Share Prices and Ownership Variables:
A Cross-Sectional and Temporal Analysis

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Abstract

We investigate the relation between share prices and the proportion of equity held by institutional investors for a sample of 52 companies quoted on the Athens Stock Exchange over the period from 1991 to 1996. We differ from earlier studies in as much as use is made of a) an explicit share valuation model and b) temporal and cross-sectional analysis.

We find no significant relationship between share prices and institutional holdings. Tentatively, we conclude that institutional investors do not see themselves as part of the decision making team in which they have a stake.

1. Introduction

In financial economics share prices depend on company profitability and risk. Any other variable, if important in its own right, should, in efficient markets, be priced away and thus reflected in the level of share prices.

Many have, however, maintained that a number of financial relationships cannot be explained only by financial theoretical constructs. Perspectives from other academic disciplines can shed light on the way various company decisions are being made.

In this paper we will investigate the relationship between share prices and institutional ownership of companies quoted on the Athens Stock Exchange (ASE). Specifically, we will investigate the association between share prices and the proportion of equity capital held by institutional investors. Since both the dependent and independent variables are affected by third variables, we will allow for their effect by explicitly introducing them into the statistical model. In previous studies (using effectively implicit valuation models) the importance of the so-called control

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variables is identified separately and not simultaneously with the importance of other variables. This approach, however, can lead to mis-specified models and to spurious results. For example, although earnings, dividends, retained earnings and book value variables have been identified by researchers as being very important in the determination of share values and/or market returns, regressions are usually run on performance measures and equity ownership. This approach may yield spurious empirical relationships.

For our basic valuation models we will utilise a recent theoretical framework developed by Ohlson (1989, 1995). This model is essentially similar to the valuation model developed by Miller and Modigliani (1961). In addition, examining the issue of institutional ownership explicitly within an empirical valuation framework, we will depart from previous work with respect to the statistical analysis used. Specifically, we will observe a given number of firms for six years and apply a generalised least squares technique to combined cross-sectional and temporal observations.

The remainder of the paper is divided into five sections. In section 2 we review the theoretical and empirical relationships between corporate value and the structure of share ownership. In section 3 we set out the valuation model under investigation. Section 4 is devoted to a description of the data and to explaining some of the fundamentals of pooling cross-section and time-series data. Section 5 presents the results while section 6 discusses the results and concludes the paper.

2.   Theoritical Framework

2.1   Structure of Share Ownership

A basic assumption which permeates the heart of finance theory is the maximisation of share prices. This is achieved if management accepts all investment projects that increase shareholder wealth. Implicit in this assumption is that management always acts in shareholders best interests. Within this decision framework all shareholders are viewed as a fairly homogeneous group, not actively involved in the running of the company. Essentially under this view shareholders exercise their control over management by voting with their dollars. Under this regime the distribution of shares among management, institutions, blockholders and individual shareholders does not influence company performance. Influences upon management actions emanate from the managerial labour market and competition among companies (Fama 1980) and the threat from outside takeovers (Martin and McConnell 1990).[4]

There has, however, been argued that the distribution of share ownership among managers and outsiders can influence the performance of companies. Jensen and Meckling (1976) distinguish between inside shareholders who manage the company and outside shareholders. Managers manage the company affairs in their own self interests which may not coincide with those of outside shareholders. Managers who do not own shares tend to act in their own interests adopting investment and

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[4]   Further, within an efficient market theory framework there should be no difference between the various groups of shareholders since all have the same common objective of maximising share values.

