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Comparing Linear Accrual-Based Models in Predicting Earnings Management of Tehran Securities Exchange accepted Firms

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Abstract:*This research investigates linear accrual models to evaluate their capability in predicting earnings management. Discretionary accruals are as earnings management index. Researchers use numerous models to predict earnings management in firms. Four models of discretionary accruals including performance model (Kothari) on asset return, modified performance model (Kothari) on asset return, performance model (Kothari) on delayed asset return, and modified performance model (Kothari) on delayed asset return are compared in this study. Applied data of this research is of 90 firms accepted in Tehran securities exchange during 2008-2012.Research hypotheses have been tested using multi-variable regression and panel data econometrics. Results showed that modified performance model on assets return compared to other investigated models is more capable in predicting discretionary accruals to predict earnings management among accepted firms of Tehran securities exchange.*

Keywords: *discretionary accruals, earnings management, discretionary accruals linear models*

I. Introduction

Earnings are one of the most fundamental elements of financial statements which has been always noted and mentioned as a criterion to evaluate the financial performance and efficiency of the business unit. Accounting is an appropriate index to predict future cash flows, but since earnings are consisted of cash and accruals and accruals can be controlled by management to some extent, management is able to manipulate earnings. When net earnings is managed or manipulated in the firm, it cannot have a significant relationship with stock price and be effective on users' expectation. Thus, the fact that when earnings can meet financial statements' users' expectation and predictions better is a question for researchers (Beneish& Nichols, 2005).

Separating ownership from management in joint stock corporations creates this potential possibility for managers to transfer at least a part of other beneficiary groups' wealth of the firm to themselves, because managers have access to information that other people do not have any access at least to a part of it. Moreover, managers are able to manipulate or manage the mentioned information for their own favor because of supplying and sending part of financial information (Dastgir&Nazemi, 2006).

Earnings management has had a very important role in the way of financial statements presentation and classification of their items as a conscious selected strategy by management to achieve specific purposes and applying it, depending on firm's nature based on size, type, industry, capital structure, social status, and earnings management issue is different. Leveling earnings, managers are able to affect stock return; accordingly, they achieve purposes such as management rewards, getting bank loans, capital increasing, affecting capital market, and job safety. If earnings management is not applied well, not only the mentioned purposes are supplied, but can have adverse consequences. Different approaches of earnings management and their potential effects for beneficiaries can be used as a guide for management to provide financial statements.

II. Statement of the problem

Accounting earnings are one of the most important performance indices used in a lot of economic decision makings including stock accreditation, performance assessment, managers reward determining and dividends. These decision makings can be effective in transferring the sources between different people; accordingly, they are highly noted in capital market. In terms of interests conflict in economic environment including interests' conflict between shareholders and managers there is always this possibility that managers manipulate earnings (Wu, 2014).

It should be noted that both groups of managers and owners try to increase their interests. Financial analysts consider earnings as a fundamental factor in their own investigations and judgments. Thus, to show a desirable image of firm and reduce the investment risk managers have a strong motivation to manage the earnings (Bhundia, 2012). Although there are opportunist and signaling motivations as well as better information presentation to the market in management topic, opportunist motivation threats capital market.

Earnings management is an activity that, based on full disclosure view, can be with undesirable consequences. These activities can lead to earnings increasing or decreasing according to perpetrators' motivation. Risky nature of these threats an numerous consequences resulted from earnings management have inspired researchers to present models for measuring and identifying earnings management signs that their power is not identical. These models are mostly based on accounting variables (especially accruals), because they are used in earnings management.

Earnings include accruals and cash flow. The difference between earnings and cash flow which is generally the result of accounting conditions, time, and the way of costs and income identification is called accruals. Firms are free in identifying these accruals and management flexibility creates opportunities for earnings management implementation. These accruals are in two parts: non-discretionary accruals and discretionary accruals.

Non-discretionary accruals are out of management controlling and show business factors. In fact, this part reflects the non-manipulated accounting accruals. Discretionary accruals can be defined as the difference between net earnings and cash flow resulted from operational activities of the firm. They are actually the accruals controlled by management.

