

The relationship between financial leverage and profitability with an emphasis on income smoothing in Iran's capital market

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Abstract

The main purpose of this research is the study of the financial leverage effect on profitability and also the presence of smoothing in listed companies of Tehran Stock Exchange. Since financial reports are important in forecasting and decision making of users, therefore, in this research has been addressed to survey income smoothing effect on financial leverage and profitability during 2006-2010 period. In this study, 60 companies listed on the Tehran Stock Exchange were selected by using systematic elimination way and for analysis and hypothesis testing using from statistical techniques such as simple linear regression and Pearson's correlation test and Z_T . And finally used in ECKEL model for identifying smoothing firms from non-smoothing. This research findings confirmed the presence of smoothing and relationships between financial leverage and profitability in listed companies of Stock Exchange and showed that firms do smooth include operating profit, gross profit and net profit. The main result of the study indicates that despite significant relationship between some variety of research hypotheses in smoothing and non-smoothing firms, there are significant differences between financial leverage and profitability between these two groups of firms.

Keywords: Income smoothing, financial leverage, owner's equity efficiency ratio, ECKEL model.

Introduction

Firms require to capital for growth and progress. Some parts of the capital within the company is provided through retained income that have been created in the result of the firm's profitability and hasn't

been divided between shareholders and the rest can be created through capital markets or borrowing. A firm which doesn't have any liability, its capital structure composed of owner's equity and since most firms' capital structure is associated with liability and capital hence financial managers are very sensitive and accurate for receiving a loan and its effects and maximizing shareholder wealth. Also, investors rely on contained financial information in the financial statement of economic units for their investment decisions, especially on reported income. Investors believe that the fixed income compared with fluctuated income guarantees higher dividend payment. Therefore, firms which have the smoother income are interested in investors and their view; it is considered as an appropriate location for investment. One of the profit manipulating goals has been reported as income smoothing, so that income smoothing can be considered as a part of income management. Income smoothing is defined as a conscious effort for reducing the cyclical changes and fluctuations in reported profits or forecast income through accounting optional technology applications in the public accepted principles framework of accounting.

Research question

In recently growing economy, investment managers always looking for suitable investment options either to gain required profits or increase their wealth in the long-term period. Company managers as representatives of shareholders must constantly attempt to set firm's capital structure so that the cost of company capital is being minimized and consequently value and profitability be maximized. Decisions about capital structure mean how finance corporate which is effective such as other financial management deci-

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sions on profitability and value of the firm. And on the one hand, this effectiveness is through the capital cost. Indeed capital cost determines the expected efficiency rate of investment within the company thereby affect on the firm's asset value. On the one hand, change in the capital structure combination of influence on company financial leverage increase or decrease rate of financial risk of the company.

Because managers have high motivation to present favourite images from company profitability process through income smoothing and satisfy creditors. If growth in financial leverage accompanied by reducing opportunistic behaviour of managers, growth in financial leverage will reduce income smoothing. In this study, we address to study the capital structure effect on profitability by separating income smoothing and non-smoothing companies.

Definitely identifying this effect will increase company profitability. Income smoothing has an obvious goal and that is creating steady growth flow in profit. Being this type of manipulation requires that company to have high profits to supply required reserves for regulating flows when we need. Generally, its goal is reducing the variability of earnings. Shortage of earning amplitude makes the most favourable condition in investors for investment in companies. Management of some companies does some conscious manipulating in the financial statement for pretending suitability of profitability items to attract investors. In this study, we use ECKEL model for identifying income smoothing. The goal of this model especially is artificial smoothing of earning. Another subject that is essential to be emphasized is the theoretical framework of ECKEL model which is only used to identify successful efforts of income smoothing. In this study by introducing a model as an ECKEL model, we focus on the relationship between financial leverage and profitability to explain it by separating income smoothing and non-smoothing firms. So the following questions are posed:

1- How companies finance to have maximum positive influence on profits and shareholders efficiency?

2- How managers make decisions in financial leverage application according to companies' profitability?

