SOME CROSS-SECTION TESTS OF THE "NORMAL" EARNINGS HYPOTHESIS OF CORPORATE SAVINGS[1]

I. *Introduction*

THE paper presents a normal earnings model of company dividends and shows it to be compatible with the results of the econometric studies of company savings or dividends which have been based on the well-known Lintner model [10, 11]. Secondly some new empirical evidence is presented. This indicates that for the United States, except in severe recession years, reasonable estimates of the parameters of the normal earnings model can be derived from cross-section samples of individual firms or industries by an auto-regressive dividend equation. Some direct econometric tests of the normal earnings hypothesis are described. These, while very crude, do tend to support the hypothesis. Finally some tests of the relevance of the average earnings performance of other firms in the industry to the dividend policy of an individual firm suggest there is no need for a relative earnings hypothesis of dividend behaviour.

II. *The Normal Earnings Model and the Lintner Model*

The normal earnings model is founded on the hypothesis that the adjustment of a company's dividends to a rise or fall in its earnings will be smaller the greater the short-run or transitory component and larger the greater the long-run or permanent component in the change in the expected stream of future earnings. This implies that the marginal propensity to save out of transitory earnings will be greater than the MPS out of "normal" earnings. The Lintner model however does not distinguish these two components of a change in earnings.

Lintner's model of dividend behaviour is based on an interview survey of U.S. firms [10, 11]. He concluded that the majority of firms had a definite target payout ratio (π) such that

$$D^*_{it} = \alpha + \pi X_{it} \tag{1}$$

where D^*_{it} is desired dividends and X_{it} is net after-tax profits of firm i in period t.

Lintner introduced an intercept term (α) into his estimating equation to allow for an asymmetry between the reaction of dividends to rising earnings and to falling earnings as well as to reflect any bias towards a gradual growth in dividends.

Actual dividends, D_{it}, were adjusted at a certain constant rate, ϕ, to differences between D^*_{it} and D_{it-1}

$$D_{it} - D_{it-1} = \phi(D^*_{it} - D_{it-1}) \tag{2}$$

Substituting (1) in (2) and simplifying

$$D_{it} = \phi\alpha + \phi\pi X_{it} + (1 - \phi)D_{it-1}$$

---

[1] I am indebted to Professor Irwin Friend of the University of Pennsylvania who supervised the dissertation from which much of this article derives.

Letting $\phi\pi = b'$, $(1 - \phi) = c'$ and $\phi\alpha = a'$, and adding an error term (u') gives the regression equation

$$D_{it} = a' + b'X_{it} + c'D_{it-1} + u_t' \tag{3}$$

This regression equation was found by Lintner to be fairly successful in predicting aggregate corporate dividends on the basis of time series of aggregate dividends and earnings. It yielded better results than alternative equations which either omit the lagged dividend variable or replace it by a lagged earnings variable. The equation has been incorporated into several macro-econometric models of the U.S. economy, most recently by Klein [7], and it has been applied to time series data for individual U.S. firms by Kuh [8].

Despite the widespread use and success of the reduced form equation (3), the Lintner model suffers two inconsistencies. Firstly, if the intercept term is non-zero the firm cannot reach its target payout ratio even if current profits persist indefinitely. Secondly, although Lintner explains the partial adjustment of dividends to a change in earnings on the basis of uncertainty as to whether earnings will remain at their new level, equation (1) implies an elasticity of expectations of future earnings of unity. If a firm is aiming at stable dividends, why should the desired level of dividends equal a certain fraction of current earnings, unless earnings are expected to remain at the same level?

The inconsistencies of the Lintner model can be avoided by specifying a relationship between dividends and normal earnings. Let X_t^* be the firm's subjectively assessed normal earnings and λ_t be the coefficient of adjustment of normal to actual earnings in period t.

$$X_{it}^* - X_{it-1}^* = \lambda_t(X_{it} - X_{it-1}^*) + \varepsilon_{it},\ E(\varepsilon_{it}) = 0 \qquad 0 < \lambda < 1 \tag{4}$$

The error term ε_t reflects any deviation from the exact adaptive expectations relationship which may result, for example, from short-run factors affecting the profitability of the firm in period t.

