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Analysis of Power and Specification of Accruals -Based Models to Detect Earnings Management

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ABSTRACT

In this paper by the Value Relevance (VR) of earnings management test on predict of stock price, have been examined the earnings management efficient perspective in listed companies at Tehran Stock Exchange. At first, with compare of five models from different models of discretionary accruals for detecting earnings management, the cross-sectional regression (year to year) of each one of models as separation in six years during (2005 to 2010) are estimated and by using of F test , the model which provides the most powerful test of earnings management, has been selected. Then, by Value Relevance (VR) measure, have been tested the efficient perspective of earnings management.

Findings indicate that earnings management criterion has no predicting value and necessary efficiency to anticipation of price in Iran Stock Exchange. Therefore, efficient earnings management perspective is not accepted in Iran capital market.

KEY WORDS: Discretionary Accruals, Earnings Management, opportunistic earnings management, efficient perspective of earnings management, Value Relevance (VR)

1. INTRODUCTION

Earnings management is one of the accounting concepts which has situated at the core of financial researchers over than 50 years (Atik, 2009). Among research topics in accounting and finance, none is perhaps more provocative than earnings management. Why? I think it is because the topic explicitly involves potential wrongdoing, mischief, conflict, cloak and dagger, and a sense of mystery. Earnings management research has been ongoing for almost two decades. Much has been learned, but many interesting questions remain unanswered (Lo, 2008).

This paper investigates power and specification of the different accruals-based models to select an appropriate model to measure earnings management in Tehran stock exchange listed firms. Earnings management is the choice by a manger of accounting policies, or actions affecting earnings, so as to achieve some specific reported earnings objective (Scott, 2009). Discretionary accruals have been used in testing and measuring of earnings management in various studies (for example, Defond and Jiambalvo, 1994, Rees et al., 1996, Teoh et al., 1998a, and b). The current literatures have continually used accruals proxies to measure of earnings management.

Researchers have been predicted that managers have strong incentives to engage in earnings management in order to meet their objectives (Badertscher, 2011 and DeFond, 2010). A few studies investigated weakness of accruals –based earnings management models (e.g. Dechow and Dichev, 2002, Francis et al., 2005 and Kothari et al., 2005).

Dechow and Dichev (2002) improved the Jones model by more explicitly mapping cash flows into the accruals generating process. Francis et al. (2005) adjusted the Dechow and Dichev model and Kothari et al. (2005) made more desirable the Dechow and Dichev model and Jones model by adding an independence variable is named ROA.

The main objective of this paper is to show power and specification of different accruals-based models to detect earnings management. This may tend to put an accurate interpretation on measuring of earnings management. The study will provide a better understanding on problems of measurement in accounting such as measurement of earnings management, because earnings management has a core role in accounting standard setting. This is consistent with Watts and Zimmerman (1979), who argues that academic research is used in the ‘‘market for excuses’’ to buttress and justify standard setters’ preconceived notions.

We select Tehran stock exchange listed firms, because Iran is a country with some distinct attributes relevant to harmonization and global convergence issues, which includes a big economy in Middle East. Iran's experience in adopting and implementing global accounting standards is likely to influence other developing countries. So, our study may contribute to the accounting literature by presenting the results of this research in an emerging economy.

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The results of the study can also help the standard setters of developing countries in understanding and setting the accounting standards.

The rest of this paper contains a brief summary of the relevant literature and the development of hypothesis and research method is described before analyzing and discussing the results.

2. LITERATURE REVIEW

Up to now, those researches which have done around those models of detecting earnings management using with usage of discretionary accruals have had been different and inconsistent results. For examples, Dechow et al. (1995) evaluated the relative performance of five earnings management measuring models taking specification and power as standards, which are the Healy (1985), the DeAngelo (1986), the Jones (1991), the modified Jones model (Dechow et al., 1995) , and the industry model (Dechow & Sloan, 1991). The result indicates that the modified Jones model provides the most powerful test of earnings management. However, regarding Shiue and Lin (2004) who evaluate the five commonly cited discretionary accruals estimation models which are the same as Dechow et al. (1995), they conclude that the DeAngelo model and Healy model are better than the others in detecting earnings management.