Literature Research

The main researches in a financial leverage field include influence of debt and financial leverage on efficiency and corporate value, influence of various

industries types on capital structure decisions and determinant factors of financial leverage. Meyers (1997) in his study as a capital structure puzzle concluded that profitable companies compared with non-profitable firms have less borrowing and consequently debt ratio to capital is low (Fernandez, 2001). Fernandez and Howakimiyan (2001), Damon and Senbet (1998) did some researches on the capital structure field and introduced optimum combination. One of the important findings of these studies was that the return on equity ratio has a significant and positive correlation with liabilities, therefore if liability ratio increases, return on equity ratio will increase. (Fama, Kenneth, 2002; Fattouh, Scaramozzino, 2002; Fischer *et al*, 1989) Aber findings (2005) showed that there is a positive relationship between short-term debt ratio and return on equity. However, there is a negative correlation between long-term debt ratio and return on equity and there is a significant correlation between liability ratios to total asset and return on equity. (Davidson, Dutia, 1991) Most of previously conducted studies about income smoothing had a limited approach. Ajinkia, Bujraj and Sengupta (2005) studies show that companies for avoiding from income reporting, attempt to income management (income smoothing) in each share lower than expected profit. (Eckel, 1981) Sabramaniam (1996) noted that market correlate the value of a company with discretionary accruals to predict future profitability and dividend changes. He believed that choice of accounting method optionally is a mechanism through which to deliver information management to market. So companies should be encouraged to smooth their profits thereby, investors understanding increase final value of the company. (Hovakmian, 2001) Dos *et al* (2009) conducted that if owners want their company's reported earnings to be smooth, they can allocate rewards for their managers because of doing it. (Fama, French, 1992) Truman and Titman (1989) believe that managers by income smoothing can influence on determining market value of temporary incomes. (Harris, Raviv, 1991) Ahmadi (2001) examined the capital structure correlation and kinds of long-term and short-term finding methods through debts by listing company's efficiency in Tehran Stock Exchange. Totally he select fifty companies from thirteen industries and using simple regression and correlation coefficients concluded that there is not a definitive conclusion about the existence of significant correlation capital structure ratio and efficiency ratios but it seems that being this correlation may not be completely ruled out as well (Ajinkya *et al*, 2005).

Delavari (1988) examined the influence of financial methods on return on equity ratios in Tehran Stock Exchange in a 5-years period and concluded that although total assets ratio to owners equity for firms groups that have borrowed a loan compared with firms which have raised the capital, statistically there is a significant difference. But return on equity ratio and sales ratio to total assets and net profit ratio to sales in two groups of companies have not a significant difference together. In other words financial leverage has no influence on profitability of Stock companies (Abor, 2005). Pour Heydari and Aflatuni (2006) showed that income smoothing is done using discretionary accruals by Iranian companies' managers and income tax and diversion in operating activities which are main stimuli for smoothing of profit using discretionary accruals. In this study, firm size, debt ratio of total assets and earnings variability are not important as an income smoothing stimulus (Alberecht, Fredrick, 1990). Mashayekhi *et al* (2005) reviewed the role of accruals in profit management. These study results suggest that earning management is applied in studying companies. Indeed management of these companies while reducing funds which results from operations has increased discretionary accruals (Dammon, Senbet, 1988). Molle Nazari and Yazdani (2006) showed patterns of balance sheet in restricting income management in listed companies of Tehran Stock Exchange. In the results of this study, they showed that some companies which are not based on gross income smoothing are based on income smoothing operating. Their stated reason of this question so that managers have used period cost as tools of income smoothing. According to main hypothesis in this study, they clarified that operating net assets of firms can be as a limiting tool for income management (Income smoothing is a part of it). Badri (1999) during a study showed that income smoothing is done in Tehran Stock Exchange listed companies. According to these findings, profitability ratio is an effective motivation for income smoothing and listed production companies in Stock Exchange which have a lower profitability ratio more involved in profit smoothing. Ghaemi *et al* (2003) and Nurani (2003) examined the correlation between income smoothing and firm efficiency. Research results showed that income smoothing has no significant effect on corporate efficiency (Belkai, Picur, 1984; Abor, 2005). Hajivand study (1997) which conducted in cement manufacturing companies, showed that goal of earning manipulation is increasing the management personal interests. Norvash *et al* (2007) in smoothing corporate features studies concluded that

income smoothing firms have much older and weaker performance and high debt ratio than non-smoothing companies (Black, 1993).