In 1992 Jones's model in order to estimate accruals was proposed and in 1995 it was revised and modified by De Chow et al and then defined as Jones's modified model. In fact, the superiority of this model over Jones's model is this hypothesis that with subtracting the changes of receivables from total income the considered income changes are in cash; accordingly, a better estimation of abnormal accruals can be obtained. The imposed modification on Jones's model has been for obviating the existing shortcomings in Jones's model. The difference between discretionary and non-discretionary accruals is very important in this model and dividing variables by assets sum it has been tried to remove the inhomogeneity of Jones's model (1992) to establish stability among the periods. Adding return of assets (ROA) to Jones's modified model has been implemented based on the research of Kothari et al (2005). They have expressed their motivation the research of De Chow et al (1998) as proposers of simple models of income, cash flows, and accruals. In their model, De Chow et al (1998) showed that income increasing as a part of accruals can be the result of firm's investment in working capital and to increase firm's d growth. As a result, increasing accruals of working capital can be predicted through sales growth. Accordingly, firm's performance can affect the model's accruals and it is better to be controlled in accruals estimating (Cheng et al, 2012).

Adding cash flow resulted from firm's operational activities by Cheng et al (2012) caused better firm's performance measurement. It has been assumed in Jones's model that sales income is non-discretionary. The weakness of the mentioned models is that if earnings are controlled through discretionary incomes, Jones's model eliminates a part of managed earnings. To remove Jones's model limitation, De Chow et al (1995) modified income through receivables changes (Cited by Wu, 2014).

III. Review of the literature

Nourvash et al (2005) investigated earnings management in Tehran securities exchange accepted firms and results of their study showed that large firms in Iran have also managed earnings and debt increasing motivates more application of this management.

Mashayekhi et al (2005) investigated the role of discretionary accruals in earnings management of Tehran exchange securities accepted firms. Results indicated that earnings management has been applied in investigated firms. In fact, these firms management has increased earnings through increasing discretionary accruals in order to reduce cash obtained from operations which indicate the weak performance of the business unit.

Nikoumaram et al (2009) evaluated accruals-based models to explore earnings management and results of their study showed that among the investigated models, regression estimation-based models have been more efficient than other three models of Hilly, De Angelo, and Modified De Angelo. Among regression models, Jones's (1991) main model is less efficient to explain earnings management. About next editions of Jones's model, Jones's modified model (1995), simple model of De Chow (2002), comprehensive model of De chow (2002), and removing inflation versions had acceptable efficiency to explore earnings management. Ball and Shivakumar (2006) extended the model considering non-linear relationship between accruals and firm's performance. They use assets return for firm's performance, and do not accept non-linear relationship between accruals and performance and Jones's both models (main and modified) are less confirmed by them. For performance they used the ratio of earnings to price, firm size, and operational cash flow. Kothari's model assumed that firms' discretionary accruals are comparable with assets return in similar industry. Thus, if there are a few firms in an industry or the changing of an industry is large, measurement error has been created.

Haushen (2007) investigated this issue that if combining non-linear accruals with discretionary models improves models' performance. Results show that a specific non-linear model improves models' performance in

showing earnings management existence. Also, results show that more advanced model which is a combination of a performance measurement, a cost variable, and future' growth size is better than other models.

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IV. Research hypotheses

First hypothesis: Kothari's linear performance model on assets return is the strongest model to estimate discretionary accruals in order to predict earnings management.

Second hypothesis: Kothari's linear performance model on delayed assets return is the strongest model to estimate discretionary accruals in order to predict earnings management.

Third hypothesis: Kothari's linear performance modified model on delayed assets return is the strongest model to estimate discretionary accruals in order to predict earnings management.

Fourth hypothesis: Kothari's linear performance modified model on delayed assets return is the strongest model to estimate discretionary accruals in order to predict earnings management.

