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A Test of the Validity of the Theory of the Firm

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Abstract

This paper examines the theory of the firm and alternative theories of firm behaviour. A probit model is estimated using data collected from a postal questionnaire combined with firm and industry specific data generated from the FAME database. The results indicate that firm size, ownership and concentration ratio do not have a significant effect on the likely-hood of a manager or owner of a firm choosing to profit maximise. The paper offers support for profit maximization as a business objective. However, no support is offered for managerial and behavioural theories of the firm.

Introduction

The aim of managers of businesses has been debated for over one hundred years. The original premise, attributed to Marshall (1890), states that managers (who may be the owners of the firm) will seek to maximize profits. This premise has been challenged theoretically by the development of managerial theories of the firm (Baumol 1959; Williamson, 1964; and Marris, 1964). Behavioural theories of the firm have also been developed to challenge the assumption of profit maximization (Simon, 1959; Cyert and March, 1963).

A number of researchers have used survey based techniques to collect empirical data to test the theory of the firm (Hall and Hitch, 1939; Lester, 1946; Shipley, 1981; Jobber and Hooley, 1987; Hornby, 1994). The advantage of data collected from a survey is that it allows us to ask managers what they intend to achieve by their decision. This is in contrast with looking at a firm's performance, where we see what the firm actually achieved. The assumption of profit maximizing implies that managers of firms make decisions in order to attempt to maximize profits; they do not necessarily succeed (Machlup 1946, 1947, 1967). It is therefore more appropriate to ask the managers directly than to look at the level of profits made by firms.

The results of a pilot survey, undertaken in November 2004, are presented in this paper. It has been possible to test the objectives of the managers to see if they are linked to a number of firm and industry level variables.

Framework

Managerial (Baumol, 1959; Williamson, 1964 and Marris, 1964) and behavioural (Simon, 1959; Cyert and March, 1963) theories of the firm suggest that a number of variables are likely to cause a firm not to profit maximise. Five such variables have been chosen and tested to see if there is a link between these variables and a manager claiming to aim for a maximum level of profit. These variables are: the size of the firm (turnover), the ownership of the firm, the number of employees, the concentration ratio, and whether the firm has shareholders or stakeholders.¹

Most of these variables (with the exception of stakeholder/shareholder) have been used by some or all of the previous studies in this area (Hall and Hitch, 1939; Lester,

¹ A stakeholder firm is one that is interested in the well being of its staff and not just its shareholder. The information used to classify firms as a stakeholder or shareholder firm was gained from the questionnaire.

1946; Shipley, 1981; Jobber and Hooley, 1987; Hornby, 1994). These variables are relevant in terms of testing alternative theories of firm behaviour.

Firm Size

The size of the firm has been measured by turnover (the amount of sales in the previous year). However, there are a number of possible methods for measuring the size of a firm: number of employees, amount of profit, etc. The overall level of sales would appear to be the most appropriate measure, as it is the traditional accounting method for measuring size.

The size of the firm is considered to be relevant by several managerial theorists (of the firm) (Baumol, 1959; Williamson 1964; Marris, 1964). Behavioural theorists also claim that the size of the firm will have an effect on the objectives of the firm (Simon, 1959; Cyert and March, 1963).

As firms become larger there are a growing number of relationships between different interest groups within the organisation. These different interest groups, e.g. managers, workers, departmental groups etc, will have different objectives and therefore are unlikely to demonstrate maximizing behaviour and more likely to reach a compromise and therefore display satisficing behaviour.

Ownership

The survey has been designed in a manner that allows the data to be split into managerially controlled firms and owner-controlled firms. Ownership type is represented by an indicator variable (owner) that takes the value of one when the firm is owner controlled, and zero when the firm is managerially controlled. Following the method developed by Crossan (2004), a firm where one shareholder owns more than 49% of the share of the firm (all firms in the second sample strata) and answers yes to question three of the survey (Do you own and directly control your own firm?) is classified as owner-controlled. All firms within the first sample strata (Listed on the main London stock exchange) are classified as managerially controlled as they have to meet the various rules to this effect to gain their listing

The assumption that ownership type will be a significant variable and that it will have an influence on business objectives is derived from the managerial theories of firms' behaviour (Baumol, 1959; Marris, 1964; Williamson, 1964). These three models contest that, due to the separation of ownership from control, firms will not profit maximise. The managers that control these firms will have a different set of objectives, e.g. sales growth, etc. Therefore ownership type should have an influence on business objectives.

Number of Employees

This data was collected from the FAME database. Behavioural theories suggest that as firms grow different interest groups might have different objectives and as a consequence satisficing behaviour may be used instead of maximizing behaviour. If this is the case then we would expect the number of employees to be relevant. It will also be interesting to see if firm size as measured by turnover is more significantly related to objectives than firm size as measured by the number of employees. Most previous studies have used only one of these measures.