Research model and measurement methods of research variables

In patterns of this study, research variables include profitability (Return On Equity) ROE, which has been considered as a dependent variable and Short-term Debt Variable ratio (SDA), Long-term Debt ratio (LDA) as an independent variable and income smoothing as an adjustment variable.

$$ROE_{i,t} = \beta_0 + \beta_1 SDA_{i,t} + \beta_2 LDA_{i,t} + e_{i,t} \quad (1)$$

According to this correlation:

$ROE_{i,t}$: Return on Equity ratio (profitability) of i firm in research Period range;

$SDA_{i,t}$: Short-term Debt ratio of i firm in research period range;

$LDA_{i,t}$: Long-term Debt ratio of i firm in research period range;

$\beta_0, \beta_1, \beta_2, \beta_3$: Regression slope;

$e_{i,t}$: Is a regression equation error.

$$SDA_{i,t} = \frac{\text{Short-term debt}}{\text{Total Asset}} \quad (2)$$

$$LDA_{i,t} = \frac{\text{long-term debt}}{\text{Total Assets}} \quad (3)$$

The dependent variable is calculated by the following way (formula 4):

$$ROE_{i,t} = \frac{EBIT}{Equity} \quad (4)$$

BIT : Earning Before Interest and taxes.

Moderating variable of income smoothing index is calculated as follows (formula 5):

$$CY = CV_{\Delta I} / CV_{\Delta S} \quad (5)$$

According to this index, two average criteria μ and standard deviation δ Of earning and revenue is calculated.

$$CV_{\Delta S} = \frac{\mu S}{\delta S}, CV_{\Delta I} = \frac{\mu I}{\delta I} \quad (6)$$

$CV_{\Delta I}$: variation coefficient of earning dispersion in ith firm in period range of study;

$CV_{\Delta S}$: Variation coefficient of sales changes in ith firm in period range of study.

When:

$CY \geq 1$, corporate hasn't smoothed its interests.

$CY \leq 1$, corporate has smoothed its interests.

Research objectives

The overall objective of this study is the correlation between profitability and financial leverage in the capital Market of Iran. And specific research objectives are stated as follows:

1. The survey of the correlation between financial leverage and profitability by separating profit smoothing and non-paved firms.
2. ECKEL model used to identify specific income smoothing behaviours and actually artificial smoothing of earning;
3. Determine listed income smoothing companies in Tehran Stock Exchange;

Methodology

This research from the objective view is an applied research design and from the classification view is based on the method and nature in correlation study classification. Listed companies on the Tehran Stock Exchange constitute the statistical community of the present study and due to some imbalance between community members, following conditions was placed to select the sample and hence sample was selected using a systematic removal. Mentioned conditions are:

The financial year ending March 29.

Not to be in a group of banks and financial institutions (holding and leasing companies)

In range between 85 to 89, companies share shares being located in the traded Stock Exchange.

According to the above conditions, the numbers of 60 companies in 85 to 89 periods were selected, in which the number of 29 firms was identified as smoothing and 31 of them as non-smoothing respect to ECKEL model. According to research subjects and existing hypothesis for doing statistical tests were used for descriptive statistic tests, correlation test (correlation coefficient, determination coefficient) significant test of r , Fisher's Z_r . Required information about firms has collected through the financial statements study and firms reports in site of Tehran Stock Exchange organization and Novin Rahavard informational bank. Final analyses have conducted using SPSS software.

Research hypothesis

In answer to the research questions following hypothesis were formulated:

The first main hypothesis:

There is a relationship between financial leverage and profitability in profit smoothing companies.

