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An Analysis of the Relationships among Stock Prices (and Returns), Dividends and Earnings in the UK Stock Market

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Abstract. The objectives of this paper are threefold: First; testing the relationship between dividends and earnings, second; examining the correlation among share prices, dividends and profits, third; investigating the behavior of the stock returns.

Two aggregate sets of nominal and real data from the UK stock market covering the period from 1963 to 1995 are used. These data were firstly plotted in graphs to generate a comprehensive picture of their behavior and then pre-estimation analysis (stationarity and cointegration) was discussed. Three models (stock price model, dividend model, return model) were estimated using these data to obtain the model hypothesis inferences and then post-estimation (classical linear model assumption (CLMA)) examinations were performed in addition to the invistigation of the models structural stability.

Pre-estimation tests suggested that, in general term, the data can be safely used to estimate the regression models since data stationarity-cointegration problems found to be limited. The findings of this research revealed that the relationship among share prices, dividends and profits, is strong ($R^2 = 0.97$) and support the idea that dividends is the greatest variable in predicting the share price. The most important predicting factor of the changes in share prices was found to be the changes in profits and previous changes (3^{rd} Lag) in dividends. The study results also show that changes in dividends are affected by earnings, changes in earnings and dividends. They suggest that changes in dividends is the strongest variable in explaining the variation in the stock returns followed by changes in earnings. In general, all models satisfy the CLMA. The oil crises in the early 1970s had a major impact on the models structural stability.

Introduction

Many of the empirical studies during 1960s and 1970s were in the support of the idea that share prices changes cannot be predictable based on historic share prices information. These investigations, recently, are challenged by researchers who based their research on US-market data and suggested that both short and long horizon returns help investors to exploit for profits since these returns may go in recurring patterns (Chiang *et al.* [1]). Recently, an important debate regarding whether there is a strong predictable component in the stock prices has emerged. This probably affects the validity of the efficient market hypothesis (EMH).(1) Many studies (see for example Gordon [2], Summers [3], Kormendi and Lipe [4], West [5], Fama and French [6], Campbell and Shiller [7], Campbell and Kyle [8], Chiang *et al.* [1, 9], Chen *et al.* [10], Guo [11] endeavored to identify variables to predict the movement in the share prices and returns(2).

Initially, this paper replicates, using UK data, some work done in the USA(3) presented in two papers (Gordon [2] and Chiang *et al.* [1]). The model introduced by Gordon [2] was firstly estimated and the model was developed to structuring the error correction mechanism to obtain an error correction model (ECM). Chiang *et al.* [1] developed a number of models of which change in dividend models and return models. I used these models to examine the relationship among earnings, dividends, and share prices.(4) Pre-estimation and post-estimation analyses were explored. The findings of this study were then compared to the results obtained by others.

The organization of this paper is set out as follows: After reviewing the relevant literature, an explanation of the data including graphical analysis is presented. Then, the data is examined for stationarity (individual variables) and cointegration (joint variables) followed by modeling and estimation section in which three types of models were estimated. These are stock price model, dividend models and stock return models. The t and F hypothesis tests and results comparisons are included in this part in addition to the testing of classical linear model assumptions (CLMA) and finally, the models were tested for their structural stability.

Literature Review

Several approaches were adapted to test components that may predict stock prices and returns of which both earning and dividend variables were found to be the most important predictors. In this section, the studies that focus on modeling and (or) estimating changes in dividends, stock prices and stock returns are reviewed.

An earlier paper published in the mid of the 20th century (Lintner, [12]) is the base of many of the relevant recent studies.(5) Lintner developed a theoretical model of firm

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(1) Efficient market (EM) in the stock exchange means that the share prices reflect all available information and as long as the market is efficient, no economic profit can be made by trading on the basis of this information.

(2) Since the value of a corporation is reflected by the market value of its shares, many of the studies which tended to evaluate the past performance of the firm and to predict its future were more concern with share prices and returns.

(3) In the early 1992, the London Stock Exchange was the second largest stock market in the world in terms of values. However, later on, this market turned to be the third largest stock exchange market after New York and Tokyo stock exchanges.

(4) The regression models were estimated through the Ordinary Least Squares (OLS) estimation method.

(5) See for example Fama and French [6], Gombola and Liu [13], Chiang *et al.* [1].

dividend behavior through studying dividend policies in 196 firm-years of dividends and attempted to find an answer to the question that whether the existing rate of payment should be changed. He found that the relationship between existing dividend rate and current earnings to be the most important factors in determining the amount of any changes in the dividend payout and suggested the following equation to explain the dividend decision:-

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

where $D^*_{it} = r_i P_{it}$ and r is the target payout ratio, P_t is the current year's profits after taxes, ΔD_t is the change in dividend payments, D_t is the amounts of dividends paid in year t.

One important conclusion Lintner came across is that dividends-profits-retained earnings subsystem, in continuous disequilibrium, is internally strongly stable (stabilizing value 85%).

Gordon [2] concentrated his study on modeling share prices via estimating three models using cross-sectional data[6] of four industries and critically evaluated three possible hypotheses with regard to the investment decision. These hypotheses which the investor considers when acquiring a share are (i) the earnings, (ii) the dividends or (iii) both. He studied the relationship among the share prices (P), dividends (D) and income (Y) by regressing the share prices against the other two ($P = a_o + a_1 D + a_2 Y$) and used the elementary theory to explain the variation in stock prices with dividends and earnings. Gordon's findings support that both dividends and income have power in explaining the movement in the share prices.[7] The dividends and income capture a substantial fraction ($R^2 > 0.85$ in all cases) of the variation in the dependent variable, the share prices.

Campbell and Shiller [7] used annual aggregate data on stock prices, dividends and earnings for Standard and Poor Composite Stock Price Index to predict stock returns. They began their empirical work by regressing real and excess stock returns on some underlying variables. For real returns, they used the log dividend-price ratio, the lagged dividend-growth rate and two log earnings-price ratios as explanatory variables. In order to analyze the stock price movements, they employed the Vector-Autoregressive (VAR) approach. Their results show that the average of the long movement of real earnings helps to predict future real dividends. They also suggest that when earnings per share is measured over many years, its ratio to the current stock price is a good predictor of the stock return.

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(6) It seems that one important reason discouraged Gordon to use time series data is autocorrelation problem.

(7) In seven of the eight cases, the dividends' coefficients exceed the incomes coefficients.

Fama and French [6], Hodrick [14] and Goetzmann and Jorion [15] studied short and long horizon forecasting of stock returns. Fama and French used dividend/price (D/P) ratios on the value and equal-weighted portfolios of New York Stock Exchange (NYSE) to forecast stock returns. They regressed both nominal and real returns using one month, one quarter, and from one to four years return horizon. They concluded that time variation in expected returns accounts only for small fractions of the short-horizon return variance and found that forecast power increases with the return horizon (R square increased to reach 64% in year 4). However, in their regression results, a high positive autocorrelation occurred. Hodrick [14] used the dividend yields as predictor of stock returns exploring three alternative methods in five horizons (from one month to four years) using data from NYSE for the period between 1926 and 1987 containing 744 observations. His results suggest that the vector autoregressive alternative (VAR) is the best technique since it appears to be unbiased measurement. Goetzmann and Jorion [15] used two time series (monthly data from NYSE and annual UK stock exchange returns and yields data and both began in 1871 and ended in 1992) to examine the ability of dividend yields to forecast long-horizon stock returns. They compared the results of the two countries using both nominal and real returns for the horizon between one and five years. They ran the regression using the complete period and two sub-periods using a fixed dividend approach and a VAR approach and both procedures produced similar results suggesting that the dividend yields are a good predictor of long-horizon stock return.

