

Comparison of Linear Accruals Models to Assess Their Ability to Predict Earnings Management

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ABSTRACT

This research compared the accruals linear models to assess their ability to predict earnings management and demonstrate the experiences of different performance levels. The fundamental factor of earnings management test in companies is the estimate of managing director and managers' opinion in determining profit which is based on measurement and the use of discretionary accruals. Literature approaches based on earnings management indicate the existence of different approaches in estimating and measure the discretionary accruals. Researcher use several models in account research for predict earnings management in companies. In this research, six models, including models of accruals Jones, modified Jones model, Jones performance model on ROA (Return on assets), the modified Jones model performance on ROA, Jones performance model on lagged ROA and modified Jones model performance on lagged ROA are compared to the best model to predict earnings management is detected. Used data is related to 801 accepted companies in Tehran stock exchange between 2008 to 2012. The research hypothesis has been tested with use of multiple regression models and econometrics of combined data. The results showed that the modified Jones model performance on ROA studied toward other models and have greatest power in the detection of discretionary accruals for predict earnings management among accepted companies in Tehran stock exchange.

KEYWORDS: Discretionary accruals; Earnings Management; Accruals Linear Models

INTRODUCTION

Accounting profit is an important performance indicator that use in many economical decisions such as stock assessment, performance evaluation, determination of manager's reward and profit division. This decision can be effective in transferring resources between different people, so will be special attention on the capital market. In condition of Conflict of interest in the economic environment such as conflicts of interest between shareholders and managers, there is always the possibility that managers attempt to manipulate profit. Although there are opportunistic incentives, signaling incentives and presentation better data to the market in the discussion of earnings management but threatening the opportunistic incentive asset market. Earnings management is an activity that can be associated with adverse outcomes from the perspective of full disclosure in financial reporting. These activities can lead to increased or decreased in accordance with perpetrators motivated by profit. Precarious nature of this threat and several consequences of earnings management due to its researchers had to measure and identify signs of earnings management lead to offer models that it seems they can't be the same power. These models are often designed on the basis of accounting variables because of the accounting variables used in the earnings management.

In this research used the balance profit and loss variables for measure accuracy of prediction earnings management to facilitate the analysis of test results for achieve the research objectives and also appear better the severely affected the earnings management activities of these variable. According to Healy opinion can be obtained the accruals from operating profit difference and cash flow from operating activities. Cash flow is protected against tampering thus discretionary accruals are more exposing to manipulation.

Some managers through the change in method of accounting and distribution of income and expenses are trying to manage the profit and the focus of all models predicts earnings management is through discretionary accruals. Inefficient of useable model in predicting the earnings management can be manipulated the validity of the conclusions made.

In 1991 Jones model was proposed for the estimated accruals and proposed in 1995 were reviewed and revised by Dechow et al and was introduced as a modified Jones model. In fact, this model is superior to the Jones model, there is an assumption that subtracting from changes receivable accounts from the total income, Income changes considered is cash and In this case, can be achieved a better estimate of abnormal accruals. Adjustments made on Jones model was for overcome the existing deficiencies in the Jones model, in this model, the difference between discretionary and non-discretionary accruals is very important and variable divided by

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total assets resolved the heterogeneous of Jones model (1991), and should be developed the consistency between courses. Jones model assumes that a sale revenue is non-optional. the weakness of the model is that the profit manage through discretionary income so Jones model eliminate the part of earnings management. Deco et al (1995) adjusted the income through changes receivable accounts for removing restriction on Jones model, in other words, all changes arises from credit sales of earnings management.

Based on Kothari et al research (2005), ROA add to modified Jones model that Dechow et al research (1998) expressed their incentive as the providers simplified income models, cash flow and accruals. Dechow et al (1998) show in model that Increase revenue as a part of accruals can be in floating capital due to investment and to enhance the company's growth. As a result the increase in floating capital accruals can be predicted through sales growth. Accordingly company's performance can be effective in accruals models and it's better to control in estimating accruals (Cheng et al., 2012).

