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DISTRIBUTION OF INCOMES OF CORPORATIONS AMONG DIVIDENDS, RETAINED EARNINGS, AND TAXES*

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This paper will present some of the more generally important results of our studies of corporate dividend policy which have a relatively direct bearing on cyclical fluctuations and longer term growth trends in the economy. The first section will review some of the results of our field investigations which are most relevant in this connection. I will then use these findings to set up a theoretical model of corporate dividend behavior and proceed to illustrate a few of the statistical tests we have under way regarding the adequacy and reliability of the model and the stability of the indicated patterns of behavior and policy.¹ Most of the discussion will run in terms of dividend decisions and dividend policies rather than retained earnings and savings, since our evidence indicates that dividends represent the primary and active decision variable in most situations. As will develop later, savings in a given period generally are largely a by-product of dividend action taken in terms of pretty well established practices and policies; dividends are rather seldom a by-product of current decisions regarding the desired magnitude of savings as such. Similarly, the primary effect of taxes on the volume of net corporate savings results from their impact on the magnitude of net earnings which is a primary determinant of the volume of

* These studies are being made at the Harvard Business School under a grant from the Rockefeller Foundation for work in the general area of profits and the functioning of the economy. The author wishes to express his appreciation to his research associate, Mr. Samuel Schwartz, who conducted most of the field interviews. Although the writing and the formulation of dividend policy presented are my own, Mr. Schwartz's field notes and verbal discussions with him have added substantially to my understanding of these problems. I have also benefited from discussions with Professors Guy Orcutt, James Duesenberry, Keith Butters, and John Meyer regarding various aspects of these studies. Needless to say, I take full responsibility for the results presented.

¹ In keeping with the broad orientation of this whole series of meetings, the statistical material presented here will concentrate on the dividends and net savings of aggregates of corporations over time and the predictability of these magnitudes. Other tests under way include time-series analyses for all major industry groups and for identical leading companies in over 20 smaller industry groups, cross-section studies of 10-k data for over 800 firms in various postwar years (and smaller numbers in earlier years) classified by a variety of industry and company characteristics and testing the significance of numerous other factors in addition to our basic model, and combined cross-sectional-time-series analyses. In addition, substantial statistical work on other data (and further theoretical work) is under way to round out the basis for normative judgments and standards. The present paper is entirely descriptive and analytical, focusing on what behavior is, not on normative questions of what it should be in terms of any possible set of standards of objectives.

dividends—and this again can most easily be developed by focusing on dividend decisions and policies.

I

As a background, it will be well to indicate at the outset the general characteristics (and our method of selecting) the companies whose dividend practices have been intensively studied on an individual basis. After a careful review of both the academic and nonacademic literature on corporate financial policies and the School's case files, we made up a list of some fifteen readily observable factors and characteristics that appeared to reflect or might be expected to have an important bearing on dividend payments and policy. We then reviewed the available information on over 600 listed, well-established companies and selected 28 for detailed investigation, such that there was a minimum of 3 companies within each major breakdown of each of these characteristics. As illustrations, we included 10 companies whose gross plant and equipment expenditure in the postwar years through 1953 had been more than 300 per cent of their gross account in 1945, and 5 under 100 per cent; 4 paid out over 70 per cent of their earnings in these years, 12 less than 40 per cent; 6 used no external financing during the period, while 5 had used these sources for more than 40 per cent of total uses of funds for plant and equipment and working capital increases; and the group was divided almost evenly between durable and nondurable goods industries and also between consumer and producer goods industries. Other factors included company size, frequency of change in rates, relative average earnings on invested capital, average price-earnings ratios, balance-sheet and fund flow liquidity, stability of earnings, capitalization, use of stock dividends, extras and splits, and the size and relative importance of stock ownership by management and other control groups. The companies selected were all in the broadly defined "industrial" area, because of the greater diversity of dividend policy within this sector and the relatively greater knowledge of dividend policies among other important groups.

A complete financial analysis based upon all published sources was then made for each company emphasizing developments within the postwar years. A special attempt was made to identify all occasions when a change in dividends might well have been under active consideration even though no change was made. The subsequent interviews were focused upon determining the factors which entered most actively into decisions in these cases, as well as in all cases where dividend rates were in fact changed. This initial focus had the very real advantage of emphasizing concrete, tangible elements in actual decisions, but the discussions of course also covered more general material. In order to be

more likely to detect differences in viewpoint that would affect decisions, we held interviews in the large majority of these companies with from two to five responsible officials, including presidents, financial vice-presidents, treasurers, controllers, and directors.

As a final introductory comment: the companies were not selected as a sample upon which to draw statistical conclusions; rather they were deliberately selected to encompass a wide variety of situations and to build in opportunities for significant suggestive contrasts between the policies of companies similar in several respects but differing in other important characteristics. In view of the extent of the diversity built into the selection of the companies, some significance can be attached to such uniformities in policies as were observed. But any appraisal of the generality of findings coming from such a field survey must necessarily depend upon an essentially statistical analysis of appropriate data.

