

An Empirical Approach to the Financial Behaviour of Small and Medium Sized Companies

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ABSTRACT. This paper shows how the financial behaviour of small and medium sized companies is influenced by size and business sector. This idea underlies two research approaches to capital structure: (i) credit rationing, and (ii) the pecking order theory. Both approaches are based on asymmetric information and have been widely developed over the past two decades. An analysis has been carried out on 1000 Valencian companies that were randomly selected from the state company registry. These companies were divided by size before analysis. As an innovation, the investigation implements a multivariate MANOVA model that takes into account two key variables in the financing of small and medium firms. Our results show that size influences company self-financing strategies, and that business sector influences short-term financial policy.

1. Introduction

The financial literature has extensively studied the effect of financial restrictions on company growth and investment plans in recent years. The financial behaviour of small companies, in particular, has been discussed by Ang (1991, 1992), Gibson (1992), Hall and Hutchinson (1993), Reid (1993), Cosh and Hughes (1994), Robson et al. (1994), Storey (1994), Chittenden et al. (1996), Hamilton

and Fox (1998) and Jordan et al. (1998). Much research has recently been undertaken in Spain, notably Hernando and Vallés (1992), Ocaña et al. (1994), Maroto (1996), Boedo and Calvo (1997), Estrada and Vallés (1998), and López-Gracia et al. (1999). Small companies are especially affected by imperfections in financial markets, and so suffer a disadvantage in obtaining external funds compared with larger companies. Given the importance of small companies in the economy, and their social value in creating jobs, it is worthwhile studying the reasons for their financial behaviour.

However, the principal aim of this work is not to study the relationship between investment decisions and financing in the realm of the small and medium sized company. The objective is to analyse the relevance of the two key factors in determining the financial behaviour of small and medium sized companies: their size, and the sector in which they operate. Unlike other studies, which have compared the financial behaviour of smaller with larger companies, this study looks exclusively at smaller companies – dividing them into three *ad hoc* groups: micro, small and medium. We hoped that this focus would find detailed differences in the strategies adopted by the different groups. If such differences are revealed, then this research could provide a solid basis for preparing plans to help smaller companies. This may help government efforts to encourage investment and create jobs.

The paper is organised as follows. Section two describes the theoretical basis of the investigation and makes reference to relevant previous studies. The third section analyses the statistical information used, and then defines the relevant variables. Section four goes on to specify the statistical methodology that is used in the empirical analysis.

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The results are then shown in section five. And, finally, section six summarises the conclusions.

2. Theoretical basis of the study

The traditional concept regarding the financial behaviour of companies – and defended until the 1950's – revolved around the optimal financial structure of the company and its investment decisions. These were seen to depend essentially on the forecasted profitability of given business projects and implicitly supposed that all projects found the necessary funds. Therefore, the “optimal” accumulation of capital occurred alongside the “optimal” financing structure. The work of Modigliani-Miller (M-M) (Modigliani-Miller, 1958) put this concept into doubt. M-M showed that under perfect capital market conditions,¹ financial decisions are made independently of investment decisions because the average cost of capital remains the same regardless of the financial structure. In other words, the market value of a company is independent of the adopted financial structure. This value is basically determined by the ability of the company assets to generate profits.

Nevertheless, there are certain imperfections in financial markets that weaken the hypothesis underlying M-M's theory. The degree to which their hypothesis is weakened conditions the financial behaviour of a company. In particular, investigations in the late 80's (Fazzari and Athey, 1987; Fazzari et al., 1988; Mato, 1989) show that the financial restrictions which some companies suffer could determine investment decisions, and so the type of finance adopted. One of the most common imperfections in the credit market is the information asymmetry between lenders and borrowers. This is especially true with smaller companies. As a consequence, lenders do not know the real value of investment projects proposed by smaller companies (*adverse selection*) and cannot be sure how the proposed funds will be applied (*moral hazard*). This is mainly caused by the poor quality of financial information produced by smaller companies. The lack of confidence on the part of credit institutions results in higher risk premiums, which in turn attract riskier projects. In this way, the final profitability for credit institutions of lending to smaller companies is under-

mined. Credit institutions may also compensate for the risk by requesting guarantees, although these are often greater than the assets available. As a result, lenders often ration the funds available at given levels of interest – and only finance those projects which offer sufficient guarantees (Stiglitz and Weiss, 1981).

