Financial Development and Financial Structure of Industrial SMEs: The Case Of Greece

Voulgaris F. [*], Asteriou D. [**] and Agiomirgianakis G. [***]

Abstract

The aim of this paper is to investigate the determinants of capital structure for the Greek manufacturing SMEs (1-100 employees). Various theories on the determinants of capital structure of SMEs are discussed and findings of previous empirical studies are examined. This study is based on a panel data set consisted of a random sample of 142 manufacturing SMEs in Greece for the time span 1989-1996. A non-linear regression model was developed with total debt, short-term debt and long-term debt ratios used as dependent variables. Enterprise size, profitability, asset structure, liquidity, average inventory period and accounts receivables collection period are found to have a significant effect on the capital structure of Greek manufacturing SMEs. A number of policy implications are suggested by the findings, which will improve the viability, growth and competitiveness of the manufacturing SME sector in Greece.

Keywords*: Small and Medium Enterprises, financial structure, panel data, non-linear regression analysis*

J.E.L. Classification: L1, C23

1.   Introduction

Small to medium enterprises (SMEs) comprise the largest portion of business in most economies and offer the greatest potential for job creation (Asquith & Weston, 1994). Indeed, in OECD countries over 95% of enterprises are SMEs providing 60%-70% of jobs (OECD 2000). The definition of an SME according to the European Union (EU) is an enterprise employing less than 250 employees and has an annual turnover of no more than 20 million Euros. In the EU there are about 19 million SMEs representing 99.8% of all enterprises and have been the major job generator by providing jobs to more than 70 million people, that is about two-thirds of all EU employment (OECD 2000). Moreover, SMEs contribute to regional development, social cohesion and to innovative creation. It is for these reasons, that policymakers worldwide are interested in the process of growth and the well functioning of the SME sector in their economies. In Greece, SME is considered an enterprise with less than 100

[*]   Technological Educational Institute of Heraklion, Greece.

[**]   *Address of Correspondence:* Asteriou D., Reading University, Department of Economics, Faculty of Letters and Social Sciences, P.O. Box. 218. White Knights Reading RG66AA, England.

[***]   City University, London U.K.

employees with an average annual turnover for the last three years not exceeding 800 million drachmas, according to the Greek Organization on SMEs (EOMMEX, 2000). Almost 99% of industrial business activities in Greece are performed by SMEs. They represent 19% of exports and contribute up to 12% of GDP. In the period 1988-1998, SMEs created about 50,000 new jobs (OECD 2000). From a total number of 509.000 enterprises (census 1998), 96.3% employed 1-9 employees, 3.5% 10-99 employees and only 0.2% more than 100 employees. It should be pointed out that the percentage of Greek companies employing more than 250 employees is minimal; consequently accepting the EU definition of SMEs would result in the inclusion of almost all enterprises.

Despite of the significant role of SMEs in modern economies they face significant constraints on their growth including a restricted access to finance. Indeed, wide variance in the profitability, survival and growth of SMEs compared to larger firms brings special financing problems. Furthermore, SMEs often have trouble in obtaining financing because banks and traditional lending institutions are adverse to risky ventures. An investigation of the financing of the small firm, its profitability and its pattern of investments is essential to the analysis of the small firm and its future development.

In recent years there has been an increasing recognition that small enterprises are different from large ones and that these differences affect numerous aspects of small firms including their capital structure. Empirical studies in several countries show that SMEs are characterized by lower and variant profitability versus Large enterprises, measured, both, as return on equity (ROE) and return on total assets (ROI), see e.g. Dunlop (1992), Peel & Wilson (1996), Cosh & Hughes, (1993). These studies also show a lower liquidity (Gupta, 1969, Chittenden et al. 1996), lower use of long-term debt (Chittenden et al. 1996, Levratto, 1997, Audretsch & Elston, 1997) and higher short-term debt (Tamari 1980, Cosh & Hughes, 1993, Rivaud et al. 1998).

However, the question of the extent to which financial structure is related to size raises the broader issue of the relationship between financial structure and business performance (Keasey & McGuiness, 1990, Keasey & Watson, 1992). It is understood that the efficient and effective provision of finance to SMEs is a key factor in ensuring that those firms with genuine growth potential can expand and compete.

The aim of this paper is to examine the enterprise and financial management characteristics that influence mostly the capital structure of the Greek SMEs.

The paper is organized as follows: In Section 2, we proceed by first reviewing available empirical evidence on the financial management characteristics and practices among SMEs and we present, briefly, the theory in support of them. Section 3 deals with the empirical analysis and results on the financial performance of manufacturing SMEs in Greece. More specifically, we discuss there the methodology, data and the model we employ. We also explain there our findings on the enterprise and financial characteristics that mainly influence capital structure of Greek industrial SMEs. Finally, Section 4 concludes our key findings and discuss the resulting policy implications that could induce financial growth and improve further the competitiveness of Greek industrial SMEs.