financing policies that benefit them but not the company shareholders. However, as management share ownership increases their financial interests will coincide with those of outside shareholders (Morck et al. 1988). Others (in addition to Jensen and Meckling 1976) view the company as a set of contracts among factors of production (Alchian and Demsetz 1972). In other words, the company is thought of as a team the members of which pursue their own different interests but realise that the final outcome depends on the survival of the company (team) in its competition with other companies (teams). Further, Demsetz (1983) views the ownership structure from a managerial perspective arguing that the ownership structure that emerges in a company, at a point in time, is determined within the company as an endogenous equilibrium outcome. Demsetz concludes that there is no ex-ante relation between ownership structure and company performance. Effectively, the central idea behind these studies is that the modern corporation may be viewed as a coalition of various groups (managers, individual shareholders, trade unions, institutions, debtholders, etc). Each group, in an effort to protect its own interests, monitors the management of the firm. The managers are viewed as a separate group with its own interests which may be different, in part or in total, from those of the other interested parties. For example, debtholders (banks or major bondholders) may press for the acceptance of less risky investment projects, shareholders may press for long-term performance, institutions may be interested in short-term results while management may be interested in the rate of growth of sales. The final outcome of this conflict of interest will depend on the strength of the incentives of each group and the financial capacity to undertake the agency costs involved in this endeavour. Further, the legal environment can also be a restrictive factor for a close monitoring of the behaviour of management.

2.2 The Role of Institutional Investors

A number of authors centered their attention on the influence of institutional shareholders on corporate value.

The relationship between value and institutional shareholdings is by no means straightforward. On the one hand, institutional investors, acting as long-term shareholders are expected to be actively involved in monitoring the performance of companies in which they invest their funds. If this regime prevails, institutional shareholders should be expected to be involved in the daily management of the company, monitoring its management for effective control. Such an involvement, though, may hinder their ability to react to bad news about the performance of the company since they cannot, for legal reasons, react to exploit valuable inside information. Further, as agency costs are quite high, profitable use of funds for the monitoring of management behaviour entails a fairly large investment in the company's shares. Such investment behaviour limits the powers of diversification and exposes the institution to a high degree of specific risk. High risk exposure and the wish to exploit even small share price increases compels institutional managers to act as if they were short-term traders. As Scherer (1980) has pointed out, institutional managers take short-term investment decisions since they themselves

are constantly being appraised. These views lead one to expect ex-ante a negative relationship between corporate value and institutional shareholding. In addition, we should expect volatile share prices for those companies the shares of which are frequently being traded for short term gains. Many academics maintain that institutional investors behave as short-term traders avoiding the close monitoring of management (Hirschman, 1970; Drucker, 1976; and, Hutton, 1995).

Pound (1988) advanced three hypotheses in order to explain the attitudes of institutional investors and their willingness to participate in the governance of the company. According to the first hypothesis (efficient monitoring hypothesis), institutional investors and large blockholders, unlike small shareholders, find it cost effective to monitor management behaviour. The monitoring of management actions compels the high echelon of management hierarchy into adopting value maximising policies. In addition, Shleifer and Vishny (1986) argue that large blockholders, through various monitoring devices and using the threat of takeovers compels management to being alert to possible raiders both from inside (large monitoring interests) and outside the company. These arguments would predict a positive relationship between corporate value and the presence of large monitoring interests. According to the second hypothesis, it may be to the advantage of institutional investors to cooperate with management on specific matters (strategic alliance hypothesis). According to the conflict of interests hypothesis, Pound's third hypothesis, institutional investors may ally with managers because of various relationships that have developed with management. A change in management may endanger these relationships. According to the last two hypotheses, we should expect a negative association between the value of the company and the size of institutional shareholdings.

2.3 Earlier Results

From our exposition thus far it has become evident that the association between corporate value and the size of institutional shareholding cannot be settled on theoretical grounds. In effect, it is an empirical issue and only by resorting to empirical testing would we be able to determine the magnitude and the sign of the association between value and the structure of share ownership. Most of the empirical work emanates from the USA and the remainder from the UK. We should also mention work from Germany and France. Pound (1988) provided evidence on the role played by institutional investors in monitoring a company's management. His study of proxy contests suggests that there is a negative relationship between value and the size of institutional shareholding lending thus credence to the conflict of interest/strategic alliance hypotheses. Graves (1988) also reported a negative relationship between R&D expenditure and the size of institutional shareholders which he considered as evidence that the institutional shareholders are much more interested in a company's short-term than in the long-term performance. Hansen and Hill (1991), however, using a different sample found a positive association between the same variables. McConnell and Servaes (1990) reported a strong positive association between Tobin's Q and the proportion of shares held by institutional investors. These results