An additional approach is *pecking order theory* (POT), proposed by Myers (1984) and Myers and Majluf (1984).² This approach attempts to explain company financial structure and is also based on information asymmetry. It tackles the asymmetry between external shareholders and those handling the information internally; and which can lead the market to under-value a company. POT has been specifically applied to small companies (Scherr et al., 1990; Holmes and Kent, 1991 and Hamilton and Fox, 1998). Smaller companies are frequently managed by only one director – who owns all the shares. Small firm owners operate without targeting an optimal capital structure, and show a clear preference for those financing forms that minimise intrusion into their business. As a result, financing is based on, firstly, personal savings and resources generated internally; secondly, short or long-term debt; and thirdly, least preferred of all, new share issues that dilute control.

Size would appear to be an important factor determining the financial behaviour of smaller companies. This could be because size may influence credit rationing by lenders – and the smaller the company, the greater the restriction (Calomiris and Hubbard, 1990). It may also be, according to the POT approach, that smaller companies limit their financial structure with the aim of avoiding the need to share control of the business with others.

Following these arguments, it would seem reasonable to state that the financial behaviour of smaller companies is conditioned by size – and can be summarised as:³

- (i) The search for short-term finance – given that financial restrictions are largely centred on long-term loans. Short-term finance basically consists of commercial credit from suppliers and bank credit.
- (ii) Self-financing – meaning the largest possible retention of profits. These retained profits create reserves that become the principal route

to internal financing (net self-financing). Fixed asset depreciation funds are usually included with the above. These funds are secure sources of finance until they are used for replacement of fixed assets – and together they constitute gross self-finance (that is, retained profits plus depreciation funds). According to the POT approach, small firms will avoid other sources of equity, such as new share issues.

Companies in certain sectors may also find that only limited funds are available to them, even if recent research in this area fails to offer conclusive empirical evidence (Hernando and Vallés, 1992). The so-called equilibrium theory of capital structure (Brealey and Myers, 1994) recognises that different types of company justify different debt ratios in each economic sector. Sectors with a lot of secure and tangible assets tend to borrow strongly; unlike other sectors that base their activities on intangible, risky assets, and so tend to self-finance their investments. In other words, the greater risk of bankruptcy in certain economic sectors means a greater aversion to risk by lenders – and a consequent reluctance to finance investment projects. So, the economic sector a company belongs to can be an important factor, and should be taken into account when explaining the financial behaviour of smaller companies.

3. Statistical information and relevant variables

The companies in this study were found in the Spanish regional state of Valencia. The *group* of companies from which the sample was selected were those that submitted their 1995 accounts to the Valencia company registry office (Registro Mercantil de Valencia). The sample was initially formed by 1000 companies taken from the company register. The balance sheet and the loss and profit accounts for 1994 and 1995 were obtained for each company, as well as the industrial sector classification. The companies presented their accounts to the registry without any type of differentiation regarding the type of financing. As a result, the sample of 1000 companies is a simple random sample.

The data was filtered with the objective of correcting any possible anomalies that could

distort the results. The following categories of companies were excluded:

1. Companies submitting unbalanced accounts.
2. Non-trading companies.
3. Companies with sales above \$16 m.
4. Newly-created companies.

The number of companies was reduced to 461 after applying these filters – basically due to inconsistency in the data supplied by the companies.⁴

The selected companies were classified according to two characteristics: size and business sector. The former was further sub-classified into three groups: micro (1), small (2), and medium sized companies (3). The business sector classification was, in turn, classified into four groups: manufacturing (1), construction (2), commerce (3) and transport, communications and others (4). The companies were divided into the three size groups in the following way:⁵

1. *Micro*: sales under \$0.5 m.
2. *Small*: sales between \$0.5–2.5 m.
3. *Medium*: sales between \$2.5–16 m.

The variables under study should capture the two essential financial behavioural characteristics of these small companies: short-term external financing, and self-financing. To this end, we have defined the following two ratios:

$$\text{Ratio A} = \frac{\text{Gross self – financing (year } n\text{)}}{\text{Total assets (year } n\text{)}}$$

$$\text{Ratio C} = \frac{\text{Current liabilities (year } n\text{)}}{\text{Total funds (year } n\text{)}}$$

Ratio A shows gross self-financing in year n (1994) compared with total assets (current assets plus fixed assets equalling total funds). The numerator indicates the sum of depreciation and retained profit (reserves). Retained profit is calculated as the variation shown in the reserve account, when, in the following year, or $n + 1$ (1995), the distribution of profits is approved for the previous year n (1994). In this way, we can calculate approximately the profits retained for the year 1994. A more exact calculation can only be made by individually obtaining profit distribution information from the owners of each company.

