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A Research Note on the Information Content of Dividends and the Corroboration Effect of Earnings and Dividend Signals: Irish Evidence

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Introduction

Modigliani and Miller (1958) demonstrated that, under the assumptions of perfect capital markets, rational behaviour and zero taxes, the value of a firm is independent of the firm's dividend payout rate. In a later paper, however, Miller and Modigliani (1961) suggested that dividends may convey information about future earnings if the management of a firm follow a policy of dividend stabilisation and use a change in the dividend payout rate to signal a change in their views about the firm's future profitability.

The first major thrust in the dividend signalling literature set out to empirically test the hypothesis that dividends convey information about future earnings. Studies by Watts (1973), Ezzell (1974), Laub (1976) and Lobo, Nair and Song (1986) provide conflicting empirical evidence on this issue and have been the subject of critical review. Specifically, Taylor (1979) notes that many of the tests performed are counter-intuitive.

A second major thrust in the dividend signalling literature concerns the effect of dividend announcements on abnormal returns to equity (see, for example, Pettit, 1972, 1976; Charest, 1978; Aharony

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and Swary, 1980; Penman, 1980; Asquith and Mullins, 1983; Dielman and Oppenheimer, 1984; Kalay and Lowenstein, 1985; Easton and Sinclair, 1989). Whilst the results of such studies are conflicting, in general they are supportive of the hypothesis that dividend signals convey information to the market over and above that conveyed by earnings signals.

In the US, Kane, Lee and Marcus (1984) and in Australia, Easton (1991) investigated the hypothesis that, as unexpected earnings and unexpected dividends are noisy signals, investors may be interested in their consistency. They find evidence to support the existence of an interaction effect of earnings and dividend announcements on abnormal returns to equity.

In a UK context, Opong (1993) reported interaction effects between dividend and earnings signals in interim report releases, but Opong (1996) suggests that the interaction effect of preliminary annual dividend and earnings announcement is weak. More recently, Hamill and McCaffrey (2000) investigated interaction effects with respect to dividend initiation announcements in Initial Public Offerings. They report that no evidence of an interaction effect is observed.

This study investigates the hypothesis that dividends have information content and that there is an interaction or corroborative effect between dividend and earnings signals with respect to future earnings. The study is performed on a sample of 25 companies listed in the Irish Stock Market Handbook (1991). Earnings and dividend data is collected for the seven-year period from 1984 to 1990. The results of the study support the contention that dividends have information with respect to future earnings and that there is an interaction effect between earnings and dividend signals on future earnings.

The remainder of this paper is organised as follows:

- A brief review of previous literature.
- An outline of the data, definitions of variables and tests used in the study.
- An evaluation of the results of the study.
- A review of some of the limitations of the study.
- A brief summary of the main results.

Previous Literature

The first major thrust in the dividend signalling literature set out to empirically test the hypothesis that dividends convey information about future earnings. The results of such studies are conflicting but, in general, are supportive of the contention that dividends convey information about future earnings (see, for example, Petit, 1972; Watts, 1973; Lobo, Nair and Song, 1986).

Taylor (1979) considers the empirical work of Watts (1973), Ezzell (1974) and Laub (1976) and notes that, in 19 out of the 20 tests performed, a particular structure of joint forecasting model is employed. The joint forecasting model may be denoted as follows:

$$E^{j}_{t+1} = E^{p}_{t+1} + f(UD_t) \quad (1)$$

where, E^{p}_{t+1} and E^{j}_{t+1} are the prior and joint forecasts of earnings at t+1, made at time t and UD_t, is the unexpected dividend at time t, i.e.

$$UD_t = D_t - D_t^{D} \quad (2)$$

where, D_t is the actual dividend at time t and D_t^{D} is its forecast made one period earlier. The prior forecast of earnings is the best predictor without the use of dividend data, whilst the joint forecast is the prior forecast with the addition of dividend data.

