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HIGHLY LEVERAGED FIRMS AND
CORPORATE PERFORMANCE IN DISTRESSED INDUSTRIES

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Abstract

This paper tests the hypothesis that highly leveraged firms operating in distressed industries manage to maintain profitability and sales growth. It is found that this is the case, in the context of a sample of 103 listed firms on the ASE (Athens Stock Exchange). Panel data is used to analyze the relationship between firm performance and leverage. Furthermore it is shown that there is a negative relationship between leverage and firms' stock returns. This can be attributed to investors' expectations, that an increase in leverage is bound to impair future firm profitability.

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1.   Introduction

Modern theory of finance tells us that borrowing promotes the allocation of resources and creates wealth. This is a view that has clearly dominated contemporary thinking and practice. Nevertheless, excessive borrowing and indebtedness can be held responsible for many of the economic problems in the business world. The core issue is that borrowing is a preferable financing source on condition that a firm creates more wealth that it absorbs- so much more that it will provide an adequate margin of protection against risk.

This paper attempts to shed some light on current business practice in Greece. More specifically, it investigates the relationship between firm economic performance and leverage in a sample of 103 listed firms on the Athens Stock Exchange (ASE), bearing the common characteristic that they all operate in distressed industries.

Initially, it is shown that there is a positive relationship between leverage and economic performance, as this is measured by growth in profitability and growth in sales. Moreover it is shown that leverage and firms' stock returns are negatively related. Next, the highly leveraged firms are extracted from our sample and we test the hypothesis of a positive relationship between firm economic performance and leverage. This hypothesis is supported by our empirical findings.

The structure of the paper is as follows. The next section includes a concise literature review on the relationship and implications of leverage on economic performance. Section three presents a detailed discussion of the data employed.

Sections four and five develop the empirical methodology and discuss the empirical results, respectively. Section six, finally, concludes.

2.   Literature Review

The importance of firm's capital structure and financing decisions to corporate performance and firm value has been an issue of extensive debate in modern corporate finance (Modigliani and Miller, 1958). Alternative theoretical models have examined different benefits or drawbacks related to debt financing and a body of empirical research has focused on implicit costs related to financial distress and the bankruptcy process. According to Titman (1984) and Maksimovic and Titman (1991) *inter allia*, high leverage may decrease demand for the firm's products and/or increase production costs, as customers', employers' and suppliers' expectations, regarding the firm's viability prospects, are adversely affected. Furthermore, Bolton and Scharfstein (1990) note that the corporate performance of highly leveraged firms may be affected by aggressive business strategies of less leveraged competitors.

Opler and Titman (1994) investigate the influence of financial distress on firm performance. The study analyzes whether firms in distressed industries with high leverage underperform peer firms with low leverage. Firm performance is proxied for by three alternative measures: industry adjusted sales growth, stock returns and operational income growth. Sales are included among the independent variables to control for a size related performance impact. The industry-adjusted investment-to-assets ratio controls for the influence of investment behavior on performance and the industry-adjusted asset-sales ratio for performance effects originating from asset sales.

A number of dummy variables are included to indicate a distressed industry or a firm in the high leverage group and the interaction between these two variables measures the combined effect of industry distress and high leverage. The study also distinguishes between customer-driven, competitor-driven and manager-driven implications in corporate performance. Small firms are more vulnerable to financial distress and thus may experience customer-driven and competitor-driven losses in sales. Large firms are more likely to gain more from reducing the activities of underperforming lines in a recession period and hence experience manager-driven implications.

Reimund *et al.* (2004) investigate the costs of financial distress for a sample of 347 German CDAX firms using an ex-post approach proposed by Opler and Titman (1994). For the CDAX sample, the empirical findings indicate that sales growth is negatively influenced by leverage even in non-distressed industries, but in contrast to Opler and Titman (1994), and not conforming to the notion of costs of financial distress, the study finds that, in distressed industries, firms with high ex ante leverage even seem to have higher sales growth than their ex-ante lower levered counterparts.