Bulkley and Tonks [16, 17] studied the volatility of the stock prices. In their first study [16], they analyzed the movements of the UK stock prices employing the de Zoete and Wedd annual Equity Price Index for long-term (1918-1982) which found to be stationary. In their second research [17], Bulkley and Tonks used Standard and Poor's Index of Stock Prices data, between 1871 and 1985, to test for efficient market and to see whether agents are able to earn excess return from trading equities for the whole period and found that it is possible for the risk-neutral agents to earn an annual excess return of 1.18%. Market efficiency was also examined by Fama [18] who focussed on long-term returns and his results were consistent with the market efficiency prediction of apparent anomalies and he suggests that anomalies is affected by the way employed to measure them.

Rationally, the prices of stocks change to reflect the market's expectations of the future cash flow and the changes in the discount rates. To test how the expectations of future dividends affect the aggregate stock return, Kothari and Shanken [19] utilized both time series and cross sectional data from New York Stock Exchange and American Stock Exchange firms and used dividend growth, investment growth, future returns, and dividend yield to explain the stock return. This analysis indicates that dividends and expected return variables explain about 90% of the variation of portfolio return. The possible impact of dividend yields on the portfolio return was also studied by Gombola and Liu [13] via examining the relationship between dividend yields and stock returns incorporating the effect of dividend stability. Firstly, the authors examined the relationship between portfolio returns, ranked by dividend yield, and the market returns using a sample of 1,080 companies. The January effect and firm-size effect were included in the investigation as presented in the following model:

$$(R_{pt} - R_{ft}) = A_p + B_{1p}\,DJ_t + B_{2p}\,(R_{mt} - R_{ft}) + B_{3p}\,LNSIZE_{pt} + B_{4p}\,YLD_{pt} + e_{pt} \qquad (2)$$

where

R_{pt} is the equally weighted return on the *P*th portfolio during month t,
R_{ft} is the risk-free rate,
R_{mt} is the return on the market portfolio,
A_p is the intercept,
DJ_t is a dummy variable take 1 in January and 0 otherwise, $LNSIZE_t$ is the natural log of the average market value of equity for firms in portfolio p in month t,
YLD_{pt} is the average dividend yield for portfolio p in month t, and e_{pt} is the error term.

They estimated the above equation using five yield portfolios segmented into high, intermediate and low dividend stability. The results of these estimations showed negative relation between yield and systematic risk. The January effect is significant and strong for many of the portfolio groups, however, the size effect is significant only for two portfolios. Gambola and Liu concluded that the firms which make a combination between stable dividend payments and high yield are different in performance from the other groups of stocks that do not provide dividend stability.

Timmermann [20] proposed a theoretical explanation of the noticeable increase in the correlation between stock returns and previous yields as a function of return horizon. He used a continuous time version of the model where dividends are the only source of income and his results indicate that periods with low dividends are accompanied by low income and high marginal rates of substitution between current and future consumption. The expected rate of return of this period must be higher than in the periods where present income is high and this leads to that the stock prices must be low whenever dividends are low which cause yield and future rate of return to be higher and then a higher future appreciation of stock prices.

To find how stock prices behave with relation to the size and book-to-market-equity (BE/ME) reflect the earnings behavior and how they relate to economic fundamentals, Fama and French [21] studied six different portfolios and estimated the following model using annual observations from NYSE, AMEX, and NASDAQ stocks covering the period from 1964 to 1990:-

$$R(t) = a + d\,D(t-1)/P(t-1) + b\,\Delta Mkt(t+1) + s\,\Delta SMB(t+1) \qquad (3)$$
$$+ h\,\Delta HML(t+1) + e(t)$$

where:

R(t) is the stock return,
a is a constant,
D(t-1)/P(t-1) is dividends on the value-weighted portfolio of NYSE stocks for year t-1 divided by the value of portfolio at the end of year t-1,
ΔMkt is a proxy for market factor in the changes in fundamentals one year ahead,
ΔSMB is a proxy for size factor in the changes in fundamentals one year ahead,
ΔHML is a proxy for book-to-market factor in the changes in fundamentals one year ahead, and
e(t) is the error term.

The findings Fama and French reached are that BE/ME captures strong variation in stock returns and helps to explain the cross-section of average return. The results suggest that the size and BE/ME are related to profitability and that firms with a low stock price with relation to book value (high BE/ME) are persistently distressed. The ratios of earnings to book equity for about 11 years are low for such firms, however, firms with high stock price relative to book value (low BE/ME) have strong profitability.

Chiang, Davidson and Okunev [1] modeled earnings, dividends and stock prices and returns within a viable economic framework. Firstly, they modeled earnings as a generalized mean reverting process when they found earnings to be random walk. They estimated the changes in the earning model by non-linear maximum likelihood techniques and then examined the relationship between earnings and dividend changes. They developed Lintner's [12] model and generated two separate models to explain the change in dividends [Δ D(t)]. In the first model, the explanatory variables are change in earnings [Δ E(t)], earnings [E(t)] and dividends [D(t)], and in the second, [Δ D(t)] were regressed against the next period earnings [E(t + 1)] and dividends [D(t)]. They modeled the stock prices and returns based on the financial theory which suggests that the share prices is the discounted value of the future expected earnings. Theoretically, they developed the changes in the share prices [Δ P(t)] in order to obtain a stock return model that they then empirically estimated. This regression consists of unrestricted and two restricted models.

Three periods (1871-1986, 1925-1986 and 1960-1986)(8) were tested using annual observations of the Standard & Poors Composite Stock Price Index (S & P). The empirical findings suggested that earnings are mean reversing in the long term and identified that the underlying explanatory variables (excluding the intercept) are significant in explaining the change in dividends [Δ D(t)] (R^2 for the three periods is ranged between 75% and 78%). They also found that change in earnings per share and earnings per share are significant in explaining stock returns and this inference provides supports to the dividend policy irrelevance. As the findings suggest, the modified equation performs as effectively as the original approach Lintner [12] has done.

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(8) The authors refer to the period 1960-1986 as short period.

Based on these studies, a number of themes can be concluded. The majority of the literature focused upon stock returns and not changes in stock prices and this is probably because the changes in the share prices are included in the return variable. Also, the investors are concern more with what they are expecting to earn from holding the shares and that is the stock return. In the long run horizon, returns have a strong predictable components which are dividends and earnings. Although some of the previous studies have performed pre-regression (stationarity and cointegration) and (or) post-regression (autocorrelation and heteroscedasticity) examinations, some others ignored them and consequently the results must be interpreted cautiously.

Data and Variables

The work in this paper is based on two UK time series stock market data.(9) The first (Data set I, the quarterly data) is used to investigate the relationship between share prices and both profits and dividends using both nominal and real terms of the data, whereas the second set of data (Data set II, the annual data) is employed to test the variation in the changes of dividends and stock returns. Data set I consists of three variables for which UK aggregate data were generated. The definition of these variables are:-

FTALL : UK financial times share index (1962=100).
PR : UK company gross profits (£M).(10)
DIV : UK company dividends (£M).

There are a total of 132 quarterly time series observations started in the first quarter of 1963 and ended in the fourth quarter of 1995. As long as we use quarterly data, it might be worth testing for seasonal effects. The data of DIV (Dividends) variable is already seasonally adjusted (as explained by the source of the data); however, both FTALL (Share price) and PR (Gross profit) variables were not. The following regressions were estimated to see whether there is a need for deseasonalization:-

$$\text{FTALL} = a + b_1 D_2 + b_2 D_3 + b_3 D_4 \qquad (4)$$

$$\text{PR} = a + b_1 D_2 + b_2 D_3 + b_3 D_4 \qquad (5)$$

where : a is a constant, D_2, D_3, and D_4 are the seasonal dummy variables.
At the 1% level of significance, both t-test and F-test prove that all the D_i coefficients are significantly (individually and jointly) equal to zero. This means that there is no seasonal effect on the data, and consequently this data does not need to be seasonally adjusted.

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(9) The source of both data is the Office of National Statistics (ONS) databank.