Adding cash flow due to operating activities of company by Cheng et al makes that better performance can be measured (Khani & Ebrahimi, 2013). Earnings management usually measure through estimate discretionary accruals. Kothari states in research (2005) that company's performance affects on estimate discretionary accruals. When the performance of the company and also the relationship between accruals and performance is not ordinary, may be non-discretionary accruals as discretionary accruals are classified incorrectly. Kothari adjusted the Jones model by adding the rate of ROA as a control for non-linear effect on the company's performance on accruals.

In recent years investigation related to earnings management and accruals is accounted the large amount of literature and ROA investigation in country overview of studies about earnings management show that the majority of research has been done based on the modified Jones model. Researcher states that the reason of using this model is the results of Dechow et al research.

Dechow ,Sloan and Sweeny (1995) were evaluated relative performance of five methods of discretionary accruals ,Healy , De Angelo, Jones and modified Jones for awareness of earnings management and concluded that modified Jones model is stronger test for detect earnings management ,yet power test of each accruals models may be difference according to environmental, economic, and political condition and local researchers pay attention to these differences in conducting tests of earnings management that the result of their investigations have greater power and credit. (Rahmani and Bashiri Manesh, 2013)

In this research to predict earnings management through accruals model is presented which is as follows: Jones model, modified Jones model, Jones performance model on ROA, the modified Jones model performance on ROA, Jones performance model on lagged ROA and modified Jones model performance on lagged ROA.

The overall objective of the research is to compare accruals linear models to assess their ability to predict earnings management. According to the above Now the question is which of the models accruals earnings management has a greater ability to predict.

Theoretical Basics

Earnings management

Net profit of a unit and as a performance evaluation criteria and potential profitability of profit is influenced on methods and accounting estimates. Act of Directors in use of realization and matching principles, estimates and forecasts and also applying methods such as change the method of evaluate commodity inventory, depreciation ,current costs or as capital expenditure in research and development and determine the cost doubtful receivables are examples of actions that managers change the profit by their actions. On the one hand, due to greater awareness of the situation of directors of the company are expected to prepare and present information in a way routinely to reflect the company's status to the fullest and on the other hand, for reasons such as retained in the company, receive bonuses and earnings management unit, intentionally or unintentionally, may manipulate earnings, the company will give the desired effect. Under such conditions the real profits with reported profit have been inconsistent in the financial statements and events occur as earnings management.

Accounting profit consistent with accepted accounting standards because alternative approaches to accounting events that are permitted are manipulated. In general, earnings management is possible in two ways: earnings management based on accounting numbers and real earnings management. In the first case management deal with arranging the accounting figures according to their desired goals through manipulating the discretionary accruals. Discretionary accrual is an item that management has control and could delay or eliminate them or expedite the registration and identification. Since the discretionary accruals is in charge of management and applicable by the management, discretionary accruals was used as the index in detecting earnings management (Hejazi and Bilandi, 2011). Degeorg et al defined earnings management as an artificial manipulation of profit by management in order to achieve the expected level of profit for some specific decisions, supply goals and personal interest of managers (Mashayekhi, 2008).

Earnings management tools

Managers can manipulate profits by using a variety of methods, tools used in conjunction with earnings management include:

A) manipulation of discretionary accruals that have not a direct impact on cash flow, for example, can noted to not fulfill the conditions and changes in borrowing costs doubtful receivables and also the delay in

excluding fixed assets whose life ended.

B) Altering the actual financial events that cause to change in cash flows even in some cases can cause changes in accruals. Such as reducing advertising costs to increase profit, acceleration and accelerate sales, Changes in delivery program, research and development costs, delays in identifying maintenance costs, discounted cash selling, general, administrative and selling costs, retraining costs and the cost of shipping is.

C) There is a third potential method that do by misleading to classify items of profit and loss (change category).in this method operating profit or real profit of the company are being manipulated without change of net profit and only by use of the movement operating costs of non-operating and certain profit, operating profit or real profit of the company are being manipulated.