Bartov, Gul, and Tsui (2000) evaluate the detecting ability of several different models by examining the association between discretionary accruals and audit qualifications. They claim that only the cross-sectional Jones and cross-sectional modified Jones model are consistently able to detect earnings management. Or Yoon et al., (2006) in Korea and Islam et al. (2011) in Bangladesh documented that the Modified Jones model is not effective in detecting earnings management.

Algharaballi and Albuloushi (2008) evaluated four models developed in prior research to detect earnings management in Kuwaiti listed firms; Jones model, modified Jones model, extended Jones cash flow model, and working capital accruals model. They conclude that all four models were well specified when applied to random samples of firms listed in Kuwait Stock Exchange. In the detection of earnings management, all models show almost the same power capability when expense manipulation was exercised. Jones model, however, shows the highest power of detecting the income increasing accruals through the manipulation of revenue.

Results of empirical research about models of detecting earnings management using by discretionary accounting accrual in Iran concluded that across regression methods , Jones Model has ability of specification earnings management (Mherazin , 2008) or Kasnik Model provides the most powerful test (Explanatory power) of earnings management (Agayee and Chalaki , 2010 , Beharmoghadam and Kohei , 2010 , Akhgar , 2011).

Banimahd and Arab Ameri (2011) examined relationship between earnings management and debt ratio in listed companies on Tehran stock exchange during 2001 to 2007. In this study, Independent variables are earnings management, size, profitability, fix asset ratio, sale growth and dependent variable is debt ratio. The outcomes of their study indicate that there is no relation between the earnings management, firm size and debt ratio. But there is a negative relation between firm profitability and sale growth with debt in study sample. Meanwhile, the results of study show a positive relation between fix asset ratio and debt. Findings no confirmed that efficient earnings management approach for explanatory power and predicting of debt.

Banimahd and Kazemi (2011) investigated relationship between earnings management and future profitability in listed companies in Tehran stock exchange during 2001 to 2007. In this study, Independent variables are earnings management, size, financial leverage and dependent variable is future profitability. The results indicate that the earnings management is positively related to the future profitability of firms. But there is a negative relation between future profitability and firm size and financial leverage in study sample. Evidence of research show that form of the earnings management is income smoothing in Iran firms. Meanwhile, research results confirm the efficient perspective of positive accounting theory on earnings management.

Akhgar (2011) investigated the using methods of management discretion in future profitability reporting of companies listed on the Tehran Stock Exchange (TSE).Accordingly investigated the type of earnings management in these companies in terms of opportunistic or efficient earnings management. The results show that managers of stock companies use of own discretions to communicate private information about firm's future profitability, and this is in accordance with definition of efficient earnings management.

The weakness points of prior researches done in Iran are that all of these studies have used the adjusted R^2 measure for explanatory of model. This is wrong from econometrics point of view and F test must be considered as the best model selection criteria. In this paper, this weakness is solved and F test has been picked up a measure to determine the discretionary model liability.

3. Earnings-management measure

Consistent with previous research, discretionary accruals are used to identify earnings management. Based on total accruals (TAC), these can be broken down into a discretionary (DAC) and a non-discretionary (NDAC)

accruals component. Most models estimate non-discretionary accruals across a regression, where TAC is the dependent variable, and the independent variables are the factors that can explain total accruals. To-date, most studies that use a cross-section approach to estimate DAC (or working-capital discretionary accruals WCDAC) have employed a regression for each industry and year using ordinary-least-square regression (OLS).

Table.1 summarizes the different definitions of earnings management, classifying them as white, gray, or black. Beneficial (white) earnings management enhances the transparency of reports; the pernicious (black) involves outright misrepresentation and fraud; the gray is manipulation of reports within the boundaries of compliance with bright-line standards, which could be either opportunistic or efficiency enhancing (Ronen & yaari , 2008).