(10) £M means that the figures are in million pounds.

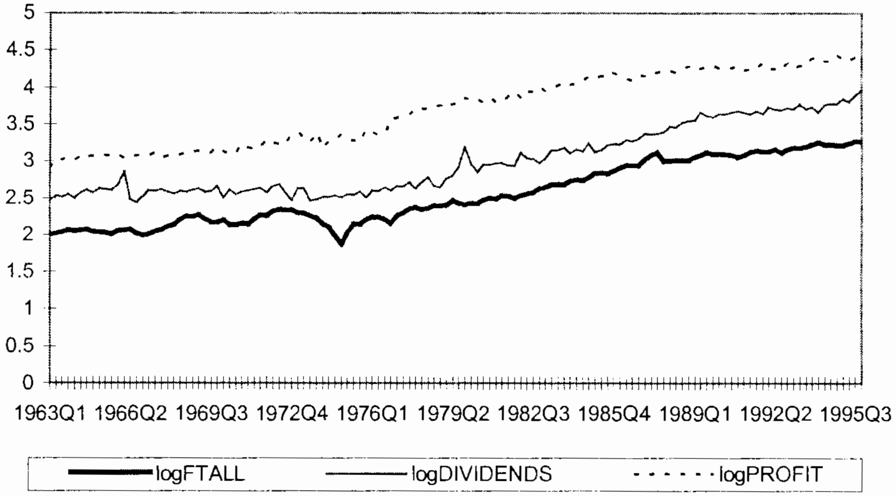
The variables used in Data set II are:-

FTI : UK industrial share prices index (1935=100).
DPS : Dividends' yield.
EPS : Earnings' yield.

This data consists of 32 annually time series observations started 1964 and ended in 1995. The period from the 1960s to the present is considered as a recent time frame and so a great number of the investigations in accounting and finance were based on this period as noted by Chiang *et al.* [1] "The majority of the studies in accounting area have focussed on the more recent time frame from the 1960s to the present."

Graphical Analysis

When dealing with time series data and before proceeding to the statistical analysis, it is recommended to graphically observe the behavior of the observations. As depicted on Graph 1, which compares the logs(11) of the nominal values of the share prices; dividends; and gross profits of the UK companies, very high increases took place between 1963Q1 and 1995Q4. FTALL increased from 99.73 in 1963Q1 to 1861.86 in 1995Q4 (the total increase is more than 18 times). However, during this same period, profits and dividends grew by more than 30 times.



Graph 1. The trend of FTALL, profits, and dividends of UK companies between 1963Q1 and 1995Q4.

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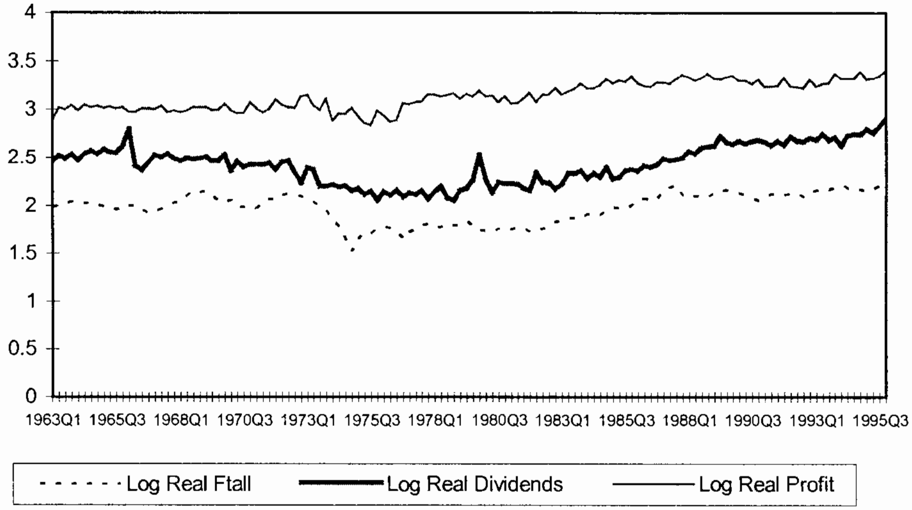
(11) Since it is inefficient to plot the ordinary observations, the natural logarithm (log) of the variables was used instead.

Graph 1 exhibits that the time series of all the three variables are trending up (drifting together) over time in a non-stationary fashion and this may result in linear relationships among these variables.(12) The very high increase in these time series reflects a high inflation and therefore the nominal values of the data can be adjusted to real values using the retail price index (Goetzmonn and Jorion [15]). By consulting the UK retail price index, the data were reproduced in real terms as depicted in Graph 2.

In this graph, real profits increased from about £760 millions in 1963Q1 to about £2509 millions in 1995Q4, and the total increase is about three times (330%). Real dividends were trending down for the period between 1963Q1 and 1975Q4, and then started drifting up. The total increase in the real dividends between 1963Q1 and 1995Q4 is about 280%.(13)



Graph 2. The trend of the UK company real share prices, real profits and real dividends.

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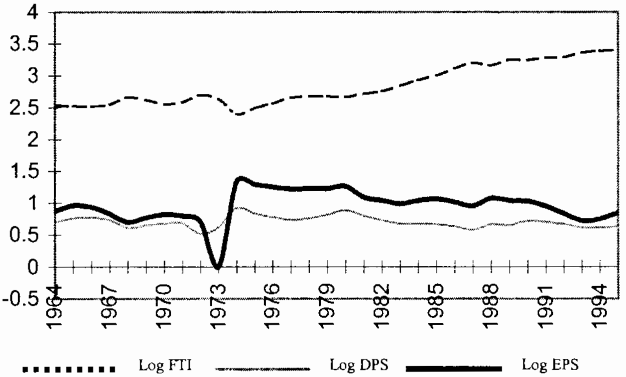
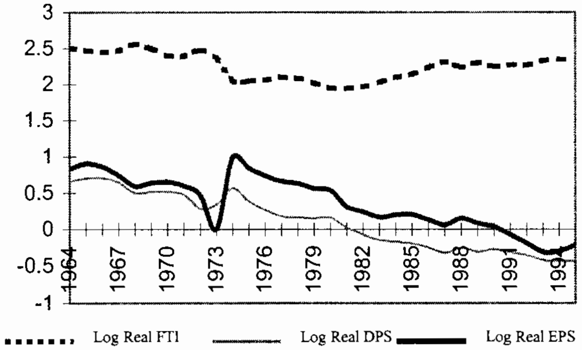
(12) This might be discovered through the cointegration analysis later on.

(13) By comparing the total increase in the nominal profits (36 times) and nominal dividends (30 times) to the total increases in the real profits (3.3 times) and real dividends (2.8 times), it can be concluded that UK economy encountered severe inflation during the last four decades.

By plotting the logs of the annual data of the share price index along with the share dividends and earning yields, Graphs 3 and 4 present the behavior of both nominal and real values and exhibit that dividends and earnings behave in a similar manner. As depicted in these graphs, what happened in the early 1970s (oil crises) has a significant effect on the stock market in the UK.



Graph 3. The UK industrial stock prices, earning yields and dividend yields for the period between 1964 and



Graph 4. The UK real industrial stock prices, earning yields and dividend yields from 1964 to 1995.

Stationarity and Cointegration

Generally speaking, the stochastic process of a time series data is stationary if its mean, variance and autocovariance are constant over time. Although it is significantly important to test the data for stationarity and cointegration ahead of regression estimation, most of the previous studies, as noted in the literature review section, had not included such tests. Whenever dealing with time series data, it is essential, before performing t and F tests, to test whether the data is stationary and Dickey-Fuller (DF) statistics can be used for this purpose.

