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Enterprise Risk Management Adoption and Significant Positive Impact on Company Value. Case Study of SIC Insurance Company Ghana (Inferential Statistics And Hypothesis Testing)

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Abstract

This paper begins with academic empirical findings on current state of maturity with ERM (Enterprise Risk Management) as evidenced by research survey at SIC Company Ghana.

The study of ERM (Enterprise Risk Management) took a qualitative research strategic approach, the study analysis of non-numerical qualitative data is expressed through words that is used to find answers to the stated hypothesis , which is applicable to this study. The research data collected was based on a single case study considering that the annual reports only indicated whether the company used COSO's framework and ERM practices, a further investigation had to be made to ensure the suitability of the potential case company. State Insurance Corporation (SIC) Ghana was contacted considering that the company seemed to be using the COSO framework as well as having a strategic thinking regarding risk. The aim of the study was to investigate the usage of ERM (which should permeate the organization. To answer the research question some hypotheses have been formulated. These hypotheses are derived from findings of earlier research and literature. It is reasonable that firms with an ERM system may decide to increase leverage as a result of their improved risk appreciation. Another industrial sector with stronger ERM requirements due to regulatory restrictions, e.g. as a consequence of the downfall of Enron, is the energy industry. On the other hand, firms with a higher number of operating segments are faced with a higher risk complexity and therefore an increasing willingness to implement ERM. To answer H1 to H5, an analysis of the ERM implementation level needs to be performed. Second, the ERM implementation levels and performance of the insurance company needs to be coupled and compared to the other insurance companies in the sample. There are two research objectives which will be focused on 1) The grounded theory method which uses two basic principles: (a) questioning rather than measuring, and (b) generating hypotheses using theoretical coding and 2) the value impact of ERM systems, different empirical methods along with different time periods (a one-year and a multi-period sample), thereby following the literature. The hypothesize that the following firm characteristics have an impact on the likelihood of an ERM implementation.

Keywords: Hypothesis; Risk; Method; Ghana; Insurance.

1. Introduction

SIC Ghana Company is the oldest non-life Insurance companies in Ghana, it started in the year 1955 when Gold Coast Insurance Company was inaugurated. SIC Ghana, commenced business in November, 1962 and in 1995 it was converted into public limited liability Company as part of the Government of Ghana divestiture programme as in accordance with provisions by current insurance legislation, Insurance Act, 2006, SIC Ghana has duly separated its general business from the life business, it is a leading provider of general insurance products in Ghana and it operations cover fire, aviation etc, The Company has operated for more than 52 years and developed long-standing relationships with insurance brokerage

firms and independent agents constitute as its primary distribution channel. The Company has maintained steady market leadership , it was listed on the Ghana Stock Exchange on January 25th, 2008 .

The general public holds a share in the Company, rate of returns on investment is required from the management of SIC Ghana, the company has contributed immensely to economic growth by converting savings made by individuals into portfolios of assets and smoothing investment returns, as well as allowing the general public and individuals to have a profitable share in prosperity of the economy. This means that generated worth by SIC Ghana must be managed in a way that will bring maximum benefit to the beneficiaries. Proper management of these funds could provide a formidable pool of long-term funds for industrial investment especially when there is a change in perception and attitude of Ghanaians towards risk insurance. The Company Act 1963 (Act 179) requires the directors to prepare the yearly fiscal defeatist each financial year. These statements give a true and fair view of the state of affairs of the Company during the stipulated financial year beginning and the income statement at the end of that year. At each statement of financial position date, liability adequacy tests are performed to ensure the adequacy of the contract liabilities, these tests and current estimates of future contractual cash flow, as well as claims handling together with administration expense on investment income from the assets backing such liabilities. Any deficiency is immediately charged to profit or loss and by subsequently establishing a provision for loss arising from liability adequacy tests (unexpired risk provision).