Equation (1) is usually tested by using OLS regression on the following model:

$$E^{j}_{t+1} = k_0 E^{p}_{t+1} + k_1 UD_t + e_t \quad (3)$$

If UD_t is found to be positive and significant in the regression of this joint forecasting model, then it is argued that dividends have information content with respect to future earnings.

Taylor (1979) argues that the form of constrained forecasting model employed in such tests is counter-intuitive, in that it suggests that a user makes a joint forecast in a sequential fashion, whilst earnings and dividends, at least in the UK and Ireland, are often announced simultaneously. When such a joint message becomes available, it causes a complete re-appraisal of existing information. It would therefore appear reasonable to suggest that the joint forecast should be made in a simultaneous, rather than a sequential, manner.

Lobo, Nair and Song (1986) tested the information content hypothesis with respect to future earnings by investigating whether more accurate forecasts of earnings can be obtained by utilising dividend information. They estimate the following cross-sectional equation:

$$E_{t+1} = m_{0j} + m_1 FE_{ijt+1} + m_2 FD_{ikt+1} + e_{ijkt+1} \quad (4)$$

where, FE_{ijt} is forecasted annual earnings per share for firm i in year t+1 using various forecasting models of earnings (j) excluding dividends, FD_{ikt+1} is forecasted dividends per share for firm i in year t+1 using various forecasting models of dividends (k) excluding earnings and e_{ijkt+1} is an error term.

The forecasts of earnings using this combined model are then compared with the forecasts of earnings using the various forecasting models excluding dividend data. Forecasting metrics are used to evaluate the relative predictive ability of the models.

Although the results of the test support the information content hypothesis, it may again be argued that it is counter-intuitive in that it again suggests that a user makes a joint forecast in a sequential fashion, whilst earnings and dividends are often announced simultaneously.

The only test performed that does not constrain the information impounding process to a sequential procedure is the preliminary test of Watts (1973). In this test, future earnings are regressed on current and past earnings and dividends in the following form:

$$E_{i,t+1} = a_i + b_1 E_{i,t} + b_2 E_{i,t-1} + b_3 D_{i,t} + b_4 D_{i,t-1} + u_{i,t} \quad (5)$$

where $E_{i,t+1}, E_{i,t}, E_{i,t-1}, D_{i,t}$ and $D_{i,t-1}$ are the earnings and dividends of firm i in the periods t+1, t and t-1 respectively and $u_{i,t}$ is an error term.

Watts argues that, if management expects future earnings to increase substantially in year t+1, they will declare higher dividends in year t than expected given the earnings of years t and t –1 and dividends of year t –1. Consequently, if current dividends do provide information on future earnings, the estimated coefficient b_3 is expected to be positive. In reporting the results of the test, Watts (1973, p197) states: "... the estimated coefficient of the current dividends term, $D_{i,t}$ is on average positive".

From his review of the tests performed by Watts, Ezzell and Laub, Taylor concludes that the tests provide conflicting evidence with respect to the potential of dividends to convey information about future earnings and that it is very difficult to find grounds to support one study's findings over another.

Despite the conflicting evidence from those studies that have attempted to empirically model and test the information content hypothesis, there is some support from behavioural surveys of dividend policy. Partington (1985) found that the managers of listed Australian companies consider the signalling effect — i.e. the use of

the dividend payment as a mechanism to signal their view of future profitability — an important factor in motivating the dividend decision. Gill and Green (1994) and Green, Pogue and Watson (1993), similarly found that the financial directors of both listed UK and Irish companies perceive the signalling effect to be an important factor in motivating the dividend decision.

A second major thrust in the dividend signalling literature concerns the effect of dividend announcements on abnormal returns to equity (see, for example, Pettit, 1972, 1976; Charest, 1978; Aharony and Swary, 1980; Penman, 1980; Asquith and Mullins, 1983; Dielman and Oppenheimer, 1984; Kalay and Lowenstein, 1985; Easton and Sinclair, 1989). The results of such studies again are conflicting but generally supportive of the contention that dividend signals convey information to investors over and above that conveyed by earnings signals.