are in line with the conclusion of the efficient monitoring hypothesis. Chaganti and Damanpour (1991) reported that company capital structure and return on equity is significantly related to the size of institutional shareholdings. Higher levels of institutional shareholdings are related to low gearing ratios and high equity returns while higher levels of family ownership correspond to higher gearing ratios. On the other hand, Short and Keasey (1997) found that directors shareholdings or other ownership interests have no influence on the performance of the company. Similar conclusions were reached by Holderness and Sheehan (1988) who analysed two samples, one with shareholders owning more than 50% of the company's shares and one in which no shareholders owned more than 20% of the shares. They reported no significant difference between the two samples for Tobin's Q ratio and accounting profits. Further evidence on the irrelevance of large shareholders and corporate value was provided by Hermalin and Weisback (1987), Morck et al. (1988) and Murali and Welch (1989). For the UK, in addition to Short and Keasey mentioned earlier, empirical studies found ownership controlled firms had higher profits but the effect was either small or statistically insignificant (Radice, 1971; Holl, 1975; Steer and Cable, 1978; and, Cubbin and Leech, 1986). More recent work, however, using large companies, reported that ownership control is associated with higher valuation ratios, profit margins, return on equity and growth rates on sales and net assets (Leech and Leahy, 1991).

For France, Jacquermin and De Ghellinck (1980) divided companies between majority and minority controlled and between familial and non-familial controlled companies. Their dependent variable under examination was a hybrid measure of return on net worth (net cash flow divided by book value of equity and reserves). Their results showed that there was no significant difference between majority controlled and minority controlled companies. They reported also significant results between familial and non-familial controlled companies. For Germany, Thonet and Poensgen (1979) examined the influence of management control and owner controlled firms on various performance measures (return on equity, market rate of return, market value to book value and growth of total assets) and found that management controlled firms had significant higher return on equity and market values while owner controlled firms had higher growth in total assets.

As with all valuation type models, the results are mixed. The studies that have been undertaken in order to investigate such important issues provide conflicting results regarding the relationship between various company performance measures and ownership structure. Since these issues have important implications for portfolio management and market efficiency, new tests using data from various parts of the world are called forth. For it is only through repeated testings of various theoretical constructs that we should feel comfortable with the relevance of these constructs to real world phenomena.

3. Share Valuation Models

According to Ohlson (1989, 1995), under clean surplus accounting and assuming that the time series behaviour of abnormal accounting earnings satisfies a certain stochastic process, a firm's market value is determined as follows:

$$MV_t = \mu A_{t^a} + v EQ_t + \varphi[V_t] \tag{1}$$

where

MV_t : is the market value of the equity for period t;
A_{t^a} : are the abnormal accounting earnings for period t;
EQ_t : is the book value of equity for period t;
$[V_t]$: is a vector that contains all other non- accounting value relevant variables not yet affecting A_t and EQ_t.

For the purposes of our analysis, we will assume that the ownership variables are included in the $[V_t]$ and consequently we will be testing the following version of Ohlson's model:

$$P_t = a_0 + a_1 A_{t^a} + a_2 EQ_t + a_3 PO_t \tag{2}$$

where

P_t : is the common stock price six months after the end of fiscal year t;
A_{t^a} : the abnormal accounting earnings per common stock attributed to the shareholders for period t, defined as $A_{t^a} = A_t - R_f EQ_{t\text{-}1}$;
A_t : the accounting earnings per common stock attributed to the shareholders for period t;
EQ_t : the book value of equity per common stock at the end of period t;
R_f : the risk free rate of return in the beginning of period t;
PO_t : the percentage of shares held by investment trusts and mutual funds;

4.   The Sample

4.1   Sample Description and Data Sources

The sample includes all firms listed on the Athens Stock Exchange for which all relevant ownership information were available for a six year period from 1991 to 1996 inclusive. Given data availability we were able to have relevant ownership data for 59 firms for the entire period mentioned above. Accounting and stock market data were taken from the «EFFECT» database, the portfolios of the mutual funds and investment companies were obtained from the data base of the journal «MONEY» (XPHMA) while the risk free rate of returns were extracted from Bank of Greece's relevant publications.