V. Research experimental variables and models

Jones's last modified versions had been presented by Kothari et al (2005) in order to separate discretionary and non-discretionary accruals are as following:

1)Performance model (Kothari) on assets return

$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t) + \beta_3(PPE_t) + \beta_4(ROA_t) + \varepsilon_t$

2) Performance model (Kothari) on delayed assets return

$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t) + \beta_3(PPE_t) + \beta_4(ROA_{t-1}) + \varepsilon_t$

3) Performance modified model (Kothari) on assets return

$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t - \Delta AR_t) + \beta_3(PPE_t) + \beta_4(ROA_t) + \varepsilon_t$

4) Performance modified model (Kothari) on delayed assets return

$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t - \Delta AR_t) + \beta_3(PPE_t) + \beta_4(ROA_{t-1}) + \varepsilon_t$

$AC_t$is sum of accruals (earnings before unexpected items minus operational cash flow) in year t for investigated firm i.

$TA_{t-1}$is the sum of assets in year t-1 for investigated firm i.

$\Delta Sales_t$is sales changes in year t for investigated firm i.

PPE_t is the gross amount of properties, machinery, and equipment in year t for investigated firm i.

$\Delta AR_t$is accounts and receivables' changes in year t for investigated firm i.

$ROA_t$is net earnings divided by sum of assets in year t.

$ROA_{t-1}$is net earnings divided by assets sum in year t-1.

£$_t$is sum of regression error. It is assumed that they are uncorrelated cross-sectional and have normal distribution with mean of zero.

VI. Statistical population and sample

Statistical population of this research includes all firms accepted in Tehran securities exchange from the beginning of 2008 to the end of 2012 (448 firms).

To determine the statistical sample in this research no specific relation has been applied to estimate sampling and sample volume, but systematic elimination method. In other words, following conditions have been imposed by researcher:

In order to bring comparability to the items, firms that their fiscal year end is not two last days of the year have been eliminated.

Then, banks, financial institutes, and financial investment firms (because of their different activity nature from other business units) have been eliminated, because these firms have higher debts, based on their activity, than other ones, while these debts increasing does not express more risks.

At this stage, firms that have not had all required information during the investigation period have been eliminated.

VII. Descriptive statistics of variables

In order to identify research population better and more familiarity with variables, data should be described before statistical analysis. First, using raw data, research variables value are calculated and then descriptive statistics, independent, and dependent variables which include mean, mode, maximum, minimum, and standard deviation of data have been calculated and presented in table 1.

Table-1. descriptive statistics

Variables	Mean	Mode	Max	Min	STD
ACt	0.1969	0.2047	0.2784	-.01276	0.0689
1/At-1	0.0015	0.0021	0.0963	0.0003	1.1934
ΔSalest	0.2318	0.2296	0.6752	-0.2139	0.4127
ΔARt	0.1653	0.1873`	0.2866	-0.0096	0.5373
PPEt	0.3256	0.3765	0.6794	0.1153	0.2935
ROAt	0.2603	0.2782	0.6278	-0.0927	0.1942
ROAt-1	0.2498	0.2677	0.4998	-0.0927	0.1893

Appropriate model determining test in panel data

To investigate the type of model testing and different time period of panel data, F-Limer (Chow) and Haussmann tests have been used. Results of these tests have been presented in table 2.

Table-2.appropriate model determination results in panel data

Tested model	Test type	Test statistics	p-value	Result
Model 1	**Chow**	3.7834	0.0215	**Random effect model**
	Haussmann	1.6345	0.3983	
Model 2	**Chow**	3.9784	0.0128	**Random effect model**
	Haussmann	1.2438	0.4256	
Model 3	**Chow**	4.6289	0.0065	**Random effect model**
	Haussmann	0.9106	0.4729	
Model 4	**Chow**	3.2241	0.0237	**Random effect model**
	Haussmann	1.0786	0.4573	

Results of Chow test about models one to four have indicated that Haussmann test is needed. Haussmann results for this models show that H0 has not been rejected. Thus, random effect method is a more appropriate option to estimate models three to six.

VIII. Results of hypotheses testing

Results of performance models significance have been provided in table 3. As it is seen F has been significant in all models.