What then can be said in any general way regarding the dividend policies of this diverse group of 28 companies? Several features of central importance stand out clearly. With the possible exception of 2 companies which sought a relatively fixed percentage pay-out, consideration of what dividends should be paid at any given time turned, first and foremost in every case, on the question whether the existing rate of payment should be changed. In studying 196 company-years of dividend action (28 companies, seven years, 1947-1953), we found no instance in which the question of how much should be paid in a given quarter or year was considered without regard to the existing rate as an optimum problem in terms of the interests of the company and/or its stockholders at the given time, after the manner suggested by the usual theoretical formulations of such problems in static terms, even when expectations are considered. Rather, there would be serious consideration of the second question of just how large the change in dividend payments should be only after management had satisfied itself that a change in the existing rate would be positively desirable. Even then, the companies' existing dividend rate continued to be a central bench mark for the problem in managements' eyes. On the basis of our field observations, the dependent variable in the decision-making process is the change in the existing rate, not the amount of the newly established rate as such.

It was equally clear that these elements of inertia and conservatism—and the belief on the part of many managements that most stockholders prefer a reasonably stable rate and that the market puts a premium on stability or gradual growth in rate—were strong enough that most managements sought to avoid making changes in their dividend rates that might have to be reversed within a year or so. This

conservatism and effort to avoid erratic changes in rates very generally resulted in the development of reasonably consistent patterns of behavior in dividend decisions. The principal device used to achieve this consistent pattern was a practice or policy of changing dividends in any given year by only part of the amounts which were indicated by changes in current financial figures. Further partial adjustments in dividend rates were then made in subsequent years if still warranted. This policy of progressive, continuing "partial adaptation" tends to stabilize dividend distributions and provides a consistency in the pattern of dividend action which helps to minimize adverse stockholder reactions. At the same time it enables management to live more comfortably with its unavoidable uncertainties regarding future developments—and this is generally true even during at least a considerable part of most cyclical declines, since the failure of dividends to reflect increasing earnings fully and promptly during the preceding upswing leaves more cushion in the cash flow position as earnings start to decline.

Within this context of the decision-making process, it became clear that any reason which would lead management to decide to change an existing rate—and any reason which would be an important consideration in determining the amount of the change—had to seem prudent and convincing to officers and directors themselves and had to be of a character which provided strong motivations to management. Consequently, such reasons had to involve considerations that stockholders and the financial community generally would know about and which management would expect these outside groups to understand and find reasonably persuasive, if not compelling. Current net earnings meet these conditions better than any other factor. Earnings are reported frequently and receive wide publicity in the financial press. Most officers and directors regarded their stockholders as having a proprietary interest in earnings, and many urged the stockholders' special interest in getting earnings in dividends, subject to their interest in regularity of payment. The managements we interviewed very generally believed that, unless there were other compelling reasons to the contrary, their fiduciary responsibilities and standards of fairness required them to distribute part of any substantial increase in earnings to the stockholders in dividends. Even the executives in the minority who were most inclined to view the interests of the company as distinct from those of the stockholders, and who seemed least concerned with their responsibility to frame dividend policy in the best interests of the stockholders as such, were generally concerned with the decline in favorable proxies and in the weakening of their personal positions which they believed would follow any failure to reflect a "fair share" of such added earnings in dividends. Similarly, managements felt that it was both fair and pru-

dent for dividends to the shareholders to reflect some part of any substantial or continued decline in earnings, and that under these circumstances stockholders would understand and accept the cut.

In contrast with earnings, other considerations and aspects of the companies' positions were thought to be less generally known, less widely understood, and less generally and sympathetically recognized by stockholders as factors which should have an important bearing upon dividend distributions. Moreover, no other consideration was nearly as consistently important year by year and company by company. Such things, for instance, as indenture provisions restricting dividends, debts to be discharged at specific dates, or tight liquidity positions were important in particular instances, but dividend decisions were dominated by such considerations rather than by earnings in line with an established policy in less than five percent of the company-years studied, and these exceptions were not clustered in any particular years. In part this finding reflects the general prosperity of the postwar period, but a large part of the explanation almost certainly lies deeper. A prudent foresighted management will always do its best to plan ahead in all aspects of financial policy to avoid getting into such uncomfortable situations where dividends *have* to be cut substantially below those which the company's previous practice would lead stockholders to expect on the basis of current earnings. Stockholder reactions in such situations have been sufficiently vigorous and effective in enough companies that the fear of such a reaction is an effective "burr under the saddle" to all managements, including those which have never been in such difficulty themselves. We might add that a policy geared to considerations other than earnings would have to be explained and justified first on one thing and then on another. Even if there were a perfectly consistent underlying rationale to such a policy, it would be difficult to explain in simple, understandable and persuasive terms, and would probably seem erratic, *ad hoc* or "academic." Moreover, as shown below, companies have generally framed policies (or systematic patterns of behavior) geared to earnings which do quite generally take care of these other considerations in what they regard as a reasonably satisfactory manner.