2. Theoretical Considerations

Empirical studies of SMEs with respect to financial structure have shown that, in comparison to large firms, they are less liquid, exhibit more volatile cash flows and profits and rely more heavily on short-term debt financing (Peel et al., 2000). According to Chittenden et al. (1996) and Gupta (1969), small firms are less liquid, mainly because of lower retained earning and inability to obtain long-term financing. In order to support their growth, they have to borrow on a short-term basis (bank loans and trade credit) (Bates 1971, Bolton Committee Report 1971, and Wilson Committee 1979). However, since they are unable to obtain sufficient finance from other sources, such as financial institutions (Petersen and Rajan, 1995), due to their higher inherent risk, SMEs in order to support their high working capital needs, turn towards high use of trade credit (Levratto, 1997, Cosh and Hughes, 1993). Keasey and Watson (1992), in their study of small firms in the north of England, found a negative relationship between bank finance and trade credit and a positive relationship between external finance and profits. Storey et al. (1987) found that small enterprises show greater variability in profits, growth and profitability increasing with use.

The efficient and effective provision of finance to SMEs has long been recognized as a key factor in ensuring that firms with growth potential can expand and compete. Empirical findings support the view that small enterprises are different from large ones in their capital structure among other things (Ang, 1991, 1992). Various theories have been suggested to explain the different capital structures observed for SMEs. Weston and Brigham (1981) used a life-cycle approach to explain the extensive use of short-term debt by small companies. A major element in this explanation was the combination of rapid growth and lack of access to the capital market. Small firms would start with owners' resources and as they grew they would face the finance gap, which they would try to cover with trade credit and short-term loans from banks, since they lacked long-term funds such as debentures or equity issues and the internally generated funds were not adequate to cover their fast growth.

The Pecking Order Framework (POF), proposed by Myers (1984), provides an alternative explanation. The POF suggests that firms finance their needs first using internally generated funds followed by debt and finally external equity. The hierarchy reflects the relative costs of the relative sources of finance. The original owner-managers see the issue of external equity as being the most expensive and also dangerous in terms of potential loss of control of the enterprise.

Agency theory analysis (Jensen and Meckling, 1976, Chung, 1993) focuses on the problems that arise from the information asymmetry that exists among small enterprises and their providers of capital. Monitoring and bonding are considered being either not feasible or disproportionately expensive. More so, because of the closely held nature of small firms moral hazard problems may be greater for small firms. In order to mitigate agency problems, lenders are likely to rely heavily on collateral in lending to SMEs.

The above theories support the view that capital structure varies with size. In the case of manufacturing companies in Greece, empirical evidence shows that

the implications of the above theories hold (Voulgaris, 2000, Georgopoulos, 1998). More specifically, long-term debt is substantially higher for large firms, especially the ones that show dynamic financial performance, compared to small and medium size enterprises. The reason behind this is the higher credibility of those firms partly due to higher value of assets that can be used as collateral in addition to their higher credit standing. On the contrary, Greek manufacturing SMEs show a higher reliance on short-term debt vs. larger firms, induced by their lower inventory turnover, lower profitability, higher risk profile and restricted access to the capital market. The overall financial leverage of Greek manufacturing SMEs is lower than that of larger enterprises.

Several empirical studies have investigated the factors that may affect mostly capital structure in firms and specifically in small and medium size enterprises. Chung (1993) analyzed firms' data to investigate the empirical relationship between the asset characteristics and financial leverage of the firm. He found that firms with higher asset diversification and larger fixed assets ratios tend to use more long-term debt, and that firms with greater growth opportunities and higher operating risk tend to use less debt. Van der Wijst and Thurik (1993) analyzed retail panel data from W. Germany to identify the determinants of small firm debt ratios. They found that influences on total debt were the net effect of opposite influences on long and short-term debt. Chittenden et al. (1996) investigated the determinants of capital structure for a sample of U.K. small enterprises that included both quoted and unquoted firms. Their findings suggest that profitability; asset structure, size (total assets), age and access to the capital market do affect the financial structure of (Total Debt/Total Asset) small firms. More specifically, long-term debt is most strongly related to asset structure, stock market listing and size. For short-term debt it can be shown that there is a negative relationship with profitability for small firms. The implication here is that profitable small firms fund their operations from retained profits whereas the less profitable ones need to borrow. The use of short-term debt is also negatively related to asset structure while it is strongly related to whether a firm is listed or not in the stock exchange. Gupta (1969) found that the total debt/total assets ratio was negatively related to the size of the firm. He attributed this to the very high cost of outside equity funds and the reluctance of the owners/managers to take in new equity owners. Jordan et al. (1998) showed that both financial and strategic factors are necessary to explain corporate debt levels. Specifically, they found that industry effects are not important in explaining the capital structure of small firms; asset structure, cash flow and innovation strategy are negatively related to debt. Their results also showed that profitability and effective tax rate are positively related to debt, whilst risk is negatively associated with debt. Binks and Ennew (1996) using a survey of 6000 firms, found that young growing firms which expect to grow in the future, perceive a tighter credit constraint vs. growing firms per se, but this is offset by a generally better relationship with their bank. Less profitable firms that had experienced financial difficulties also feel more constrained than those that had not.