2. Main Body

The increasingly turbulent and complex economic scenario brought research about risk management again to the forefront. Historically, companies have managed risks in silos, following a Traditional Risk Management (TRM) approach, and using hedging derivatives and corporate insurance as the mail tools for this activity. In recent years, some firms have started to adopt an integrated approach, called Enterprise Risk Management (ERM) in order to deal with the market complexity. The empirical research regarding the ERM adoption is trying to investigate the relation between this choice and firm value. The majority of the studies are concentrated on financial companies, specifically on insurance companies. Nevertheless, results are still ambiguous. A possible reason consists of the lack of an effective proxy for the degree of ERM capability and implementation. Standard & Poor's 500(S&P 500) ,produced an ERM rating, but only for insurance companies, thus making the study of ERM adoption easier for companies belonging to this industry. In the study I treated ERM as a dummy variable, setting a value equal to one to companies that explicitly declare in their financial reports the adoption of an integrated approach to risks and also to those that have hired a CRO.

The main contribution of the research lies in the attempt to investigate the effect of ERM adoption also on financial firms. Moreover, I tried to discover the determinants of an ERM adoption. The results show that: overall, ERM increases firm value, regardless the specific industry user. In terms of economic implications, the results seem to show that the market perceives the ERM adoption as a value driver, and not as a cost for the company. This pushes the research about this new paradigm in risk management to go ahead and better understand the organizational implication, the necessary steps, the difficulties and the real benefits of this holistic approach.

Firm Size: Companies are faced with an increasing scope and complexity of risks (see Nocco and Stulz, 2006). According to the principle of proportionality, an increasing firm size is related to an increasing number of risks, which tends to result in a higher likelihood of ERM implementation (see Hoyt and Liebenberg, 2011). Additionally, larger firms are able to invest more financial, technological and human resources for implementing adequate ERM programs (see Beasley et al., 2005; Golshan and Rasid, 2012).

H1: Companies are more likely to implement an ERM system with increasing firm size.

Firms which are engaged in several segments or business units are generally more broadly diversified (see Pagach and Warr, 2011; Golshan and Rasid, 2012). Thus, on the one hand, a higher industrial diversification generally comes with a decrease of operational and financial risks due to diversification within the company find a statistically significant positive relation between diversification and the existence of ERM programs as well as the effectiveness of ERM. To indicate the industrial diversification status, we use a dummy variable, which takes the value 1 for firms operating in at least two different segments or business lines and 0 otherwise assume the following hypothesis

H2: Companies are more likely to implement an ERM system with increasing financial leverage.

Financial Leverage: Besides firm size, the financial structure and in particular the ratio of debt (or liability) to asset capital, i.e. financial leverage, has empirically been shown to be a driver for ERM implementation, but with ambiguous results, including significant negative as well as positive relations. On the one hand, firms with a holistic risk management may reduce financial leverage to “decrease the risk of debt-payout defaults” Furthermore, ERM activities enable firms to reduce debt costs by presenting the capital market an appropriate company strategy, a trustful risk handling as well as an adequate risk policy (see Meulbroek, 2002). This may contribute to more favorable conditions for debt capital, whereby raising additional debt is possible. Hence, we hypothesize.

H3: Companies are more likely to implement an ERM system with increasing return on assets.

Return on Assets: Another relevant determinant for ERM examined in the literature is the profitability of firms as measured by the return on assets (RoA) (see Razali et al., 2011), where the variable is not significant, however), which represents an indicator regarding the efficiency of the management by using its available assets to generate earnings, calculated by dividing a firm's annual net income by its book value of total assets . We assume that companies with an increasing RoA are more likely to fund the required financial resources to implement ERM.

H4: Companies are more likely to implement an ERM system if they are operating in the banking, insurance or energy industry.

Industry: Previous studies suggest that firms from specific industries are more likely to adopt an ERM system than others, e.g., because of different regulatory requirements or because of a higher (different) degree of risk awareness within the respective industry as compared to other. The banking and the insurance industry, for instance, face considerable regulatory pressure with respect to a holistic risk management due to the risk-based solvency regulations Basel III and Solvency II, respectively (see, e.g., Beasley et al., 2005; Gatzert and Wesker, 2012). Banks and insurers are also in the focus of rating agencies such as Standard & Poor's, Moody's, Fitch Ratings or A.M. Best, where ERM practices are part of the credit rating process . Furthermore, firms from the financial sector generally aim to present an adequate and transparent risk management system to increase confidence at the capital markets and to acquire customers.