The particular mix of attitudes and sentiments, pressures and sense of responsibility, standards of fairness and good management performance entering into the dividend decisions, practices and policies was somewhat different in each company visited, and covered a wide spectrum within the group as a whole. In almost every company it was nevertheless such that, barring clearly exceptional circumstances, major changes in earnings or levels of earnings "out of line" with existing dividend rates were the most important determinants of the company's dividend decisions. In particular, we found that the level of current

earnings was almost invariably the starting point in management's consideration of whether dividends should be changed, and there were many cases where management, lacking a signal from earnings, had simply not sought out or brought other pertinent data (which might have favored a dividend change) to bear on the problem. Earnings were always present as a major factor and most generally dominated the decision whether or not to change the rate, even when the discussions ranged over a number of other considerations.

We also found that the relationship between current earnings and the existing dividend rate was very generally much the most important single factor determining the amount of any change in dividends decided upon. In describing the character of this dependence, it is convenient to divide the companies into two groups. In the first group are two-thirds of the companies studied, each of which had a rather definite policy regarding the ideal or target ratio of dividends to current earnings. In all but two of these companies, however, for reasons already indicated, this normal pay-out ratio was considered to be a target or an ideal toward which that company would move, but not a restrictive requirement dictating a specific percentage payment within each year. Moreover, most of these companies also had somewhat more flexible but nevertheless reasonably well-defined standards regarding the speed with which they would try to move toward a full adjustment of dividends to current earnings. In a majority, these standards took the form of a formal policy or a rather clear understanding that dividends should be adjusted by some fraction of the difference between the last period's payment and the rate which would be indicated by applying the target pay-out ratio to current earnings, or a policy to make a full adjustment rather regularly over some stated period of years. The corresponding standards in the other companies with fixed pay-out targets were expressed more in terms of having and maintaining a reasonably consistent pattern of action which would both meet the company's particular needs most of the time and also reasonably balance the longer term interests of stockholders in the company and their shorter term interests in current income. Although these less specific standards resulted in a little more flexibility, the resulting dividend action in most company-years was approximately that which would have been taken if the fractions implicit in the more general standards for each company had been made explicit and adhered to in each case.

The target pay-out ratios varied from a low of 20 per cent to a high of 80 per cent, with 50 per cent the most common figure and most of the other companies aiming at 40 or 60 per cent. With respect to speed of adjustment, two companies sought to make a reasonably full adjustment in dividends within each year, while most of the others generally

sought to move some part of the way within each year.² Among the latter, the fraction generally "made up" in each year varied from one-half to as little as one-fifth or one-sixth. In every company the adjustment in any given year was subject to a general preference for changes in the dollar rate of dividends per share in terms of some rounded unit such as five, ten, or twenty-five cents and was often stated as a range such as "between a quarter and a third." It should also be noted that dividends were uniformly considered in terms of annual periods.

As an illustration of these patterns of adjustment, consider two synoptic companies which had been paying \$2.00 a share on reasonably stable earnings of \$4.00 a share. After earnings had increased to a \$6.00 level, an ultimate adjustment to a \$3.00 dividend rate would be indicated in both companies. In the company with a lower rate of adjustment, the dividend would be increased to \$2.25 in the first year and on to \$2.50 in the second and \$2.65 in the third year (even on earnings of \$5.50). The other company, with a more rapid rate of adjustment but with the same change in earnings and the same target pay-out, would move its previous \$2.00 rate to \$2.50 in the first year and to \$2.75 in a second. It will be noted that some further increases in the current dividends are to be expected even in years when profits suffer some decline whenever substantial earlier increases in earnings have not yet been fully reflected in dividends and the existing rates are still below target pay-out ratios applied to the new (lower) rate of current and reasonably foreseeable future earnings per share. Similar reverse movements of current dividend payments and changes in earnings sometimes occur in the contrary case where earnings are somewhat higher than in the preceding year and dividends had not yet been fully adjusted to the depressed level of earnings. This pattern was less frequently observed, however, because of a general reluctance to make reductions in dividends rates, especially in "regulars." For these reasons the relationship between an existing dividend rate and that rate which would constitute a target pay-out of current and reasonably foreseeable profits was found to be a much more generally significant and stronger factor in dividend decisions than simply the current change in profits taken by themselves.