According to Van der Wijst (1990) the influence of various firm characteristics on profits, costs and financial structure can be modeled, so that

these relations provide an industry standard for the performance of the firm with a specific combination of characteristics. Van der Wijst's model, which can be used for inter-firm comparisons, enables the calculation of different debt ratios for each combination of total assets, depreciation charges, asset structure and inventory turnover. The model enables a complete assessment of the performance of a small firm by comparing the actual data of the firm with the industry standard values calculated for this specific firm. Van der Wijst found that there are no significant scale effects as regards short-term debt in his sample, i.e. the ratio of short-term debt to total assets increases with total assets. Also, high depreciation charges are associated with low use of long-term debt. A high fixed asset component is associated with more long-term debt and less short-term debt while the reverse is true for a high inventory turnover.

Calogirou et al (1998) examined the financial structure and profitability in the Greek pharmaceutical industry and found no well-established interrelationship between financial and profitability factors. On the contrary, they found a clear positive relationship between size and profitability.

The implication therefore of the financial theory, supported by empirical findings is that the capital structure of small enterprises is different from that of the large ones. Literature also suggests that debt structure is a function of size, asset structure, profitability, liquidity, age, access to capital markets, risk and growth. In the following section we try to investigate the main determinants of the capital structure of manufacturing SMEs in Greece.

3.   Empirical Analysis and Results

The aim of this section is to estimate empirically reduced form equations and henceforth to shed light on the determinants of the Greek SMEs. The data set is constituted by the Balance Sheet and Income Statement accounts of a random sample of 142 industrial SMEs in Greece, such as: Capital Stock, Net Worth, Short Term Liabilities, Long Term Liabilities, Fixed Assets, Depreciation, Current Assets, Inventories, Total Assets, Sales Turnover, Gross Profits, Net Profit (before tax), plus 25 financial ratios.[1] The financial data are extracted from the database of ICAP Hellas. The data set covers the period 1989-1996 (Panel Data with n=142; t=8).

Along the lines suggested by Van Der Wijst (1990) we adopt a general form of the empirical model given by:

$$Y_{it} = b_1 + b_2 S_{it} DC_{it}^{b3} AS_{it}^{b4} IT_{it}^{b5} (exp \sum_{l=1}^{k} b_{6l} X_{l,it}) + u_{it} \qquad (1)$$

where, Y_{it} is the variable to be explained (short run and long run debt, as well as Total Debt and Return to Equity), S_{it} denotes size variable (in our case total assets), DC_{it} is defined as depreciation charges over total costs, AS_{it} is asset structure (given by fixed over total assets ratio), IT_{it} is the inventory turnover, X_{it}

---

[1]   The construction of the financial ratios has been done by the authors. Data are available from authors upon request.

is a set of other explanatory variables, i is an index for firm, t is an index for time, b denotes the coefficient to be estimated while finally u_{it} is the disturbance term. The variables *DC, AS* and *IT* are divided by their sample average values, so that the coefficient b_2 can be interpreted as the scale adjusted debt ratio.

Equation (1) is not linear and the estimated values of the coefficients are produced by a non-linear least squares fit using Marquardt's algorithm (see Marquardt, 1963). The above model enables the calculation of different debt ratios for each combination of total assets, depreciation charges, asset structure and inventory turnover. Similar models could be specified and estimated for a similar sample of large firms. The estimated results for the above specifications and specifically for the determinants of the short-term debt, long-term debt, total debt and profits are presented at Table 1 and in regressions 1 to 6. In each case (with the exception of the profits equation) we start from a general model and then we end-up to a parsimonious model (excluding from our specification the estimated coefficients that are proved to be insignificant).

The results regarding the short-term and the long-term debt suggest that there are significant scale effects in the Greek SMEs, while the effects from the total debt (0.656) are relatively higher compared to the ones obtained for the short-term debt (0.406) (b1 is highly significantly different from zero in all cases) and long-term debt (0.170). In regression 1, first we test for all the possible determinants of the total debt variable. In most cases these tend to be the sums of the results for short-term and long-term debt. We found that, except the scale effects, we have positive effects form the size, the accounts receivable collection period, the fixed assets turnover, the net working capital turnover, the net profit over sales ratio, the % change of sales and the % change of the total asset variables. However, significant effects are proven to be only those from the size, the accounts receivable collection period and the % change of the total asset variables. The fact that size is positively correlated with the total debt suggests that larger SMEs have better access to bank financing (both short and long-term debt) due to their higher credibility and use of collateral, as explained by the theory. More so, according to agency theory, information asymmetry and moral hazard will be greatest for small size firms especially in the case of Greece, because of the lack of financial disclosure and their owner-manager nature. Accounts receivable collection period affects positively the use of short-term debt (see regression 4, Table 1), which consists the major component of total debt in SMEs in Greece and therefore correlates positively with total debt. In order to promote their sales, many SMEs use relaxed credit terms thus increasing their financing needs

Finally, growth measured as percentage change in total assets is found also positive and significant in determining the amount of total debt since growth will increase the need for external finance and especially short-term debt (see Regression 4, Table 1) because of its easier availability.

