \$170,000 total present value. The optionee is therefore credited with \$84,000 worth of current equivalent in 1954. On October 1 he exercises his option in full. At that time, the market price of the stock purchased is \$119 per share, resulting in an after-tax reward equal to \$204,000 by the definition above.¹⁴ Now, installments totaling \$108,000 have been "paid" in anticipation of this event. With interest, they would have accumulated to approximately \$110,000 by October 1, 1954.¹⁵ Thus, a net of \$94,000 is still "due" the executive, and two payments of, say, \$50,000 each in 1955 and 1956 complete his current equivalent.¹⁶

With this approach it is possible to reconcile the apparent conflict between the desire for a current equivalent which extends over a period of time—beginning when the option is granted—and the principle that the actual compensation afforded by that device can be determined accurately only in retrospect. Having done so, we can perhaps claim to combine the virtues of both *ex ante* and *ex post* techniques. The choice of the end of the calendar year as the day on which to perform the periodic assessments of the prospective value of an option is merely for convenience; any date would do. The most obvious alternative is the anniversary of the option grant itself, but for the purpose of calculating current equivalents for a large number of executives, it is easier to specify one common date and collect stock price data only for it.¹⁷ In any event, the general format of the after-tax current equivalent is fairly simple, and it is offered here not only as a useful instrument by which to compare the option with other rewards, but also as a workable substitute that should be brought to the attention of corporations in

¹⁴ That is, 85 per cent of $(10,000)(\$119 - \$95)$.

¹⁵ For the procedure involved, see the section on "present and cumulative values" below.

¹⁶ Its final form is: 1953—\$24,000; 1954—\$84,000; 1955—\$50,000; 1956—\$50,000. The reason for the variation in annual amounts is, of course, the change in stock prices observed, particularly the drop in 1954 prior to exercise.

¹⁷ And, of course, assessments could be made at more frequent intervals such as every six months or every quarter.

designing their executive compensation packages. Thus a firm might issue "shadow" stock options to its managerial group and use the current equivalent described as the *actual* means of payment. For instance, the executive could be told, "We will compensate you as well as if you had such-and-such an option, but you will be given instead an increase in your salary each year which depends on the price of our stock just as the value of that option would have. Let us know when you eventually would have exercised the option, and we'll settle up then with a final series of salary increments." In effect, the proposal is for a variable component of salary which will act as a proxy for the changing potential value of the option it replaces.

Mortality Considerations

In the development of current income equivalents for pensions and deferred compensation arrangements, it was deemed necessary to take into account the possibility that the executive in question might not live to receive some or all of the payments promised. The present value of both rewards was therefore computed using a discount for mortality as well as for time deferral. In the case of a stock option this additional discount is not required. The optionee's estate is permitted by law to exercise his option if he should die and, it may be assumed, will do so if that instrument has a positive value. While the relevant statutes sanction such an exercise up to the end of the original term of the option, all but a few companies specify a foreshortening of this period in the event of the optionee's death. In the large majority of plans, exercise must take place within a year thereafter. By making regular appraisals of the worth of the option in the manner described above, we therefore ensure that the actual financial gain it provides, if exercised by the executive's heirs, will—even though that gain is impossible to determine from any published source—be reasonably close to the most recent estimate made. Thus, if a series of salary payments is constructed which varies with changes in this estimate, those payments should represent an appropriate alternative to the option regardless of whether its initial recipient or his descendants exercise it.

Tax considerations are neutral in this respect also.¹⁸ According to

¹⁸ Internal Revenue Code, Section 421(d)(6)(C).

the law, an estate tax is payable on the difference between the market price of the stock on the date of the optionee's death and its designated option price. Under the same rule, however, the basis for calculating any capital gains achieved through the resale of stock acquired by exercising an *inherited* option is correspondingly increased. For example, if an executive should die holding an option to purchase shares of his company's stock for \$20 at a time when the market price of that stock is \$50, an estate tax would be assessed on the \$30 difference. Were the option to be exercised subsequently and the stock resold for \$90, only \$40 of that amount would be subject to a capital gains tax. If, then, it is assumed, as was done previously, that the over-all effective tax rate levied on the estates of executives is likely to be close to the 25 per cent capital gains rate payable on any stock option profits they themselves might obtain, there is no need to make an adjustment in tax liabilities for the possibility that the executives may not live to exercise their options. There is, in short, no *additional* tax due, and approximately the same *rate* applies to the stock price differential which defines the executive's reward if he lives and which is taken to be the best estimate of the benefit claimed by his estate if he does not.