Kane, Lee and Marcus (1984), Easton (1991), Opong (1993,1996) and Hamill and McCaffrey (2000) investigated the hypothesis that, as unexpected earnings and unexpected dividends are noisy signals, investors may be interested in their consistency — i.e. that there is an interaction effect between dividend and earnings signals. The interaction effect is examined via the following regression models:

$$AR_t = a_0 + a_1UE_t + a_2UD_t \quad (6)$$

$$AR_t = b_0 + b_1UE_t + b_2UD_t + b_3I(-0) + b_4I(-+) + b_5I(+-) + b_6I(+0) + b_7I(++) \quad (7)$$

where, AR_t is the abnormal return to equity, UE_t is the unexpected earnings, UD_t is the unexpected dividends in period t. The variable I(-0) is an interaction dummy variable that takes the value of 1 if unexpected earnings is negative and unexpected dividends is zero in period t and takes the value 0 otherwise. Similarly, the variable I(-+) takes the value of 1 if unexpected earnings is negative and unexpected dividends is positive in period t and takes the value 0 otherwise. The other dummies are defined analogously. Easton argues that the variable I(--) is excluded from the model to prevent the existence of an exact linear relationship between the dummies and the intercept. Therefore, the intercept has the interpretation of the worst-news scenario — i.e. negative unexpected earnings and dividends. The other dummy variables represent the incremental return over the (--) case.

The null hypothesis is that there are no interaction effects between earnings and dividend announcements. This hypothesis predicts that

the coefficients on the interaction dummy variables will be jointly equal to zero. This hypothesis is tested using a F-statistic. The expectation models used for earnings and dividends in both the Kane *et al* and Easton studies conform to a seasonal random walk. Hence, the dummy variables generated to test for an interaction effect between earnings and dividend signals effectively relate to the signs of the periodic changes. This is consistent with the notion that perhaps the most basic type of signal that may be conveyed by realised earnings and dividend numbers is the direction of the periodic change. The results of both the Kane *et al* and Easton studies support the existence of an interaction effect between earnings and dividend signals with respect to abnormal returns to equity. The results of Opong (1996) and McCaffrey and Hamill (2000) in a UK context, however do not support the existence of an interaction effect.

Data, Definitions and Tests

Data

The sample is selected from all those companies (a total of 90) listed in the Irish Stock Exchange Handbook (1991). From these companies are excluded: (a) firms primarily engaged in financial activities (e.g. banks, investment funds, etc), (b) property and oil and gas exploration companies, and (c) firms for which data was not available over the period 1984 to 1990. As a result of this exclusion policy, the final sample consisted of 25 companies. **Table 1** provides details of the industrial classification, market capitalisation and listing for the final sample. This information is extracted from the Irish Stock Exchange Handbook (1991) as data was not readily available on computerised databases (for example, Datastream).

From **Table 1**, it is clear that, in comparison with Opong's (1996) sample, Irish companies are relatively small. Further, although Opong (1996) does not report the industrial make-up of his sample, the industrial classification of Irish companies is rather mixed, although there would appear to be a relatively large proportion of food product companies.

TABLE 1: COMPANIES INCLUDED IN STUDY

COMPANY NAME	INDUSTRIAL CLASSIFICATION	LISTING	MKT. VALUE IR£'000 *
ARDAGH	Glass Products	OFLIST	48,800
ARNOTTS	Department Store	OFLIST	34,300
AVONMORE FOODS	Food Products	OFLIST	136,900
CLONDALKIN GROUP	Print & packaging	OFLIST	147,200
JAMES CREAN	Food & consumer products	OFLIST	133,700
CRH	Construction materials	OFLIST	717,700
EURPOPEAN LEISURE	Leisure	OFLIST	19,000
FITZWILTON	Cash & carry	OFLIST	97,200
FYFFES	Food products	OFLIST	283,600
GRAFTON GROUP	DIY stores	OFLIST	24,100
GREEN PROPERTY	Property development	OFLIST	17,400
INDEPENDENT	Newspapers	OFLIST	111,300
IRG	Polymor products	OFLIST	18,000
JONES GROUP	Metal products	OFLIST	51,300
JURYS GROUP	Hotel	OFLIST	31,700
KERRY GROUP	Food products	OFLIST	309,000
LYONS IRISH	Food products	OFLIST	69,000
McINERNEY	Construction	OFLIST	4,700
NORISH	Food storage	OFLIST	11,800
POWER CORP.	Department store	OFLIST	153,400
RYAN	Hotel	OFLIST	28,200
JEFFERSON SMURFIT	Print & packaging	OFLIST	1,378,500
UNIDARE	Indutrial holdings	OFLIST	35,800
WARDELL ROBERTS	Food distributor	USM	26,000
WATERFORD WEDGWOOD	Glass products	OFLIST	283,500