On the other hand, negative and statistically significant effects are found from the net working capital over total assets ratio, the average inventory period and from the net profit over total assets ratio. This suggests that profitable companies are able to finance their assets from retained earning and they use less external financing. This is consistent with the pecking order theory that

suggests that debt will only be used by firms that do not have sufficient funds from internally generated profits. Furthermore, high net working capital means high use of long-term financing. Since long-term debt is not easily available to small firms, the long-term funds consist of company's own funds (profit and capital), hence the negative relation to total debt. The negative effect of the average inventory period to total debt can be justified by the fact that the build up of inventory in most cases related with inefficient management thus making those companies risky investment for the banks. The efficiency and liquidity proxies and the % change of net profit are found to affect negatively total debt but the empirical analysis suggested an insignificant relationship from a statistical point of view. Regression 2 of Table 1, includes only the significant estimates giving the parsimonious model for the determinants of the total debt of the Greek SMEs. The magnitude of the coefficients shows that liquidity has the most adverse effect on total debt (-0.631) of Greek SMEs. The second most important determinant of debt is ROI (-0.484).

The results for the determinants of the short-term debt (Regressions 3 and 4 in Table 1) suggest a strong positive relationship among size and short-term debt as well as the asset structure, the accounts receivable collection period, the efficiency proxy and the % change in total assets. Negative and significant effects are found for the cases of the liquidity proxy (given by the current assets over current liabilities ratio this time) and the net profit over total assets ratio. The former finding suggests that size and asset structure (Net Fixed Assets/Total Assets) are the most important determinants of short-term debt with positive influence (coefficients = 0.084 and 0.345 respectively). The same holds for the long-term debt (0.02 and 0.04). These findings indicate that size and asset structure play a very important role on Greek manufacturing SMEs' access to financing. The larger a company and the more collateral it can provide in terms of fixed assets, the less risky investment is perceived by the banks. The theory of finance suggests that a firm's leverage depends on the value of its collateral securities. The peculiarity here is that the high fixed asset component is associated with both long-term and short-term debt while for other countries this is true only for long-term debt (Van der Wijst, 1990). The case with Greece is that in many cases short-term debt is rolled over for a long period of time, thus actually acting as long-term debt. Short-term debt is used to finance the piling up of Accounts Receivables hence the correlation is as expected. The efficiency proxy and the assets growth indicate a higher financing need which in the case of Greek manufacturing SMEs is covered with short-term debt as supported by previous empirical findings (Voulgaris et al., 2000, Georgopoulos, 1998). While the latter might show that firms with higher profits will have more internal funds available and therefore they will need to borrow less in the way of short-term funds thereby improving liquidity.

Next, we analyze the effects on the long-term debt over total liabilities ratio. The results obtained are presented in Table 1, Regressions 5 and 6. Positive industry scale effects (from the constant) and relationship among size, liquidity, asset structure and % change of sales was found as it was expected. More specifically, the positive sign of the size variable suggests that the larger size firms have less difficulty in raising long-term debt for the reasons explained

above, therefore improving their liquidity. The positive sign and the significance of asset structure on the long-term debt indicate that the maturity structure of debt relates to the maturity structure of assets. Furthermore, high asset structure implies higher collateral and therefore lower risk for the banks. This confirms the importance of collateral in small and medium-sized enterprise financing.

The positive correlation between long-term debt and growth, measured as percentage change in Sales, indicates the high need of long-term funds for growing SMEs and the importance of the availability of those funds, in view of the high cost of outside equity funds and the psychological factors associated with their management which accounts for a reluctance to take in new equity owners. In contrast the average inventory period, the efficiency proxy and the net profit over sales variables are found to be negatively associated with the depended variable. This fact suggests that inventory build up is mainly financed by company's own funds (since was not found significant positive correlation with short-term debt) possibly due to reluctance of banks to finance these companies.

High employee productivity indicated by Sales per employee as well as high net profit margins suggest high retained profits which are used to finance the company's operations and therefore lower use of long-term external funds.