Table-3.regression model results of performance models

ACt =**β**0 +**β**1(1/TAt-1) + **β**2(ΔSalest) + **β**3(PPEt) + **β**4(ROAt) + £t												Model 3
ACt =**β**0 + **β**1(1/TAt-1) +**β**2(ΔSalest) + **β**3(PPEt) + **β**4(ROAt-1) + £t												Model 4
ACt =**β**0 + **β**1(1/TAt-1) +**β**2(ΔSalest- ΔARt) + **β**3(PPEt) + **β**4(ROAt) + £t												Model 5
ACt =**β**0 + **β**1(1/TAt-1) +**β**2(ΔSalest- ΔARt) + **β**3(PPEt) + **β**4(ROAt-1) + £t												Model 6
	Models 3 testing			Model 4 testing			Model 5 testing			Model 6 testing		
	Parameter	Ratio	t-static	Parameter	Ratio	t-static	Parameter	ratio	t-static	Parameter	Ratio	t-static
Fixed ratio	β0	0.0842	4.2166	β0	0.32-88	2.71-53	β0	0.23-86	6.65-48	β0	0.04-73`	2.54-67`
1/At-1	β1	0.1148	3.9980	β1	0.2481	4.9326	β1	2.4369	4.5638	β1	0.2186	3.4879
ΔSalest	β 2	1.37-79	6.04-27	β 2	0.01-77	8.28-79						
-ΔARt ΔSalest							β 2	0.08-18	2.62-24`	β 2	0.24-36	2.43-36
PPEt	β 3	0.1829	4.0878	β 3	0.0342	2.2145	β 3	0.0028	6.0954	β 3	0.2736	3.2433
ROAt	β 4	0.01-46	3.32-61				β 4	1.37-82	2.93-08			
ROAt-1				β 4	1.4238	6.2134				β 4	0.4073	4.2887
Adj R2	0.3146			0.2644			0.4236			0.3365		
F-static	6.2867			6.4439			8.3426			6.3761		
F (p-value)	0.0000			0.0000			0.0000			0.0000		
D-W	1.8891			1.9286			2.7862			2.2238		

To tests research hypotheses, Kothari's performance models estimated before are used. To do this, the adjusted determining coefficient 1 obtained from regression model is used. Determining coefficient indicates the percentage of dependent variable changes explained by independent variables. The more this value, the more correlation between dependent variable and independent ones will be. This issue in the earnings management model indicates the model capability in better recognition of discretionary accruals. Thus, to determine a model which has the most capability in recognition of discretionary accruals, adjusted determining coefficients obtained from models' estimation are compared.

The adjusted determining coefficient obtained from model one to four is 0.31, 0.26, 0.42, and 0.33, respectively. It is seen that the most adjusted determining coefficient is related to third model (0.42), and the least one is for the second model (0.26).

Results showed that adjusted determining coefficient obtained from the third model has been more than other models. Thus, it can be claimed that the third model (i.e. Kothari's modified performance model on assets return) is more capable than other investigated models in recognizing discretionary accruals to predict earnings management among accepted firms in Tehran securities exchange. Accordingly, the third hypothesis is confirmed and other ones are rejected.

IX. Conclusions

To test research hypotheses panel data estimation and multi-variable regression applying a sample including 90 firms in Tehran securities exchange during 2008 to 2012 were used. Obtained results are presented for each hypothesis. Research includes four multi-variable regression models. To choose appropriate models Chow and Haussmann tests were applied in using panel data analysis.

Performance models are known as Kothari models and they have been presented because of Jones's model completion. All mentioned models have been estimated and results were compared. Comparing adjusted determining coefficients obtained from models estimation showed that the third model has had the highest determining coefficient. Thus, regarding the relevant data of Tehran securities exchange, it is the most efficient model to estimate earnings management. Accordingly, the third hypothesis is confirmed and other ones are rejected. Results obtained in this research are consistent with results of Wu (2014). He compared linear earnings management models in Taiwan and concluded that Kothari model is the most efficient model.

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