Earnings management practices

In short, earnings management practices follows and every one of these methods can be categorized into one of three:

1. Choice of accounting procedures

Accounting policy choice would affect on the timing of recognition of revenues and expenses in the calculation profits.

For examples, procedure that ahead the recognize revenues, delayed the identify the costs and increase reported profit.

2. Using accounting procedures / optional estimates

Even after the manager chose accounting practices, there is still the option of how accounting principles are applied.

For example, there is authority for estimate life services, cannibalized value, invisible life assets, and fuel rates of receivable accounts.

3. Timing Accounting Procedures

Management also has authority that when and how to identify the event when accounting events requiring disclosure in the financial statements. For example in the case of these defective assets that how much it will depreciate.

4. Timing

Educational timing and purchases asset could affect on the accounting profit. Managing can choices the timing and amount of investment in cost of research and advertising development and maintenance. In all three cases, the cost of courses that can be tolerated, are identified.

Management also makes decision about the timing of the sale of property, machinery and equipment to speed up or delay the recognition of gains and losses.

Earnings management methods

Accrual accounting system required the managers to make numerous accounting judgments that have a profound effect on reported profit. Examples of discretionary judgment accounting for intangible benefit that can change gradually in one direction. Include the following:

1. Treaties need to estimate the long-term construction work progress and completion costs. Managers can use to estimate optimistic progress to boost profit
2. Calculation of depreciation, useful life and residual value estimates are required. Managers can estimate the value of life optimistically disposed of depreciable assets are used at the same time reduce the cost of depreciation.
3. Receivable accounts should be presented net recoverable value, managers can use to profit-taking optimistic estimates are overstated the profit.
4. Expenditure should be classified as period costs product costs. Through classifying certain expenses as costs rather than product costs, period, managers can reduce inventory costs during periods of growth.
5. Gains resulting from the sale of divested assets may be fully identified. Managers can contribute to profit by selling assets that have risen in value, including possible securities traded in the market and fixed assets, are on the agenda.
6. Companies building software products when the software must have justifiably technical, and cost estimating software development cost of the asset after that time will end. Managers can date of expedites the immediate spending some money making software to prevent.
7. Expenditure commitments anticipated performance warranty (guarantee) must be registered in compliance with operational revenue. Optimistic estimate of warranty costs, managers can reduce running costs.
8. Repairs as normal as the cost is the major overhaul of the asset is the cost. Managers can be seen as major repairs to routine maintenance, this benefit can help.
9. Managers can contribute to profits, the incentive to make their customers (such as price discounts) such way to raise the pace of sales.
10. Inventories should be reported to the lowest of cost or market price. Administrators can take advantage of optimistic market value of reducing losses, reducing the value of the goods is in stock Materials.

Accruals

Accrual accounting gives managers are misled shareholders and changes resulting contract will be profitable for them. Engineering researchers consider earnings management through accruals specific total accruals into discretionary and non-discretionary accruals, and analyze the test.

Haley 1985 model discretionary accruals from the total accruals comparison with the previous period could be calculated.

The model assumes that the expected change in the level of non-discretionary accruals during periods of zero crosses any changes were attributed to earnings management.

De Angelo 1986 accruals during the past year can be used for estimates, accruals and accruals in the current year and stated that if there is a difference from last year is an optional item.

In a recent study, Jones model and modified Jones model and the model of non-discretionary accruals based on Kothari to calculate the appropriate measure of earnings management practices have been used.

Accounting profit is recognized on accrual basis. Commonly used accrual basis leads to different levels of reported operating profit and reported net cash flows from operations, accruals in the financial statements as a secret. Portion of fund accounting profit results of operations or cash portion of accruals (the difference between profit and cash flows) form. Sector commitment is more important in evaluating the company's performance.

Discretionary and non-discretionary accruals

Accruals are divided into two categories:

Those accruals that created in business model and operating environment of companies and the business unit management is not involved in their creation and commercial activities have been created during the non-discretionary accruals call.