Finally, for the determinants of the Profit variable (see Table 1, Regression 7) the empirical analysis suggested that the only variables affecting profits are the size (with a magnitude of 0.15 which means that size is a major determinant of profitability, as indicated also by financial theory (economies of scale) and empirical evidence) and the net profit over sales ratio which was expected, because, according to the Du Pond formula, ROE is a function of net profit margin, asset turnover and asset leverage (i.e. $ROE = \dfrac{Net\,Profit}{Sales} \times \dfrac{Sales}{Total\,Assets} \times \dfrac{Total\,Assets}{Net\,Worth}$).

Continuing our analysis, in order to examine more analytically the effects of the explanatory variables to the dependent variables, we break our sample in each consecutive year. In other words we examine only the cross sectional dimension of our data for every year in order to compare possible differences and similarities through time. In these regressions we include only the variables that are found to be statistically significant from our previous analysis.

Table 2 shows the results for the determinants of the short-term debt from 1989-1996. The results suggest that the main determinants of the short-term debt are the size and the liquidity proxy variable. Size is in all consecutive years positive and statistically significant, while the same (but with a negative sign) is the case for liquidity. Size effects appear to be bigger as years go by with the exception of 1996, while the negative magnitude of the liquidity effects falls until 1991 increases after that until 1993 and then falls again. This may suggest that the progressive liberation of the banking system in Greece during that period, made the banks more reluctant in financing small sized firms due to their higher inherent risks, moral hazard and information asymmetry. The behaviour of the liquidity factor could be partly explained by the recessionary period in Greece at that time, like elsewhere in Europe, which caused liquidity constraint in small sized companies. The accounts receivable collection period variable gave

significant estimates only for 1989, 1992 and 1996, while significant results for some years appeared from the net profit over sales ratio, the net profit over total assets ratio and the % change of total assets, with the net profit over total assets ratio being continuously significant and negative for the time period 1991 to 1995. Finally, the efficiency proxy for each year appeared to be redundant.

Table 3 examines differences and similarities through time on the determinants of the long-term debt over total liabilities ratio. In this case we do not have any variable being significant for all years except the constant, which suggests positive industry scale effects, which are bigger for the years 1991 and 1992. This may suggest that current ratio seems to be positive and significant for all the recessionary years. This may suggest again the importance of the liquidity as a risk-mitigating factor for the banks in lending on long-term basis to Greek manufacturing SMEs.

4.   Conclusions

Our main findings on the determinants of the capital structure of Greek manufacturing SMEs are:

There are significant scale effects in Greek SMEs. Variables such as size (total assets), liquidity, asset structure, average inventory period, average collection period, employee productivity, return on total assets and growth were found to affect significantly capital structure.

Profitability measured, as return on total assets and net profit margin, was found to have the strongest effect on all types of debt (short-term, long-term and total debt), correlating negatively with external financing, as expected according to the theory and in line with the findings of previous studies.

Size and growth play also an important role in access to financing of Greek manufacturing SMEs.

Asset structure is also a very important factor in obtaining both short-term and long-term debt. This is in line with the theory of finance and empirical findings from other countries, and confirms the importance of collateral in small and medium enterprises financing. The peculiarity here is that the fixed asset component correlation is stronger with the short-term debt than with the long-term debt. This is in contrast with the findings of previous studies, which find an association with the long-term debt only, and can be attributed to the rollover of the short-term debt due to difficulty of Greek SMEs in obtaining long-term debt.

New findings in this study are the effects of liquidity and its components, i.e. accounts receivables and inventory build up on the capital structure of SMEs. More specifically, liquidity (measured as Current Ratio and Net Working Capital/Total Assets ratio) is found to have a negative but important effect on short-term debt and total debt, which is in line with theory and indicates ability for self-financing. No correlation of liquidity and capital structure has been found in previous studies. Positive correlation was found between average collection period and short-term debt, as well as total debt, while no significant correlation was found with inventory build up and short-term debt as was expected. The findings suggest that firms with low efficiency in managing and

selling stocks have difficulty in obtaining financing. From the efficiency proxies only the number of sales per employee was found significant in affecting short-term debt positively and long-term debt negatively, thus resulting in no significant effect on the overall leverage.

The above results verify the theories of life cycle, POF and agency theory and are in line with most findings from previous studies. An aspect of further research would be to examine differences in capital structure between micro, small, and medium-sized enterprises in Greece, or between manufacturing sectors and investigate the extent to which the determinants of capital structure vary between the size groups.

Our results have a number of policy implications:

1. SMEs should be facilitated in their access to financing in order for them to grow, be viable and competitive and thus contribute to the country's economic development.
2. Policy measures should facilitate SMEs' entry to the capital market in order for them to obtain long-term funds. As implied by the results of the study, the long-term debt available to unlisted small firms is provided on the basis of collateral rather than profitability.
3. Credit risk should be reduced through the promotion and development of mutual guarantee schemes.
4. Venture Capital approach to financing should be encouraged and supported, as well as means to inform SMEs on regulations, opportunities, investment laws, technology, innovation, partnership, etc. and to train management and personnel on financial management techniques and decision making, new trends in marketing, (i.e. e-trade, e-marketing) and research and development in cooperation with universities and research centers.