At the 5% level of significance, the null hypothesis that there is no stationarity with and without a trend for all variables, using nominal data, (FTALL, PR and DIV) cannot be rejected. Moreover, the real values of the variables are not stationary at DF and ADF(1) levels.(14)

On the other hand, by applying the first-difference for the three variables, I found that there is stationarity for both nominal and real data. The nominal and real series of FTALL, PR and DIV (individually) are integrated of order one or I(1). Again via Dickey-Fuller test, both nominal and real values of the industrial share prices (FTI), dividends' yield (DPS) and earnings' yield (EPS) are not stationary at the 5% level of significance whether there is a trend or not.(15) However, testing for stationarity using the first-difference of the nominal and real values of these three variables shows that there is stationarity in case of trend and no trend. Accordingly, both nominal and real time series of FTI, EPS and DPS are individually integrated of order one, I(1). These findings are consistent with the findings of Chiang *et al.* [1].

These results, using both sets of data, lead us to test for cointegration among the variables. Since each individual variable of the quarterly data (FTALL, PR and DIV time series) and annual data (FTI, EPS and DPS time series) is not stationary, we need to investigate whether they are cointegrated,(16) and this is important for the reason that the regression results may not be spurious although the usual F and t tests are still valid(17). One important difference between testing for unit roots and cointegration is that the former deals with univariate (single variable) time series whilst the other deals with the

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(14) Real profit is stationary only with trend when using DF, however, it is not stationary in case of no trend and in both cases at ADF(1) level.

(15) There is only one exceptional case, which is in the real data of earnings yield (REPS) since in this case there is a stationary only with trend at DF level.

(16) If the variables are cointegrated, it means that the long-run linear combination among them is stationary or I(0).

(17) Gujarate [22], p. 725.

relationship among a group of variables where each has a unit root. Thus, we are interested in finding whether each two pairs of data (in both nominal and real terms) is cointegrated (the long-term linear relationship) which can be achieved by running the following regression models and test for unit root for residuals:-

$$FTALL_t = \alpha + \beta \; PR_t \; + u_t \tag{6}$$

$$FTALL_t = \alpha + \beta \; DIV_t \; + u_t \tag{7}$$

$$PR_t = \alpha + \beta \; DIV_t \; + u_t \tag{8}$$

where α is a constant, and u_t is the error term.

At the 5% level of significance, there is no cointegration between profits (PR) and dividends (DIV) both in nominal and real values. Since DF ratio exceeds the DF critical value, a cointegration expected to occur between nominal share prices (FTALL) and nominal gross profits (PR). However, there is no cointegration between the real values of these two variables. On the other hand, share prices (FTALL) is cointegrated with dividends (DIV) and real FTALL is cointegrated with real dividends and this is coherent with the findings of Campbell and Kyle [8].

To test the linear relationship (cointegration) among all three variables, the following model is estimated using both nominal and real values:-

$$FTALL_t = \alpha \; + \; \beta_1 \; PR_t \; + \beta_2 \; DIV_t + \; u_t \tag{9}$$

Based on the unit root test for residuals(18), at the 5% level of significance and by using DF(19) and DFA(1) tests, the three variables are (jointly) cointegrated when using the nominal values. as appeared in the behaviour of the residuals depicted in Graph 5.

Nevertheless, real share prices (RFTALL), real profits (RPRF), and real dividends (RDIV) are not cointegrated as their residuals depicted in Graph 6 which explains how the long run linear relationship among the three variables behaves.

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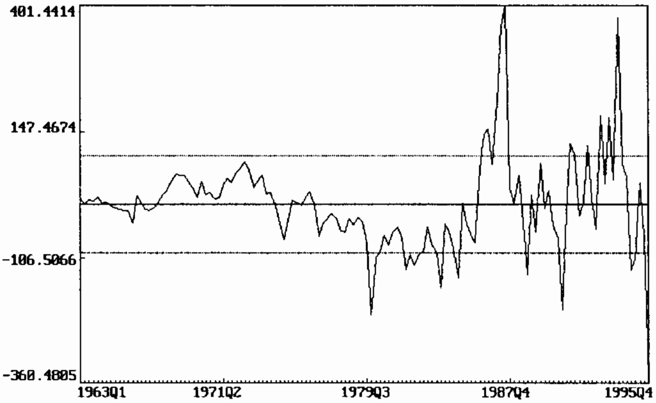
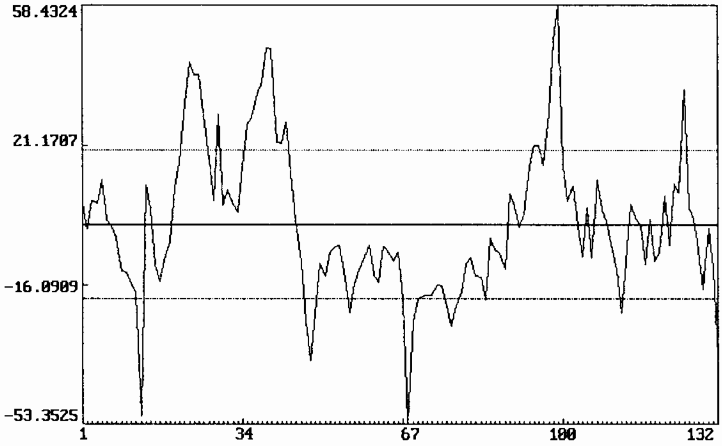
(18) Because there might be some restrictions on using the OLS estimator to test for cointegration among more than two variables, another recommended method (**Johansen Maximum Likelihood Procedure**) was consulted and the results of this method provides the same conclusion.

(19) Since the DF test might not be as powerful as some other tests, some authors suggested Cointegration Regression Durbin-Watson (CRDW) test. Applying this test confirmed our cointegration finding.



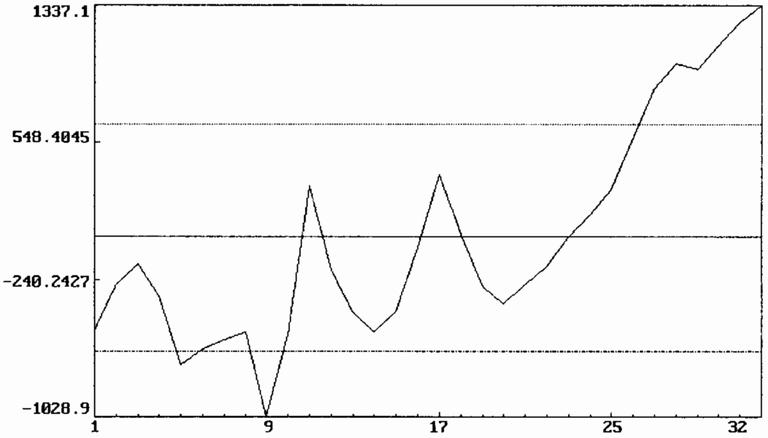
Graph 5. Plot of residuals and standard error bands.



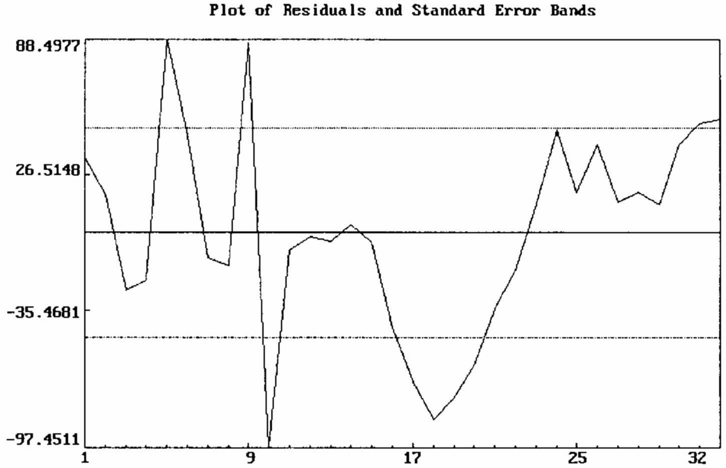
Graph 6. Plot of residuals and standard error bands.