4.2   Definition of Variables

For the purpose of testing empirically the model described by equation (2) the dependent and independent variables included in it are defined as follows:

P_t is the common stock price six months after the end of fiscal year t.
A_t is the accounting earnings per share for period t.
A_{t^a} represents abnormal accounting earnings per share for period t, that is $A_{t^a} = A_t - R_f EQ_{t\text{-}1}$. A_{t^a} could alternatively be defined as pure profits, it being the difference between earnings per share (At) minus the opportunity cost

of these earnings ($R_f EQ_{t-1}$), according to Ohlson (1989,1995) and Feltham and Ohlson (1995) contributions.

EQ_t represents the book value of equity per share for period t.

R_f is the annual rate of return on one year government bills at the beginning of period t.

PO_t represents the percentage of shares held by investment trusts and mutual funds.

Application of the diagnostic tests suggested by Belsley et al. (1980) detected the presence of seven influential outliers and as a result, our sample was reduced to 52 firms.

Initially, we present results (Table 1) for our sample of 52 firms observed for 1991 to 1996. We, thus, ran six (6) separate cross-sectional regressions. As we mention in our methodology (in the next paragraphs of this section) we also ran a regression on the combined set of cross-section and time-series data using all 312 available observations. In order to combine time-series and cross-sections data we applied Chow's (1960) homogeneity test both to our initial sample of 59 firms and to our reduced sample of 52 firms. The Chow statistic showed non-homogeneity of data for the first sample and homogeneity for the second sample of 52 firms. Consequently, our sample for pooling as with our cross-sectional analysis will consist of 52 firms.

4.3   Choise Between Cross-Sectional and Temporal Analysis

Given the nature of our data, i.e. fifty two (52) shares over a six (6) year period, we have two choises. We can either conduct a purely cross-sectional or a cross-sectional and temporal analysis. In a cross-sectional analysis we are concerned with deriving information from quantifiable dependent and independent variables at a point in time. Non-quantifiable variables, that is intra-firm variables, cannot be ascertained. If intra-firm variation cannot be measured, its effect must be allowed for statistically. A way for overcoming these problems is to combine cross-section and time-series data.

4.4   Pooling of Cross-Section and Time-Series Data

The estimation of functions that combine time-series and cross-section data is an occurence common enough in empirical business research. Usually we observe a number of companies, households, individuals etc. over a number of years. The combination of time-series and cross-section data offers researchers a significant number of degrees of freedom which allows them to overcome the constraints of the assumptions of the classical least square regression model. Perhaps, the most serious underlying assumption is that both the slope coefficient and the intercept are fixed and identical from observation to observation. This assumption is violated since individuals are likely to differ in their response to some economic or other stimuli.

The common approach is the introduction of unobservable cross-section and time effects. The introduction of all these variables allows one to capture all those

important individual or time effects which affect the dependent variable but which cannot be measured explicitly.

Furthermore, the introduction of these effects helps to reduce the degree of autocorrelation, heteroscedasticity and multicollinearity.

Algebrically, the relationship may be written as follows:

$$Y_{it} = \alpha + \Sigma \beta_k X_{kit} + \varepsilon_{it} \tag{3}$$

$(i = 1, 2,..., N$ and $t = 1, 2, ..., T)$
where
$\varepsilon_{it} = \mu_i + \lambda_t + w_{it}$;
Y_{it} is the dependent variable;
X_{it} is the $k + h$ non-stochastic explanatory variable;
μ_i is the unobservable cross-sectional effect which is invariant over time but differs among cross-sections;
λ_t is the unobservable time effect, which is constant among cross-sections but differs over time;
w_{it} is the unobservable remainder effect, which differs both across time and among cross-sections.

The parameter of the above specification can be estimated making a number of different assumptions regarding the nature of the stochastic term ε_{it}. These assumptions, used widely in applied research are:

Assumption 1: The terms μ_i and λ_t are unknown constants while the term w_{it} is a random variable.
Assumption 2: All the terms mentioned above are random variables.