H5: Companies are more likely to implement an ERM system if they are an operating in at least two segments or business lines.

Besides the industrial complexity of firms, the international diversification of organizations is regarded as another driver of ERM (see Hoyt and Liebenberg, 2011). Based on a similar line of reasoning as before, we expect a positive relation between international diversification and ERM engagement caused by the fact that internationally operating firms generally face a higher number and complexity of risks and need to comply with different national regulatory requirements (see Hoyt and Liebenberg, 2011). To estimate the effect of these determinants (firm characteristics) on the implementation of ERM systems in firms. I first follow (Liebenberg and Hoyt,2003) and use a logistic regression based on a one-year sample. This model is typically used for binary decisions, in this case the examination of factors that are hypothesized to be drivers of an ERM engagement. The binary dependent variable ERM assumes a value of 1 if a firm adopted an enterprise-wide risk management and 0 otherwise where the logarithmized quotient of the likelihood of a firm that is using ERM, given by p(ERM=1) and its converse probability represents the odds ratio, b0,…, bn denote the estimated regression parameters of the selected determinants, and the coefficients x1,..., xn represent the firm characteristics, which I hypothesis to have a significant influence on a firm's decisions regarding whether to implement an ERM system or not. In particular, as discussed above, I assume the following variables to impact ERM engagements of firm.

A major disadvantage of this approach is that a logistic regression together with a one-year sample generally ignores information contained in prior time periods. I thus additionally use a multi-period sample to run a Cox proportional hazard regression following (Pagach and Warr,2011), which on the one hand is intended to support the results of the logistic model and on the other hand includes information regarding the development of a firm towards an ERM implementation decision over time. The time extended data set when using the Cox proportional hazard regression is an event history data set, which reduces the number of observations over time. In case a firm implements an ERM program in year T, it exits from the data set in the following year T+1 implying that the number of observations in the data set decreases from year to year. The Cox proportional hazard model is thus able to incorporate the development of a time series regarding ERM decisions. In accordance with the logit model, I estimate the hazard model by using a Cox proportional hazard function, i.e. a function of the common effects of several determinants of ERM dependent on the corporate year T.

2.1.0. Inferential Statistics and Hypothesis Testing

(Comparing years)

SIC Ghana when the company implements ERM B.

SIC Ghana when the company did not implement ERM

Question .

- Is a Company's profitability associated with a CRO'S (Chief Risk Officer) ERM adaptation?
- Are Companies who implement the different methods of Enterprise risk management more likely to have a good positive relations between profit and loss?

2.1.1. Statement of the Hypothesis

H0: There is no association between ERM adaptation and Chief Risk Officers H1: There is an association between Enterprise Risk Management and profitability .

This association is not due to chance.

The direction of this association is not typically assumed.

2.1.2 Basic Inferences

Correlation

- SIC Ghana`s implementation of ERM is positively associated with its current profit margin. Association
- Companies without adequate transparency risk management system risk decrease confidence at the capital markets and to acquire customers.
- Companies who present an adequate and transparent risk management system increase confidence at the capital markets and to acquire customers

2.1.3 Measure of Effect

$$\mathbf{RR} = \frac{\text{Companies without adequate transparent risk management system}}{\text{Companies who present an adequate and transparent risk management system}}$$