Mortality is a factor on the other side of the compensation "equation," however. It was asserted earlier that a current equivalent must be composed entirely of direct payments to the executive if it is to be, as advertised, a true current income alternative. Hence any scheme that requires a continuation of payments to the man's estate following his death is unsuitable. The salary increments which comprise the stock option's current equivalent must therefore be large enough to generate the necessary present values when they are discounted for both futurity and mortality. The promise of an annual salary increase extending some years into the future can only be made contingent upon its intended recipient's remaining alive. Since this is the sort of promise advocated here as a possible substitute for the stock option—or, at least, as a useful restatement of its compensatory value—the computations must take into account the fact that the executive's survival is not certain. In the illustration above, for example, the first series of four salary payments might have to be, say, \$25,000 per year instead of \$24,000 in order for them to represent the required \$85,000 present value. Similar upward revisions in the other figures originally obtained are also

necessary. The ultimate impact of these changes on the "typical" current equivalent will probably not be very great, but they are correct in principle and, for that reason, should be undertaken.¹⁹ Moreover, the ready availability of mortality data makes the task of doing so quite simple.²⁰ If, then, an executive should die holding an unexercised option or before having received all the salary payments due him under the current equivalent of an option he *has* exercised, there is no need for any adjustment on that account—and no basis for a concern that the attenuated series of payments which results somehow understates his reward.

Discount Rate

The opportunity cost used to transform the financial gain provided by a stock option into a series of annual payments spread over a period of years should, by definition, indicate the return available from the investment activity in which the optionee might engage if his option actually were substituted for in the manner described. For two reasons it seems sensible to consider investment in common stocks his most appropriate choice. First of all, much has been made of the point that the reward obtained from a stock option should be measured by the net advantage it confers when compared with its closest market alternative. That alternative was taken to be the purchase of the shares acquired under option at their market price on the date of exercise. From that view followed also the notion that stock price developments thereafter were irrelevant, since they represented occurrences to which *all* investors were subject regardless of the circumstances surrounding their original stock purchases. In short, the value of an option is determined by the differences and the similarities between it and the opportunities open to the ordinary common stock investor.

Secondly, the role which an option can be thought of as playing in the

¹⁹ In the absence of mortality considerations and assuming a discount rate of 5 per cent per annum, a series of ten annual payments of \$12,330 each made at the beginning of every year would have a present value equal to \$100,000. If those payments were to constitute part of a current equivalent for a man aged 50, the additional discount for mortality would require that the payments be \$12,760 each in order to generate the same present value.

²⁰ As was true in the case of pensions and deferred compensation arrangements, the 1951 Group Annuity Table for Males will be used.

executive's personal financial planning is one which could logically be filled by a portfolio of equities. It was decided above that the current equivalent designed for a pension plan should provide the same sort of basic postretirement economic security. By similar reasoning, both the uncertainty and the profit potential associated with the stock option suggest that the executive should be inclined to pursue an investment policy having the same characteristics with any funds offered him as its replacement. Thus, an option—in effect and by intent—makes its recipient a stock market investor, and its current equivalent should be calculated using a discount rate which reflects that condition.

It remains then to choose a specific figure that reconciles the various pieces of evidence and opinion that exist about the likely outcome of employing capital in the purchase of common stocks. A substantial amount of information on the returns that could have been achieved through the ownership of a diversified portfolio of equities over the last three or four decades has been made available in a study conducted at the University of Chicago.²¹ The conclusion reached was that after-tax yields from dividends plus capital appreciation would have ranged generally between 5 and 10 per cent per annum, depending on the particular time period involved and on the individual's personal income tax bracket. Executives might be expected to have done somewhat better on average than the typical investor because of their business experience and their access to both information and opportunities. On the other hand, they are subject to the upper end of the income tax rate schedule—which serves to constrain their net profits—and it must be remembered that the returns described were calculated in retrospect. The men who comprise the sample for this study would have been conditioned in their investment behavior by the unhappy financial events of the late 1920's and the 1930's. While it may today be generally believed, with some justification, that business indexes and stock prices move inevitably upward, many current investors have been exposed to a different sort of learning process and operate within a different sort of economic environment than those executives who appear in proxy statements covering the years of our empirical interest. A belief that the latter would lean toward a fairly conservative common stock portfolio and would

²¹ L. Fisher and J. H. Lorie, "Rates of Return on Investments in Common Stocks," *Journal of Business*, January 1964, pp. 1-21.

project a fairly modest investment rate of return will therefore be the basis of the discount rate choice. Five per cent per annum seems to be a reasonable characterization of the probable result of that kind of attitude. Objections to this particular figure may then be answered in two ways: Alternatives of the same general order of magnitude will not produce significant differences in the calculations;²² and 5 per cent at least bears a sensible relationship to the discount rate chosen earlier for debt portfolios.