OFLIST Full official listing.

USM Listed on Unlisted Securities Market.

* Market value as at 30/09/91.

Definitions

Earnings per share and dividends per share are used rather than total earnings and total dividends in order to adjust for any undesirable influence exerted by larger companies within each sample and also because of the possible heteroscedasticity of error terms. It should be noted that the earnings variable employed excludes extraordinary items and is consistent with the Statement of Standard Accounting Practice No. 3 *Definition of Earnings Per Share*, prior to the amendment introduced by Financial Reporting Standard No. 3. The earnings variable excludes extraordinary items, as it is hypothesised that managers set dividend levels in the context of sustainable earnings and, by definition, extraordinary items are not sustainable (see, for example, Lintner, 1956; Green and McIlkenny, 1991; Allen, 1992; Green, Pogue and Watson, 1993).

Tests

In order to investigate the hypothesis that dividends convey information about future earnings and that there is an interaction effect between earnings and dividend signals with regard to future earnings, the following models are estimated:

$$E_{t+1} = a_0 + a_1E_t + a_2D_t + a_3E_{t-1} + a_4D_{t-1} \quad (8)$$

$$E_{t+1} = b_0 + b_1E_t + b_2D_t + b_3E_{t-1} + b_4D_{t-1} + b_5I(++) \\ b_6I(+0) + b_7I(-+) + b_8I(-0) + b_9I(+-) \quad (9)$$

The models tested are based upon the preliminary test of Watts (1973), but are modified to incorporate signalling effects. Specifically, it is assumed that signalling effects are captured by the direction of the periodic changes in reported earnings and dividend numbers. The dummy variables are therefore constructed as in the Kane *et al* and Easton studies — i.e. the variable I(++) is an interaction dummy variable that takes the value 1 if the periodic change in earnings (E_t - E_{t-1}) is positive and the periodic change in dividends (D_t - D_{t-1}) is positive and takes the value 0 otherwise, etc.

It should be noted that earnings and dividend levels variables are included as independent variables, rather than the "change" in earnings and dividends. The rationale for this amendment is threefold. First, conceptually as argued by Taylor (1979), the formation of expectations as employed by Kane *et al* and Easton restricts the information-impounding procedure to a sequential process. This is counter-intuitive, given that earnings and dividends

are announced simultaneously. Second, there is considerable empirical evidence that, although a random walk is descriptive of earnings behaviour (see Walsh and Horgan, 1989, for empirical evidence on the time-series properties of the annual earnings of listed Irish companies), it is not descriptive of dividend behaviour (see Green and McIlkenny, 1991, for evidence of the dividend behaviour of listed Irish companies). Forming dividend expectations would require the estimation of intertemporal dividend models, such as that of Lintner (1956). Data restrictions, however, prevent the application of such expectation models. Finally, an important finding in the recent literature on the modelling of the relationship between earnings and stock returns is that it may be possible to improve such modelling by using both "changes" and "levels" variables.