Now suppose dividends per unit of capital are a linear function of normal earnings per unit of capital.[1] Letting W_t represent the average value of investors' capital in period t, and η_t be any deviation from the exact linear relationship which might result, for example, from the rounding of dividends per share to the nearest nickel, dime or quarter,

$$\frac{D_{it}}{W_{it}} = \delta_t + \rho_t \frac{X_{it}^*}{W_{it}} + \eta_{it} \qquad E(\eta_{it}) = 0 \tag{5}$$

Dividing (4) by W_t, substituting in (5) and rearranging terms yields

$$\frac{D_{it}}{W_{it}} = a_t + b_t \frac{X_{it}}{W_{it}} + c_t \frac{D_{it-1}}{W_{it}} + u_{it} \tag{6}$$

[1] This is preferable to postulating a linear relationship between dividends and normal earnings in absolute terms as has been done by Lancaster and Fisher [9,3]. Investors are primarily concerned with the rate of return on their capital, and any minimum acceptable level of dividends will be relative to the value of investors' capital. For similar reasons, Dobrovolsky [1], using cross-section and time series data for U.S. corporations, estimated a regression of dividends on current earnings and lagged dividends with all variables expressed per dollar of net worth. It is noteworthy that Dobrovolsky's incorporation of a lagged dividend variable was designed to reflect shareholders' pressures or "dividend requirements" rather than arising from a Lintner-type partial adjustment model or a normal earnings model [1, pp. 36–42].

where

$$a_t = \delta_t \left[1 - \left(\frac{W_{it-1}}{W_{it}}\right) + \lambda_t \frac{W_{it-1}}{W_{it}}\right],$$

$$b_t = \rho_t \lambda_t,$$

$$c_t = (1 - \lambda_t)$$

and

$$u_{it} = \left[\eta_{it} - (1 - \lambda_t) \frac{W_{it-1}}{W_{it}} \eta_{it-1} + \rho_t \frac{\varepsilon_{it}}{W_{it}}\right].$$

Where the estimate of a in equation (6) is found to be insignificantly different from zero (as is so in all our regressions), the results are consistent with the Lintner model as well as with the normal earnings model. However the normal earnings model is to be preferred to the Lintner partial adjustment model on the a priori grounds discussed above. The good fits that have been obtained with both time series and cross-section data are equally as intelligible in terms of the former as of the latter.

The replacement of the Lintner model by the normal income model begs some speculation about the factors underlying the basic parameters of the latter. If δ equals zero, ρ is both the marginal propensity to pay dividends (MPD) out of normal income, and the "normal" payout ratio. This is essentially a long-run concept, and the equation (5) part of a long-run planning model. Many simple models embodying (5) could be proposed. The simplest would be one in which all variables were expected to grow at a constant rate, profits were a linear function of sales, investment was dependent on a simple change-in-sales accelerator, and the firm planned to finance all or a constant proportion of investment by retentions.

λ is on the other hand a short-run parameter and unplanned. It will probably change over time, depending in part on the past performance of earnings, and in part upon the circumstances under which earnings change. If a fall in earnings is associated with an event which is expected to be short-lived and not to recur frequently, for example most strikes, λ will be lower than if the fall in earnings were associated with a possibly permanent decline in demand for the product of the firm.

III. *Empirical Tests*

A. *Estimation of Reduced Form of the Normal Earnings Model*

It was intended to discover whether reasonable estimates of the parameters of the normal earnings hypothesis could be obtained from cross-section samples of individual U.S. firms in a wide selection of different industries. Time-series regressions are unsuited to estimating the parameters of a normal earnings model since the coefficient of adjustment is unlikely to remain constant over time. Equation (6), where D_t, X_t and W_t denote annual common stock dividends, net after tax earnings and net worth respectively, was estimated from cross-section data on individual firms. Net worth, though far from ideal, was the only measure for the value of shareholders' capital available to us.

Equation (6) violates the classical least squares assumption in several respects. Firstly, least squares bias will occur owing to the presence of the lagged dividends variable, which will be correlated with u_t unless u_t has no serial correlation. Secondly, heteroscedasticity might result from correlation between either

W_{it-1}/W_{it} or $1/W_{it}$ and either X_{it}/W_{it} or D_{it-1}/W_{it}. Thirdly, the suppression of the W_{it-1}/W_{it} in our equation will lead to bias in the parameter estimates if it should be correlated with either of the independent variables and δ is non-zero.