Present and Cumulative Values

The size of each component "layer" of annual salary payments in the current equivalent is determined by requiring that its interest-and-mortality-discounted present value be equal to the corresponding yearly estimate of the change in value of the stock option. In order to facilitate computation, it will once again be assumed that such payments are made on an annual rather than on a monthly basis. Following the executive's exercise of his option, the payments credited to him in anticipation of the reward he thereupon obtains will be cumulated—by compounding annually at 5 per cent—to the *end* of the year of exercise, the convention being that all those payments occurred at the beginning of their respective years. Accordingly, the salary increment already specified for the year of exercise will be compounded to 1.05 times its original amount; the increment applying to the previous year to $(1.05)^2$ times its original value, and so on. The option exercise itself will also be considered to have occurred at the beginning of the year and therefore be cumulated to 1.05 times its measured value in order to compare it with its counterpart salary payments.²³ By adopting this rule, we preserve—but in a more convenient form—the same *relative* sequence of timing between the option gain and the current equivalent that would, on average, be observed if a detailed month-by-month analysis were undertaken. Thus, the futurity or retroactivity of a series of twelve monthly salary increments can be summarized fairly satisfactorily by assuming the payment of their total amount halfway through the year. Similarly,

²² See Chapter 12 for confirmation.

²³ The only question involved here, it should be stressed, is timing. The amount of the option gain is still to be determined by the market price of the stock in question on the day the option is exercised.

option exercises are likely to be distributed evenly over the year, and the mean interest adjustment necessary for them should also be one-half the annual rate. If, instead, both transactions are treated as having taken place at the beginning of the calendar year, they are in effect moved ahead in time an average of six months apiece, and their relationship is not distorted. The final stream of payments in the current equivalent—the first element of which is scheduled by convention for the first day of the year *after* exercise occurs—is then established by setting its present value equal to the difference between the after-tax option gain and the indicated cumulative value of the “anticipatory” salary payments.

Retirement

Among the executives who receive stock options are some who contemplate retirement prior to the formal terminal date of their option grants. For example, ten-year options are often issued to a group which contains executives age 55 and over, who must retire at age 65 under the provisions of their company's pension plan. The tax law stipulates, however, that the right to exercise any option expires three months following the termination of the optionee's employment—and retirement is regarded as a “termination.” Since the effective life of the option in such a situation is therefore abbreviated, it would be improper to attribute to it a current equivalent which would extend over the full ten-year period nominally prescribed. Rather, the years between granting and retirement will be considered the relevant interval. Except for this change, the procedures outlined above for calculating the option's “replacement” in the general case will be adhered to.

Resignation

Another eventuality that may require some adjustment in the current equivalent is the resignation—voluntary or otherwise—of the optionee. Obviously, any salary increments being credited to a particular executive should stop at the time his firm's proxy statements tell us he leaves his job. Unlike retirement, however, resignation is not a predictable factor, and the current equivalent cannot be constructed as though the instances in which it does occur could have been foreseen. In principle, another

discount like that for mortality should be adopted. This would serve to reduce the present value of any given stream of annual salary increments—to reflect the possibility that the executive might decide to change jobs before receiving them all—and would therefore raise the amount of salary needed to replace the stock option.

On the other hand, it was concluded earlier that executive job changes, at least with respect to individuals at the level of the present sample, were both infrequent and very difficult to quantify. Recourse will once more be had to that argument, and the assumption here will be that any realistic discount for turnover is likely to be small enough to be ignored. As a result, the computations may slightly understate the stock option's "true" current equivalent.

It is not necessary even in theory to discount the prospective value of the option itself, however. As indicated above, that instrument is legally exercisable for three months after the termination of employment. We may reasonably expect the optionee to claim this privilege if his unexercised option is at all valuable. If it is not—and he does not—the corresponding current equivalent would almost surely be negligible anyway. In cases where an option is automatically revoked upon the resignation of the optionee, he can simply exercise it before quitting.²⁴ In short, an option is effectively "vested" insofar as resignation is concerned.