The first assumption leads to the dummy variable model[5] while the second leads to the error components model.[6]

With the dummy variable model the resulting estimates will be unbiased and consistent, but will not be the most efficient in comparison with other estimating techniques. Another disadvantage of this is the use of a significant number of degrees of freedom. Further, application of this approach eliminates a large amount of the variation among both the explained and the explanatory variables when the variation between cross-sections and between time periods is large.[7]

Furthermore, it is extremely difficult to attach a sound economic meaning to the dummy variables. Finally, this approach is especially sensitive to possible errors in variables.[8]

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[5]   The well known covariance analysis, which in the past had been used extensively in the area of production funcrtion. See Mundlak (1963) and Hock (1962).
[6]   For a number of variations of the error components model see, Balestra and Nerlove (1966), Wallace and Hussain (1969), Chamberlain and Griliches (1975), Lilliard and Willis (1978), Lillard and Weiss (1979), Hausman and Taylor (1981)
[7]   Maddala (1971).
[8]   Mundlack (1978) and Hausman and Taylor (1981)

The above problems may be overcome using a specification that treats the μ_i and λ_t as random variables.

With this approach the relationship may be written as:

$$Y_{it} = \alpha + \Sigma \beta_k X_{kit} + \varepsilon_{it} \tag{4}$$

$(i = 1, 2, ..., N \text{ and } t = 1, 2, ..., T)$

where

$$\varepsilon_{it} = \mu_i + \lambda_t + w_{it} \tag{5}$$

In equation (5) the total random effect ε_{it} consists of three random effects, the first accounting for firm effects, the second for time effects and the third is an overall cross-section and time-series effect.

The estimation of the coefficients involves the use of a modified Aitken procedure consisting of two stages.[9] In the first stage the estimates of the variance of the error components may be obtained using least squares with dummy variables, while in the second one could use the generalised least squares estimator:

$$B = (X'\Omega^{-1}X)^{-1} X'\Omega^{-1}Y$$

In this paper we present results both from pure cross-sectional and temporal cross-sectional analysis.

5. Presentation of Results

5.1 Results from Cross-Section Analysis

Our relationship under examination specifies that differences in share prices across firms and over time can be explained by differences across firms and over time in abnormal earnings per share, book value per share and institutional holdings.

Table 1: *Model:* $P_t = a_0 + a_1 A_{t^a} + a_2 EQ_t + a_3 PO_t$, *Cross-Section Analysis with O.L.S.* $(n = 52)$

Year	a_0	a_1	a_2	a_3	R_2–Adj	F
1991	387.152 (1.72)***	4.660 (5.94)*	1.823 (6.97)*	−799.124 (−0.53)	0.6367	30.80*
1992	405.997 (2.39)**	4.189 (8.74)*	1.373 (8.64)*	−1524.39 (−1.22)	0.7652	56.40*
1993	684.351 (2.87)*	3.738 (5.30)*	1.442 (7.74)*	−2370.809 (−1.16)	0.6229	29.09*
1994	696.506 (4.16)*	3.785 (7.49)*	1.109 (9.84)*	−1454.708 (−1.15)	0.7506	52.18*

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[9]   Amemiya (1971).

Year						
1995	286.789	1.459	0.972	6192.958	0.3797	11.41*
	(1.23)	(1.41)	(5.38)*	(1.86)***		
1996	563.068	4.416	0.903	630.227	0.5419	21.11*
	(2.12)**	(4.70)*	(5.26)*	(0.17)		

*: significant at a = 0.01 (two tail test); **: significant at a = 0.05 (two tail test); ***: significant at a = 0.10 (two tail test).

Definition of Variables:

P_t: the common stock price six months after the end of fiscal year t; A_t: the accounting earnings per common stock attributed to the shareholders for period t; A_{t^a}: the abnormal accounting earnings per common stock apportioned for the shareholders for period t defined as $A_{t^a} = A_t - R_f EQ_{t-1}$; EQ_t: the book value of equity per common stock for period t; PO_t: the percentage of shares held by investment trusts and mutual funds; R_f: the risk free rate at the beginning of period t.