We will consider each of these problems in turn. It was decided that the least squares bias, if any, would have to be tolerated at this stage of the study. Liviatan has proposed an instrumental variable method for deriving consistent estimates of the parameters of an autoregressive equation such as (6) [12]. But in estimating a distributed lag consumption function on household survey data, he found that not only were the standard errors of the instrumental variables estimates much larger but in no case (out of 6; 2 regressions based on each of 3 sets of reinterview survey data, one including durable expenditure in consumption, the other not) were the instrumental variable estimates significantly different from the least squares estimates. Nor were the derived long-run marginal propensities to consume much different [13]. While it would be presumptuous to suggest that the same would hold true in the case of cross-section firm data, and certainly Liviatan's technique will be tried in some further work on short-run dividend behaviour currently being undertaken, our suspicions are that the loss of efficiency will be such that classical least squares is in fact preferable.

Heteroscedasticity does not appear to have caused much damage, the standard errors of our parameter being generally small.

None of our estimates of a was significantly different from zero. Inspection of the make-up of the constant term reveals that if a is in fact zero, δ could only be non-zero where $W_{t-1}/W_t = /1/(1 - \lambda)/ > 0$. However, in all our industry samples average net worth in 1956 was greater than in 1955. Thus one might conclude that δ is in fact close or equal to zero for most firms, in which case the W_{t-1}/W_t variable is dispensable.

This is not an entirely satisfactory ex post justification for not including W_{t-1}/W_t as an explicit independent variable. Its inclusion might have resulted in a non-zero estimate of δ. In fact if X_t/W_t and W_{t-1}/W_t are negatively correlated (on the grounds that X_t/W_t is serially correlated over time, and a high rate of return increases net worth) and the coefficient of W_{t-1}/W_t equals $[-\delta(1 - \lambda)]$ and thus is negative, our estimates of a suffer a downward bias. How serious is the upward bias in the b estimates can only be judged on the basis of the results. We omitted the W_{t-1}/W_t variable through misjudgement of the data necessary to test the model, rather than because of any prejudgement as to its importance.

A second estimating equation was used because it appeared that in several cases c was upward-biased owing to the presence of "firm effects." Included among firm effects are any factors leading to a consistent departure in the structure of the dividend function of an individual firm from that of the industry. Equation (6) may be rewritten to make these firm effects (F_i) explicit. Using primes to indicate that the variable has been "deflated" by W_{it}

$$D'_{it} = a + bX'_{it} + cD'_{it-1} + F_i + e_{it}$$

where $F_i + e_{it} = u_{it}$. F_i will be correlated with both D'_{it} and D'_{it-1} leading to an upward-biased c. Making the simplifying assumption that firm effects are additive, F_i might be eliminated by taking first differences. However, this may lead to a downward-biased b since $(x'_{it} - X'_{it-1})$ may include a large random component, which depresses or inflates the accountant's profits figures, but may not be included in the firm's assessment of profits available for dividends. These may result from factors of a primarily accounting nature, such as write-offs or the general over- or understatement of earnings (cf. Friend and Puckett [4], p. 665). Accordingly, first differences of three-year agrgegates were taken so that the second estimating equation was of the form

$$d'_{it} = a + bx'_{it} + cd'_{it-1} + u'_{it} \tag{7}$$

where d'_{it} and x'_{it} are equal to

$$\sum_{n=3}^{0} D'_{i(t-n)} - \sum_{n=4}^{6} D'_{i(t-n)} \text{ and } \sum_{n=3}^{0} X'_{i(t-n)} - \sum_{n=4}^{6} X'_{i(t-n)}$$

respectively.

The data, originally collected and standarised by the Federal Reserve Board, included most of the largest companies in each industry group. The complete sample, from which were selected nine industrial groups is described in detail in [2] pp. 580–88.

Equations (6) and (7) were estimated by least squares for these nine industrial groups for $t = 1956$. The results are listed in Tables 1 and 2.