Performing the unit root tests for residuals using the UK annual industrial share prices index (FTI), dividend yields (DPS) and earning yields (EPS), we conclude that, in nominal terms, there is no cointegration between any two of the three variables nor there any cointegration among these three variables together.

Using the real terms of each two variables did not change the conclusion reached when dealing with the nominal values of the variables except between the EPS and DPS when performing the DF test using the real values of the observations. Graphs 7 and 8 show the behavior of the unstationary residuals of the three variables in nominal and real values. These residuals seem to follow a random walk which may indicate that the regression study should be better focused on the short-run relationship among these variables.



Graph 7 (Nominal). Plot of residuals and standard error banks



Graph 8 (Real). Plot of residuals and standard error bands.

Modelling and Estimation

Based on the stationarity and cointegration inferences, we can proceed to estimate the appropriate models. Stock Price Model studies the relationship among share prices, dividends and profits within the UK stock market using both nominal and real data in the long run and also in the short-run (via an error correction model). Dividend Model examines the relationship between dividend yields and earning yields. Return Model focuses on analyzing stock returns behavior. Such estimation and analysis may help defining the factors that have had an impact on the returns of the UK company shares during the last four decades of the 20th century and these factors may continue to have similar impact in the future.

Stock Price Model

The economic theory states that stock prices bear a specified relation to earnings and dividends and this is based on the fact that stockholders are interested in both dividends and income. Accordingly and based on the asset pricing theory, share price is the discounted value of future expected dividends(20) as expressed in the following equation:

$$P_t = E\left(\int_t^{\infty} e^{-i(s-t)}\, D(s)\, ds \right) \tag{10}$$

where:-

P_t is the current share price at time t,
i is the risk adjusted discount rate,
$D(s)$ is the dividends at time s, and
E is the expectation operator at time t.

This equation discloses that stockholders are interested in the entire sequence of dividend payments. This infinite sequence can be represented by two factors: the current dividends and the expected growth in the dividends. Based on the fact that the most important and predictable cause of growth in a firm's dividends is the profit, Eq. 10 can be replaced with the following model(21):-

$$P_t = a_o + a_1 D_t + a_2 I_t + u_t \tag{11}$$

where:-

P_t is the share price at time t.
D_t is the dividends at time t.
I_t is the profit at time t.
u_t is the disturbance term.

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(20) Assuming that the long term cost of equity is constant.

(21) This model was introduced and estimated by Gordon [2].

Using the quarterly nominal data to estimate the above model, we obtain the following results(22):-

$$\begin{array}{llllll} \mathbf{FTALL_t =} & \mathbf{20.062} & + \ \mathbf{0.126\,DIV_t} & + \ \mathbf{0.036\,PR_t} & & (12) \\ \text{s.e.}^{(23)} & (13.27) & (0.012) & (0.003) & & \\ & & & R^2 & = \mathbf{0.97} & \\ & & & \textbf{DW-Statistic} & = \mathbf{0.81} & \end{array}$$

It can be seen that the share price (FTALL) has a positive relationship with both dividends (DIV) and gross profit (PR). DIV and PR generally capture 97% of the variation in stock price. Literally, one million pounds increase in the UK company dividends generates, on average, about 13 pence increase in the UK share prices and one million pounds increase in the UK company gross profits, on average, leads to about 4 pence increase in the UK company share prices. This may mean that, in the nominal term, the effect of the company dividends on its share price is more than three times stronger than the effect of its profit. Comparing these findings to the results obtained by Gordon [2] as presented in the following:-(24)

$$\begin{array}{lllll} \mathbf{P_t = 8.7} & + \ \mathbf{8.4\ D_t} & + \ \mathbf{2.0\,Y} & & (13) \\ \text{s.e.} & (1.7) & (0.8) & & \\ & & & \mathrm{R}^2 = \mathbf{0.94} & \end{array}$$

we find that the explanatory variables are significant in both studies and show similar trends (the signs of the coefficients are the same). Since Gordon did not use time series data but cross-sectional data instead, the size of the coefficients cannot be compared. However, the weight of the regressors can be compared. Gordon's estimation suggested that shareholders are concerned more about how much money they receive in present (dividends) but less about what they will get in future (profits) and this is consistent with our finding. In both results, the dividends' coefficients are more than three times greater than the value of the profit coefficients which may indicate that the preference of the investors has not changed since the mid of the last century.(25) R-squared in both cases are very high ($R^2 =>$ 0.94) and this means that more than 90% of the variation in the stock prices is explained by the company dividends and profits whether dealing with individual industries or aggregate market.

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(22) At the 1% level of significance, the coefficients of both Dividends and Profits are significantly different from zero. Testing for the joint significance of the coefficients (testing the significance of R^2), using the F test, the null hypothesis that the dependent variable (FTALL) is not linearly related to the explanatory variables is rejected.

(23) s.e. means Standard Errors.

(24) Gordon (1959) regressed the share prices against the dividends and income using cross sectional data. He used four industries which are chemicals, foods, steels and machine tools.

(25) Gordon's study was in year 1954.

Using the quarterly real data to estimate the stock price model (model 11), the following results were obtained:

$$\begin{array}{lcccc} \mathbf{RFTALL_t} = & \mathbf{33.231} & + \ \mathbf{0.169\,RDIV_t} & + \ \mathbf{0.012\,RPRF_t} & \\ \text{s.e.} & (5.717) & (0.015) & (0.004) & \\ & & & R^2 & = \mathbf{0.66} \\ & & & \textbf{DW-Statistic} & = \mathbf{0.43} \end{array} \qquad (14)$$

From the above results, the relationship between real share prices (RFTALL) and both real dividends (RDIV) and real gross profit (RPRF) is positive. Based on the coefficients, we can literally say that one million pounds increase in the UK company real dividends, on average, leads to about 17 pence increase in the UK share prices. However, one million pounds increase in the UK company real gross profits, on average, generates about one pence increase in the UK company share prices. This means that, in real term, the effect of the company dividends on its share price is about 15 times stronger than the effect of its profit. These variables together explain about 66% of the variation in the UK stock prices.(26)

The regression results using both nominal and real data suggest that, in the UK stock market, dividends are significant factor to the shareholders. This supports Lintner's [12] point of view that dividends which are paid by the company reflect its reputation and therefore managers should bear in mind that maintaining paying out dividends to the share holders is a significant issue in determining share prices and, ultimately, affecting the company market value. Results of performing the t test and F test for significance suggest that the independent variables are individually and jointly significant in explaining the share prices in the UK.

Durbin-Watson and Breusch-Godfrey (BG) test (Langrange Multiplier test) shows that this model suffers from the first order and higher-order autocorrelation. By using Gauss-Newton iterative method (an estimation of regression models with serially correlated errors), the following results are obtained:

a. Using nominal terms:-

$$\begin{array}{lcccc} \mathbf{FTALL_t} = & \mathbf{21.90} & + \ \mathbf{0.12\,DIV_t} & + \ \mathbf{0.037\,PRF_t} & \\ \text{s.e.} & (16.85) & (0.014) & (0.003) & \\ & & & R^2 & = \mathbf{0.97} \\ & & & \textbf{DW-Statistic} & = \mathbf{0.88} \end{array} \qquad (15)$$

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(26) Testing for normality shows that there is no normality in this data when using nominal data and in spite of this, since we have large sample (132 observations), it is possible to apply the normal distributed tests (Gujarate [22], p. 317). However, at the 1% level of significance, the real values of the data are normally distributed. There are evidences of neither perfect nor high multicollinearity.

b. Using real terms:-

$$\begin{array}{lllll} RFTALL_t = & 34.885 & + \ 0.115\, RDIV_t & + \ 0.021\, RPRF_t & (16) \\ \text{s.e.} & (9.021) & (0.021) & (0.006) & \\ & & R^2 & = 0.71 & \\ & & \text{DW-Statistic} & = 0.51 & \end{array}$$