References

Ang, J.S., 1991, "Small Business Uniqueness and the Theory of Financial Management", *Journal of Small Business Finance*, Vol. 1, No. 1, p. 1-13.

Ang, J.S. ,1992, "On the Theory of Finance for Privately Held Firms", *Journal of Small Business Finance*, Vol. 1, No. 3, p. 185-203.

Asquith, D. and F. Weston, 1994, "Small Business, Growth Patterns and Jobs", *Business Economics*, Vol. 29, No. 3, July, p 31-34.

Audretsch, D. and J. Elston, 1997, "Financing the German Mittelstand", *Small Business Economics*, Vol. 9, p. 97-110.

Bates, J. ,1971, *The Financing of Small Business*, Sweet and Maxwell, London.

Binks, M. and C. Ennew, 1996, "Growing Firms and the Credit Constraint", *Small Business Economics*, Vol. 8, p. 17-26.

Bolton, J., 1971, *Report of the Committee of Inquiry on small Firms*, Cmnd 4811, HMSO, London.

Calogirou, Y., A. Mourelatos and L. Papagiannakis, 1998, "Multivariate Analysis for the Assessment of Corporate Performance: The Case of Greece: Operational Tools in the Management of Financial Risks", C. Zopounidis (ed.), Kluwer Academic Publications.

Chittenden, F., G. Hall and P. Hutchinson, 1996, "Small Firm growth, Access to Capital Markets and Financial Structure, Review of Issues and an Empirical Investigation", *Small Business Economics*, Vol. 8, p. 59-67.

Chung, K.H. ,1993, "Asset Characteristics and Corporate Debt Policy: An Emirical Investigation", *Journal of Business Finance and Accounting*, Vol. 20, No. 1, p. 83-98.

Cosh, A. and A. Hughes, 1993, "Size, Financial Structure and Profitability: U.K. Companies in the 1980's", Working Paper, Small Business Research Center, University of Cambridge.

Dunlop, W., 1992, "Small vs. Large Firms in Australian Manufacturing", *Small Business Economics*, Vol. 4, p. 45-58.

EOMMEX 2000 "National Policies for Greek SMEs", EOMMEX studies, Greece, www.eommex.gr

Georgopoulos, A., 1998, "Is the Size of Corporations Decisive Factor in the Exercise of Credit Policy?" Commercial Bank, *Economic Review*, 15, p. 12-32.

Jacobson, R. ,1987, "The Validity of ROI as a Measure of Business Performance", *The American Economic Review*, Vol. 3, No.3, p. 470-478.

Jensen, M. and W. Meckling, 1976, "Theory of the Firm: Managerial Behaviour, Agency Costs and Capital Structure", *Journal of Financial Economics*, 3, p. 305-360.

Jordan, J., J. Lowe and P. Taylor, 1998, "Strategy and Financial Policy in UK Small Firms", *Journal of Business Finance and Accounting*, Vol. 25, No. 1, p. 1-27.

Keasey, K. and P. McGuiness, 1990, "Small New Firms and the Return to Alternative Sources of Finance", *Small Business Economics*, Vol. 2, p. 213-222.

Keasey, K. and R. Watson, 1992, "Investment and Financing Decisions and the Performance of Small Firms", London: National Wastminster Bank.

Levratto, N., 1997, "Small Firms Finance in France", *Small Business Economics*, Vol. 8, p. 279-295.

Marquardt, D., 1963, "An Algorithm for Least Squares Estimation of Non-Linear Parameters", *Journal of Social Industrial and Applied Mathematics*, (11).

Myers, S.C., 1984, "The Capital Structure Puzzle", *Journal of Finance*, 34(3), p. 575-592.

OECD (2000), *Small and Medium Enterprise Outlook,* OECD.

Peel, M., N. Wilson and C. Howorth, 2000, "Late Payment and the Credit Management in the Small Firm Sector: Some Empirical Evidence", *International Small Business Journal,* Vol. 18, No. 2, p. 17-37.

Peel, M. J. and N. Wilson, 1996, "Working Capital and Financial Management Practices in the Small Firm Sector", *International Small Business Journal*, Vol. 14, No. 2, p. 52-67.

Petersen, M.A. and R.G. Rajan, 1995, "The Effect of Credit Market Competition on Lending Relationships", *Quarterly Journal of Economics*, Vol. 110, p. 407-443.

Storey, D., K. Keasey, R. Watson and P. Wynarczyk, 1987, *The Performance of Small Firms.* Rutledge, London.

Van der Wijst, N. ,1990, "Modelling Interfirm Comparisons in Small Business", *Omega, International Journal of Management Science*, Vol. 18, No. 2, p.123-129.

Van der Wijst, N. and R. Thurik, 1993, "Determinants of Small Firm Debt Ratios: An Analysis of Retail Panel Data", *Small Business Economics*, 5, p. 55-65.