TABLE 1.—*Regression Results, Equation (6), Cross-Section Firm Data*
(Standard errors are given in parentheses)

Industry	*a*	*b*	*c*	R^2	Number of firms in sample
Food and Tobacco	·002 (·004)	·173 (·054)	·723 (·071)	·902	32
Petroleum and Rubber	–·006 (·003)	·101 (·036)	·952 (·039)	·996	26
Chemicals	–·002 (·002)	·177 (·030)	·764 (·044)	·981	29
Iron and Non-Ferrous Metals	–·005 (·008)	·214 (·078)	·709 (·143)	·732	27
Machinery	–·001 (·004)	·060 (·021)	1·005 (·076)	·893	41
Transportation Equipment	·000 (·007)	·084 (·052)	·858 (·116)	·815	21
Retail Trade	·001 (·003)	·137 (·057)	·783 (·083)	·924	35
Railroads	·001 (·002)	·215 (·040)	·542 (·078)	·942	20
Electrical Utilities	–·019 (·010)	·165 (·119)	1·147 (·172)	·784	28

Note: R^2: coefficient of determination adjusted for degrees of freedom.

In both cases the equations fit the data very satisfactorily. On the basis of goodness of fit, equation (6) yields on the whole better results than equation (7). c estimated by equation (6) is less than that estimated by equation (7) in only 4 cases suggesting that firm effects are either not a severe problem elsewhere, or that they cannot be simply eliminated by taking first differences of three-year aggregates. Random components in x'_i seem to have led to a significant downward-bias in b in Petroleum and Rubber, Iron and Non-Ferrous Metals, and Retail Trade where equation (7) is used.

TABLE 2.—*Regression Results, Equation (7), Cross-Section Firm Data*
(Standard errors are given in parentheses)

Industry	a	b	c	R^2
Food and	–·001	·235	·609	·820
Tobacco	(·001)	(·034)	(·100)	
Petroleum and	·000	·050	1·048	·964
Rubber	(·001)	(·041)	(·057)	
Chemicals	·003	·152	·799	·774
	(·002)	(·051)	(·121)	
Iron and Non-	·005	·079	·950	·843
Ferrous Materials	(·001)	(·040)	(·112)	
Machinery	·002	·167	·521	·926
	(·001)	(·040)	(·067)	
Transporta-	·000	·169	·673	·905
tion Equipment	(·002)	(·048)	(·124)	
Retail Trade	·001	·060	·893	·851
	(·001)	(·022)	(·068)	
Railroads	·002	·229	·638	·695
	(·001)	(·060)	(·211)	
Electric	·000	·366	·408	·481
Utilities	(·003)	(·117)	(·119)	

Table 3 lists the estimates of the parameters of the normal earnings mode which have been derived from the regression coefficients in Table 1. Th parameter estimates are those derived from the equation (6) regression, excep in those four cases, Food and Tobacco, Machinery, Transportation Equipmen and Electric Utilities, where some upward bias in the estimates of c appears t have been eliminated by using equation (7). Since the constant term is in a cases statistically insignificant which we take to imply that $\delta = 0$, b is an estimat of the short-run MPD and $b/1 - c$, the long run MPD.

TABLE 3.—*Estimates of Normal Earnings Model Parameters derived from Regression Results in Tables 1 and 2*

Industry	Marginal Propensities to Pay Dividends Short-run (b)	Long-run [$b/(1 - c)$]	Rate of Adjustme ($1 - c$)
Food and Tobacco	·24	·60	·39
Petroleum and Rubber	·10	2·01	·05
Chemicals	·18	·75	·24
Iron and Non-Ferrous Metals	·21	·74	·29
Machinery	·17	·35	·48
Transportation Equipment	·17	·52	·33
Retail Trade	·14	·63	·22
Railroads	·21	·47	·46
Electric Utilities	·37	·62	·59

Source: Tables 1 and 2, see text.

While the majority of these estimates are of reasonable magnitude, the bla tant exception being Petroleum and Rubber, there is considerable inter industry variation both in the long-run propensity and in the rate of adjustmen

The high short-run MPD and adjustment rate in Electric Utilities is explained by the regulated nature of that industry. Elsewhere the variation in the long-run MPD would have to be explained in terms of a long-run planning model, while that in the rates of adjustment by differences in the variability of earnings, and the particular situations faced by different industries in 1956.