Market Concentration

Market concentration has been measured by a ratio of the size of the industry (by sic code) and the size of the five largest firms within the industry. Therefore, the value of the variable increases as the industry becomes more concentrated (oligopolistic). This information has been generated using the FAME database.

Baumol (1959) contends that “big Businesses” that operate in an oligopolistic market structure are more likely to aim for sales (in his experience) than firms who operate in more competitive markets. Oligopolists are assumed to be more interested in maintaining their market share than in profit maximizing. Sweezy argued that firms in an oligopolistic market are likely to maintain their prices, so as to not lose market share, and, therefore, they are not (necessarily) interested in profit maximization but in keeping their market share (Sweezy, 1939).

An alternative view is that due to the lack of competition that oligopolists face they may be more likely to aim to profit maximize than firms that operate in markets with greater competition.

Stakeholder

The fifth independent variable (SH) is another dummy variable. It attempts to measure the firm’s attitude towards its employees. Is the firm only interested in shareholders or is it a stakeholder firm, where all employees have a chance to share in the wealth created by the firm? Firms are classified as either a stakeholder firm, where the dummy variable will take the form of zero or a shareholder firm where the dummy variable will take the form of one. A stakeholder firm is an organisation where all members of the organisation benefit. Firms have been ranked as a stakeholder or shareholder firm using the responses gained from the survey.

Data and Models

A questionnaire was posted to 200 UK based firms in November 2004.² The recipients of the questionnaire were asked to pick their overriding business objective from a list of four possible answers: (profit maximization, sales revenue maximization, a combination of sales and profits, and a different objective not listed). A number of other questions were included to help with the measurement of other variables (see the explanation of individual variables above).

This data has been combined with data collected from the FAME database which contains financial information on 2.7 million UK firms.

Using this data an ordered probit model has been constructed to test for significant relationships between business objectives and the other variables.

² This questionnaire is part of a pilot study being conducted. A full survey will be undertaken during July 2005.

The probit model to be estimated, with n observations and m independent variables is:

$$Y^* = \beta_0 + \sum_{i=1}^n \beta_i X_i + \varepsilon_i \quad i=1,2, \dots, m.$$

Where Y^* is an unobservable index of the likelihood of a firm profit maximising. The unobservable (dummy/fictitious) Y^* must be linked to the observable (dichotomous) variable D .

This can be done by specifying

$$D_i = 1 \text{ if } Y_i^* > 0 \\ = 0 \text{ if } Y_i^* < 0$$

Zero is a threshold value for the Y^ . If Y^* is greater than zero the firm is a profit maximizer.*

The probability that $D = 1$ for the i th firm is given by

$$P_i = \Pr(D_i = 1) = \Pr(Y_i^* > 0)$$

The independent variables are: the size of the firm ($fsize$), number of employees ($employ$), ownership of the firm ($owner$), concentration ratio (CR), and stakeholder/shareholder firm (SH).

The model estimated is

$$Y^* = \beta_0 + \beta_1(fsize)_i + \beta_2(employ)_i + \beta_3(owner)_i + \beta_4(CR)_i + \beta_5(SH)_i + \varepsilon_i \\ i=1,2, \dots, m.$$

The model is estimated to test for significant relationships between the dependant variable and any of the independent variables.

Results

Descriptive data (means, standard deviations, etc) for the independent variables are listed in Table 1. The estimates from the Probit model are given in Table 2.

T-tests have been carried out on the independent variables and no significant relationship has been found between any of the independent variables and the dependant variables (1% and 5% level).

It was decided that the number of employees and the size of the firm was likely to be strongly correlated. Therefore, to correct for this bias, the model was estimated with the ($employ$) variable excluded and then with the ($fsize$) variable excluded. Although this did have an effect on the results, both variables were still insignificant at a 1% and 5% level. However, the ($employ$) variable became significant at a 10% level when the model was estimated without the ($fsize$) variable (see Table 3 and 4).

Managerial and behavioural theories of the firm claim that as a firm increases in size (measured by sales or number of employees) then that firm is less likely to profit maximize than a smaller firm. This is due to the firm becoming more complex and

the likely separation of ownership from control (managerial theories). This paper cannot offer any support for this hypothesis as there is no significant relationship between firm size (sales or number of employees) and the decision to aim for profit maximization as the firm's overriding objective. Hornby (1994) and Shipley (1981) found similar results that could not offer any support for the alternative theories of the firm. Jobber and Hooley (1987) offer some limited support for managerial theories of the firm

Behavioural theories of the firm claim that as a firm grows in size the managers are less likely to pursue maximizing goals. Firms are more likely to aim for a satisfactory amount of profit combined with a satisfactory amount of other objectives (e.g., sales). The results from this survey suggest that large firms are not more likely to aim for a combination of objectives. This survey can offer no support for behavioural theories of the firm.