²This group included all the companies which were willing to make use of "extra" as well as "regular" rates. In a minority of instances, companies would make two years' adjustment in one with no further action the second year, or defer an increase one year and then catch up in the second. These anticipations and deferrals were about equally frequent and had no particular pattern in time, except for some clustering of anticipations in 1950. Clearing up debt or currently rich investment opportunities were the two most frequent reasons for deferrals, but the total number was relatively small and well scattered over the seven years studied. The small number of companies which as a matter of policy would not use extras, generally adjusted their dividends at intervals of two or three years. This reflected the reluctance (common to all companies) to reduce regular rates once established and a consequent conservatism in raising regular rates. Several of the companies not using extras distributed stock dividends when earnings were rising in the interval between changes in regular rates.

The different target pay-out ratios and adjustment rates in the various companies reflected a large number of different factors in the companies' experience, objectives, and pattern of operations. In some cases management had weighed and in some manner "balanced out" these considerations at some time in the earlier history of the company; in most companies a growing body of experience and precedents accumulated out of numerous decisions individually made on an *ad hoc* basis gradually became more rationalized and formalized in a reasonably fixed and definite policy. Among the more important factors which had more or less consciously and rationally entered into these standards were: the growth prospects of the industry and, more importantly, the growth and earnings prospects of the particular company; the average cyclical movement of investment opportunities, working capital requirements, and internal fund flows, judged by past experience; the relative importance attached by management to longer term capital gains as compared with current dividend income for its stockholders, and management's views of its stockholders' preference between reasonably stable or fluctuating dividend rates, and its judgment of the size and importance of any premium the market might put on stability or stable growth in the dividend rate as such; the normal pay-outs and speeds of adjustment of competitive companies or those whose securities were close substitutes investmentwise;³ the financial strength of the company, its access to the capital market on favorable terms, and company policies with respect to the use of outside debt and new equity issues;⁴ and management's confidence in the soundness of earnings figures as reported by its accounting department, and its confidence in its budgets and projections of future sales, profits, and so on.

It would take us beyond the limits of this paper to undertake any systematic discussion of the impact and relative importance of each of these factors on the level of the target pay-out ratio and the speed-of-adjustment factor. For our present purposes, the important thing is that, in each of these companies, two more or less specific standards

³ This is an aspect of the phenomenon I have elsewhere termed "dividend leadership" by analogy with price leadership and wage leadership. See John Lintner, "The Determinants of Corporate Savings," in *Savings in the Modern Economy*, ed. Heller *et al.* (University of Minnesota Press, 1953), p. 252. The dividend policies of companies whose securities already had the investment standing which the interviewed companies' managements hoped to attain were also frequently influential.

⁴ The cost of equity capital or long-term debt generally did not enter into either the establishment of the policy or in particular dividend decisions in companies which as a matter of policy would not go to the market for long-term capital. In the others it entered only as a long-term average and often rather vaguely. We found no case where the cost at a particular time entered directly into a current dividend decision; the influence of the current cost of outside capital was rather on the timing of its use and on the amount secured in connection with investment decisions as discussed below. We did find three company-years in which dividends were raised to the top of the permissible range marked out by established policy (or a little above) a year or so before new equity issues in order to improve the terms.

have been jelled out of experience—or established as a matter of policy on the basis of a more or less balanced appraisal of these considerations—and that once established, the target pay-out ratio and the standard (fractional) speed of adjustment were adhered to with little deviation over extended periods of time. Moreover, although the target pay-out ratios and standards regarding speed of adjustment varied over a considerable range among these companies on a cross-section basis, in most of the companies the standards themselves were invariant over time—as specific figures for target pay-out ratios and as orders of magnitude for speeds of adjustment. Except for four companies, there was little evidence of any significant change in these standards within individual companies during the postwar years, and there was little evidence in the interviews (or in the spot statistical checks we have made) of any significant modifications in the standards between the prewar and post-war periods.

Special comment is required, however, regarding the bearing of the magnitude and profitability of current investment opportunities and the ease or stringency of current liquidity positions on each year's dividend decisions within the framework of these two standards. As already indicated, each company's target pay-out ratio and speed-of-adjustment factor reflected the cyclical movements of investment opportunities, working capital requirements, and fund flows in its previous experience along with the other considerations mentioned. Moreover, the standards ran in terms of net earnings as reported to stockholders and many used LIFO accounting for much of their inventories. Generally speaking, after these standards had been established or embodied in informal understandings, the company lived with them and undertook all of its financial planning and capital budgeting in the light of these standards of dividend behavior. Managements deliberately planned ahead so that carrying through their established dividend policy would not involve them in unduly short liquidity positions. Management was generally in a position and was willing to draw down on working capital to help meet such requirements. In general, management's standards with respect to its current liquidity position appeared to be very much more flexible than its standards with respect to dividend policy, and this flexibility frequently provided the buffer between reasonably definite dividend requirements in line with established policy and especially rich current investment opportunities. If investment opportunities were particularly abundant and could not be financed with the funds currently available after dividends had been increased in line with established policies, the remaining investment projects which could be undertaken only through outside financing were re-examined to make sure that they were sufficiently desirable as to justify the company in having recourse

to outside capital. If so, the necessary capital was raised and the projects were undertaken; if not, the projects were abandoned. In the companies which as a matter of policy would not go to the outside market except in most extreme circumstances, the capital budget year by year was simply cut to fit the available funds.