Rather than become embroiled in a speculative exercise of this nature it was decided to test the predictive power of the estimates of ρ. When $\delta = 0$, ρ, the long-run MPD, will also equal the long-run or "normal" pay-out ratio. Thus the estimates of ρ were compared with the average pay-out ratios for 1963, which being the fifth year of continued expansion, is one in which the ratios should, on average, be close to their normal level.

Unfortunately, data-collection on the FRB sample was discontinued in 1956. However, the FRB continued to publish a limited amount of data, aggregated by industry group from the reports of large companies. But for the exclusion of Retail Trade the industry classification as well as the coverage is close to that used in this study. The average 1963 pay-out ratios of these samples are listed in Table 4, except that for Retail Trade, which is the average pay-out ratio for the 1960/61 accounting year for firms with assets of over 10 million dollars. For purposes of comparison the average pay-out ratios of the original samples for 1956 are also entered. Owing to its poor showing in the regression analysis, Petroleum and Rubber was omitted.

TABLE 4.—*Estimated Long-run and Actual Pay-out Ratios in 1956 and 1963*

Industry Classification for columns (1) and (2)	Estimated Long-Run Pay-out Ratio, 1956	Actual Average Pay-out Ratio		Industry Classification for column (3)
		1956	1963	
	(1)	(2)	(3)	
Food and Tobacco	·38	·49	·40	Food and Kindred Products
Chemicals	·25	·31	·25	Chemical and Allied Products
Iron and Non-Metals	·26	·52	·38	Primary Metals and Products
Machinery	·65	·37	·47	Machinery
Transportation Equipment	·48	·48	·47	Transportation Equipment
Retail Trade	·37	·43	·34	Retail Trade
Railroads	·37	·49	·41	Railroads
Electric Utilities	·38	·33	·29	Electric Utilities

Sources: column (1), Table 3.
column (3), *Federal Reserve Bulletin*, (May 1963) except Retail Trade, I.R.S., *Corporation Income Tax Returns, 1960–61*, (Washington, 1963).

The long-run pay-out ratios calculated from the regression coefficients and the actual average pay-out ratios may be viewed as alternative estimates of the long-run pay-out ratio, or average propensity to distribute out of normal earnings. In four cases the regression estimates are closer to the 1963 pay-out ratios than are the 1956 ratios, in two cases the reverse is true, and in the remaining two cases there is little to choose between them. To some extent the discrepancies between the regression estimates and the 1963 ratios must be due to changes in the coverage of the samples, to deviations between the 1963 ratios and the 1963 "normal" ratios, and to changes in the normal ratios between 1956 and 1963. In view of these difficulties the regression results must be considered a qualified success.

Insofar as these and other results bear out the value of equation (6) as a short-run dividend function, they lend support to the normal earnings hypothesis. The marked difference between the short-run and long-run MPDs demonstrate the inadequacy of a simple proportional model of business savings. The normal earnings hypothesis deserves to be upheld at least until some other explanation of the positive lagged dividend coefficient is forthcoming, or the hypothesis is empirically refuted.[2] However, as far as assessing the normal earnings hypothesis is concerned single-year regressions are very inadequate since there is no means of distinguishing between transitory and permanent earnings changes.

Accordingly equation (6) was estimated using the aggregate dividends and earnings data of the 21 manufacturing industries for each year in the period 1956–1960. The results are given in Table 5.

TABLE 5.—*Regression Results, Equation (6), Cross-Section Industry Data* (standard errors of coefficients are given in parentheses)

Year	a_t	b_t	c_t	R^2	Long-run MPD	Rate of Adjustment
1956	−·001	·119	·839	·935	·75	·16
	(·003)	(·052)	(·077)			
1957	−·001	·075	·909	·977	·83	·09
	(·001)	(·034)	(·067)			
1958	−·018	·335	1·081	·276	<-1.0	−·08
	(·019)	(·328)	(·592)			
1959	−·008	·443	·250	·847	·59	·75
	(·004)	(·050)	(·039)			
1960	·001	·120	·800	·955	·60	·20
	(·002)	(·034)	(·070)			

These results on the whole support expectations concerning cyclical fluctuations in the coefficient of adjustment, λ. λ might be expected to fall as aggregate earnings fall below their "normal" level, that is during the "downturn" phase, owing to uncertainty about how much further business will decline. This explains the very low λs in 1957 and 1958, and is consistent with the high standard erros in the latter year. As earnings recover, as in 1959, λ will be high, until earnings have reached their "normal" level. The values for λ for 1956 and 1960, which represent "secular expansion" years are intuitively plausible. As for the long-run MPD, comparison is made more difficult by the lack of standard