This hypothesis will be studied in two following sub-hypothesis:

Secondary hypothesis: There is a positive correlation between short-term debts to total assets and return on equity in profit smoothing companies.

Secondary hypotheses: there is a negative correlation between long-term debt ratio to total assets and return on equity in profit smoothing companies.

The second main hypothesis:

There is a correlation between financial leverage and profitability in the non-smoothing companies. This hypothesis will be studied in two following sub-hypothesis:

Secondary hypothesis: There is a positive correlation between short-term debt to total assets and return on equity ratio in non-smoothing companies.

Secondary hypothesis: There is a negative correlation between long-term debt to total assets and return on equity ratio in non-smoothing companies.

The third main hypothesis:

There is a difference between income smoothing and non-smoothing companies from financial leverage and profitability. Analysis of research hypothesis:

For testing and analysis of this research hypothesis, following steps have been taken:

- Selecting the sample firms from the statistical community by systematic removal;
- Catching financial statement and other needed information of selected firms as sample and extracting required information from financial statement;
- Calculating the required ratios and profitability of selected companies using Excel software;
- Identifying the income smoothing and non-smoothing companies in the sample using ECKEL model;
- Using from Novin Rahavard Software, excel, SPSS for hypothesis testing and doing other data analysis using statistical methods such as descriptive statistic, correlation test (correlation coefficient, determination coefficient), significant test of r , Fisher's Z_r ;

So, in the starting point and after the election of company using previously described ECKEL model were divided into two types of income smoothing. To enhance precision, accuracy of calculations, separating firms into two types of income smoothing and non-smoothing, three levels of selected companies have considered as samples for 85-89 period. These three levels of profit include: operating profit, gross profit, net profit. Required information on this part consists of revenue amount and three levels of mentioned income of sample companies over the mentioned years.

After calculations, even if it is detected in one of the income smoothing levels is considered as an income smoothing company. Analysis of this section is presented in *Chart(1)*. After separation and classification of firms in two types of smoothing and non-smoothing, capital structure and profitability will be calculated to examine the research hypothesis.

Kolmogorov-Smirnov (KS) test in profit smoothing companies

For examining the normality of dependent variance test, Kolomogrov-Asmyrnyov test (KS) has been conducted.

Statistical hypothesis corresponding to this test can be expressed as follows.

H_0 : ROE variable has a normal distribution

H_1 : ROE variable hasn't a normal distribution

Table 1. Kolmogorov-Smirnov in profit smoothing companies

Number	145
Mean	99.4194
Standard deviation	8.43227E1
Absolute value of maximum standard deviation	0.113
Maximum positive deviation	0.113
Maximum negative deviation	-.72
Kolmogorov-Smirnov	1.356
Significant level	0.51

According to the above output ($p\text{-value} > 0/05$), H_0 hypothesis are verified and the ROE normality claim is accepted.

The summary of the (1-1) sub-hypothesis regression model test of main hypothesis result is like a Table (2) as follows:

Table 2. The summary of regression model 1-1 sub-hypothesis from first main hypothesis

Estimate standard error	Adjusted coefficient of determination	Coefficient of determination	Significance level	Test result
84/61618	0.007	0.000	0.659	Reject of hypothesis

According to (1-1) first hypothesis in the second chart, significant level of model shows the confirming of the H_0 hypothesis in 5% level and presence of correlation between two variable of short-term debt ratio to total asset and return on equity is not approved. Also coefficient of determination is equal to 0/000, which represents lack of explaining in this correlation.

1-2 hypotheses: there is a negative relationship between long-term debt ratio to total asset and return on equity in profit smoothing companies.

Table 3. Results of other secondary hypotheses from first main hypothesis

Secondary hypothesis of first main hypothesis in smoothing companies	1-2 second hypothesis
Significance level	0/003
Coefficient of determination	0/061
Adjusted coefficient of determination	0/054
Estimate standard error	81/99828
Watson's camera test	2.187
Test result	Confirm of hypothesis

According to third chart whereas sig is less than five percent, H_0 hypothesis is rejected in five percent error level and due to presence of correlation between two variables, long-term debt ratio to total asset and return on equity in these two variables is confirmed. Also calculated coefficient of determination shows the number of 0/061, which is a low number and it doesn't offer a good value from changes in return on equity variable by long-term debt ratio to total asset. The statistic value of Watson's camera according to chart 4 is 2/187 and this number shows that errors are independent from each other and emerge that there is no auto correlation between errors.