Partial Exercises

The executives who exercise their option rights in full with one transaction are a minority. In most cases, especially those involving very large option grants, the optionee will purchase his shares in several installments over a period of years. A ten-year option for ten thousand shares granted in 1952 may, for example, be exercised for three thousand shares in 1954, another three thousand in 1956, and a final four thousand in 1959.²⁵ A procedure must therefore be established for the current equivalent which allows this sort of behavior to be analyzed as well as the single-exercise case.

²⁴ The law permits but does not require a corporation to provide a three-month grace period. See the comparable discussion of exercises by an optionee's estate, p. 58.

²⁵ As was noted earlier, some option plans require a certain pattern of partial exercises.

The most appropriate solution would seem to be to treat the various partial exercises as definitive statements of the reward derived from their respective fractions of the option, and to construct for each one a separate stream of salary payments. Thus, in the situation described, an estimate of the potential worth of the entire option would be made at the close of both 1952 and 1953, and the regular series of "anticipatory" annual salary increments begun accordingly. At the end of 1954, the after-tax reward achieved from the exercise of three thousand shares would be measured, three-tenths of the accumulated value of the prior salary payments subtracted from that reward, and a series of payments running through 1962 and having a present value equal to the difference then calculated. This would complete the portion of the current equivalent attributable to the 1954 option exercise. Appraisals of the potential worth of the remaining seven thousand shares would continue to be made and the normal procedure for setting up further anticipatory salary increments for them carried out. Consequently, the total current equivalent during 1955 and 1956 would consist of a fixed and a variable component. By the end of 1956, however, another segment of the option's reward will have been established and a final stream of salary payments stretching from 1957 to 1962 computed for it. Ultimately, all ten thousand shares will be acquired and the full amount of the current equivalent fixed. In effect, an option is treated as a unit until some portion of it is exercised, after which time each bloc of shares purchased has attributed to it a separate series of salary increments.

Multiple Option Grants

Not only do most executives take advantage of their stock options in a piecemeal fashion, but many of them also receive several different option grants which have overlapping terms. In the illustration above the optionee might have been awarded an option for another five thousand shares in 1958, its term to coincide with that of the original grant up to 1962 and to continue thereafter for an additional six years. Situations of this kind can be handled in the same way partial exercises are—by keeping track of every option separately and constructing for each its own alternative reward. The complete current equivalent for an executive will therefore be comprised of a number of salary increment "vec-

tors," the aggregate amount in any one year being the sum of all the various payments calculated for that year as a result of every option granted. These figures can be so added because there is no real interaction between them. The 25 per cent capital gains tax rate applicable to stock option profits is a ceiling rate that does not vary with either the pattern or the size of those profits. Thus, the after-tax current equivalent of each option is independent of all others, and they may simply be superimposed.²⁶

Declining Stock Prices

Once an executive has purchased shares under option, subsequent changes in the price of the stock involved are asserted to be irrelevant—as, in fact, is his decision whether and when to resell the shares acquired. His reward is fixed by the discount from market price which he claims on the date of exercise. Prior to that time, of course, we are very much concerned with price fluctuations as a determinant of his current equivalent. A continual increase in stock prices during this interval is not only a happy circumstance for the optionee but is especially manageable from our point of view. The requisite current equivalent simply increases each year accordingly. Price declines imply a matching decrease. In the vast majority of cases, that is *all* that will be implied, i.e., the successive annual salary increments become smaller but remain positive. An example of such a pattern was seen in the illustration used to supplement the initial description of the current equivalent. Variations in the relevant payments are automatically smoothed by spreading out over a period of years the "salary substitute" for each year's change in the executive's prospective after-tax option reward and by establishing equivalence on a present value basis. If, instead, the procedure of awarding a lump-sum cash bonus equal to the annual change in option value were adopted, negative payments would be necessary quite often. In the example cited, the current equivalent would have consisted of an \$85,000 bonus in 1953, a \$170,000 bonus in 1954, and then—apart from any adjustments for interest accumulation—a \$51,000 levy against salary in

²⁶ The same conclusion holds for the flat 15 per cent rate assumed here as an approximation to the impact of tax deferral, tax avoidance at death, and additional tax deductions due to option profits.