In this connection it must be recognized that net earnings generally increase much more than in proportion to increased volume (and similarly on declines). Even though dividend rates are increased somewhat in line with policy described, the current pay-out ratio will decline with increased profits and under this pattern of behavior retained earnings fluctuate still more than in proportion. Marked fluctuations in working capital requirements and investment outlays are consequently "automatically" provided for under this form of conservative dividend behavior to a very considerable extent at least. This fact, together with the marked dependence of capital budgets upon the availability of internal funds (even when outside funds are used) shown in all the studies of this subject, go far to explain the finding that investment requirements as such very generally had relatively little direct effect in modifying the pattern of dividend behavior, except in a limited number of special situations well scattered over the years studied.

So far we have been describing the dividend practices of about two-thirds of the companies in our field interviews which had a rather clearly established dividend policy, defined in terms of a more or less standardized rate of adjustment to a fixed target pay-out ratio on current earnings. The dividend practices of other companies may be described much more briefly. These companies had no formal or well-established standards with respect to either target pay-out ratios or speed of adjustment, as such. One well-known company had a special system, unique in our field work, by which its dividends were generally set to provide roughly a median market dividend yield among an *ad hoc* group of growth companies; and another simply had an erratic set of dividend decisions which reflected the capricious personality of a dominating member of the management far more than any other consideration. Otherwise, the dividend behavior of all the remaining companies adhered rather closely to what would have been expected if the companies had had a well-defined dividend policy of the type found in the large majority of companies previously described: their actions in changing dividends within the postwar period were generally consistent with the rates which would have been paid in each year or two if the company had in fact been setting dividends in terms of some (appropriately specified) target pay-out ratio and speed of adjustment. These companies appeared in general to take into account much the same range of factors as was described previously in connection with the

setting of a target pay-out or adjustment factor, except that in these companies such factors were applied directly on what management regarded as an *ad hoc* basis to the specific dividend decision itself. In particular, they seemed to have much the same desire to attain reasonable consistency and avoid erratic action, as well as very similar standards of fairness, sense of prudence, and fears of adverse stockholder reactions, as were found in the majority of companies.

In the light of the entire pattern and internal logic of these dividend policies and practices, the effects of taxes on the amount of dividends distributed by the companies studied should be clear. Standards and objectives were established in terms of earnings as reported to stockholders and these, of course, were uniformly stated after tax liabilities had been deducted in full. Moreover, net earnings were the predominant element which determined current changes in dividends in the light of the policy. The higher the tax liability, the smaller the net earnings reported and the smaller the dividend.

II

These dominant patterns of decision making with respect to dividends (and consequently retained earnings) which we have observed in our field work can be readily embodied in a simple theoretical model of this aspect of corporate financial policy which can be subjected to statistical testing. Specifically, our field work suggests the hypothesis that the strong central tendencies of most dividend decisions can be readily explained on the basis of the following equation:

$$(1) \quad \Delta D_{it} = a_i + c_i (D^*_{it} - D_{i(t-1)}) + u_{it}$$

where $D^*_{it} = r_i P_{it}$ and r is the target pay-out ratio, P_t is the current year's profits after taxes, ΔD_t is the change in dividend payments, and D_t and D_{t-1} are the amounts of dividends paid in the years identified by the dating subscripts t . The subscript i identifies the individual company and D^*_{it} represents the dividends which the company would have paid in the current year if its dividend were based simply on its fixed target pay-out ratio r_i applied to current profits. The parameter c_i indicates the fraction of the difference between this "target" dividend D^*_{it} , and the actual payment made in the preceding year $D_{i(t-1)}$, which the company will intend on the average to reflect in its current year's dividend as an increase (or decrease) from the previous year's payment. The constant a will be zero for some companies but will generally be positive to reflect the greater reluctance to reduce than to raise dividends which was commonly observed as well as the influence of the specific desire for a gradual growth in dividend payments found in about a third of the companies visited. The variable u represents the

discrepancy between the observed change ΔD_{it} and that expected on the basis of other terms in the equation. It will absorb discrepancies due to each company's preference for dividend rates in rounded units per share, as well as the impact of all other considerations insofar as they are not systematically reflected in the values assigned to the two parameters c_i and r_i and the constant term, which is in the nature of a trend factor.