Table.1: Alternative definitions of earnings management

White	Gray	Black
Earnings management is taking advantage of the flexibility in the choice of accounting treatment to signal the manager's private information on future cash flows	Earnings management is choosing an accounting treatment that is either opportunistic maximizing the utility of management only) or economically efficient	Earnings management is the practice of using tricks to misrepresent or reduce transparency of the financial reports.
Ronen and Sadan (1981), Demski, Patell, and Wolfson (1984), Suh (1990), Demski (1998), Beneish (2001), Sankar and Subramanyam (2001)	Fields, Lys, and Vincent (2001), Scott (2003)	Schipper (1989), Levitt (1998), Healy and Wahlen (1999), Tzur and Yaari (1999), Chtourou, Bédard, and Courteau (2001), Miller and Bahnson (2002)

There are two types of earnings management: efficient and opportunistic. Earnings management is efficient if managers use their discretion to communicate private information about firm profitability, which is yet to be reflected in the historical cost-based earnings, while it is opportunistic if managers use their discretion to maximize their utility, thereby garbling earnings (Subramanyam, 1996).

In this study, the discretionary accruals models which are used to measurement of earnings management are as following:

3.1 The Jones Model (1991)

Jones offers a new and potentially more effective way to estimate nondiscretionary accruals in her model. She uses a plant, property and equipment variable (PPE) to control for any changes in non-discretionary accruals arising from the depreciation charge and hence resulting from changes in business activities of the firm. Using the same idea, a sales revenue variable is used to control for changes in non-discretionary accruals related to working capital accounts arising from changes in the economic environment of the firm. However, revenues, according to Jones, are not completely exogenous; for example, shipments of merchandise could be postponed in order to postpone recognition of revenue until the next year. The time series regression is estimated for each sample firm as follows:

$$\frac{TA_{it}}{A_{it-1}} = \alpha_t(\frac{1}{A_{it-1}}) + \beta_{1i}(\frac{\Delta REV_{it}}{A_{it-1}}) + \beta_{2i}(\frac{PPE_{it}}{A_{it-1}}) + \varepsilon_{it} \qquad (1)$$

Where:
TA = total accruals for firm i in year t;
A_{it-1}= total assets for firm i in previous year;
ΔREV_{it} = change in revenues for firm i in year t;
PPE_{it} = gross property, plant, and equipment for firm i in year t;
ε_{it} = error term for firm i in year t.

All variables in her model are scaled by lagged assets to reduce heteroscedasticity. However, because of using parameter estimates for predictive purposes rather than hypotheses tests, the problem of biased standard errors estimates related to heteroscedasticity is not a major issue (Kmenta 1997). An ordinary least squares (OLS) regression with no intercept is employed using the time series data available prior to the specific event period to estimate a_i, b_{1i}, and b_{2i} for α_t, β_{1i} □, and, β_{2i} □respectively. Discretionary accruals (DA), as shown below, are computed as the difference between total accruals and the non-discretionary components of accruals.

$$\mathbf{DA_{it} = TA_{it} / A_{it-1} - [a_1(1/A_{it-1}) + b_{1i}(\Delta REV_{it}/A_{it-1}) + b_{2i}(PPE_{it}/A_{it-1})]} \qquad (2)$$

Looking at the Jones model, it is clear that the idea of using two variables (ΔREV and PPE) to control for changes in non-discretionary accruals makes this model potentially more accurate for an analysis of earnings

manipulations. However, the assumption that coefficient estimates are stationary over time would create a survivorship bias. As well, sales manipulation that can be managed by managers is completely ignored since this model assumes that all revenues in the period are nondiscretionary.

3.2 The Modified Jones Model (1995)

Dechow et al. (1995) modify the original Jones model to eliminate the conjectured tendency to measure discretionary accruals with error when discretion is exercised over revenues. The change in revenues is adjusted for the change in receivables in the event period. They assume that all changes in credit sales in the event period proceed from earnings management. They conclude that managing earnings by exercising discretion over the recognition of revenue on credit sales is easier than managing earnings by exercising discretion over the recognition of revenue on cash sales. The time series regression for the sample is estimated as follows:

$$\frac{TA_{it}}{A_{it-1}} = \alpha_t(\frac{1}{A_{it-1}}) + \beta_{1i}(\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}}) + \beta_{2i}(\frac{PPE_{it}}{A_{it-1}}) + \varepsilon_{it} \qquad (3)$$

where:

ΔREC = the change in accounts receivable for firm i in period t.