Voulgaris, F., 2000, "Financial and Statistical Analysis of the Behaviour of Manufacturing SMEs in Greece" , doctoral thesis, Technical University of Crete, Chania.

Voulgaris, F., M. Dumpos and C. Zopounidis, 2000, "On the Evaluation of Greek Industrial SMEs' Performance via Multicriteria Analysis of Financial Ratios", *Small Business Economics*, (in press).

Weston, J.F. and F. Bringham, 1981, *Managerial Finance* 7th Ed., Hinsdale: Dryden Press.

Wilson, H., 1980, *Report of the Committee to Review the Functioning of the Financial System*, Cmnd 7937, HSMO, London.

Table 1: *Estimation results for the determinants of the Greek SMEs.*
Number of firms: 142, Years: 8 (1989-1996), Number of Observations: 1136.

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7
Dependent Variable	**Total Debt**		**Short Term Debt**		**Long Term Debt / Total Liabilities**		**Profit**
Intercept	0.655	0.656	0.407	0.406	0.169	0.170	-0.05
	(20.91)*	(21.24)*	(25.0)*	(26.1)*	(12.6)*	(12.7)*	(-0.79)
Size	0.073	0.071	0.08	0.084	0.02	0.02	0.15
	(9.30)*	(9.25)*	(8.71)*	(8.88)*	(2.3)*	(2.3)*	(3.64)*
Liquidity Proxy I Current Assets/Current Liabilities	---	---	-0.023	-0.023	0.02	0.018	---
	---	---	(-13.6)*	(-13.62)*	(6.41)*	(11.6)*	---
Liquidity Proxy II Quick Ratio	-0.003	---	---	---	-0.003	---	---
	(-1.57)	---	---	---	(-0.92)	---	---
Net Working Capital/Total Assets	-0.616	-0.631	---	---	---	---	---
	(-17.66)*	(-18..9)*	---	---	---	---	---
Asset Structure Net Fixed Assets/Total Assets	---	---	0.214	0.345	0.03	0.04	-0.07
	---	---	(2.72)*	(3.21)*	(3.71)*	(4.15)*	(-0.75)
Avg. Inventory Period	-0.0002	-0.0002	-0.00008	---	-0.0007	-0.0006	0.00005

	(-1.99)*	(-2.10)*	(-0.04)	---	(-4.2)*	(-4.7)*	(0.53)
Accounts Receivable Collection Period	0.00001	0.0001	0.00005	0.00004	---	---	---
	(8.56)*	(8.64)*	(2.1)*	(2.00)*	---	---	---
Fixed Assets Turnover	0.00003	---	---	---	-0.0002	---	---
	(1.39)	---	---	---	(-0.65)	---	---
Net Working Capital Turnover	0.00002	---	---	---	---	---	---
	(1.65)	---	---	---	---	---	---
Interest Rate Proxy	---	---	---	---	---	---	0.00015
	---	---	---	---	---	---	(0.139)
Efficiency Proxy Sales/No of Employees	-0.00002	---	0.00006	0.00006	-0.0009	-0.0008	---
	(-1.27)	---	(2.35)*	(2.32)*	(-3.6)*	(-3.5)*	---
Net Profit / Sales	0.028	---	0.056	---	-0.105	-0.08	0.3812
	(1.02)	---	(1.62)	---	(-3.3)*	(-3.3)*	(2.86)*
Net Profit/Net Worth	---	---	---	---	-0.006	---	---
	---	---	---	---	(-1.03)	---	---
Net Profit / Total Assets	-0.520	-0.484	-0.653	-0.654	0.061	---	---
	(-9.63)*	(-10.5)*	(-10.4)*	(-10.5)*	(1.06)	---	---
Sales (% change)	0.00005	---	-0.00008	---	0.0002	0.0002	0.0003
	(0.68)	---	(-0.93)	---	(2.91)*	(3.03)*	(0.78)
Total Assets (% change)	0.0011	0.0011	0.0011	0.0011	---	---	---
	(5.98)*	(6.15)*	(4.88)*	(4.80)*	---	---	---
Net Profit (% change)	-0.00003	-0.00006	---	---	---	---	---
	(-1.29)	(-1.31)	---	---	---	---	---
R^2	0.48	0.49	0.27	0.27	0.14	0.14	0.22

– *The estimation results are produced by a non-linear least squares fit using the Marquardt's algorithm.*
– *Estimated t-statistics are printed beneath the estimated coefficients in parenthesis.*
– *An (*) is printed next to the t-statistics that give statistically significant estimates for 5% level.*

Table 2: *Estimation results for the determinants of the Greek SMEs.*
Number of Observations: 142