The degree to which this model summarizes the dividend policy observed in our field work may be quickly indicated. Twenty-six out of the twenty-eight companies had (or acted to a good approximation as if they had) a pretty specific value of r_i established as a matter of policy, and twenty had reasonably definite values of c_i while six others had somewhat more flexible values of c_i . Twenty-two of the companies considered adjusting dividends year by year and generally did so as shown in the model, but the other four generally sought to make adjustments only every two or three years. Among these twenty-six companies both r_i and c_i were unchanged in the postwar period covered except for single major policy changes in r_i in two companies and in c_i in two others. As a descriptive summary, we may note that about 85 per cent of the company-years of dividend action studied in this group of twenty-eight companies can be explained in terms of this model with only moderate discrepancies and that the discrepancies have no clear pattern in time or in the reasons ascertained for their occurrence in various companies at any given time. This 85 per cent figure includes "predictions" of dividend changes accurate within amount limits set by the "rounding" band (cf. above) and time limits of twelve months' periods. The figure is over 90 per cent if six months' further leeway is allowed and failures to reduce existing regular rates are not counted. Apart from the latter reluctance to cut rates, the nearest thing to a pattern we observed was evidence of follow-the-leader behavior or pseudo fashions in payment of extras (as well as in stock dividends and splits which are not involved in the present analysis) and some bunching of increases larger than normal in 1950 due to favorable expectations. The diversity built into the selection of our field cases lends some measure of nonstatistical significance to these findings and encourages further testing of the resulting model, but the smallness of the number of cases and our methods of selection (which were chosen to serve other important objectives) bar anyone from attaching statistical significance to the preceding findings.

Extensive statistical tests of the adequacy and reliability of this model have already been made with encouraging results, and still more are currently under way in work which will be published in detail elsewhere. (See footnote 1.) We have time here to illustrate no more than

one set of results which have a direct bearing on the cyclical and longer term matters which are being discussed in these meetings. Specifically, we will take this model developed from postwar dividend behavior observed in the field, fit it to prewar data for the corporate universe specified in the national income accounts, and use the resulting parameter values to make forecasts of postwar dividends and retained earnings. The magnitude of the resulting errors of predictions will then be compared with those obtained from using four alternative models previously suggested by other authors, and also with a "naïve model." Before turning to these results, however, we may note that equation (1) may readily be converted into

$$(2) \quad D_{it} = a_{it} + b P_{it} + d D_{i(t-1)} + u_{it}$$

where $b = cr$ and $d = (1-c)$, without affecting the error term.

This is the equation I suggested and used in a previous study with excellent correlations, random residuals and highly significant regression coefficients over the entire period, 1918-51, and all major subgroups of years.⁵ I noted that when the equation was fitted to the years 1918-41, practically the same regression coefficients were obtained as were found when the war and postwar years were included, so that the equation fitted to the interwar years gave very satisfactory predictions of both the war and postwar dividend payments (or retained earnings). The equations fitted to data for 1918-41 (excluding 1936 and 1937 because of the undistributed profits tax) were: $D = 352.3 + .15 P_w + .70 D-1$ with profits adjusted for inventory gains and $D = 106.0 + .145 P_n + .788 D-1$ when profits were unadjusted. These are the equations used in the following projections. Since Commerce has subsequently revised the postwar data and more years are now available, it is significant to note that this equation fitted to the data through 1941 predicts the nine years of postwar data as revised with an average algebraic error of -163.7 million dollars (which is a 2.0 per cent underestimate of actual average dividends and a 2.2 per cent overestimate of actual retained earnings) when the prewar equation with inventory valuation adjustments is used, and +457.9 million dollars (5.6 per cent of actual

⁵ See Lintner, *op. cit.*, pp. 252-253. R with dividends as the dependent variable was .976 without inventory valuation adjustment, .967 using data with this adjustment. The corresponding values with retained earnings were .996 and .993. The von Neumann ratios were respectively 1.62 and 1.94. These results (and those presented later in this paper) imply stability over time in the aggregative c and r (or b and d). It should be noted that since we found four changes in c or r in just twenty-eight companies in seven postwar years and since such changes were probably more frequent before the war especially during the depression, the stability in the aggregative or weighted averages c and r found in this statistical work implies an underlying synchronizing mechanism of weight shifts and policy shifts of the same character suggested in an earlier study concerning profits themselves. See same reference, especially pp. 243-248. These considerations are being examined in some detail in the broader statistical analysis we are making.