1955.²⁷ In the interest of offering a sensible alternative to the stock option, it seems important to minimize the likelihood of having to appropriate a portion of the optionee's salary if stock prices should ever fall. Under the method advocated here a decline in price will, with few exceptions, merely cause the optionee to forego receipt of some of the later installments of the salary increases promised when prices were high. If, for instance, the potential worth of an unexercised ten-year option should decrease by \$100,000 during its fifth year, the counterpart of that change would be a reduction of about \$25,000 per year for the next five years in the previously scheduled salary increments.²⁸

This method does not, however, eliminate entirely the possibility that a negative current equivalent may at times be called for. While an actual loss by the executive on his option is ruled out—he simply need not exercise when the option price exceeds market price—a sharp increase in stock prices during the early years of the grant followed by a sharp drop can create a situation where the employer firm should “take back” part or all of the initial salary increments awarded. Thus, although the aggregate interest-adjusted current equivalent will at worst just cancel itself out over the term of the option, one segment of it may have to be negative.

Either of two responses can be made if such a situation should occur: We can adhere to the “theory” of the current equivalent and include in it the necessary negative values, or we can specify that zero be the smallest permissible annual salary “increment.” The latter is almost certainly preferable from an operational standpoint. It seems improbable that a corporation would propose to its executives a scheme that might require them to “indemnify” it if early stock option forecasts turn out to have been too optimistic—even if a corollary of that optimism was a generous temporary salary increase. One somehow finds it difficult to conceive of a policy of that sort being carried out in practice and, if practicality is to be claimed here, this consideration is not irrelevant.

The effect on the empirical results of adopting the alternative pro-

²⁷ Actual after-tax reward was \$204,000.

²⁸ As will be seen below, the smoothing inherent in the approach chosen also serves to reduce the over-all tax burden associated with a *before-tax* salary alternative to the option.

cedure depends on subsequent events. In cases where the stock price later recovers, the current equivalent will once again become positive and, in the end, only its pattern and not its aggregate value will have been altered.²⁹ If, however, the price does not recover sufficiently, the optionee will have been credited with too much salary. His current equivalent, under which payments were awarded for at least a few years, will be more valuable than the option itself, which is either entirely worthless or nearly so. Fortunately, this second situation arises fairly infrequently: even when it does, the spreading out of any initial positive increments will keep the resulting error from being very great.³⁰ The position may therefore be taken that to rule negative elements out of the current equivalent is not only a sensible concession to practicality but is also unlikely to have much effect on the findings.³¹

The same sort of reasoning applies to situations in which the executive never does exercise his option because the market price of the shares involved falls below and remains below the option price. In principle again, any incremental salary payments credited to him at the time a profit seemed to be in prospect should be recovered via an eventual levy on salary. By convention here, they are not.

The Before-Tax Current Equivalent

Given a definition of the reward provided by an option and a format for determining its after-tax salary counterpart, the final step is to compute a before-tax current equivalent: that series of additions to the executive's actual before-tax salary which will generate the various annual increments implied by the (sum of the) after-tax equivalent(s). A vehicle is thereby obtained which permits the relative importance of stock options and other compensation devices to be measured on a common pre-tax basis and which can be used subsequently to assess the "efficiency" of a particular option by comparing its cost with that

²⁹ For an example, see the illustration in Chapter 6, pp. 97--101.

³⁰ The extent of the "error" involved and the frequency of its occurrence empirically are discussed below in Chapter 12.

³¹ While this is true for the time period covered by this study, it may or may not be so in the future. Stock market conditions will not necessarily continue to be favorable, and the possibility of unprofitable stock option experiences may well increase.

of its current income substitute. Because the underlying after-tax equivalent is constructed in a way that should prevent wide variations in its constituent annual figures, the necessary before-tax increments will also be "smoothed." This will help keep their aggregate amount—and thus their total cost to the firm—as low as possible, since a progressive personal income tax schedule subjects fluctuating incomes to a higher over-all effective rate than stable ones.

Summary

A stock option is a deferred and contingent compensation device whose effectiveness is most appropriately measured *after* the fact. Despite the uncertainties involved, it is possible to design a current income alternative that covers the same span of years as the term of the option, that has the same time-adjusted after-tax value, that could be used as an operational substitute for the option, and that should have the same incentive features. Within such a framework, the rewards provided by stock options—even though unique in their characteristics—can be meaningfully compared with an executive's other earnings.³²

³² Once again, the reader is referred to Appendix G, which describes the manner in which the procedures developed above can be modified to fit the changes in the tax treatment of stock options embodied in the Revenue Act of 1964.