Williamson (1964) and Marris (1964) contend that managerially controlled firms are less likely to profit maximize than owner controlled firms. The separation of ownership from control leads to a principal-agent problem where the agents (managers) attempt to maximise their own utility and not the owners' (shareholders') utility. This report provides no evidence of a link between the ownership of the firm and managers' (agents') choice of main business objective.

Baumol (1959) argues that firms that operate in oligopolistic markets are less likely to profit maximise and are more likely to aim for a maximum amount of sales revenue (subject to a profit constraint). The data collected finds no relationship between the concentration ratio of the industry (that the firm operates in) and the decision to profit maximize.

The study offers support for profit maximization as the main objective for managers of the firm. 52.5% of managers who responded to the questionnaire claimed that a maximum level of profits was their "overriding aim". These results are higher than previous surveys have found (Skinner 52% (1970), Shipley 47.7% (1981), Jobber and Hooley 40.2% (1987), Hornby 38.5% (1994)).

Limitations

The study is limited by its small sample size (40). It is possible that a larger sample would result in different results (a larger sample will be taken in July 2005). Firm size and the number of employees were close to being significant, and may well prove to be significant with a larger sample. The relationship was negative, larger firms were less likely to profit maximise than smaller firms. Hornby (1994) found similar results, and this does not offer any new hope for managerial theories of the firm.

There are well known problems with using questionnaires as a method of data collection. The author has attempted to deal with these issues but cannot claim to have eradicated all problems that exist with this method of data collection.

Conclusions

This is the first study to use survey data as the dependant variable in an ordered probit regression model to test theories of firm behaviour. The findings from the study suggest strongly that ownership and firm size do not determine what objectives managers pursue. This implies that managerial and behavioural theories of the firm do not explain the different objectives pursued by managers of the firm.

The results do offer some support for profit maximization, as over fifty per cent of the firms surveyed claimed to aim for a maximum level of profits.

This study has been useful in highlighting the limitations of the current theories that have been developed to explain the behaviour of decision makers within firms. It is widely accepted that all firms do not aim for a maximum amount of profits. The theories developed to explain this behaviour need further examination.

	Mean	Std Dev	Minimum	Maximum
OBJECT	0.52500	0.50574	0.00000	1.00000
FSIZE	2946152.40000	7256531.95396	3653.00000	3.35590D+07
EMPLOY	14579.95000	38694.85469	1.00000	223335.00000
OWNER	0.30000	0.46410	0.00000	1.00000
CR	40.88150	21.07165	10.20000	90.64000
SH	0.80000	0.40510	0.00000	1.00000
	Sum	Variance	Skewness	Kurtosis
OBJECT	21.00000	0.25577	-0.10407	-2.09671
FSIZE	1.17846D+08	5.26573D+13	3.54454	12.78470
EMPLOY	583198.00000	1.49729D+09	4.38740	22.37837
OWNER	12.00000	0.21538	0.90725	-1.24162
CR	1635.26000	444.01423	0.60166	-0.57797
SH	32.00000	0.16410	-1.55909	0.45075

Number of observations = 40	Scaled R-squared = .125892	
Number of positive obs. = 21	LR (zero slopes) = 5.12866 [.400]	
of dep. var. = .525000	Schwarz B.I.C. = 36.1782	
Sum of squared residuals = 8.85863	Log likelihood = -25.1115	
R-squared = .111952		
Fraction of Correct Predictions = 0.650000		
Parameter	Estimate	Standard Error
C	.447827	720564
FSIZE	-.433393E-08	622444E-07
EMPLOY	-.212722E-04	184465E-04

OWNER	411511	483773
SH	-.523798	561078

Table 3 Fsize variable excluded		
Dependent variable: OBJECT		
Number of observations = 40	Scaled R-squared = .125774	
Parameter	Estimate	Standard Error
C	456763	.709382
EMPLOY	-.221419	-.221419
OWNER	.406323	478190
CR	.327674	.327674
SH	-.523798	-.523798
Standard Errors computed from analytic second derivatives (Newton)		

Table 4 Employ variable excluded		
Dependent variable: OBJECT		
Number of observations = 40	Scaled R-squared = .089580	
Parameter	Estimate	Standard Error
C	372636	.715485
EMPLOY	-.621161	501458
OWNER	399486	468851
CR	511957	.010992
SH	-.368751	.548895
Standard Errors computed from analytic second derivatives (Newton)		

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