Specifically, Ohlson (1991) demonstrates that where earnings are either totally transitory or completely permanent, then returns are related solely to the yield (levels) or to the first difference (changes) proxy respectively. As in practice, it is unlikely that many firms' earnings are totally transitory or totally permanent, both variables should be included, i.e. the following form of model should be employed:

$$AR_t = c_0 + c_1(E_t - E_{t-1}) + c_2E_t \qquad (10)$$

When this model form is employed, the coefficient on unexpected earnings is given by the sum of the coefficients on the level and change variables (see, Brown, Griffin, Hagerman & Zmijewski, 1987 and Ali & Zarowin, 1992). An equivalent specification to the level and change variables is the current and lagged level variables, that is:

$$c_1(E_t - E_{t-1}) + c_2E_t = (c_1 + c_2)E_t - c_1E_{t-1} \qquad (11)$$

The advantage of this specification is that the coefficient on the current level variable directly gives the coefficient on the unexpected component.

Equations (8) and (9) are estimated by pooling the cross-sectional and time series data and applying Ordinary Least Squares Regression. The null hypothesis is that there are no interaction effects between earnings and dividend signals with regard to future earnings. This hypothesis predicts that the coefficients on the interaction dummy variables will be jointly equal to zero. This hypothesis is tested using an interaction F-statistic based upon the R^2 of the constrained model (equation 8) and the unconstrained model (equation 9) (see Pindyck and Rubinfeld, 1988, pp. 117-120).

A priori expectations are that the estimated coefficients on the current dividend (D_t) and earnings (E_t) variables will be positive and significant, indicating that both current dividends and earnings convey information about future earnings. With regard to the interaction dummy variables, Easton argues that, as these coefficients represent the incremental return over the worst-news signal — i.e. negative unexpected earnings and dividends — then, *a priori*, the estimated coefficients should be positive. The expected sign on the constant term in model (9), which is a surrogate for the (--) signal, is negative. Deriving from equation (11) above, *a priori* expectations are that the sign of the estimated coefficient on the lagged earnings variable will be negative.

Results and Implications

The results from the estimation of equations (8) and (9) are presented in **Table 2.**

The estimated coefficients on the current earnings and dividend variables are positive and significant in the regression of both equations. The empirical evidence therefore, provides support for the contention that dividends convey information about future earnings incremental to that provided by current earnings. It is also noteworthy that the lagged earnings variable is negative and significant in accordance with *a priori* expectations.

The key test of whether investors evaluate the information in earnings and dividends in relation to each other is provided by the interaction F-statistic. Effectively, the statistic tests whether the inclusion of the interactive dummy variables jointly increases the explanatory power of the model. The interaction F-statistic (F=3.056) is significant and clearly indicates that the interaction dummy variables are jointly significant, supporting the notion of an interaction effect between earnings and dividend signals with regard to future earnings.

TABLE 2: ORDINARY LEAST SQUARES ESTIMATION ON POOLED DATA (DEPENDENT VARIABLE E_{T+1})

	Equation (8)	Equation (9)
CONSTANT	0.610	-0.320
	(0.635)	(-0.106)
E_t	1.520	1.701
	(14.675)*	(12.971)*
D_t	0.960	0.882
	(2.842)*	(2.238)*
E_{t-1}	-0.800	-1.009
	(-6.352)	(-7.373)
D_{t-1}	-0.494	-0.456
	(-1.712)	(-1.222)
I(++)		0.086
		(0.026)
I(+0)		0.252
		(0.068)
I(-+)		7.962
		(2.214)*
I(-0)		4.926
		(1.518)
I(+-)		-0.861
		(-0.206)
R^2	0.798	0.821
No. of Observations	125	125
Interaction F-Statistic		3.056**

* Positive and significant at 5% level using a one-tailed t-test

** Significant at 5% level

In general, the results reported in **Table 2** are consistent with those of Easton with regard to the signs of the estimated coefficients, the only exception being the sign of the I(+-) dummy variable which, while statistically insignificant, is negative. That is, an increase in earnings accompanied by a decrease in dividends is perceived as "bad news". Further, the only individual dummy variable that is positive and statistically significant as per the standard t-test is the I(-+) variable — i.e. a decrease in earnings accompanied by an increase in dividends is perceived as "good news". It may be argued that this result

suggests that the signal provided by the direction of the change in dividends is more dominant than the signal provided by the direction of the change in earnings. Given that dividends are more "controllable" than earnings, and that managers are reluctant to cut dividends (see Green, Pogue and Watson, 1993), this hypothesis seems plausible. Implicit in the experimental design of the Kane *et al* study is the assumption that earnings and dividend signals are weighted equally. If, however, the dividend signal is dominant, it may be argued that a decrease in dividends will, in general, signal a fall in future profitability, irrespective of the direction of the change in earnings.