Other categories of accruals called optional that create cause of choose accounting method, optional allocation, managerial decisions, judgments and estimates such as commodity inventory, received and payments accounts, depreciation expense and Non-discretionary accruals required accounting standards and influence of economic conditions of companies and limited by regulation agency and external factors such as active service exemption benefit costs and as a result these items are relatively safe from manipulation of management but discretionary accruals applicable comment by management (Mostafa Zadeh, 2008).

In some research related accruals this classification is used such as Brawn (1988), Dechow (1994), Rogres & Stocken (2005), Gong et al (2009), Norosh et al (2006), Modares & Abbas Zadeh (2008), (Mahdavi and Zare Hosein Abadi, 2011).

Earnings management models based on accruals

Jones (1991) proposed a model in which assuming the uniformity of discretionary accruals is not important. Emphasis on modeling the effect of changing economic conditions on the Company's non-discretionary accruals.

The real gross amount and machinery, equipment and income changes are two variables to measure the unmanaged accrual amount that show the net cost of depreciation amount, income change and floating capital account changes (Bolo & Hoseini, 2007).

According to this assumption which change in credit sales is resource for earnings management, Dechow et al was deducted the changes in income accounts and received documents. Hereby Jones model was adjusted. Modified Jones model is controlled both economical transactions and company's credit policy. These models are used to analyze aggregate accruals managed and unmanaged components.

Kothari et al provide new model according to accounting process and relationship between ROA and accruals the goals is estimate accruals with low error rate.

Researchers typically were used Jones model (1995) and modified Jones model (Dechow, Sloan and Sweeny, 1995) to estimate the components of accruals. Use Dechow et al (1995) and Kothari Studies show that these models are presented a reasonable estimate of earnings management models. They also noted that these models causes problems for companies experience that have high level of performance that these problems may reflect the measurement error.

In addition to the measurement error in discretionary accruals (Mc Nichols & Wilson) biased coefficient can due to used data in balance sheet instead of cash flow data (Hribar & Collins, 2002) thus the Jones model and modified Jones may be improve by adding operating cash profit and ROA (De Angelo, Skinner 1994, Jeter & Shivakumar 1999, Kothari et al 2005, Rees et al 1996) control performance (Holthausen et al 1995, Kothari et al, 2002) and by using cash flow data (Hribar & Collins, 2002).

In fact, in Jones model and modified Jones, companies in the same industry and in particular year have homogeneous accruals Steps. According to Dopush et al (2007) the accruals are affected to accruals coefficients models. Guay et al believe that there are much more likely the companies have high performance to engage in earnings management.

Research History

Peasnel et al (1991) tasted power of Jones models and Jones and Marjin modified about earnings management by using simulation data. In this research examine the sectional approach and abundance event of

first and second type of error .results confirm proper detection of all three models but further analysis found that Marjin model have more efficient in estimating discretionary accruals.

Zhang (2002) compared the power models Healy, De Angelo, Jones and modified Jones in detecting earnings management in manipulating profit with aim to increase profit of per share. They found that arrears of taxes cost can change earnings management while accruals models are unable. Further analysis show that the cost of dept expense for the benefit of this type of manipulation is applied .These results was inconsistent with the result of Dechow et al (1995) and Bartov (2001) research that accruals can detect earnings management.

Kothari et al (2005) evaluate compliance with the performance measure discretionary accruals. Results show that discretionary accruals measurement consistent with the performance raises the reliability implications of earnings management research, when hypothesis tests do not detect the difference between profit and non-earnings management companies or controlled corporations with earnings management is uncompromised.

Jinhan Pae (2005) to investigate the accruals models and effect of expected operating cash. Findings indicate if operating cash flow can improve the prediction and explanation of the Jones model while the deferred accruals not to do it.

Jones et al (2007) examine the Power of different models of accruals in detecting fraudulent companies. The study found an association between discretionary accruals and the amount of fraud in nine different models were investigated. Results show that total accruals have relation with fraud event but discretionary accruals from Jones model modified Jones and performance relationship model.