Kolmogorov-Smirnov (KS) on non-smoothing companies

For examining the normality of dependent variable test Kolmogorov-Smirnov test (KS) has been conducted.

Corresponding to this test, statistical hypothesis can be expressed as follows:

H_0 : ROE variable has a normal distribution.

H_1 : ROE variable hasn't a normal distribution.

Table 4. Kolmogorov-Smirnov test (KS) in non-smoothing companies

Number	155
Mean	110.9166
Standard deviation	126.14925
Absolute value of maximum standard deviation	0.187
Maximum positive deviation	0.187
Maximum negative deviation	-.119
Kolmogorov-Smirnov	1.367
Significance level	0.62

According to above graphic output (p -value > 0/05). Also H_0 hypothesis is verified and the ROE normality claim is accepted.

The summary of regression model test from 1-2 sub-hypothesis in second main hypothesis rests on non-smoothing companies is explained in *Table (4)*:

2-1 hypothesis: There is a positive relationship between short-term debt ratio to total asset and return on equity in non-smoothing companies.

Table 5. The summary of regression model 1-2 sub-hypothesis from second main hypothesis

Watson's camera statistic	1/585
Estimate standard error	122/26970
Adjusted coefficient of determination	0/061
Coefficient of determination	0/067
Significance level	0/001
Test result	Confirm

According to 1-2 hypotheses in table 5, model significant level show H_0 hypothesis rejection in 5 percent level and presence of correlation between two variables of short-term debt ratio to total asset and return on equity in non-smoothing companies are approved. Also, coefficient of determination is 0/067 which shows weak explaining of this correlation.

2-2 hypothesis: There is a negative correlation between long-term debt ratio to total asset and return on equity in non-smoothing companies.

Table 7. Related result to third main hypothesis

Research variables	Symbols	Smoothing companies		Non-smoothing companies		difference Zrf
		Zr1	p-value	Zr2	p-value	
Short-term debt ratio to total asset and return on equity	SDA	0.005	0.956	-0.258	0.001	0.021
Long-term debt ratio to total asset and return on equity ratio	LDA	-0.247	0.003	-0.050	0.536	0/083

Table 6. Results of other secondary hypotheses from second main hypothesis in smoothing companies

Secondary hypothesis of first main hypothesis in smoothing companies	2-2 Second hypothesis
Significance level	0.536
Coefficient of determination	0/003
Adjusted coefficient of determination	-0/004
Estimate standard error	126/40204
Watson's camera statistic	-
Test result	Reject

According to table 6, whereas the significance level is more than five percent, H_0 hypothesis is rejected in one percent error level and due to presence of correlation between two variable, short-term debt ratios to total asset and return on equity in these two variables is not verified. Also, calculated coefficient of determination shows the number of 0/003 that is a low value and it does not represent a good value changes from return on an equity variable by short-term debt ratio to total asset. And, 2-3 hypothesis show that sign is lower than one percent, H_0 hypothesis is rejected in five percent error level and presence of correlation between these two variables is verified by owner's equity ratio to total asset and return on equity. Also calculated coefficient of determination shows the number of 0/103 which is a low number and it does not represent a good value from return on equity variable changes by owners of equity variable to total asset. One of the regression hypotheses is independence of errors. If this hypothesis is rejected and errors have correlation with each other, there is not a possibility of using regression. The statistic value of Watson's camera according to Table (7) will be 1.642. This number indicates that errors are independent from each other and there is no auto correlation between errors and correlation hypothesis between errors is rejected and regression can be used.

According to third main hypothesis:

There is a difference between income smoothing and non-smoothing companies in terms of capital structure and profitability.