Asgharian (2003) investigates whether highly leveraged firms are more sensitive to an economic downturn. The study tests the hypothesis that highly leveraged firms lose market shares to their less leveraged rivals in an industry recession. The relationship between firm performance and leverage is analyzed by parametric and semiparametric regression methods. Sales growth, profitability growth and stock returns are the variables used to depict corporate performance. Leverage is measured by the ratio of total debt to book value of equity. A number of additional explanatory variables is

also included, namely, size (total assets), (lagged) investment ratio (net investments to total assets) and (lagged) profitability (EBIT to total assets). The empirical findings indicate that highly leveraged firms in distressed industries face relatively lower sales growth and stock returns but are still in a position to retain a relatively higher growth in profitability. The decline in sales of the highly leveraged firms is taken to be a result of managers' preferences to decrease the activity of product lines with low profitability.

Babenko (2003) proposes a model of optimal capital structure that incorporates costs of financial distress, which is found to perform successfully in explaining the observed leverage ratios in the US. The study initially considers customer-driven financial distress, where prices for the firm output decline whenever the firm has poor financial status. It is found that costs of financial distress account for about 8-9% decrease in optimal leverage and cause higher yield spreads than predicted by traditional structural models. Employee-driven financial distress is then explored, originating from loss of intangible assets when firm revenues decline. It is found that contracting problems within the firm lead to overpayment to firm employees and result in lower optimal debt in its capital structure. The state tax effect on optimal leverage and yield spreads is finally examined. It is found that a 5% increase in state tax reduces optimal leverage by approximately 10% and widens the yield spreads.

Banga and Sinha (2003) investigate whether the structure of debt affects the output and investment strategies of the firm. More specifically, the study examines the impact of total debt (short- and long-term debt) on firm's output, gross investments and technology-upgrading strategies. The empirical findings indicate that debt as a

whole may have a negative impact on the choice of output and investment levels of the firms. However, short-term debt leads firms to follow a more conservative business approach, whereas long-term debt a more aggressive one. Irrespective of its structure, debt forces the firms to upgrade their technology. Total debt has a negative impact on profitability; however, firms with higher long-term debt show higher profitability.

Safieddine and Titman (1999) investigate leverage and corporate performance in unsuccessful takeovers and find empirical evidence supporting the view that leverage-increasing targets act in the interests of shareholders when they terminate takeover offers. Higher leverage helps firms remain independent not because it entrenches managers but because it commits managers to making the improvements that would be made by potential raiders.

 The relationship of leverage and stock returns is also important, since stock returns are used to measure changes in firm value. According to Modigliani and Miller, expected stock returns increase with leverage. The higher expected returns of leveraged firms can be considered as a compensation for higher risk since beta risk of the common stocks will increase with leverage. On the other hand, highly leveraged firms that are exposed to higher financial risks are usually firms with a low business risk (Bradley *et al.*, 1984). In any case, highly leveraged firms in the same industry are expected to bear more financial risk for similar business risk. Leverage may affect stock returns even if there are no costs or benefits associated with financial distress, what is called a 'pure leverage effect' (Asgharian, 2003).

Finally, a number of past studies, including Jensen (1986) and Wruck (1990) *inter allia*, argue that high leverage may be beneficial to corporate performance, since it may improve managerial incentives and lead to optimal investment decisions.

3.   Data

The study employs a dataset for firms listed on the Athens Stock Exchange during the period 2002-2004. The sample firms are assigned to an industry group if more than 60% of their annual sales are derived from activities within that particular industry. Our sample was initially consisting of 150 firms that were rated above average by the ICAP1 database, as regards creditworthiness. Creditworthiness is directly related to economic performance and these firms have operated in distressed industries. A distressed industry is defined according to the same criterion of creditworthiness used by the ICAP database. Firms involved in divergent activities were excluded whenever they could not be meaningfully assigned to a particular industry. In addition, the following firms were excluded from the sample:

- firms belonging to industries with too few firms listed at the stock market (less than four firms);

- banks, insurance companies and other financial institutions, because of their special financial structure;

- investment companies, because their income mainly results from the value of their holding portfolios; this value depends on the financial structure and business conditions of the firms whose

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stocks are included in the portfolio rather than the financial structure of the investment companies;

- nine firms were not listed in 2002 or 2003 or their shares were excluded from the ASE in 2004;

- some firms were also excluded from the sample due to events such as bankruptcy or takeover.