Aminul Islam et al (2011) was evaluated the performance modified Jones model of stock exchange market in Bangladesh. In this research was introducing another model for detecting earnings management that was used in the current year's income and has been deleted the property and machines of Jones model. Also differences between cost of goods sold and account rendered and total depreciation cost and benefit cost of active service exemption. Criteria r shows that the accuracy and performance of modified Jones model in Bangladesh stock market is weak and R^2 level is approximately 9%, while the level R^2 of their model was about 84% and detection power of accruals is more.

Dechow et al (2011) introduce the new approach for measure profit management to examine the earnings management models based on accruals in this research was used the approach of simulation data to test detection models Haley , Jones , modified Jones, Dechow, Joe and Mc Nichols. Results show that the power of accruals-based model is poor.

Collins et al (2011) , Kothari et al (2005), Mc Nichols(2000) and Dechow et al (1998) have demonstrate ,in various studies that Jones models and modified Jones does not care to growth issues and company's performance.

Norosh et al (2005) examine the earnings management in accepted companies in Tehran stock exchange and the finding of this research show that big companies in Iran manage the profit and action of this administration is to raise more debt.

Mashayekhi et al (2004) examine the role of discretionary accruals in earnings management of accepted companies in Tehran stock exchange. The results indicate that the company has applied the study of earnings management, in fact management companies that increase profit by increasing discretionary accruals in order to compensation this issue and decrease cash flow from operation that represent the poor performance of business unit.

Niko Maram et al (2009) estimate the models based on accruals for detecting earnings management, finding of this research show that the models under review, in general models based on regression techniques to estimate the more power than three model like Healy, De Angelo and modified De Angelo among the regression method, the main Jones method (1991) have less power for explanation of earnings management. The next edition of the Jones model, edit the modified Jones (1995) and simplified Dechow model (2002) and comprehensive Dechow model (2002) and were acceptable for inflation-adjusted version of its ability to detect earnings management.

Mashayekhi et al (2012) detect earnings management by using neoral network that the results show the despite of poor yield advantage of neural networks, linear regression, selected the linear and non-linear choice of two model is not possible, and this is selected the ability of model and topology.

Bozorg Asl & Ghafar Por (2012) detect the Comparative study of accruals to earnings management for prediction models and finding show that modified Jones model (1995) in accepted companies in Tehran Stock Exchange for the detection of profit management has more power.

Rahmani & Bashiri Manesh (2013) to estimate the power detecting earnings management models. the results with detecting five valuable model of earnings management showed that modified Jones model is not efficient in detecting earnings management and Dechow, Mc Nichols (2002) have higher validity and accuracy to identify and explore earnings management.

The Hypothesis of Research

Based on theoretical Basics, the result of previous research of research hypothesis was formulated as follows:

Modified Jones performance model on ROA have more power in predict the earnings management than other linear models (Jones, Modified Jones, Jones's Performance Model on ROA, Jones's Performance Model on lagged ROA, Jones's Modified Performance Model on lagged ROA).

Research models and measured variables

The used models to estimate discretionary accruals and non-discretionary variables require that presented the way of Calculate:

Linear Accruals models:

1) Jones model:

$$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t) + \beta_3(PPE_t) + \epsilon_t \quad \text{Model No. (1)}$$

AC_t = Total accounts in t year for studied company (Income Before extraordinary items minus operating cash flow)

TA_{t-1} = Total assets in t-1 year

$\Delta Sales_t$ = the change in sales for the company under study

PPE_t = Gross amount of property, machinery and equipment for the year under study.

ϵ_t = the total regression error, which is assumed to be uncorrelated and normally distributed with mean zero.