Our cross-sectional results appear in Table 1. The t-ratios of the estimates, that appear in parentheses, were all corrected for heteroscedasticity using White's (1980) consistent covariance matrix. In all years the overall significance of the equations and their explanatory power are satisfactory. The two main independent variables that according to theory should determine value have the expected positive sign and are statistically significant.

With regard to the influence of institutional holdings the results are mixed. The results for 1991 to 1994 suggest a weak negative relationship. For 1995 we observe a positive and statistically significant result and for year 1996 the relationship is positive but statistically insignificant.

Overall, we could say that there has not been significant influence on the part of the Greek institutions on share prices for the period 1991 to 1996.

5.2 Results from Generalised Least Squares. Time-Series and Cross-Sectional Data

The results from the combined sample of 312 observations are shown in Table 2.

Table 2: *Model:* $P_t = a_0 + a_1 A_{t^a} + a_2 EQ_t + a_3 PO_t$, *Cross-Section and Time-Series Analysis with G.L.S. (n = 312)*

Years	a_0	a_1	a_2	a_3	R_2(Basu)	F
1991-1996	987.10	2.55	0.59	–213.90	0.801	
	(7.50)*	(8.60)*	(6.30)*	(–0.30)		

*: significant at a = 0.01 (two tail test); **: significant at a = 0.05 (two tail test); ***: significant at a = 0.10 (two tail test).

Definition of Variables:

P_t: the common stock price six months after the end of fiscal year t; A_t: the accounting earnings per common stock attributed to the shareholders for period t; A_{t^a}: the abnormal accounting earnings per common stock apportioned for the shareholders for period t defined as $A_{t^a} = A_t - R_f EQ_{t-1}$;

EQ_t: *the book value of equity per common stock for period t; PO_t: the percentage of shares held by investment trusts and mutual funds; R_f: the risk free rate at the beginning of period t.*

Our relationship under examination specifies that differences in share prices across firms and over time are functionally related to differences across firms and over time to abnormal earnings per share, book values per share and the proportion of institutional holdings.

The R^2 value is quite high. The abnormal earnings coefficient appears to exert significant positive (and statistically significant) influence on share prices. The same comment applies to book value of equity per share. Once more our institutional holdings variable bears no relationship with the independent variable.

6. Discussion and Conclusions

We set out to investigate whether institutional holdings exert an independent influence on share prices. We used data from companies quoted on the Athens Stock Exchange, a market which for some is considered to be emerging whereas for others is already considered to be a fledged stock market.

As to our main variable of interest, institutional holdings, the results taken at face value show that institutional investors are neither short-sighted nor long-sighted. Apparently, their experts analyse company fundamentals and act accordingly. Value is determined not by the presence of institutional holdings in the ownershiop structure of the company but by company expressed results.

Overall, therefore, our results agree with trandiotional efficient markets theory. We should disregard the negative but (statistically) almost non existent relationship between value and institutional shareholdings. Had it been statistically significant we could argue for the relevance of the myopic institutional theory. It is important to take into account the fact that Greece top management is controlled by major shareholders who manage their company along the lines suggested by the profit maximisation postulate. Within this framework, institutional shareholders are likely to be passive investors relying on management policies for the eventual maximisation of their portfolio holdings.

It is obvious that more work is required on the important subject of the ownership structure and its influence (if any) on share prices. Better research design studies are clearly required. We should remember that by performance within a share valuation framework we mean expected performance. Yet, in virtually all empirical valuation models researchers investigate the relationship between ex-post values for the dependent and independent variables. It is not sufficient to maintain that expectations are realised within a five-year period, or within a ten-year period etc. It is extremely important to study market expectations processes. Without such studies, it would not be possible to determine the extent to which corporate government variables affect share prices, capital structure decisions, dividend payouts, investment decision and other important decision variables. Nevertheless, the interdisciplinary approach linking organisational, managerial and finance perspectives is of paramount importance in that there is already sufficient evidence to allow us to argue convincingly that finance theory cannot alone wholy explain such crucial

matters as share price formation, capital structure determination, dividend policy considerations and various other seemingly financial matters.

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