TABLE 1
SUMMARY OF RESULTS OF PREDICTIONS OF POSTWAR DIVIDENDS (1946-54, INCLUSIVE), FROM VARIOUS EQUATIONS FITTED TO PREWAR DATA,
ALL AMERICAN CORPORATIONS

Variables Used	Years Fitted	ALGEBRAIC MEAN ERROR			MEAN ABSOLUTE ERROR			ROOT-MEAN-SQUARE ERROR		
		Billions of Dollars	% Actual Dividend	% Actual Retained Earnings	Billions of Dollars	% Actual Dividends	% Actual Retained Earnings	Billions of Dollars	% Actual Dividends	% Actual Retained Earnings
<i>Pw, D-1</i>	1918-41	-163.7	2.0	2.2	527.2	6.4	5.6	596.7	7.3	6.3
<i>Pn, D-1</i>	1918-41	457.9	5.6	6.1	498.8	6.1	6.7	611.2	7.5	8.2
<i>D=D-1</i>	—	590.8	7.2	7.9* 6.3†	636.8	7.8	8.5* 6.7†	815.8	10.0	10.9 8.6
<i>Pw</i>	1918-41	2462.4	30.1	26.0	2462.4	30.1	26.0	2684.3	32.8	28.4
<i>Pn</i>	1918-41	2618.8	32.0	35.1	2618.8	32.0	35.1	2922.5	35.7	39.1
<i>Pn, P-1, S-1</i>	1921-40	5333.4	65.2	71.4	5333.4	65.2	71.4	5433.1	66.4	72.7
<i>Pn, D-1, B-1</i>	1918-41	2162.4	26.4	28.9	2162.4	26.4	28.9	2434.1	29.8	36.6
<i>Pn/NW</i>	1918-41	-316.8	3.9	4.2	624.6	7.6	8.4	712.1	8.7	9.5
<i>Pw/NW</i>	1918-41	-658.6	8.1	7.0	684.6	8.4	7.2	802.1	9.8	8.4
<i>Pn, NW</i>	1918-41	1471.8	18.0	19.7	1471.8	18.0	19.7	1502.8	18.4	15.9
<i>Pw, NW</i>	1918-41	1334.3	16.3	14.1	1368.3	16.7	14.5	1623.1	19.8	17.1
<i>Pw, D-1, NW</i>	1919-41	2256.2	27.6	23.9	2256.2	27.6	23.9	2449.1	29.9	25.9

* Using retained earnings without inventory valuation adjustment.

† Using retained earnings with inventory valuation adjustment.

SOURCE: *Pw* and *Pn* are profits after tax with and without inventory valuation adjustment respectively, *D* net dividends, *S* book surplus, *B* cumulated retained earnings from 1918, *NW* average net worth (book value). Regressions were computed using Department of Commerce data back to 1929, and earlier data (adjusted to Commerce concepts) from Goldsmith's *A Study of Saving in the United States*, Part 1, and *Statistics of Income*.

dividends and 6.1 per cent of retained earnings) when the equation fitted to unadjusted profits is used. The mean absolute errors are 5.6 and 6.7 per cent of actual values and root-mean-square errors are only a little larger, as shown in Table 1. The von Neumann statistics to test randomness in each case (1.98 and 2.04) also lie satisfactorily close to their expected value of 2.25 for nine observations.

In each of these respects, both prewar equations on this model give results in predicting postwar dividends and retained earnings that are superior to those obtained from the use of a naïve model in which each year's dividends are simply assumed to be equal to the preceding year's payments. (The algebraic mean error from our equation with inventory valuation adjustment is only a little over one-quarter of that of the naïve model.) This naïve model in turn gives postwar forecasts which have average errors (algebraic and absolute and root-mean-square) which are from one-third to more than five-sixths lower than those involved in making estimates from prewar relationships based upon profits alone, or current and lagged profits and surplus as proposed by Tinbergen and Modigliani,⁶ or with the addition of surplus to the profit-lagged-dividend model. Dobrovolsky's basic model relating the dividend return on book value to reported earnings on book value of net worth⁷ also yields estimates with higher absolute and root-mean-square errors than either of our equations. Although this equation underestimates dividends in seven of the nine years, an extreme overestimate (1948) pulls the mean algebraic error below that of our equation without in-

⁶ See Franco Modigliani, "Fluctuations in the Savings Income Ratio: A Problem in Economic Forecasting," Part V, Vol. 11, in *Studies in Income and Wealth* (National Bureau of Economic Research, 1949), especially p. 414. The equation given in this reference, which we used in the calculations reported in Table 1, was originally developed and used specifically for estimating postwar savings. (Incidentally, the errors are larger in the later than earlier years of the postwar period, contrary to the expectation when it was developed.)

⁷ See Dobrovolsky, *Corporate Income Retention, 1915-1943* (National Bureau of Economic Research, 1951), especially p. 2 and Chap. 3, especially 20-26. His basic analysis and model of dividend policy was that stated in the text, although upon turning to size groups and cross-section statistics, lagged dividends were introduced and the conclusion reached that "among other factors affecting income retention, dividends paid in the preceding period have been found to have considerable importance." (Summary, p. 3.) As noted above, in our field work we found that instead of being simply "among other factors affecting" current dividends, lagged dividends (together with current earnings) were the prime determinants of the decisions; conversely, instead of finding book equity a prime factor, we found no company that attached any significance to it in their dividend decisions. If rate of return as such on book equity is not the critical decision variable, then net worth must enter the equation as a separate variable (since it seriously fails to satisfy the homogeneity requirements for use as a deflator over time); in this case the equations fitted to prewar data (even with the addition of lagged dividends) give predictions which are consistently inferior to our own basic model and to the naïve model, as shown in Table 1. The high autocorrelation of prediction residuals since 1949 from the net worth-ratio model using profits without inventory valuation adjustments suggests its possible usefulness for limited periods as a predictive tool, but the failure of the model to reflect properly the decision-making determinants at the microeconomic level (cf. Lintner, *op. cit.*, pp. 230-231 and 248-250) and the observed major shifts in parameters over time weigh heavily against its reliability and more basically against its structural significance.