2) Modified Jones model

The second model used to measure earnings management, modified Jones model (provided by Dechow, Sloan & Sweeney, 1995). The model is as follows:

$$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t - \Delta AR_t) + \beta_3(PPE_t) + \epsilon_t \quad \text{Model No. (2)}$$

ΔAR_t = Changes in accounts and receivable documents in t year for studied company t

3) Performance Models (Kothari, 2005)

Kothari et al (2005), Jones model by adding variables were adjusted return on assets (ROA) as a control variable. Previous studies have concluded that Dechow et al 1995, Kothari et al 2005) conclude that the Jones model is not suitable for units with good or poor performance. Latest version of the modified Jones model by Kothari 2005 discretionary and non-discretionary accruals in order to separate components was presented as follows:

Performance model Jones on ROA

$$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t) + \beta_3(PPE_t) + \beta_4(ROA_t) + \epsilon_t \quad \text{Model No. (3)}$$

Performance model Jones on lagged ROA

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

Modified Jones model performance on ROA

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

Modified Jones model performance on lagged ROA

$$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t - \Delta AR_t) + \beta_3(PPE_t) + \beta_4(ROA_{t-1}) + \epsilon_t \quad \text{Model No. (4)}$$

Model No. (5)

Model No. (6)

ROA_t = Net income divided by total assets at year t

ROA_{t-1} = Net income divided by total assets at year t-1

Where the definition of variables is similar to the definition provided in the model Jones and asset returns as a control variable is added. In order to homogenization research data for all variables used in the model above, the total assets are divided into the early years.

Research method

Current research is correlation method from purpose, practical, nature and description method. Data analysis is sorted for the combined analysis of data. Required data is derived from the basic financial statement of companies, these data were collected through Rahavard Novin software and information center of stock exchange organization.

Population and Statistical Sample

Statistical population of this research is for all accepted companies in Tehran Stock Exchange, which have been active since the beginning of 2008 to 2012 in stock. Due to population and the extent of coordination between community members, the following criterion is placed for selecting the sample and hence the sample was selected using systematic elimination.

1. The company before 2008 is accepted in Tehran Stock Exchange
 2. Firms affiliated companies, financial details are not
 3. End of financial year end is March
 4. The company during the research period, there is no change in the financial year
 5. Required information about such companies within the realm of research databases available.
- With regard to the total number of 108 companies were selected as the sample. Earnings management is measured to determine which model is appropriate for the analysis of the main study. Each model separately edits and is estimated for the sample companies by using a 5-year period (from 2008 to 2011).

Research findings

Descriptive statistics

In order to better recognition the population under study and more Orientation about the variables before analyzing data are needed to describe the data. Statistical description data is a step in the direction of the pattern recognition and basis for explaining the relationships between variables that are used in research. Thus the hypotheses of the study, descriptive statistics were calculated and variables used in the study are presented in Table 1. Provides descriptive statistics overview of research data.

Table1: Descriptive statistics of research variables

Standard deviation	Minimum	Maximum	Middle	Mean	Variable
0.0689	-0.1276	0.2784	0.2047	0.1969	AC _t
1.1934	0.0003	0.0963	0.0021	0.0015	1/A _{t-1}
0.4127	-0.2139	0.6752	0.2296	0.2318	ΔSales _t
0.5373	-0.0096	0.2866	0.1873	0.1653	ΔSales _t - ΔAR _t
0.2935	0.1153	0.6794	0.3765	0.3256	PPE _t
0.1942	-0.0927	0.6278	0.2782	0.2603	ROA _t
0.1893	-0.0927	0.4998	0.2677	0.2498	ROA _{t-1}

For example, the variable total accruals (AC) observed that the mean is 0.1969 and this indicates that most of the data are about the Amount of this variable. Middle of the range was 0.2047 and stated that about half of the data were more than this amount and half below this value. SD also obtained 0.0689, Show that the fluctuations around the average data rate is 7 hundredths, other variables are to be interpreted in this way.

Chow and Hausman test

Hypothesis test for the measurement of variables, data collection and sample companies during the period 2008 to 2011 is used. Total number of sections 108 (company) and consists of a 5-year period, so the overall analysis has been used the combined data from 540 observation (year-the company). The uses of combined data from different models are used to test hypothesis. These models include such methods as fixed effects models, random effects models and pooled data models. Used the Limer (Chow) and Hausman test for checking Kind of model test in the levels and different time periods combined data. In Chow test if the test statistic is significant, the null hypothesis is rejected and the fixed effect model (panel data) is accepted. The state of the evidence is not significant, data fusion or integration method is used to test the hypotheses. In Hausman test also if the result of the Hausman test is significant, statistic rejects the null hypothesis and can be accepted fixed effects models.