To estimate a_i, b_{1i}, and b_{2i} for α_t , β_{1i} □, and, β_{2i} □respectively, an ordinary least squares (OLS) regression with no intercept is employed using the longest time series data available prior to the specific event period. The difference between total accruals and the non-discretionary components of accruals is considered as discretionary accruals (DA) as explained below:

$$\mathbf{DA_{it} = TA_{it} / A_{it-1} - [a_1(1/A_{it-1}) + b_{1i}(\Delta REV_{it} - \Delta REC_{it}/A_{it-1}) + b_{2i}(PPE_{it}/A_{it-1})]} \qquad (4)$$

3.3 The Extended Jones Cash Flow Model (1999)

Kasznik (1999) adds to modified Jones model changes in operating cash flow as an explanatory variable to explain the negative correlation between cash flow from operations and total accruals. He finds that managers use income-increasing discretionary accruals to manage reported earnings toward their forecast numbers when they have overestimated earnings. In contrast, he finds no evidence that managers use income-decreasing discretionary accruals to manage reported earnings downward when they have underestimated earnings in their forecasts. The time series regression for the sample is estimated as follows:

$$\frac{NDA_{it}}{A_{it-1}} = \alpha_{0i}(\frac{1}{A_{it-1}}) + \alpha_{1i}(\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}}) + \alpha_{2i}(\frac{PPE_{it}}{A_{it-1}}) + \alpha_{3i}(\frac{\Delta CFO_{it}}{A_{it-1}}) + \varepsilon_{it} \qquad (5)$$

ΔCFO change in cash flows from operation from year t−1 to year t (CFOt−CFOt−1). All variables are scaled by beginning total assets.

3.4 The Performance-Matching Model (2005)

Kothari, Leone, and Wasley (2005), develop a performance-matching model. They offer two different approaches. The first involves matching similar firms, which alleviates the need to use an OLS estimate of DA. They detect earnings management by comparing the accruals of firms that are otherwise almost identical. The second, the linear-performance matching model, embodies two modifications of the Jones and the modified Jones models: an intercept, and an additional control for the lagged rate of return on assets, ROAt–1.

Because the first term in the Jones model is the reciprocal of lagged assets, econometrically, the Jones model does not have an intercept. Deflating by lagged assets is meant to mitigate heteroskedasticity. Finding that heteroskedasticity is still an issue, Kothari, Leone, and Wasley also include an intercept to mitigate it. They find that an intercept yields higher symmetry around zero discretionary accruals, which enhances the power of tests for type I error.

We named this model as Kothari-Jones and Modified Kothari-Jones models and the time series regression for the sample is estimated as follows:

3.4.1 Kothari-Jones Model

$$\frac{NDA_{it}}{A_{it-1}} = \alpha_0 + \alpha_i(\frac{1}{A_{it-1}}) + \alpha_{1i}(\frac{\Delta REV_{it}}{A_{it-1}}) + \alpha_{2i}(\frac{PPE_{it}}{A_{it-1}}) + \alpha_{3i}ROA_{i,t-1} + \varepsilon_{it} \qquad (6)$$

3.4.2 Modified Kothari-Jones Model

$$\frac{NDA_{it}}{A_{it-1}} = \alpha_0 + \alpha_i(\frac{1}{A_{it-1}}) + \alpha_{1i}(\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}}) + \alpha_{2i}(\frac{PPE_{it}}{A_{it-1}}) + \alpha_{3i}ROA_{i,t-1} + \varepsilon_{it} \quad (7)$$

Where α_0 is a constant and $ROA_{i,t-1}$ is the lagged rate of return on assets

4. RESEARCH METHODOLOGY

Our research methodology is applied research. Applied research is a form of systematic inquiry involving the practical application of science. It accesses and uses some parts of the research communities' (the academy's) accumulated theories, knowledge, methods, and techniques, for a specific, often state, business, or client driven purpose. Applied research is compared to pure research (basic research) in discussion about research ideals, methodologies, programs, and projects. To test the hypotheses, multiple regression model approach with Ordinary Least Squares method was applied. Data was collected as following:

i) The library studies is related to historical background, documents and theoretical framework.

ii) Data have been driven from financial statements of listed companies in Tehran Stock Exchange during 2005 to 2010.