Performing both t and F tests, proofs that the coefficients (individually and jointly) are significant. It is important to note that these results are close to those that were estimated using OLS estimation which means that removing the effect of the autocorrelation did not change the results significantly. Testing for heteroscedasticity using the White test (which does not rely on the normality assumption) proved that the data is heteroscedastic. In order to avoid the heteroscedasticity problem, we run the regression using ordinary least square estimation based on adjusted White's heteroscedasticity and the results of this estimation as follows:

a. Using nominal terms:

$$\begin{array}{lllll} FTALL_t = & 20.062 & + \ 0.126\, DIV_t & + \ 0.036\, PRF_t & (17) \\ \text{s.e.} & (7.324) & (0.018) & (0.004) & \end{array}$$

b. Using real terms:

$$\begin{array}{lllll} RFTALL_t = & 33.231 & + \ 0.169\, RDIV_t & + \ 0.012\, RPRF_t & (18) \\ \text{s.e.} & (5.522) & (0.017) & (0.005) & \end{array}$$

Performing t test proofs that the coefficients are significant. Since these results are close to those that were estimated using OLS estimation, removing the effect of the heteroscedasticity also did not change the results significantly.

Error Correction Model (ECM)

In the previous section, the investigation was directed towards the long-run equilibrium relationship between the share prices and both dividends and earnings. However, since there might be disequlibrium in the short-run, we should use the error term in the general model (model 12) to join the short-term behaviour of the share price (FTALL) to its long-term value via ECM(27) which can be tested by estimating the following unrestricted model:

$$\begin{aligned} \Delta FTALL_t = \gamma_0 & + \gamma_1 \Delta DIV_t + \gamma_2 \Delta DIV_{t-1} + \gamma_3 \Delta DIV_{t-2} + \gamma_4 \Delta DIV_{t-3} + \gamma_5 \Delta DIV_{t-4} \\ & + \gamma_6 \Delta PR_t + \gamma_7 \Delta PR_{t-1} + \gamma_8 \Delta PR_{t-2} + \gamma_9 \Delta PR_{t-3} + \gamma_{10} \Delta PR_{t-4} \\ & + \gamma_{11} \Delta FTALL_{t-1} + \gamma_{12} \Delta FTALL_{t-2} + \gamma_{13} \Delta FTALL_{t-3} + \gamma_{14} \Delta FTALL_{t-4} \\ & + \gamma_{15} RES_{t-1} + e_t \qquad (19) \end{aligned}$$

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(27) Since structuring the error correction model is subject to the variables to be cointegrated, we are using the nominal data because the condition is satisfied in this case.

where

Δ means the first difference[(28)], and

RES_{t-1} is the first lag of the residuals (or speed of adjustment) of the general model (model 12).

OLS estimation of this model is as follow:

$$\begin{array}{lll} \Delta FTALL_t = \underset{(5.558)}{8.487} & - \underset{(0.014)}{0.013}\,\Delta DIV_t + \underset{(0.017)}{0.026}\,\Delta DIV_{t-1} + \underset{(0.02)}{0.012}\,\Delta DIV_{t-2} + \underset{(0.019)}{0.046}\,\Delta DIV_{t-3} + \underset{(0.018)}{0.027}\,\Delta DIV_{t-4} \\ & + \underset{(0.007)}{0.017}\,\Delta PR_t - \underset{(0.006)}{0.005}\,\Delta PR_{t-1} - \underset{(0.006)}{0.002}\,\Delta PR_{t-2} - \underset{(0.006)}{0.007}\,\Delta PR_{t-3} - \underset{(0.007)}{0.027}\,\Delta PR_{t-4} \\ & + \underset{(0.098)}{0.158}\,\Delta FTALL_{t-1} + \underset{(0.102)}{0.013}\,\Delta FTALL_{t-2} - \underset{(0.101)}{0.053}\,\Delta FTALL_{t-3} + \underset{(0.099)}{0.215}\,\Delta FTALL_{t-4} \\ & - \underset{(0.063)}{0.192}\,RES_{t-1} \end{array} \quad (20)$$

s.e. in parentheses below coefficients.

By performing the t-test to decide which of the explanatory variables should remain in the restricted model, at the 95% level of confidence, ΔDIV_{t-3}, ΔPR_t, ΔPR_{t-4}, $\Delta FTALL_{t-4}$, and RES_{t-1} are significantly different from zero. Based on this result, we can restrict the above model (model 20) to be as follow:

$$\Delta FTALL_t = \gamma_1 \Delta DIV_{t-3} + \gamma_2 \Delta PR_t + \gamma_3 \Delta PR_{t-4} + \gamma_4 \Delta FTALL_{t-4} + \gamma_3 RES_{t-1} + u_t \quad (21)$$

By estimating this model, we obtained the following results:-[(29)]

$$\begin{array}{llllll} \Delta FTALL_t = 0.041\,\Delta DIV_{t-3} & + 0.025\,\Delta PR_t & - 0.026\,\Delta PR_{t-4} & + 0.213\,\Delta FTALL_{t-4} & - 0.192\,RES_{t-1} & \\ s.e. \quad (0.015) & (0.007) & (0.007) & (0.085) & (0.049) & (22) \end{array}$$

$$R^2 = 0.188$$

$$\text{DW-Statistic} = 1.63$$

Equation 22 explains that in the short-run, the following variables have significant effects on the changes in the share prices: the change in the third lag of the dividends [Δ DIV(t-3)], the change in the profits [Δ PR(t)] and the change in the forth lag of the profits [Δ PR(t-4)], and the change in the forth lag of the share prices [Δ FTALL(t-4)].[(30)]

[(28)] We include 4 lagged values because we are dealing with quarterly data since in the short run (one year) there are 4 quarters.

[(29)] The results of running this regression, when including a constant, is quite close to this one.

[(30)] Performing both t and F tests, at the 10% and 5% levels of significance, shows that all these explanatory variables are individually and jointly significant. DW-ratio (1.63) falls in the no-decision region (1.82 > 1.63 > 1.60), in the short-run relationship, which means that autocorrelation is hard to be detected.

About 0.19 of the inconsistency between actual share price and long-run (equilibrium) value is corrected (eliminated) each quarter. This percentage (19%) is considered to be lower than the usual quarterly adjusted level since normally, in quarterly measurement, adjusted asset market reaches equilibrium fairly quickly.

R^2 is much smaller than it was in the long run relationship. The explanatory variables explain about 19% of the variation in the change of the share price. This probably means that, in the short run, there are many other factors affect the share price behavior. However, in the long run, as suggested by previous studies, dividends and earnings are good predictors of the share prices movement.

Dividend Models

Since there is no cointegration, as explained earlier, between earnings (EPS) and dividends (DPS), in nominal terms, the focus here is on the short-term relationship between them and thus we will investigate the variables which help explaining the variation in the changes in dividends (differences of the regresand variable). Two dividend change models that were introduced by Chiang *et al.* [1] were chosen for estimation.

First model

In their study, Chiang *et al.* [1] suggested the following regression equation for explaining of the variation in the dividend changes(31):-

$$\Delta D(t) = \alpha + \beta_1 \Delta E(t) + \beta_2 E(t) + \beta_3 D(t) + u(t) \qquad (23)$$

where

$\Delta D(t)$ = D(t+1) - D(t),

D(t) = the level of dividends at time t,

α = the constant,

$\Delta E(t)$ = E(t+1) - E(t),

E(t) = the level of earnings at time t, and

u(t) = the residual term.

