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Full Length Research Paper

A study of linear and non-linear relations between accounting variables and share return of automobile industry: Some Iranian angles

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The present study deals with the evaluation of linear and non-linear relations between accounting variables and share return in automobile industry in Iran. The accounting variables under examination include three variables of operational profit, net profit and cash flows resultant from the operation. The regression analysis has also been used for testing the existence of a relation between variables and significance of measured linear and non-linear models. The results of the research express the existence of linear and non-linear relations between the accounting variables of share return of automobile industry. Of course, some of these models explain that this relation is better than other models, regardless of their test results. In other words, some of the models, such as exponential model and third-grade non-linear model are more capable of defining share return. Also, models without width from onset relative to models with width from the onset could explain share return better.

Key words: Accounting variables, share return, linear relation, non-linear relations.

INTRODUCTION

Accounting is considered as one of the most important information resources in stock markets (Salehi, 2008). In the theory of stock market, the role of accounting is to compete with other resources of information, such as mass media, financial analysts and even the market prices themselves. Also, in new definitions expressed from the accounting science, accounting is considered most as an information system (Namazi and Salehi, 2010), and in the opinion of some of them, the main objective of accounting in offering new information for owners and managers can be defined as a mechanism for conveying related and useful information from inside the organization to outside of it, and its result is used to adopt better decisions by investors (Baydoun and Willet, 2000).

Adopting better decisions cause improvement in stock markets and finally results in increase of the whole community welfare. For making better decisions by investors and finally the performance improvement of stock markets, it seems necessary to analyze accounting information and examine the relation between this information with other factors that are effective in decision making (Salehi et al., 2011). By using the relations examination that exists between accounting information and other factors, we can help promote the analysis level in stock market. Undoubtedly, without conducting wide and comprehensive research in order to analyze the information in this market, we cannot expect to anticipate performance growth of this market and so increase in whole society welfare (Rostami and Salehi, 2011). The brief examination of developments trend of Tehran stock market as the main basis of capital market in Iran economy shows that the lack of analysis has always been governed in this market. Finally, because most of the investors have little information about the way of investing and are not capable of applying all information relating to companies that are willing to invest in them, it is necessary to provide information through research, so that investors can make decisions carefully and quickly, and select the intended company share by using them.

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LITERATURE REVIEW

These results have been achieved from researches that have been conducted whether in or out of Iran about this surveys topic. Much research has not been conducted about examining non-linear relations between accounting variables in Iran. Karami et al. (2007) conducted a study about the linear and non-linear relations between financial ratios and share return in Tehran stock exchange and by considering profit making owing ration and market as independent variables, they came to the conclusion that there are linear and non-linear relationships between research variables, but this relationship is not significant and could not be reliable, and variables could not explain more than 50% of share return changes.

Ball and Brown (1968) dealt with examining the relationship between annual profit and share price. Their research result showed that annual profit changes and share price changes are related to each other, and so we can say that accounting and the information resulting from it are valuable and could be useful in economical decision makings.

Easton et al. (1992) dealt with examining the relationship between accounting profit and share return, in which: PT is the share price at the end of t year; PT -1 is the share price at the beginning of t year; DT is the paid cash profit of t year; a is the percentage of capital increase from demands point and cash revenue; B is the percentage of capital increase from the saved point (share profit) to the paid name (the investor) about increasing the capital of cash revenue and demands point.

RESEARCH METHODOLOGY

The present research is a descriptive research that dealt with describing and examining the relationship between variables. In order to test the relationship between variables and the significance of estimated models, regression analysis was used. First, linear and non-linear regression models were estimated by using SPSS software and then regression model significance was done using statistic f in 95% reliability level.

If the achieved f amount from regression model is greater than the critical f value of the table or, in other words, the significance level is less than 5%, the regression model would be significant. Also, for examining self independence entity of variables, Durbin Watson test was used as acceptable amount of this test is between 1.5 and 2.5.

Due to the fact that the reliability level of the test is usually 95% in humanistic – sciences researches, the reliability level in this research is also 95%; so, if the significance level of the model (sig) is less than 5%, the model is verified. Tables 1, 2, 3 and 4 shows the results of the study.