Ratio C indicates the importance of current liabilities compared with total funds for a given year n (1994). Current liabilities include short-term commercial and bank debt; as well as other, normally less important, short-term debt. Total funds refer to the sum of total debt (current liabilities and long-term debt) and the owner's equity or net worth. We obtain a more adequate measurement by making this comparison using total funds – instead of total debt – because long-term debt is either insignificant or zero.⁶

According to the theoretical approaches based on the conditions of asymmetric information in which smaller companies operate (credit rationing and POT), these variables could reasonably capture the financial behaviour of small companies. Our objective is to use these variables to see if the hypothesis implicit in these theories holds true – namely, that size and industrial sector decisively influence the financing policies of smaller companies.

After the calculations were made, those companies showing ratios very different from the rest were eliminated as they were considered outliers.⁷

Finally, after initial data filtering and subse-

quent variable filtering, we were left with a definitive group of 445 companies. Their classification by sector and size is shown in Table I below.

The following tables illustrate the variables used (ratios A and C) in the sample. Table II shows the entire sample; and Table III shows the same statistics – but with the companies separated by size.

Ratio A shows a small asymmetry on the right, with a slight peakedness (leptokurtic); and the mean is surpassed by only 30% of the companies. With respect to ratio A, it is medium-sized companies that show a behaviour closest to normal. Finally, ratio A shows greater dispersion than the ratio C variable, this variation being especially notable in micro-sized companies.

From the above distributions, we can deduce that the behaviour of ratio C is very near to the normal model as its distribution frequency is approximately symmetrical, and its peakedness is also very close to the normal model. The symmetry is also reflected in the coincidence of the fifth decile (the median) with the mean. The small company category is closest to the normal model.

TABLE I
Frequency distribution

	Micro	Small	Medium	Total (%)
Sector 1	40	36	9	85 (19.1)
Sector 2	25	11	1	37 (8.3)
Sector 3	75	68	35	178 (40.0)
Sector 4	117	27	1	145 (32.6)
Total (%)	257 (57.8)	142 (31.9)	46 (10.3)	445 (100)

TABLE II
Statistical distribution of the ratio A and C variables in the whole sample

	Mean	Var. Coeff.	Skewness	Kurtosis
Ratio A	0.079	1.038	1.550	1.923
Ratio C	0.567	0.568	0.205	-0.355

	Deciles								
	1	2	3	4	5	6	7	8	9
Ratio A	0.005	0.014	0.026	0.039	0.049	0.070	0.093	0.129	0.207
Ratio C	0.131	0.255	0.375	0.488	0.575	0.663	0.741	0.845	0.956

TABLE III
Statistical distribution of the ratio A and C variables by company size

	Mean	Var. Coeff.	Skewness	Kurtosis
Micro	0.072 ^a 0.549 ^b	1.139 0.628	1.692 0.368	2.358 -0.357
Small	0.087 0.601	0.954 0.477	1.593 -0.002	2.185 -0.237
Medium	0.097 0.568	0.794 0.496	0.898 -0.293	0.010 -0.987

	Deciles								
	1	2	3	4	5	6	7	8	9
Micro	0.002 ^a 0.090 ^b	0.010 0.210	0.020 0.338	0.031 0.442	0.040 0.548	0.054 0.628	0.085 0.716	0.112 0.847	0.204 0.991
Small	0.011 0.193	0.023 0.324	0.039 0.464	0.046 0.536	0.060 0.609	0.075 0.713	0.099 0.773	0.132 0.860	0.217 0.923
Medium	0.008 0.143	0.023 0.261	0.049 0.393	0.068 0.522	0.073 0.634	0.085 0.689	0.128 0.737	0.170 0.824	0.229 0.956

^a The variable ratio A is shown in the first row of each category.

^b The variable ratio C is shown in the second row of each category.

4. Methodology applied

The objective of this study is to analyse the influence of company size and sector on the funding of smaller companies, and so test the previously mentioned hypothesis that underlies the theories of credit rationing and POT. To this end, the statistical methodology used is *analysis of variance*.

Analysis of variance is a methodology connected to regression analysis. The latter attempts to explain the behaviour of a continuous variable of interest (in our case, the ratios A and C) by interpreting the values of other variables (in our case, the independent variables of company size and sector). Nevertheless, our objective is simply to establish if there are differences in the behaviour of the variables according to two characteristics of the company (the factors size and sector). We are not attempting to quantify the influence of these factors. Analysis of variance can provide a solution to this question. It allows us to see if the values of one, or more, continuous variables of some elements (companies) vary, or not, when considering different characteristics or factors. These characteristics are represented by discrete variables, whose values indicate the different

situations under which we wish to analyse the variable of interest.