By using UK industrial share prices data (the nominal annual data) the results of the estimation of this model is as follows:

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(31) This model was chosen because it has a similar approach to Lintner's [12] model which is the best known model to explain the relationship between dividend changes and earnings. Lintner [12] argued that since managers believe that cutting the dividends hurts the reputation of the firm, they neither heavily increase nor decrease the dividends even with high earnings or loss because higher dividends cannot be sustained. Therefore, managers should have in mind target dividends that are determined depending on the current earnings and the last year dividends.

$$\begin{array}{llllll} \Delta DPS_t & = 1.565 & + \; 0.195\,\Delta EPS_t & + \; 0.061\,EPS_t & - \; 0.431\,DPS_t & \\ \text{s.e} & (0.556) & (0.026 & (0.036) & (0.152) & (24) \\ & & & & R^2 & = 0.75 \\ & & & & \text{DW-statistics} & = 1.72 \end{array}$$

This equation suggests that the variations in dividend changes are affected by the changes in earnings, earnings and dividends. Literally, one pound increase in the change in earnings per share leads, on average, to about 20 pence increase in the change in the share dividends. Nevertheless, one pound increase in the earnings per share increases the changes in dividends per share by only 6 pence. Since the coefficient of DPS_t (-.431) reflects the relationship between dividends and changes in dividends, it can be inferred that speed of adjustment is about 43%.(32) The explanatory variables (ΔEPS_t, EPS_t and DPS_t) together capture about 75% of the variation in the change in dividends.(33)

Comparing these findings, which are based on UK annual data that covers 32 years (from 1964 to 1995), to Chiang *et al.* [1] findings, which were based on US annual observations that cover 27 years (from 1960 to 1986)(34), suggested that these findings are consistent. For example, the R square, which measure the goodness of fit of the regression line, (0.75) is close to the Chiang *et al.*'s findings (0.77) and the behavior of the changes in dividends in both US and UK stock market is affected by earnings, changes in earnings and dividends and this probably means that the companies in the UK and USA follow similar strategy of dividend policy although in the UK stock market speed of adjustment is faster.

Second model

The second model which was estimated by Chiang *et al.* [1] is presented in the following equation:-(35)

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(32) All of these coefficients are significant at the 10% level of significance. At the 5% and 1% levels of significance, only earnings per share (EPS) is insignificant in explaining the changes in the dividends.

(33) From the F test, there is an evidence that the explanatory variables are jointly significant in explaining such variation and this means that the value of the R-squared is significant and the regression is accurate. According to the normality tests, this model is normally distributed and there is no evidence of multicollinearity nor autocorrelation of any order. Also, the heteroscedasticity test, which is based on the regression of squared residuals on squared fitted values, evidences that there is no heteroscedasticity and thus the disturbances term, u_t, are homoscedastic.

(34) The findings of Chiang *et al.* [1] is presented in the following equation:-

$$\begin{array}{llllll} & \Delta D(t) = 0.016 & + \; 0.069\,\Delta E(t) & + \; 0.077\,E(t) & - \; 0.11\,D(t) & (25) \\ \text{T statistics} & (0.36) & (4.46) & (5.07) & (-3.44) & \\ & & & & R^2 = 0.77 & \end{array}$$

(35) Originally, this model was introduced by Lintner [12].

$$\Delta D(t) = \gamma_0 + \gamma_1\ E(t+1) + \gamma_2\ D(t) + u(t) \tag{26}$$

Using the nominal annual data to estimate this model, the following information were obtained:

$$\begin{array}{llll} \Delta DPS_t & = 2.594 & + 0.159\ EPS_{t+1} & - 0.829 DPS_t \\ \text{s.e.} & (0.581) & (0.029 & (0.130) \end{array} \tag{27}$$

$$R^2 = 0.63$$

$$\text{DW-statistics} = 1.08$$

This model presents the effect of the previous dividends and current earnings on the change in dividends. There is a positive relationship between the earnings and the change in dividends. However, as found in the first model, the relationship between ΔDPS_t and DPS_t is negative.(36) From the R^2, there is an evidence that EPS_{t+1} and DPS_t explain about 63% of the variation in dividend changes.(37)

By comparing these results to the results of Chiang *et al.* [1],(38) we find that the positive and negative relationships between the dependant variable [$\Delta D(t)$] and the independent variables [E(t+1) and D(t)] are the same which are significant in both studies at the 1% level of significance. In our findings, however, the R^2 (63%) is lower than it is in Chiang *et al.*'s finding (78%)(39) and this may suggest that there are other factors affecting the changes in the UK company dividends by about 37% whilst these factors affect the changes in the US company dividends by only 22%. It might be concluded that the first model is better to be used to predict the movement in the changes of the UK company dividends.

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(36) From t test, both EPS_{t+1} and DPS_t are individually significant in explaining the changes in dividends (ΔDPS) at the 1% level of significance.

(37) In order to test for the coefficient efficiency of the regression, we test the null hypothesis (Ho: $\gamma_1 = \gamma_2 = 0$). Based on the F ratios, we reject the null hypothesis that the dependent variable is not linearly related to the explanatory variables. Normality tests of this model suggest that the disturbances of the error terms is normal. There is an evidence of no multicollinearity in this model, but it suffers from positive autocorrelation in low and high orders as well as heteroscedasticity. However, running the regression with correction for these problems did not alter the results significantly.

(38) The following regression presents Chiang *et al.*'s findings:-

$$\begin{array}{llll} \Delta D(t) = & 0.011 & + 0.073\ E(t+1) & - 0.10\ D(t) \\ \text{t statistics} & (029) & (6.69) & (-4.00) \end{array} \tag{28}$$

$$R^2 = 0.78$$

(39) The F test show that the explanatory variables are together significant in explaining the dependent variable in both findings.

Return Models

The majority of the previous studies focused on regressing share returns, instead of changes in stock prices, against one or more independent variables, to predict the movement in stock returns. In this part of the study we are intersted in estimating, using UK stock market data, unrestricted and restricted models that were previously estimated using US stock market data.(40) The following equation represents the unrestricted model:

$$R(t+1) = \delta_0 + \delta_1 \frac{\Delta E(t)}{P(t)} + \delta_2 \frac{E(t)}{P(t)} + \delta_3 \frac{\Delta D(t)}{P(t)} + \delta_4 \frac{D(t+1)}{P(t)} + \in(t) \qquad (29)$$

where

$$R(t+1) = \frac{\Delta P(t) + D(t+1)}{P(t)}, \text{ and}$$

$$\in(t) = \frac{e(t)}{P(t)}$$

The first restricted model consists in the right side of the equation the constant and the first two explanatory variables of the above regression equation, whilst the second restricted model is to run the return [R(t+1)] against D(t+1)/P(t) with the constant. Table 1 summarizes the results in both nominal and real terms for unrestricted and restricted models:

Table 1. Results of estimating model 29 using nominal and real data

Type of Data	δ_0	δ_1	δ_2	δ_3	δ_4	R^2	DW-statistics
Nominal	0.132	5.048	2.99	-57.11	-11.52	0.71	1.95
	(0.031)	(3.217)	(2.214)	(12.848)	(5.816)		
	0.068	-9.421	1.049			0.39	2.05
	(0.035)	(2.533)	(1.315)				
	0.116				-2.761	0.013	1.95
	0.053				(4.512)		
Real	0.101	-1.286	-2.95	-45.953	-9.075	0.52	1.44
	(0.041)	(4.358)	(3.145)	(16.361)	(7.763)		
	0.051	-11.792	-3.154			0.33	1.88
	(0.038)	(3.184)	(1.642)				
	0.087				-8.415	0.088	1.76
	(0.053)				(5.036)		

*Figures in parentheses are standard errors.

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(40) These models were estimated by Chiang *et al.* [1].