[2] Hart concluded that a normal model was not apparently necessary on the basis of 3 samples of U.K. firms, one each from brewing, textiles and manufacturing as a whole. He estimated a simple equation of the form, $\log S = a \, b\log X + u$, for each year between 1949 and 1963, and suggested that the apparent stability of b over the period indicated that the savings-income ratio was unaffected by transitory components, (5, particularly 6). The author is currently engaged in a study of the dividend policy of U.K. firms and expects to throw light on this question.

errors. However there appears to have been a downward shift in the long-run MPD following the recession of 1958. The 1958 figure itself, together with the very low R^2 for that year, suggest that the normal earnings hypothesis, at least in the particular form in which it has been presented breaks down in the event of a severe and widespread decline in earnings.

B. *Estimation of Crude Normal-Transitory Earnings Model*

In order to make a direct test of the normal earnings hypothesis, a regression equation relating dividends to crudely-calculated estimates of the normal and transitory components of earnings was estimated, using the 1956 firm data in the 9 industry groups.

The concept of normal earnings which underlies the normal earnings hypothesis has not been precisely defined. If dividends are related to some notion of normal rather than actual earnings in order that dividends might be immune from short-run fluctuations in earnings, (perhaps because unstable dividends are interpreted as an indication of riskiness, or simply because predictability in the dividend rate is valued in itself) the appropriate normal earnings in any period will equal the initial value of the smoothed stream of expected earnings over the planning horizon.

In fact normal earnings, X^*, were simply estimated as three-year average of actual earnings over the years 1954 to 1956, and transitory earnings, X^{**}, as the difference between normal and actual earnings. The equation initially run for each industry-group was (5) with the addition of the transitory earnings variable, expressed on a per dollar of net worth basis,

$$D'_{it} = a + bX^{*\prime}_{it} + cX^{**\prime}_{it} + u_{it} \tag{8}$$

where b and c are estimates of the MPD out of normal and transitory earnings respectively.

The results of running equation are listed in Table 6.

In 8 out of 9 cases the estimated short-run MPD out of transitory earnings, c, was not significantly different from zero at the 5% level and much lower than b. This is in accordance with the normal earnings hypothesis in which dividends are a function of normal earnings.

It might be argued that these estimates of the MPD out of transitory earnings are biased downwards owing to the existence of firm effects, particularly in so far as "risky" firms may both pay below average dividends and experience greater-than-average transitory components in earnings. Secondly random fluctuations in earnings of a purely accounting nature will cause errors in X^{**}, also tending to bias c downwards. On the other hand a simple average of earnings from 1954 to 1956 probably underestimates the level of normal earnings of most firms in 1956, tending to bias c upwards. While more rigorous tests of the normal earnings hypothesis are necessary, at least a tentative conclusion may be drawn from these results to the effect that the MPD out of transitory earnings is less than that out of normal earnings.

C. *Test of a Relative-Earnings Hypothesis*

It is not unreasonable to expect a firm to take into account the earnings performance of other firms in its industry in the adjustment dividends to a rise or fall in its own earnings. Since the complete sample was subdivided into 9 industry groups it was possible to test whether a firm would react differently to a change in earnings which was exclusive to itself, from one which just

TABLE 6.—*Regression Results, Equation (8), Cross-Section Firm Data* (standard errors are given in parentheses)

Industry	a	b	c	R^2
Food and	·002	·589	·150	·644
Tobacco	(·009)	·(078)	(·163)	
Petroleum	—·077	1·198	—·304	·928
and Rubber	(·010)	(·099)	(·402)	
Chemicals	·002	·627	—·145	·876
	(·006)	(·046)	(·155)	
Iron and Non-	·002	·476	·354	·460
Ferrous Metals	(·014)	(·141)	(·286)	
Machinery	·032	·219	·258	·398
	(·007)	(·041)	(·103)	
Transporta-	·016	·352	—·133	·518
tion Equipment	(·010)	(·078)	(·147)	
Retail Trade	·002	·601	—·016	·826
	(·005)	(·049)	(·139)	
Railroads	·003	·506	—·404	·875
	(·002)	(·045)	(·231)	
Electric	·011	·899	—·301	·482
Utilities	(·015)	(·179)	(·515)	