Analysis of variance ideally suits our needs because of (i) the continuous nature of the variables of interest (ratio A and ratio C); (ii) the discrete nature of the company sector factor; (iii) the classification of company size factor in three categories; and (iv) the objective of the study itself.

In summary, we propose applying an analysis of variance considering the two factors that apparently influence the two variables that are the object of this study. Those two factors are the size of the company and the business sector to which it belongs. The two dependent variables, as defined earlier, are (i) ratio A – representing the ability of a company to internally finance itself; and (ii) ratio C – reflecting the short-term nature of funding.

The analysis of a single variable is called ANOVA, while the analysis of inter-related variables is a generalisation of the previous method and called MANOVA (multivariate analysis of variance). Both types of analysis can be applied to one or more factors – depending on the interaction between them. If there is no interaction, there

would be no reason to study the simultaneous influence of these factors over one or more variables.

This analysis was implemented using the SPSS statistical software packet. Using the Pearson test we looked for a correlation between the dependent variables, that is to say, between the two ratios. The correlation coefficient is -0.2358 . This is a significant correlation as the critical level is 0. This implies the rejection of the null hypothesis (correlation equals 0), and so the acceptance of a correlation between the dependent variables. This result shows that a manova analysis is the most adequate model.

The existence of an interaction between the factors was later verified by using the Wilks lambda test. As the Wilks value is 0.9666, and its subsequent critical significance measured 0.255, we can accept – within the normal limits – the null hypothesis of no interaction between the factors. With this new result, we can go on to apply the definitive methodology of a manova for each factor.

To be valid, the data used in a multivariate analysis of variance must meet these two basic statistical hypotheses: homoscedasticity and multivariate normality of the variables. With regard to the former, the hypothesis of homoscedasticity was checked by using the Cochran's statistic – and we found that the hypothesis was not satisfied. In some cases, non-fulfilment of this hypothesis can be corrected using the logarithm of the variables or a Box-Cox type transformation. In our case, these transformations were performed but the problem remained uncorrected. However, a violation of this hypothesis will not significantly affect the result (Uriel E., 1995) if the design is *balanced*.⁸ As our sample design was unbalanced, we looked at its balance – despite the fact that this procedure implied a loss of information.

The hypothesis of multivariate normality can be checked using various statistical tests. However, our sample is large enough to apply the central limit theorem, and so its non-agreement with the hypothesis does not have an important effect on the results. In this way, it can be said that analysis of variance is a robust technique when faced with deviations from normality.⁹

The balanced distributions for both factors are shown in Tables IV and V.

TABLE IV
Balanced distribution of size

	Micro	Small	Medium	
Sector 1	12	8	9	
Sector 2	6	4	1	
Sector 3	11	28	35	
Sector 4	17	6	1	
	46	46	46	138

TABLE V
Balanced distribution of sector

	Sector 1	Sector 2	Sector 3	Sector 4	
Micro	21	25	19	30	
Small	13	11	9	6	
Medium	3	1	9	1	
	37	37	37	37	148

5. Analysis of results

Once we had checked that there were no interactions between the factors, we tested the following hypotheses:

1) Regarding the size of the company:

H_0 : The mean in the selected companies of the ratios A and C is the same in the three groups: micro, small, and medium.

H_1 : The means are not the same.

2) Regarding the company sector:

H_0 : The mean in the selected companies of the ratios A and C is identical in the four sectors identified.

H_1 : The means are not the same.

These verifications will also be undertaken using the Wilks lambda test. These results, and the critical levels of significance, are shown in Table VI.

TABLE VI
Multivariate analysis of variance

	Size	Sector
Wilks test	0.93337 (0.055)	0.85133 (0.001)

The critical level of significance for the size factor is 5.5, and so we can reject the null hypothesis, which is to say that the type of finance adopted by a company is influenced by its size. Null hypothesis can also be rejected in the second case, but now we can say that the type of finance is highly influenced by the sector.

An analysis has been carried out from a one-dimensional perspective with the objective of obtaining more detailed conclusions regarding short-term financial behaviour and self-finance. Four anovas were applied – combining each factor with each variable. The test for the first anova was defined as:

H_0 : Micro, small, and medium-sized companies show the same mean of self-finance.

H_1 : They do not show the same mean.

The other three anovas were defined in the same way. The statistic used to resolve them is F , or the quotient of the mean squares of the factors and the residuals. The results, and their level of critical significance (in brackets), are shown in Table VII.

TABLE VII
Analysis of variance

	Size	Sector
Ratio A	3.34731 (0.038)	0.64043 (0.590)
Ratio C	0.89603 (0.411)	7.71817 (0.000)

From these results, it is possible to conclude that size significantly influences the self-financing of smaller companies as the null hypothesis is rejected at a level of significance of less than five per cent. On the other hand, sector exerts a significant influence only over the short-term nature of financial behaviour, as the significance level is zero per cent.