In other words, the model significance level of less than 5% shows that the statistic f of the achieved regression model is greater than critical value of the table and as a result the statistic f is located in h rejection zone and model significance is verified. So, having the greatest moderated definition coefficient in every manner used as the best evaluation of the study, the exponential non-linear regression model (power) with zero wide from the onset was achieved as the best single-variable model to define share return by accounting variables. Also, in respect to the achieved results, multi-variable model was prepared for defining share return by accounting variables in this research.

Table 1. The results of the test.

Variable	Share return
Operational profits	0.946
	0.000
	Power
Net profit	0.952
	0.000
	Power
Operational cash flow	0.936
	0.000

The objective of this study is to specify the best linear models for studying relation between accounting variables and share return. Each of the regression models in two positions with a gap from the origin and without gap from origin has been estimated and 60 regression models in this study has been estimated for studying relations between independent variables with share return and their efficiency has been tested in models with no gap from origin. We considered that all dependent variables will be explained by independent variables in models with a gap from origin. Part of the dependent variables is explained by a fixed part of the models with a gap ($a \neq 0$) from origin A and models with no gap from origin B.

Research on companies listed on New York stock market was done for 1968 to 1986 period. In this research, relation between share return and accounting profit was studied with obligation: by adding to time period will increase two variables correlation, also errors will decrease and real and exact profit of the company can be calculated. They utilized this for a period of ten years. But it must be considered that calculating t no error and exact accounting profit can be done only for the whole period of activity of the company. They considered one year and more than one year profit as middle term profit and added them to get the final profit for exposed period and the independent variable in their research was Eps/p. The outcome showed that in longer periods, correlation between two variables increased and the increased profit shows more return (Easton et al., 1992). Research on non-linear relations between variables has been insignificant.

RESULTS AND HYPOTHESES

In this research, which is about studying linear and non-linear relation between variables and share return, there is one theory which says: there are significant relations between accounting variables and share-return in car industry and part producing companies.

Independent variables of this research are: operational profit net profit and operational cash flows, which are all accounting variables. The dependant variable is the annual share return which has been calculated annually and according to the following order. Regression linear and non-linear models which have been used for

Table 2. Results of estimation of 10 linear and non-linear models in accounting variables.

Variable		Model									
		Linear		Logarithmic		Inverse		Quadratic		Cubic	
		A	B	A	B	A	B	A	B	A	B
Operating profit		0.343	0.477	0.506	0.701	0.297	–0.023	0.366	0.641	0.701	0.831
		8.823	15.350	16.360	38.437	7.341	o.634	5.336	16.182	12.721	27.114
		0.010	0.001	0.001	0.000	0.017	0.438	0.020	0.000	0.000	0.000
		Confirmed	Confirmed	Confirmed	Confirmed	reject	Confirmed	Confirmed	Confirmed	Confirmed	Confirmed
Net profit	Share return	0.508	0.567	0.562	0.714	0.269	-0.047	0.470	0.598	0.647	0.798
		16.492	21.933	20.236	40.936	6.508	0.278	7.663	12.921	11-343	22.013
		0.001	0.000	0.001	0.000	0.023	0.606	0.006	0.001	0.001	0.000
		Confirmed	Confirmed	Confirmed	Confirmed	reject	Confirmed	Confirmed	Confirmed	Confirmed	Confirmed
Operational cash flows		0.361	0.350	0.465	0.667	0.062	-0.060	0.339	0.566	0.700	0.810
		9.487	14.091	14.021	40.001	1.997	o.o99	4.853	11.424	12.662	23.805
		0.008	0.002	0.002	0.000	0.180	0.757	0.027	0.001	0.001	0.000
		Confirmed	Confirmed	Confirmed	Confirmed	Rejected	Rejected	Confirmed	Confirmed	Confirmed	Confirmed

Table 3. Results of estimation of linear and non-linear models in accounting variables.