Dependent Variable: Short Term Debt

	1989	1990	1991	1992	1993	1994	1995	1996
Intercept	0.399	0.411	0.366	0.290	0.510	0.448	0.406	0.415
	(5.90)*	(6.63)*	(6.73)*	(5.29)*	(9.59)*	(12.2)*	(10.04)**	(9.27)*
Size	0.071	0.063	0.104	0.122	0.091	0.135	0.109	0.072
							(3.99)*	(2.44)*
	(2.40)*	(2.14)*	(4.03)*	(4.58)*	(3.37)*	(5.19)*		
Liquidity Proxy Current Assets/Current Liabilities	-0.058	-0.016	-0.013	-0.021	-0.104	-0.064	-0.026	-0.036
							(-6.07)*	(-5.11)*
	(-7.06)*	(-4.57)*	(-5.09)*	(-5.19)*	(-7.63)*	(-7.86)*		
Accounts Receivable Collection Period	0.0007	0.00008	0.0003	0.0004	0.0001	0.00004	0.00007	0.00012
							(1.52)	(2.39)*
	(2.39)*	(0.34)	(1.47)	(2.35)*	(1.15)	(0.85)		
Efficiency Proxy Sales/No of Employees	-0.0007	-0.0008	-0.0001	0.00004	0.0005	0.00002	0.00004	0.00001
							(0.86)	(1.73)
	(-0.56)	(-0.59)	(-0.94)	(0.43)	(0.69)	(0.98)		
Net Profit / Sales	-0.099	0.069	0.195	0.479	0.190	0.175	0.095	-0.032
							(2.14)*	(-0.48)
	(-0.31)	(0.23)	(0.84)	(2.53)*	(1.98)*	(0.709)		
Net Profit / Total Assets	-0.26	-0.516	-1.237	-0.919	-0.468	-1.121	-0.794	0.033
	(-0.81)	(-1.703)	(-4.14)*	(-4.01)*	(-2.47)*	(-4.91)*	(-4.72)*	(0.21)
Total Assets (% change)	0.0011	0.0017	0.002	0.0004	0.0012	0.0012	0.0017	-0.0009
							(2.64)*	(-1.07)
	(1.74)	(2.18)*	(3.58)*	(1.01)	(1.74)	(2.66)*		
R²	0.325	0.219	0.563	0.352	0.455	0.489	0.394	0.246

– *The estimation results are produced by a non-linear least squares fit using the Marquardt's algorithm.*
– *Estimated t-statistics are printed beneath the estimated coefficients in parenthesis.*
– *An (*) is printed next to the t-statistics that give statistically significant estimates for 5% level.*

Table 3: *Estimation results for the determinants of the Greek SMEs.*
             Number of Observations: 142

Dependent Variable: Short Term Debt

	1989	1990	1991	1992	1993	1994	1995	1996
Intercept	0.117	0.284	0.306	0.348	0.106	0.163	0.187	0.124
	(3.23)*	(4.48)*	(5.93)*	(6.48)*	(2.32)*	(4.36)*	(4.57)*	(3.85)*
Size	-0.03	-0.05	-0.066	-0.080	-0.033	-0.064	-0.029	-0.001
							(-1.12)	(-0.09)
	(-1.33)	(-1.66)	(-2.57)*	(-2.37)*	(-1.28)	(-2.83)*		
Liquidity Proxy Current Assets/Current Liabilities	0.046	0.019	0.017	0.012	0.058	0.054	0.005	0.007
							(1.44)	(1.55)
	(5.92)*	(5.39)*	(6.39)*	(2.93)*	(4.70)*	(8.24)*		
Avg. Inventory Period	-0.0001	-0.0003	-0.0006	-0.0007	-0.0005	-0.0004	-0.0002	-0.0002
							(-2.15)*	(-1.11)
	(-1.20)	(-1.35)	(-3.70)*	(-3.54)*	(-0.52)	(-4.07)*		
Efficiency Proxy Sales/No of Employees	-0.0008	-0.0006	-0.0007	-0.0001	-0.0008	-0.0002	-0.0005	-0.0005
							(-1.10)	(-0.92)
	(-0.69)	(-0.72)	(-0.75)	(-1.25)	(-1.16)	(-0.52)		
Net Profit / Sales	-0.290	-0.122	-0.038	-0.473	-0.210	-0.118	-0.104	-0.010
							(-2.58)*	(-0.184)
	(-1.69)	(-0.619)	(-0.58)	(-2.98)*	(-2.76)*	(-1.14)		
Sales (% change)	0.001	-0.0004	0.0002	-0.0006	0.0008	0.0001	-0.0002	0.0002
							(-0.55)	(2.01)*
	(3.34)*	(-1.08)	(0.51)	(-0.14)	(2.44)*	(1.13)		
R²	0.298	0.231	0.321	0.185	0.227	0.399	0.101	0.059

– The estimation results are produced by a non-linear least squares fit using the Marquardt's algorithm.
– Estimated t-statistics are printed beneath the estimated coefficients in parenthesis.
– An (*) is printed next to the t-statistics that give statistically significant estimates for 5% level.