If Rate Ratio = 1

There is no relationship between the ERM adaption and the outcome

This is the 'null' value

2.1.4 Interpreting Measures of Effect

Relative Risk/Risk Ratio

RR = 1: No Association

RR >1: Risk Factor

RR <1: Protective Factor

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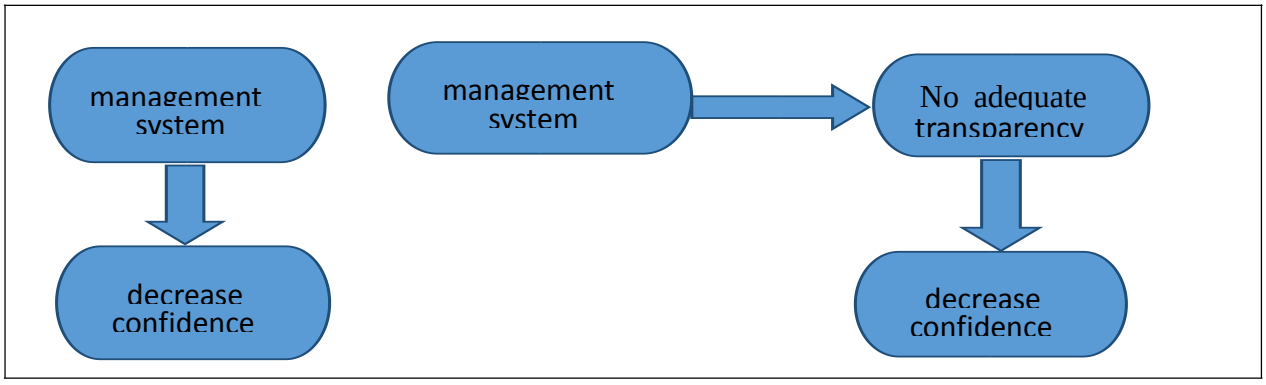


2.1.5 Table 1. Confounding Variables Using Statistical Model

Source: Authors' own design

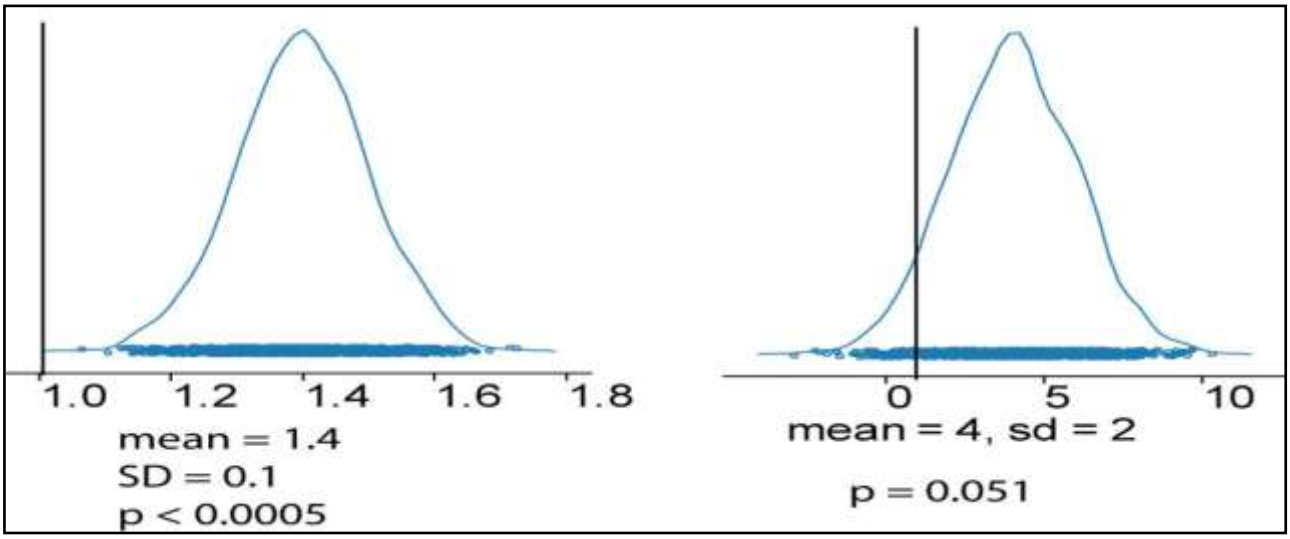
The relationship between management system and decrease confidence is confounded by No adequate transparency

2.1.6 Statistical Significance

P value Measures the likelihood that the observed estimate is due to random sampling error.

P < 0.05 is, by convention, an indication of 'statistical significance'.

The graph below shows two results of Companies that do implement ERM and those that don't. Which is of better value to customers?