Once accepted that the financial behaviour of smaller companies differs, depending on both size and sector, we undertook a posterior analysis to detect what are these differences. To this end, the Bonferroni test uses the differences in the mean ratios for each category to indicate which categories are significantly different from the others

Table VIII
Mean ratios for each category (Bonferroni test)

Size	Ratio A	Sector	Ratio C
Micro	0.0563	Sector 4	0.3824
Small	0.0707	Sector 1	0.6373
Medium	0.0961	Sector 3	0.6514
		Sector 2	0.6795

at a significance level of five per cent. The results for the means of ratio A for each size of company, and the means of ratio C for different sectors, are shown in Table VIII.

Looking at the self-financing variable together with the size factor, we can conclude that medium-sized companies act in a significantly different way from micro companies; and the bigger the company, the larger the mean of ratio A.

With regard to the sector factor, the Bonferroni test shows that section four (transport, communications and others) is the only sector that can be considered different from the others in short-term financing.

6. Conclusions

This paper has revised two theoretical approaches that deal with the conditions of asymmetrical information in which small companies operate. These approaches are (i) credit rationing imposed by banks on smaller companies; (ii) the pecking order theory (POT) that implies a preference ranking in the selection of a capital structure. The main objective of this work has been to analyse the possible influence, implicit in both of the above approaches, of size and sector factors in the finance policies adopted by small and medium sized companies – specifically in short-term funding and self-finance. The methodology used is novel in that it implements various manova models in this area of research.

The results can be considered robust from the statistical point of view although they should be treated with caution as they deal only with the years 1994–95; and cannot be generalised or produce definitive conclusions. In addition, the poor quality of accounting data presented by small companies leads us to think that the initial sample should have been larger, and so able to produce

more final observations. A larger sample may have resulted in better model behaviour and allowed us to define the sectors in greater detail.

Our principal conclusions can be summarised in two points:

1. Company's self-financing policy is significantly affected by company size. A clear difference can be seen between micro and medium sized companies – and the greater the difference in size, the greater the effect. The direction of this effect is the opposite of what we expected – as it is the larger companies that show a higher index of self-finance. Accordingly, it is the smaller companies that show a precarious financial behaviour because they are apparently based on short-term financing.
2. The business sector factor overwhelmingly affects the type of finance adopted by companies – especially the short-term nature of the financing. But it should be noted that the *transport, communications, and others* sector behaves differently from the rest.

Annex

Testing the basic hypotheses in the analysis of variance.

TABLE A.1
Univariate analysis of normality

	Ratio A	Ratio C
Lilliefors test	0.1950 (0.000)	0.0535 (0.200)

TABLE A.2
Multivariate analysis of homoscedasticity

	Size	Sector
Barlett-Box <i>M</i>	14.14112 (0.031)	37.37199 (0.000)

TABLE A.3
Univariate analysis of homoscedasticity for the variable ratio A

	Size	Sector
Cochrans test	0.47496 (0.026)	0.26737 (1.000)

TABLE A.4
Univariate analysis of homoscedasticity for the variable ratio C

	Size	Sector
Cochrans test	0.35894 (0.960)	0.44294 (0.001)

Notes

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¹ Cost-free transactions, (legalization of debt, etc.), no bankruptcy costs or taxes, no information asymmetry between various agents, and unlimited resources.

² A detailed review of this theory can be found in Harris and Raviv (1991). This work also offers a review of other approaches that help explain the capital structure of a company. However, smaller companies are discussed in much less depth.

³ Other financing options, such as issuing bonds, official grants, and leasing, are less important and have not been considered in this study.

⁴ The company registry simply registers company accounts and does not examine them.

⁵ These were the bands adopted in an empirical study of 2,126,346 companies made by the Spanish Institute of Tax Studies (Instituto de Estudios Fiscales – 1996)

⁶ In other words, the low level of company debt, and its exclusively short-term nature, would appear to be an indebtedness of 100% if compared with total debt instead of total funds.

⁷ The criteria used to filter the data was to eliminate those outside of the interval $[\bar{x}_i - 3s_i, \bar{x}_i + 3s_i]$; with $\bar{x}_i$ and s_i being the mean and typical deviation for each of the studied variables.

⁸ A design is said to be balanced when each category has the same number of elements.

⁹ Homoscedasticity and normality tests are shown in the annex, although it is not necessary to confirm agreement with the basic hypotheses in a balanced design.

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