There is no evidence in the case; the random effects model was used to test the hypothesis. Hausman and Chow test results are presented in Table 2.

Table 2: The results of determination suitable type of model in combined data

Test the model	Type of model	Statistic	test	P-value	Test result
Model 1	Chow test	2.3264		0.3169	Pooled data
	Hausman test	—		—	
Model 2	Chow test	1.8429		0.3842	Pooled data
	Hausman test	—		—	
Model 3	Chow test	3.7834		0.0215	Random Effect
	Hausman test	1.6345		0.3983	
Model 4	Chow test	3.9784		0.0128	Random Effect
	Hausman test	1.2438		0.4256	
Model 5	Chow test	4.6289		0.0065	Random Effect
	Hausman test	0.9106		0.4729	
Model 6	Chow test	3.2241		0.0237	Random Effect
	Hausman test	1.0786		0.4573	

Chow test results for the model estimate has approved in the first and second null hypothesis of this test is

based on the same intercept in all courses. Therefore estimated using panel data to estimate the first and second model, is a more appropriate option. But on the third to sixth model, the results of the Hausman test has been performed requires. Hausman test results for these models indicate that the null hypothesis is not rejected by the test. Therefore the random effect model to estimate the appropriate option from third to sixth.

Approximation of research models

After determining the appropriate model to test the research hypothesis, six models were estimated. They use these models for the separation of normal and unusual accruals (non-discretionary) income. Values of residues resulting from estimated models are for measures of discretionary accruals, remaining from estimation models by such. The estimated results of the first model of research, is provided by least squares regression ordinary (OLS) in Table 3. Statistic Fisher (P-value 0.000, static 8.2893) shows that in general the model is meaningful. Therefore it can be used the residues resulting from estimated model as a measure of discretionary accruals.

Table 3: estimation results of model 1

$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t) + \beta_3(PPE_t) + \epsilon_t$			
p-value	t-static	Coefficient	Description
0.0000	-6.6458	-1.2109	Fixed coeff
0.0000	-4.2869	-0.6843	$1/A_{t-1}$
0.0039	-3.4358	-0.1439	$\Delta Sales$
0.0246	2.9953	0.3237	PPE_t
0.2784			Adjusted R²
(0.000)		8.2893	(p-value) F-static
2.0931			D-W
540			Evidences No

Significance test results for the modified Jones model years 2008 to 2012 can be seen in Table 4. The Fisher statistic (P-value- 0.000, Static 4.9216) shows that in general the model is meaningful. Therefore it can be used the residues resulting from estimated model as a measure of second discretionary accruals index.

According to regression model, model parameters or a coefficient of the independent variables represents the intensity of the relationship and type of relation between independent variables and the dependent variable. Thus, if the coefficients of the independent variables, ie β is positive, direct relationships have direct relation with independent variables and if the coefficient is negative, it will be an inverse relationship.

Table 4: Estimation results of Model 2

$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t - \Delta AR_t) + \beta_3(PPE_t) + \epsilon_t$			
p-value	t-static	Coefficient	Description
0.0134	-2.9708	-1.2433	Fixed coeff
0.0063	-2.4438	-0.7234	$1/A_{t-1}$
0.0000	-4.0236	-0.0328	Sales- ΔAR_t
0.0000	6.4122	0.2137	PPE
0.3261			Adjusted R ²
(0.0000)		4.9216	(p-value) F-static
2.0426			D-W
745			Evidences No

Significance test results for the performance model years 2008 to 2011 can be seen in Table 4. Models III to VI were used as performance models. As can be seen statistic F was significant in all 4 models.