Variable		Model									
		Power		Compound		S		Growth		Exponential	
		A	B	A	B	A	B	A	B	A	B
Operational profit		0.490	0.943	0.141	0.285	0.573	0.099	0.141	0.285	0.141	0.285
		15.338	264.75	3.464	7.368	21.108	2.762	3.469	7.368	3.464	7.368
		0.002	0.000	0.084	0.016	0.000	0.117	0.084	0.016	0.084	0.016
		Confirmed	Confirmed	Confirmed	Confirmed	Rejected	Confirmed	Confirmed	Rejected	Confirmed	Rejected
Net profit	Share return	0.593	0.952	0.181	0.293	0.738	0.020	0.181	0.293	0.181	0.293
		22.810	316.686	4.304	7.638	43.251	1.324	4.304	7.638	4.304	7.638
		0.000	0.000	0.057	0.014	0.000	0.268	0.657	0.014	0.057	0.014
		Confirmed	Rejected	Confirmed	Rejected	Confirmed	Rejected	Confirmed	Rejected	Confirmed	Rejected
Operational cash flows		0.370	0.936	0.122	0.237	0.165	-0.022	0.122	0.237	0.122	0.237
		9.811	234.475	3.083	5.982	3.961	0.660	3.083	5.982	3.083	5.982
		0.007	0.000	0.101	0.027	0.066	0.429	0.101	0.027	0.101	0.027
		Confirmed	Confirmed	Confirmed	Rejected	Rejected	Rejected	Confirmed	Rejected	Confirmed	Rejected

Table 4. Statistical indicators of dependent and independent variables.

Variable		Statistical indicator			
		Central indicator			Dispersion indicator
		Average	Median	Mode	Standard deviation
Operational profit	Billion Rls	1166635	135225	15091	2239638
Net profit	Billion Rls	855072	112429	5783	1663103
Operational cash flow	Billion Rls	859072	103335	1317	1837325
Share return	Percent	46.03	44.35	1.40	38.27

Table 5. Compound model.

Model	Estimation	A≠0	A=0
Multi variable model	Adj.R	o.667	0.966
	D.W	1.702	1.608
	Sig	0.001	0.000
	F	10.994	150.977

studying relations between variables are:

1. Linear y = a+Bx
2. Logarithmic y = a+BLnx
3. Inverse y = a+B⁄x
4. Quadratic y = a+Bx+Bx
5. Cubic y = a+Bx+Bx+Bx
6. Compound y = aB
7. Power y = ax
8. S y = exp (a+B⁄x)
9. Growth y = exp (a+B⁄x)
10. Exponential y = ae

Statistical sample

Statistical integral of this research includes all car industry and part producing companies listed on Tehran stock exchange. Statistical samples include car industry and part producing companies which: (1) had been active in stock market during period of 2007 to 2010, (2) had no interruption longer than 30 days, (3) complete information about their variables is available (4) their financial year ends at March 19, (5) not being one of investing companies. Exposing these conditions, 16 companies were selected. Most information used in this research were obtained from the stock market site and portfolio site and to be more accurate, calculation of share return was done manually.

If operational income (profit) is OI, net income (profit) is NI and operational cash flows is ocF, the multiple non-linear variable models for calculating share return would be:

Y = a+(oI)+(NI)+(ocf)

When it changes from a non-linear model:

Ln (y) = In(a)+B.In(oI)+B.In(NI)+B.In(ocF).

The results of the estimations of multiple variables model are as shown in Table 5. Coefficient adjustment of sing variable models show that the best model for no gap from origin is (a = 0).

Variables in this regression multi-variable model for explaining share at a gap from origin position is in net profit and the share at no gap from the origin position is in operational profit. In this position with attention to the result of standard coefficient of natural variable, logarithmic table net profit is the best model for explaining the share return. In the single variable models, the net profit variable had the best adjusted coefficient as it was used in the multiple variable model.

Conclusion

Results of this research confirmed between linear and non-linear variables. It can be said that this relation is strong and in some cases, such as the natural logarithmic variable, the net profit could explain up to 95% of vacillation of share return. Investors in making decisions pay attention to other factors like economic (exchange and inflation rates) and also political and social situations, but still the act of share return and general and comprehensive model for decision making by investors is indefinite. Results of research in models with no gap from origin in single variable models, and also, multiple variable models show that they have more ability to explain the share return. This is because, the research variable dependant or independent has some fractional, so their distribution is around pivot, therefore, models with no gap from origin have more ability to describe share return than models with a gap from origin. At last, natural logarithmic variable of net profit was designated as the best variable for explaining share return.

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