2.1.7 Calculating P Value Using Risk Ratio

Using paired T- test to compile the financial data of SIC Ghana from 2006 to 2016 years before and after the introduction of ERM. The information used in this research was extracted from the annual financial reports produced by companies. Specifically, since the reporting of the adoption of ERM is not mandatory, it collected by hand all the financial reports and I performed a detailed search for ERM evidence (explicit or implicit, like e.g. the hiring of a Chief Risk Officer) in the company disclosure.

From the financial statements, I also collected other accounting and non-accounting data, in order to have specific information about the company. Table 3 and 4 describe the main characteristics of my dataset. As it is seen there is an impressive operational performance in 2015, positive increase of the company`s finances, Profit before tax increased from a loss position of GHS9, 225,264 in 2014 to GHS12,138,284 in 2015 representing a 231.5% increase in profit. Profit after tax increased by 214.39% resulting in 8.5% increase in Shareholders' funds.

The SIC company embarked on an Enterprise Risk Management programme which is aimed at enhancing risk response decisions and thus reducing operational surprises and losses as well as consistent improving efficiency to strengthen internal control systems to consolidate gains to provide value for its shareholders and stakeholders alike.

Table 2. SIC Insurance, Ghana Annual Report and Financial Statements 31 December, 2006 to 31 December 2016

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	TOTAL
Profit-before tax	4,019,500	9,386,669	10,994,570	7,487,560	8,044,291	8,037,058	7,534,851	563,123	9,225,264	12,138,284	5,337,880	82,769,050
Profit after tax	2,951,900	7,034,449	8,696,418	5,891,490	6,028,415	5,867,053	9,034,389	594,652	8,303,403	9,498,923	3,736,516	67,637,608

TOTAL	9259400	18081415	22070311	15304737	15683344	15131976	21280334	6102583	26585703	30388194	26558968	204,976,844

Source: Authors' own work

Model 1

Table3. The ERM Disclosure		
	ERM adoption during 2014- 2016 Profit after tax	Percentage
ERM = 1	12,138,284	214.39%
ERM = 0	9, 225,264	178.5%

3.0 Model Specification

Regression was used to describe the relationship between the insurance business operation and profit growth in SIC Ghana. Whereby

PBT = Profit Before Tax

PAT = Profit After Tax

Xw = Worth

A = Dummy Variable

^{1}Y = Difference in Yearly Worth

^{1}X = Year

The model specifications here are formulated to tests the two hypotheses and they are as follows: Let 's incorporate dichotomous information into regression models. Consider the simple model of PBT (Profit before Tax) determination as a function of the years of Worth. (W):

Profit before tax = $^{1}\mathbf{X}$ + $^{2}\mathbf{Xw}$+ **A** 3.0a

To measure PBT loss years , I introduce a dummy variable for PBT as an independent variable in the model defined above,

Profit before tax = $^{1}\mathbf{X}$+ $^{1}\mathbf{Y}$ + **Xw** +**A** 3.0b

The attribute profit has two categories: PBT and PAT. The PBT category has been included in the model, while the PAT category, which was omitted, is the reference category.