As a result, the remaining sample consists of 103 firms in 15 industries for the 3-year period 2002-2004 (Table 1).

INSERT TABLE 1 HERE

The study has focused on the following variables of interest; the main source has been the published financial accounts of the sample firms:

- firm's total revenue

- profitability, defined as the ratio of operating income over total assets

- stock returns, defined as the annual percentage price changes (source: the Athens Stock Exchange)

- size of firms (as measured by total assets)

- investment ratio, defined as the ratio of net investment over total assets

- leverage, defined as the ratio of total debt over the book value of equity.

4. Methodology

This section first presents the empirical model and variables of interest and then discusses the estimation method applied.

4.1 Model and Variables Included

The empirical model is designed to measure the effects of leverage on firm performance. The dependent variables employed as measures of firm performance are:

- sales growth (Δr): the percentage change in firm's total revenue between time t and t-1, where t=2001, 2002, 2003 and 2004;

- profitability growth (Δpr): the difference in profitability between time t and t-1, where profitability is depicted in operational profit before tax; since some firms may exhibit negative profits, the difference between two years' profitability is employed rather than the percentage change in profitability;

- stock returns (Δs): the percentage change in a firm's stock market prices between time t and t-1; prices are adjusted for corporate actions such as new issues or splits.

The model consists of a set of three regressions, one for each variable of the firm's performance. The main interest is in the coefficient of leverage in these three regressions.

The explanatory variables of the model include:

- leverage: the lagged value of the ratio of total debt to book value of equity; book value of equity is preferred, because the market value of

equity may reflect the market's anticipation of the future sales performance and result in an endogeneity problem;

- size: the natural logarithm of total assets at time t is used as a measure of firm size; large firms are expected to be more leveraged and less vulnerable to economic downturns;

- investment ratio: the ratio of net investments to total assets.

4.2 Estimation Method

The regression model consists of three separate regressions on the same set of explanatory variables. The core model is:

$$Y_t = \beta_0 + \beta_1 L_t + \beta_2 S_t + \beta_3 I_t + D_t + u_t \qquad (1)$$

where Y_t is the measure of firm performance, i.e. sales growth (Δr), profitability growth (Δpr), or stock returns (Δs); and L_t, S_t, I_t stand for leverage, firm size and net investment ratio, respectively.

We have incorporated panel data estimation for a number of reasons widely discussed in the literature and specifically relevant to our study. Hsiao (2003) and Klevmarken (1989), *inter allia*, note that panel data:

- control for individual heterogeneity, as panel data indicate that firms are heterogeneous and therefore minimize the risk of obtaining biased empirical results;

- provide more informational input, more variability, less collinearity among the variables employed, more degrees of freedom and more efficiency;

- provide the opportunity to identify and measure effects that are simply not detectable in pure cross-sectional or time-series data.

In this study, we have chosen the fixed effects model as an appropriate specification, since we are focusing on a specific set of firms and our inference is restricted to this set of firms. In fact the fixed versus random effects issue has generated a hot debate in the biometrics and statistics literature which has spilled over into the panel data econometrics literature. The way the issue is resolved is by testing the restrictions implied by the fixed effects model, derived by Chamberlain (1984) and check whether a Hausman and Taylor (1981) specification might be a viable alternative.

Thus, we proceed as follows: initially, we test for the impact of leverage on the economic performance of firms for the whole sample consisting of 103 firms. We, next, extract 55 firms from our sample with leverage greater than 1. For this procedure, the following points had to be dealt with:

- two of the firms with high leverage have a 3-year average below 1; nevertheless, their leverage exceeds unity by far in 2004; i.e., the leverage of Nikas and Katselis was 1.66 and 1.26, respectively; that is the reason both firms were included in the highly leveraged sub-sample;

- the leverage of Terna is at the margin (0.98-0.99-0.99) for the three years but it was included under the highly leveraged firms;

- the average leverage exceeds 1 for 14 firms, during the 3-year study period; hence, they were classified as highly leveraged firms, even though they might show leverage below 1 in one or two years.