equalled the change in earnings experienced on average by the industry as a whole. A simple estimating equation was used:

$$D'_{it} = a + bX'_{It} + c(X'_{it} - X'_{It}) + u_{it} \tag{9}$$

where X'_{It} is the average earnings of industry-group I of which firm i is a member. If its short-run MPD is lower when a rise in earnings is unique to an individual firm than when the rise in earnings is equal to the average rise in earnings of the industry-group, c should be less than b. Dividends and earnings data were again expressed per dollar of net worth on the same grounds as previously. The regression was run using the complete sample of 259 firms for each of 3 years, 1954, 1955 and 1956. The results are listed in Table 7.

TABLE 7.—*Regression Results, Equation (9), Cross-Section Firm Data* (standard errors are given in parentheses)

Year	a	b	c	R^2
1954	·018	·345	·323	·443
	(·003)	(·026)	(·023)	
1955	·019	·318	·306	·368
	(·004)	(·028)	(·026)	
1956	·009	·435	·430	·527
	(·004)	(·028)	(·026)	

Although there was considerable inter-year variation, in no year was there a statistically significant difference between b and c. These results strongly suggest that a firm's short-run dividend behaviour is independent of its earnings performance relative to that of other firms in the industry. It will not raise dividends any less if its earnings rise in isolation, nor will it raise dividends if average industry earnings rise while its own remain unchanged.

V. *Conclusions*

1. The normal earnings hypothesis as a short-run theory of dividend behaviour is compatible with the results of the empirical studies of dividend behaviour in the U.S. A normal earnings model is to be preferred to the Lintner model of dividend behaviour on a priori grounds.
2. The parameters of one possible normal earnings model can be estimated by the regression of current dividends on current earnings and lagged dividends, all expressed as rates of return on capital, with cross-section data on firms or industries. There are however indications that this normal earnings model may break down in a severe recession. Other normal earnings models might be more appropriate.
3. The normal earnings hypothesis is supported by evidence indicating a lower marginal propensity to pay dividends out of the short-run or transitory component of earnings than out of the long-run or permanent component.
4. In making short-run dividend decisions firms appear indifferent to the earnings performance of the industry as a whole, and only concerned with their own experience .There is no evidence of the relevance of a relative earnings hypothesis.

M. DAVENPORT

University of York

REFERENCES

[1] Dobrovolsky, S. (1951) *Corporate Income Retention*, 1915–43, New York: National Bureau of Economic Research

[2] *Federal Reserve Bulletin* (June 1956), Washington.

[3] Fisher, M. R. (1957) L'epargne et les profits des entreprises dans l'hypothése du "revenue permanent", *Economie Appliquée*, 10, 1–24.

[4] Friend, I. and Puckett, M. (1964) A reappraisal of the role of dividends in the determination of stock prices, *American Economic Review*, 54, 656–682.

[5] Hart, P. E. (1962) The business propensity to save and size of firm, *The Review of Economic Studies*, 29, 147–150

[6] Hart, P. E. (1965) Business savings and errors in variables, *The Review of Economic Studies*, 32, 225–232.

[7] Klein, L. R. (1964) A post-war quarterly model, description and applications, in *Models of Income Determination*, Studies in Income and Wealth, Vol. 28, Princeton Univ. Press.

[8] Kuh, E. (1963) *Capital Stock Growth: A Micro-Econometric Approach*, Amsterdam: North Holland.

[9] Lancaster, T. (1963) Business saving and normal income, *The Review of Economic Studies*, 30, 203–216.

[10] Lintner, J. (1953) The determinants of corporate savings, in *Savings in the Modern Economy*, ed. by W. Heller and others, Minneapolis: University of Minnesota.

[11] Lintner, J. (1956) Distribution of incomes or corporations among dividends, retained earnings and taxes, *American Economic Review*, 46, 97–113.

[12] Liviatan, N. "Consistent Estimation of Distributed Lags", *International Economic Review*, Jan. 1963

[13] Liviatan, N. "Distributed Lag Consumption Functions", *Review of Economics and Statistics*, XLVII, No. 1. Feb. 1965 pp. 43–53.