Using multiple correlation coefficient equality tests, it is examined that whether is there a significant correlation between calculated correlation coefficient between financial leverage in this research and profitability in profit smoothing and non-smoothing companies or not? In other words, our intention is the examining of this question that whether income smoothing or not doing of that has an effect on the correlation between capital structure and profitability of companies or not? The results of this test are shown in table 7. Made according to calculations in %95 confidence level all of calculated Zrf were between 1/96 and -1/96 and in fact they haven't placed in critical point. Therefore, the third hypothesis in this research is rejected and thus that cannot be said that there is a significant difference between two studied communities in terms of the relationship between profitability and financial leverage variables in profit smoothing and non-smoothing companies.

Results

In the present research, in profit smoothing companies, according to 1-1 hypothesis, there is no significant relationship between short-term debt ratio to total assets and return on equity. Based on 1-2 hypothesis, there is a significant correlation between long-term debt ratio to total asset and return on equity. Also in non-smoothing companies according to 2-1 hypothesis, there is a significant relationship between short-term debt ratio to total asset and return on equity. Based on 2-2 hypothesis, there is no significant relationship between long-term debt ratio to total asset and return on equity. The final result, according to third hypothesis, there is no significant difference between income smoothing and non-smoothing companies in terms of correlation between financial leverage and profitability. Myers (1997), Fernandez (2001) in fields of optimal capital structure and **Damon, Senbet (1988), Howakimiyani (2001)** in the field of capital structure conducted some researches regardless of being smooth and non-smoothing in companies and introduce the optimum combination. One of the important findings of this research was the positive and significant correlation between return on equity to debt. Namely if debt ratio increase, return on equity ratio will increase. This result is correlation to this research result in profit smoothing and non-smoothing companies. Aber (2005) conduct a research in the field of short-term debt ratio and return on equity regardless of profit smoothing and non-smoothing in companies there

is a positive relationship that is inconsistent with the research result in profit smoothing companies and is consistent to non-smoothing companies. And, there is a negative correlation between long-term debt ratios to return on equity which is consistent to research results in smoothing companies and is inconsistent with non-smoothing companies. And, there is a significant correlation between debt ratio to total asset and **return on equity and is equal to research result in non-smoothing companies.** Ahmadi (2011), Badri (1999), Ghaemi et. Al. (2003) also confirmed the income smoothing phenomena presence among listed companies in Tehran Stock Exchange which is consistent to research results. Also Delavari (1998) research result examined the financial methods effect return on equity ratio in Tehran Stock Exchange regardless of being smoothing and non-smoothing of companies conducted in 5-year period. And concluded that statistically there is a significant difference between total assets in owner's equity for company groups that have raised the capital, in other words financial leverage has no effect on Stock companies' profitability.

Recommendations for investors and financial analysts

For allocation of resource optimization and capital by users, one of the most commonly used tools is ratios analysis. In this study, significant correlation between return on equity and some ratios were observed because of long-term debt ratios in profit smoothing and short-term debt ratio in non-smoothing companies. So using from these ratios is recommended to investors and financial analysts when they decide. And, according to ECKEL model it seems that for better analysis of ratios that is better, at first companies separate to two types of smoothing and non-smoothing companies and then to be used for current variables. But the results of the research hypothesis test indicate that there is no significance difference between income smoothing and non-smoothing companies in terms of capital structure and return on equity. Therefore, according to this result which has been resulted from a statistical sample in this research, it seems that for using from ratios there is no need for separating income smoothing and non-smoothing companies. Also it is suggested that current research and variables correlation to be conducted by industry type separation in Stock Exchange thus industry type characteristics to be considered.

Limitations of the study

In conducting this research, there were several limitations which may have affected on obtained findings. There are some limitations in various stages of theoretical structure development, measurement, collection and conclusion as follows:

Limitation in sampling (some of the companies because of the conditions that we considered to companies did not place the member of a community that is supposed to select the sample, for example companies which have a financial year except 12/29). In this research all of the listed companies in stock did not studied therefore there are some limitations in result generalization of this study in Iran's capital market.

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