Table 5: test results of regression model from the third to the sixth of performance model

$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t) + \beta_3(PPE_t) + \beta_4(ROA_t) + \epsilon_t$	Model (3)
$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t) + \beta_3(PPE_t) + \beta_4(ROA_{t-1}) + \epsilon_t$	Model(4)
$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t - \Delta AR_t) + \beta_3(PPE_t) + \beta_4(ROA_t) + \epsilon_t$	Model(5)
$AC_t = \beta_0 + \beta_1(1/TA_{t-1}) + \beta_2(\Delta Sales_t - \Delta AR_t) + \beta_3(PPE_t) + \beta_4(ROA_{t-1}) + \epsilon_t$	Model(6)

Test Model (6)			Test Model(5)			Test Model (4)			Test Model(3)			Description
t-static	Coefficient	Parameter	t-static	Coefficient	Parameter	t-static	Coefficient	Parameter	t-static	Coefficient	Parameter	
-2.5467	-0.0473	β_0	-6.6548	-0.2386	β_0	-2.7153	-0.3288	β_0	4.2166	0.0843	β_0	Fixed coeff
3.4879	0.2186	β_1	4.5638	2.4369	β_1	4.9326	0.2481	β_1	3.9980	0.1148	β_1	1/A_{t-1}
						-8.2879	-0.0177	β_2	-6.0427	-1.3779	β_2	$\Delta Sales_t$
-2.4336	-0.2436	β_2	-2.6224	-0.0818	β_2							$-\Delta AR_t$
3.2433	0.2736	β_3	6.0954	0.0028	β_3	2.2145	0.0342	β_3	4.0878	0.1829	β_3	PPE_t
			-2.9308	-1.3782	β_4				-3.3261	-0.0146	β_4	ROA_t
4.2887	0.4073	β_4				6.2134	1.4238	β_4				ROA_{t-1}
	0.3365			0.4236			0.2644			0.3146		Adj R²
	6.3761			8.3426			6.4439			6.2867		F-static
	0.0000			0.0000			0.0000			0.0000		F (p-value)
	2.2238			2.7862			1.9286			1.8891		D-W

Research hypotheses and conclusions

The comparison of six model used for test hypotheses research that it was estimated before. For this test, is used the adjusted R squared for coefficient of determination regression model. The coefficient of determination indicates that a percent change in the dependent variable explained by the independent variables research. If it is much higher correlation with the independent variables will be the dependent variable. These models to be indicative of earnings management is discretionary accruals model to better distinguish. Therefore, the adjusted R squared from modified models compared to determined models that have most powerful in identifying discretionary accruals, and then measure the significant of adjusted R squared obtained from models by assistant Vuong Z-test.

For example, R² of the modified test first model (Jones) is equal to 0.27. In other words, 27% changes in total accruals (the dependent variable) are simply due to changes in the explanatory variables and the other 73% of the variation due to other factors. The coefficient of second model is equal to 0/32 and in performance models (ie, III to VI models) was 0.31, 0.29, 0.42, and 0.33.

The highest coefficient of determination of the V model is (0.42) and the minimum adjusted coefficient for the first model is (0.27). However should be use Vuong model cause to ensure the difference between adjusted coefficient of V model and other models. The result of Vuong test for comparison adjusted coefficient V model and other model and estimate the significance of their differences is in table 6. Significant level of this test is lower than 0.05, therefore the different between coefficient is significant.

Table 6: results of Z Vuong test for comparison the modified coefficients from estimated models

Compared fifth model with sixth	Compared fifth model with fourth	Compared fifth model with third	Compared fifth model with second	Compared fifth model with first	
4.2718	4.2907	4.2983	4.2899	4.1168	t-Statics
0.006	0.000	0.023	0.0060	0.003	p-value
Confirm	Confirm	Confirm	Confirm	Confirm	Conclusion

As can be seen in the results of Vuong test showed that the coefficient of determination of the V model have significantly different with coefficient of determination of other models. Therefore, we can say that V model (modified Jones model performance with return on assets) have more power in recognize discretionary accruals for predict the earnings management between accepted companies in Tehran stock exchange than other studied models .so the research hypothesis has been confirmed.

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