As presented above, in the unrestricted model with nominal data the stock returns have a positive relationship with two of the regressors Δ E(t) and E(t) and negative relation to the other two regressors Δ D(t) and D(t+1). At the 90% level of confidence, the constant, Δ D(t) and D(t+1) are significant. Nevertheless, only Δ D(t) has the power to explain the stock returns at the 1% and 5% levels of significance. The first restricted model estimation shows that the change in earnings negatively affects the stock returns, but earnings, as in the unrestricted model, have a positive relationship to the stock returns. From t ratio, the changes in earning Δ E(t) is significant whilst the earnings E(t) is not. The estimation of the second restricted model suggested that dividends had no significant effect on the stock returns in the UK industry.

However, using the real values, all signs of the coefficients in all cases are negative. These puzzling results may indicate that returns, in general, were trending in the opposite way of the earnings and dividends(41) In the unrestricted model, only the changes in dividends is significant in explaining the stock returns. Both regressors are significant in the first restricted model at 10% level of significance. As concluded from the nominal data results, dividends D(t+1) in real terms do not have an explanatory power to explain the variation in returns.

In the unrestricted model, R square values of the order 71% (in nominal data) and 52% (in real values), elucidate that 71% and 52%, respectively, of the variation in the stock returns can be explained by the explanatory variables. These R-squared values decrease to 0.39 and 0.33, respectively, when leaving out the changes in dividends and dividends from the regression equation. These values become very small when the regression model includes only the dividends as an explanatory variable.(42)

From these results, it might be concluded that stock returns in the UK stock market are influenced by changes in dividends and changes in earnings and accordingly any increase or decrease in these two variables is expected to significantly affect the market value of a corporation. Although, the corporate governance does not have an entire control on its earnings, it can run an effective policy for dividends. Comparing these findings to Chiang *et al.* [1]'s findings shows some similarities in the behavior of the

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(41) Except for the second restricted model, the F-statistics explain that the null hypothesis that $B_o: \delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$ (or $\delta_1 = \delta_2 = 0$ in the restricted case) is rejected which means that R^2 is significant.

(42) There is no normality problem in any of these three models (unrestricted and restricted) using both nominal and real data. Testing for multicollinearity leads us to conclude that including D(t+1)/P(t) or E(t)/P(t) in the regression model may cause it. Since these variables as seen before, in most cases, do not add explanatory power to the model, it might be better to be excluded either of both from the return model. In the unrestricted and restricted return models, using both nominal and real data, there is no evidence for (positive or negative) serial correlation among the members of the observations nor for heteroscedasticity at all different levels of significance.

variables and inference testing. In the light of results of previous empirical studies which have used similar periods, findings of this study perform better results. For example, Easton and Harris [23] modeled returns against changes in earnings and earnings when they found that R^2 equals to 7.7%. Ali and Zarowin [24] regressed the same explanatory variables and obtained $R^2 = 19\%$. Chiang *et al.* [1], when considering these two variables, found that R^2 to be in the order of 23%.

The Models Structural Stability

The sensitivity of the employed models can be tested through their structural stability when applied to UK stock data. These time series data contains the oil crises in 1974Q3(43) and the stock market crash in the 4th quarter of 1987.(44) The extent to which the underlined models reflects these events can be determined through testing the regressions coefficients' stability.

The oil crises in 1974 had a heavy effect on many different aspects of life, especially the business environment. Goetzmann and Jorion [15] stated "A closer look at the data indicates that most of the effect is due to the extraordinary crash and rebound of the early 1970s, that is, the continuity of the UK market index during a period of global social and economic upheaval." Chow test evidenced that the stock model is not stable meanings that the patterns (trends) of the data after the oil crises in 1974 changed significantly and this may indicate that, the investors' behavior after 1974 was not the same as it was before. This is also true for the second dividend model and the return unrestricted model when using the real data.

With respect to the stock market crash, Chow test confirmed that the patterns (trends) of the data included in the stock price model after the crash (in 1987) changed significantly reflecting the changes in the investors' behavior. In all the other models, we can not reject the null hypothesis that the model is stable and this means that these models are not significantly impacted by the stock market crash in 1987.

Summary

This research focussed on modeling stock prices and returns and changes in dividends. Based on quarterly and annual aggregate UK stock data, the relationships among the stock prices (and returns), dividends and earnings were investigated.

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(43) The stock price (FTALL) was 125.34 (in 1974Q2) and declined into 95.59 (in 1974Q3). This decrease accounts for about 24% (see Graph 1). The FTI nominal share prices index was 435.6 in 1973 and dropped into 251.2 (more than 40%) in 1974. Although the oil crises may had started earlier, the heavy effect on the stock market took place during year 1974.

(44) The stock price (FTALL) dropped from 1294 (in 1987Q3) to 1003 (in 1987Q4) or by about 23%. The FTI share prices index was 1600 in 1987 and dropped into 1448.7 in 1988.

The models estimation suggested that: (i) profits and dividends are important in explaining the variation in the share prices (ii) the changes in dividends are significantly affected by dividends, earnings and changes in earnings. The explanatory variables in the return models suggest that changes in dividends per share have the strongest power in explaining stock returns, whilst changes in earnings per share are the second strongest variable in explaining such returns. In the restricted model, when using the real terms of the data, the earning per share variable also has some explanatory power in explaining returns. Many of this paper's results consist with the previous literature findings.

There is a number of limitations to this study which can be overcome by future research. One is that companies which were not listed in UK stock market are excluded in the study and there might be a way of gathering data for such companies. Another limitation is that the data which were used to test the underline models were not up to date and this may affect the results reached if the data were more recent. On the other hand, other independent variables that might influence the analysis, such as the firm size and reputation, were not included in the analysis since we are dealing with aggregate time-series data.

For future studies, those models might be re-estimated using UK cross sectional data in order to test their reliability for portfolio study purposes. Also, these models might be re-estimated using data from different nations, such as developing countries. It may also be suggested that other considerable regressors to be included in those regression models such as the market, firm size and risk proxies.

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تحليل العلاقات بين أسعار الأسهم (وعوائدها) والتوزيعات والأرباح في سوق الأسهم في المملكة المتحدة

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ملخص البحث. لهذا البحث أهداف ثلاثة هي: أولا اختبار العلاقة بين التوزيعات والأرباح، وثانيا دراسة الارتباط بين أسعار الأسهم وكل من التوزيعات والأرباح، وثالثا بحث سلوك عوائد الأسهم.

في هذه الدراسة تم استخدام شريحتين من البيانات الخاصة بسوق الأسهم في المملكة المتحدة مشتملة على: أ) القيم الاسمية والحقيقية لبيانات ربع سنوية، و ب) القيم الاسمية والحقيقية لبيانات سنوية. كلا الشريحتين تغطي الفترة مابين ١٩٦٣م حتى ١٩٩٥م. هذه البيانات تم عرضها أولا في أشكال بيانية لتكوين صورة عامة عن سلوكها، ثم تم فحصها فحصا أوليا (قبل استخدامها في اختبار النماذج) للتعرف على مدى توفر الصفات اللازمة في تلك البيانات لتكون صالحة للاستخدام في دراسة وتقييم النماذج الثلاثة التي سيتم اختبارها وهي: (١) نموذج أسعار الأسهم، (٢) نموذج التوزيعات، (٣) نموذج العوائد. خلال عرض وشرح نتائج التقويم تطرق الباحث إلى الاختبارات الخاصة بافتراضات النموذج الخطي المستخدم ((CLM وفي نهاية البحث تم اختبار الثبات البنائي للنماذج المستخدمة.

أوضحت نتائج الاختبارات القبلية في مجملها صلاحية البيانات لدراسة الارتباطات المختلفة باستخدام النماذج الثلاثة الموضحة أعلاه. أوضحت نتائج الارتباط أن هناك علاقة قوية (الارتباط = ٠.٩٧) بين أسعار الأسهم السوقية والتوزيعات وأرباح الشركات، كما بينت تلك النتائج أن التوزيعات هي العامل الأقوى الذي يساعد في التنبؤ بالأسعار السوقية للأسهم في حين أن أقوى العوامل مساهمة في التنبؤ بالتغيرات في أسعار الأسهم