In comparison with prior UK studies, the results of this study are somewhat different. Opong (1996) reports an insignificant coefficient on the earnings surprise variable and a significant coefficient on the dividend surprise, whilst Hamill and McCaffrey (2000) report exactly the opposite — i.e. an insignificant coefficient on the dividend surprise and a significant coefficient on the earnings surprise. Both studies report an insignificant interaction F-statistic. Clearly, more research is required on this issue both in a UK and an Irish context.

Some Limitations

The results reported in this study suffer from a number of statistical problems:

- The lack of readily available financial data on Irish companies over a sufficiently long time series makes it necessary to adopt the crude and unorthodox method of estimating the models on pooled time-series and cross-sectional data (as opposed to individual company analysis). The pooling of cross-sectional and time series data is conceptually appropriate if it can be assumed that the interaction effect is both constant across firms and through time. Green, Pogue and Watson (1993) conclude that the dividend decision is not only perceived by managers as a signalling mechanism but also as a means of influencing a firm's standing in financial markets, facilitating future financing and reducing the threat of takeovers. Further, they argue that the cash resources, investment opportunities and the growth of the firm are important factors in the dividend decision. It would, therefore, appear rather heroic to assume that the interaction effect is constant across firms and through time. Given data restrictions, however, it is not possible to perform the analysis at the individual firm level. From a

statistical perspective, the central issue associated with pooling is one of efficiency (see Pindyck and Rubinfeld, 1988, pp. 252-261). Hence model parameters may be inefficient.

- Parameter estimates obtained via OLS regression will be biased, due to the inclusion of a lagged dependent variable amongst the explanatory variables.
- Multicolinearity exists where there is a linear relationship among some or all explanatory variables (see Gujuarati, 1988, pp. 283-315). Green and McIlkenny (1991) provide evidence to suggest that there is a linear relationship between current dividends and earnings for Irish companies. If multicolinearity is present, coefficients possess large standard errors in relation to the coefficients themselves, which effectively means the coefficients cannot be estimated with accuracy. Tobin (1950) suggests that cross-sectionally pooling data, as done in this study, mitigates the problem of multicolinearity. Further, Gujarati (1988) suggests that multicolinearity may not pose a serious problem when R^2 is high and the regression coefficients are individually significant, which would appear to be the case for the results reported in **Table 2.**

Given these statistical problems and the mixed results from UK studies to-date, an avenue for future research may be the exploration of the use of non-parametric tests to investigate the issues of interest. Certainly, the sample sizes of all three UK studies are small: Opong's (1996) sample of 192 observations; Hamill and McCaffrey's (2000) sample of 132 observations; and the current study of 125 observations.

Notwithstanding the statistical problems alluded to above, as the key test of the interaction hypothesis is given by the F-statistic reported in **Table 2**, the results support the existence of an interaction effect between earnings and dividend signals with respect to future earnings.

Summary

Kane, Lee and Marcus (1984) and Easton (1991) hypothesise that, as unexpected earnings and unexpected dividends are noisy signals, investors may be interested in the interaction between those signals. Consistent with that hypothesis, they found evidence of an interaction effect between earnings and dividend signals on abnormal returns to equity. This paper investigates both whether dividends have

information content and whether there is an interaction between the signals provided by the direction of the periodic changes in earnings and dividends with respect to future earnings. The results of the study support the hypothesis that dividends have information content with respect to future earnings and the existence of an interaction effect between earnings and dividend signals on future earnings.

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