Model 1 is shown in Figure 3.0a

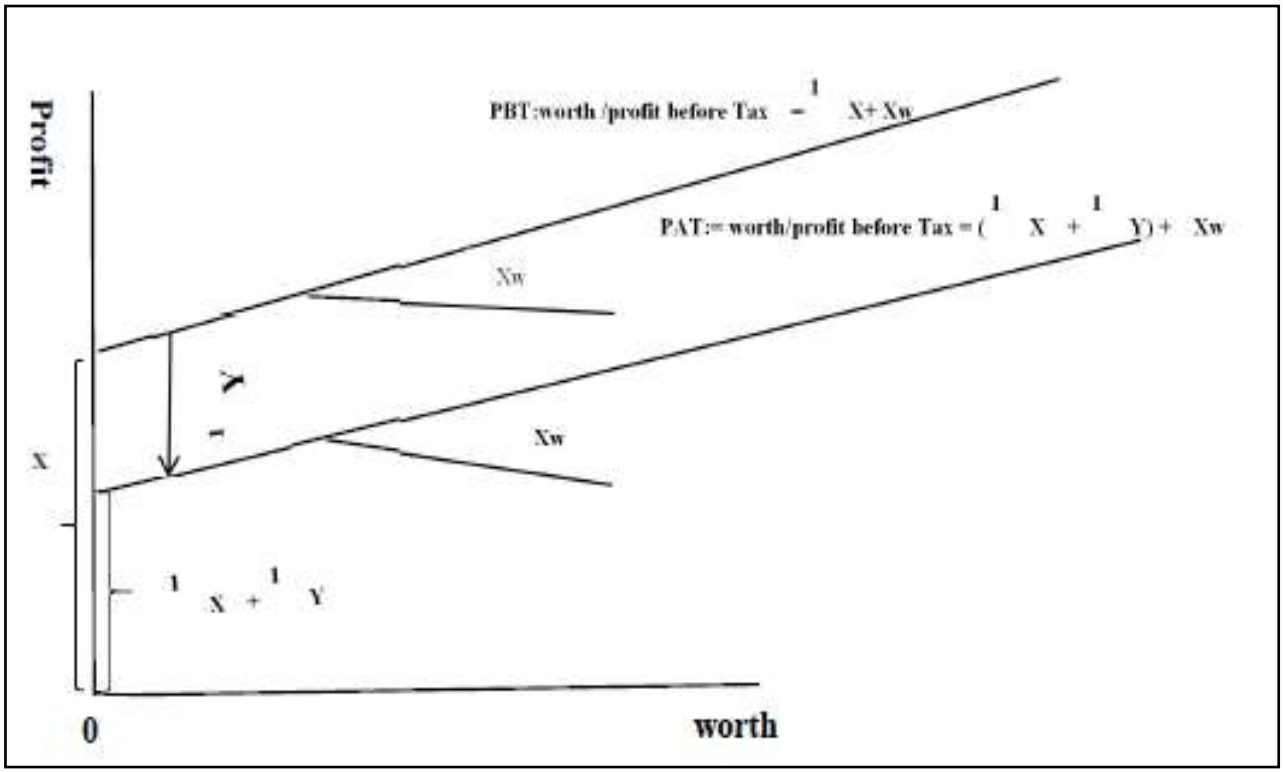
Taking <0. The interpretation of is the following: is the difference in yearly worth between PBT and PAT, given the same amount of time intervals to generate profit (and the same error disturbance u). Thus, the coefficient determines whether there is loss against capital invested or not. If <0 then, for the same level of other factors (worth, in this case), PBT is less than PAT on average. Assuming that the disturbance mean is zero, if we take expectation for both categories we obtain:

$$K^{PB}_{T} = W(\text{worth/profit before Tax} = 1,\text{profit}) = {}^{1}X + {}^{1}Y + Xw \qquad 3.0c$$

$$K^{PB}_{T} = W(\text{worth/profit before Tax} = 0,\text{profit}) = {}^{1}X + Xw$$

FIGURE 4.7.1a Same slope, different intercept.

As can be (3.0 a) the intercept is ^{1}X for profit after tax and $^{1}X + {}^{1}Y$ for profit before tax. Graphically there is shift of the intercept but the line for PAT and PBT are parallel.



In (3.0b) ,1 have included a dummy variable for PAT but not for PBT, because if I had included both dummies this would have been redundant. In fact, all I need is two intercepts, one for PAT and another one for PBT. As it can be seen, if I introduce the PAT dummy variable, I have an intercept for each profit. Introducing two dummy variables would cause perfect multicollinearity given that PAT+PBT=1, which means that PBT is an exact linear function of PAT and of the intercept. Including dummy variables for both profits plus the intercept is the simplest example of the so-called dummy variable trap, as I shall show later on. If I use PAT instead of PBT, the worth equation would be the following:

$$\text{Worth} = U + h^{PB}_{T} + Xw + A \qquad 3.0d$$

Nothing has changed with the new equation, except the interpretation of **U** h^{PB}_{T} **and :U** is the intercept for PAT,

which is now the reference category, and $U + h^{PB}_{T}$ is the intercept for PBT. This implies the following relationship between the coefficients:

U = ^{1}X **+** ^{1}Y and **U+ h=** ^{1}X

In any application, it does not matter how I choose the reference category, since this only affects the interpretation of the coefficients associated to the dummy variables, but it is important to keep track of which category is the reference category. Choosing a reference category is usually a matter of convenience. It would also be possible to drop the intercept and to include a dummy variable for each category. The equation would then be

$$\text{Worth} = Ð^{PB}_{T} + Ð^{PA}_{T} + Xw + A$$

where the intercept is **Ð** for **PBT** and **Ð** for **PAT.**

Hypothesis testing is performed as usual. In model (3.0b), the null hypothesis of no difference between PBT and PAT is $H_0: {}^1\mathbf{Y} = \mathbf{0}$, while the alternative hypothesis that there is loss against PAT is $H_1: {}^1\mathbf{Y} < \mathbf{0}$. Therefore, in this case, I apply a one sided (left) t test. **3.0e**

A common specification in applied work has the dependent variable as the logarithm transformation ln(y) in models of this type. For example:

$$\mathbf{In\ (worth)} = {}^1X + {}^1Y_{PAT} + Xw + A \qquad \mathbf{3.0f}$$

Let us see the interpretation of the coefficient of the dummy variable in a log model. In model (3.0f), taking A=0, the profit for a PAT and for a PBT is as follows:

$$\mathbf{ln(\ worth_{PAT})} = {}^1\mathbf{X} + {}^1\mathbf{Y} + \mathbf{Xw} \qquad \mathbf{3.0g}$$

$$In(worth_{PBT}) = {}^1X + Xw \qquad \mathbf{3.0h}$$

Given the same amount of worth , if I subtract (3.0g) from (3.0h), the equation is

$$\mathbf{ln(\ worth_{PAT}) - In(worth_{PBT}) = {}^1Y} \qquad \mathbf{3.0i}$$

Taking antilogs in (3.0i) and subtracting 1 from both sides of (3.0i), the results is

$$\frac{\mathbf{Worth_{PAT}}}{\mathbf{worth_{PBT}}} - \mathbf{1} = \boldsymbol{\alpha}^{\mathbf{1}}\mathbf{Y} - \mathbf{1} \qquad \mathbf{3.0j}$$

That is to say

$$\frac{\mathbf{Worth_{PAT} - worth_{PBT}}}{\mathbf{worth_{PBT}}} = \boldsymbol{\alpha}^{\mathbf{1}}\mathbf{Y} - \mathbf{1} \qquad \mathbf{3.0\ k}$$

Finally, According to (3.0k), the proportional change between the PAT and the PBT, for the same amount of worth, is equal to $\boldsymbol{\alpha}\ {}^1\mathbf{Y} - \mathbf{1}$. Therefore, the exact percentage change in yearly profit between PBT and PAT is $100 \times (\boldsymbol{\alpha}^1\mathbf{Y} - \mathbf{1})$.

As an approximation to this change, $100\times\ {}^1\mathbf{Y}$ can be used. However, if the magnitude of the percentage is high, then this approximation is not so accurate.

4. Conclusions

In order to test the hypothesis a fixed effect panel regression was run on different versions of the models shown below (1) and (2). This shows that the ERM adoption has a strong significant positive impact on company value. Among the control variables, leverage (LEVERAGE), size (SIZE), ROA and the company beta (BETA) have a significant impact on the company value. In particular, both the variables ROA and BETA have a positive effect, meaning that the most profitable years for the companies have the highest value. Whereas, LEVERAGE and SIZE have a negative impact on firm value. Overall, these results show that ERM increases the firm value, regardless the specific industry user. This result means that the market perceives the involvement of the company in an ERM system as a good signal. Table 4 shows the main results of model (2), which focuses on the determinants of the probability when the company adopted an ERM system. Regression was performed using independent variables the most cited in the main literature about ERM. The results presented in this paper are still preliminary and not conclusive. The research needs further empirical analysis. Specifically, to check for the robustness of the results, I will collect and introduce new control variables in the models. Finally, to generalize the results, I will enlarge my dataset to other companies; in particular I will extend data both at industry and country level.

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