ventory adjustment but still double that of our model with inventory adjustment. This net worth model, adjusting profits for inventory gains, has larger errors of all three types than either of our equations.

We may also make brief reference to the fact that the addition of plant and equipment expenditures, or capital outlays less depreciation, or the first differences in either of these, in no case gives a statistically significant regression coefficient with the appropriate negative sign on dividends for either the interwar years or for the entire period since 1918, with or without 1942-45. Nor have these investment variables proved significant in time series when inventory change was added to give a measure of annual expansion in physical assets. The excess of internal funds over either capital outlays or physical asset expansion is significant only if substituted for the profits variable, but the results are statistically inferior to those of the basic model. Similarly, the addition of current change in profits or of highest previous dividend outlays (when in excess of last year's dividend) fails to yield significant coefficients (or even significantly change the values observed for the basic variables). These results suggest that the parameters in our basic model were not biased by failing to allow explicitly for two types of considerations for which there was some evidence in our field work—and which have proved to be important in studies of consumer outlays and savings.

This work also indicates that the common explanation of low pay-out ratios in the postwar period as being due primarily to *ad hoc* current allowance for spectacularly large investment outlays misses the essential point involved. The evidence available indicates that the lag in the adjustment to new higher levels of profits was no more sluggish than would have been expected on the basis of the patterns of behavior established between World War I and World War II, nor is there evidence that the normal or target or equilibrium ratio of dividends to profits for corporations as a whole is any different in the postwar years than during the preceding quarter century.⁸ On the basis of our work so far, at least, the essential explanation seems to be simply that invest-

⁸ It is clear that the difference between the new and the old equilibrium levels of dividends for any given stable levels of profits after tax will simply be a fraction, equal to the target pay-out ratio r , of the change between the two (stable) levels of profits: $\bar{D}_n - D_o = r[P_n - P_o]$. After any significant change in the level of net profits which is maintained, dividends will move toward their new equilibrium level in a geometric progression over time. After any number of years t following any major change in profits with dividends initially in equilibrium, the discrepancy between actual dividends and their new equilibrium level will be $\bar{D} - D_t = (1 - c)^t (\bar{D} - D_o)$. With an empirical value for r of .6 (the average of our two equations), a sustained increase of 9 billion dollars in corporate net profits, such as occurred following the war, would imply an increase in dividend distributions of approximately 5.5 billion dollars. (The difference between dividends in 1945 and 1954 was 5,317 millions.) Similarly an empirical value for c of .25 implies that 76.5 per cent of this increase in dividends would have occurred through the fifth year, which again seems to agree rather well with the facts.

ment outlays have over long periods been quite consistently and highly correlated with current profits, sales volume, and internal fund flows, and that allowance for these relationships in past experience has been built into the dividend policies of corporations in such a way that corporations can pay the dividends implied by those policies with considerable consistency over long periods of time, and do so (in the light of the rest of their planning) with considerable comfort and success. Moreover, the results of our statistical work indicate that allowance for tax considerations affecting dividend policy is properly and adequately made simply by our use of profits after taxes as a key variable in the equation. In particular, the evidence is consistent with a judgment that postwar dividends were not depressed (below normal expectations in terms of profits after tax and long-established policies) by the large tax bite out of pretax earnings.

On the evidence so far available, it appears that our basic model incorporates the dominant determinants of corporate dividend decisions, that these have been introduced properly, and that the resulting parameters are reasonably stable over long periods involving substantial changes in many external conditions. The analytical properties of this model, its implications for the cyclical stability and long-term growth of the economy, and its bearing on the effects of various taxes as stabilizing devices are being developed in a separate paper. We can only note here that the dividends-profits-retained-earnings subsystem is internally very stable though in continuous disequilibrium. Our statistical results suggest that over the last thirty-five years the aggregate marginal propensity to save *ceteris paribus* has had a high stabilizing value of approximately 85 per cent. The year-to-year *m_{ps}* implied by our equations is somewhat lower, however, except in the neighborhood of cyclical turning points when it may be higher. On the other hand, the (asymptotic) long-run *m_{ps}* is only on the order of 40 per cent in view of the apparently stable weighted average target pay-out ratio of about 60 per cent.