5. Empirical Findings

We run a panel least squares regression with 309 total panel (balanced) observations; the cross-sectional observations are 103. Table 2 summarizes the empirical findings including estimated coefficients of explanatory variables and respective standard errors.

INSERT TABLE 2 HERE

For the three regression models under study, the column with the F-statistic presents the Chow-test for fixed effects. It tests for the joint significance of the dummies of the initial model.

If $\quad y = ai_{NT} + Xb + Z_\mu\mu + v$

where Z_μ is the matrix of individual dummies

H_0: $\mu_1 = \mu_2 = ... \mu_{N-1} = 0$

The observed statistic in all cases is distributed as $F_{(102,305)}$. The restricted Residual Sum of Squares (RRSS) being that of OLS on the pooled model and the unrestricted Residual Sum of Squares (URSS) being that from the within regression. The test statistic is given by:

$$F = \frac{(RRSS - URSS)/(N-1)}{URSS/(NT - N - K)} \approx F_{N-1,\,N(T-1)-K}$$

In all cases the null hypothesis would be rejected. In all models to take care of heteroskedasticity the models were estimated by the method EGLS (Roy, 2002).

It appears that leverage is significant in all three models. More specifically:

- it is found that leverage influences company stock return negatively, and both profitability growth and sales growth positively;

- the positive impact that an increase in the leverage of the firm has on its economic performance, is a result, which deserves further investigation;

- we claim that it may be the outcome of effective management, since the economic performance of a firm that operates in a distressed industry improves through an increase in leverage.

Therefore, we proceed to extract the highly leveraged firms from our sample. We then run a panel regression on the 55 firms with leverage greater than 1 in our sample for the three-year period 2002-2004 (Table 3). The objective is to test the following hypotheses:

- H1: highly leveraged firms in distressed industries retain their sales growth even though they might face negative stock returns;

- H2: highly leveraged firms in distressed industries retain their growth in profitability.

INSERT TABLE 3 HERE

Testing for fixed effects in this case, we compare with a $F_{(102,305)}$ test and once again we reject the null hypothesis. The method of estimation is again EGLS .

**6.	Conclusion**

The study tests the hypothesis that firms with high leverage operating in distressed industries maintain a good economic performance. The analysis is related to the empirical study of Opler and Titman (1994) but the econometric approach allows the data to determine both the functional relationship and the impact of leverage and firm size on economic performance, while taking into account the heterogeneity among firms. Summarizing the results, it is found that on the basis of our sample evidence, highly leveraged firms do maintain their economic performance even though they operate in distressed industries. We claim that this is mainly due to good management practices, prevalent in the majority of the firms in the sample we have used.

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APPENDIX

Table 1: The Firms in the Sample by Industry

Industry	No. of Firms
Construction	13
Printing & Publishing	6
Computers	7
Transport	3
Retailing	7
Food & Beverage	16
Basic Metals	10
Elastics & Plastics	5
Non-Metal Ore & Cement	5
Clothing	2
Machinery & Equipment	3
Metallic Products	2
Refineries	1
Private Hospitals	1
Wholesaling	22
Total	*103*

Table 2: Panel Regression Results

		C	L_{t-1}	I_t	S_t	R^2	F
Δr	**coeff.**	0.27	-0.16	0.06	-0.006	0.67	1.32
	std. error	0.06	0.03	0.02	0.003		
Δp	**coeff.**	0.01	0.007	0.003	-0.007	0.56	1.24
	std. error	0.002	0.002	0.007	0.002		
Δsl	**coeff.**	1.73	0.49	-6.81	-0.004	0.56	1.5
	std. error	0.11	0.03	0.05	0.0006		

Table 3: Panel Regressions on Highly Leverages Firms

		C	L_{t-1}	I_t	S_t	R^2	F
Δr	coeff.	0.46	-0.18	0.42	-0.002	0.71	2.04
	std. error	0.09	0.02	0.22	0.0007		
Δp	coeff.	0.07	0.01	-0.05	-0.005	0.51	1.22
	std. error	0.009	0.003	0.006	0.0004		
Δs	coeff.	7.28	1.18	-5.18	-0.006	0.61	1.19
	std. error	0.15	0.07	0.65	0.0008		