4.1 Sample Selection

The population of this study includes all listed companies in Tehran Stock Exchange during 2005 to 2010. The sample selection is based on the criteria as following:

- All firms are listed in the TSE end of 2004.
- The fiscal year of firm should be end up to 29 December
- Firms shouldn't change their fiscal year during 2005 through 2010.
- All of firms required data must be available.
- The firms must not be active as the intermediate industries, banking and insurance companies.

Collectively, these filters yield a sample of roughly 437 observations (firm-year) which include 73 firms.

5. RESULTS

5.1 Descriptive Statistics

Before regression process, descriptive statistics related to models and indexes e.g. Maximum, Minimum, Mean and Standard deviation have been processed by SPSS software. Tabel.2 and 3 show the summary of descriptive statistics.

Tabel 2. Descriptive Statistics of discretionary accruals

	Jones	Modified Jones	Kazsnik	Kothari-Jones	Modified Kothari-Jones
N Valid	437	437	437	437	437
Minimum	-1.62488	-2.10482	-2.14339	-1.70417	-1.65479
Maximum	5.39994	4.63227	4.65046	3.46573	3.52637
Mean	0.000000	-0.0000001	0.0000001	-0.0000001	0.000000
Std.Deviation	0.43218026	0.42403775	0.42402397	0.36483011	0.36488379

Tabel 3. Descriptive Statistics Related to Research Variables

	ACCUAL	ROA	DREV	DCFO	DREC	DREVREC	PPE
N Valid	437	437	437	437	437	437	437
Minimum	-1.53016	0.00010	-0.46260	-2.43520	-1.64780	-1.81190	0.0000
Maximum	5.49002	1.41560	3.48780	3.22750	1.84870	3/03610	0.91201
Mean	0.815653	0.1504751	0.154712	0.239121	0.471584	0.107555	0.342458
Std.Deviation	0.43522286	0.1339797	0.2947966	0.270801	0.166763	0.318363	0.177359

5.2 Hypotheses Development and Finding

5.2.1 Testing the First Hypothesis

we formulated two hypotheses for the Iranian companies. The first hypothesis is therefore stated as follows:

H_0. There is no significant difference between discretionary accruals models in detecting earnings management.

H_1. There is significant difference between discretionary accruals models in detecting earnings management.

To select appropriate earnings management model for efficiency test, we at first estimated all models year to year once as a panel data and another time as the time series during six years for each model. Table 4. and table 5. show the results.

Tabel 4. Results of Models as Panel Data

Model	F stat	Sig. F	Adjusted R^2	Durbin-atson d
Jones	19.796	0.000	11.5 %	1.77
Modified Jones	7.716	0.000	4.4 %	1.66
Kazsnik	5.76	0.000	4.2 %	1.66
Kothari-Jones	48.137	0.000	30.2%	1.56
Modified Kothari-Jones	45.699	0.000	29.1 %	1.479

Tabel 5. Results of Models as Time Series

Model	F stat	Sig. F	Adjusted R^2	Durbin-atson d
Jones	2.04	0.108	0.7 %	2.109
Modified Jones	7.715	0.000	4.4 %	2.192
Kazsnik	5.78	0.000	4.2 %	2.193
Kothari-Jones	45.652	0.000	29.1 %	2.122
Modified Kothari-Jones	45.697	0.000	29.1 %	2.133

The F test in above tables indicates specification power of earnings management model. Each model which is higher in F test provides higher specification to other models. Therefore, F test of the performance-matching model (Kothari et al., 2005) is higher in both panel data and time series data.

In addition, although adjusted R^2 in above five models refers to Kothari model, this measure can't express the model's specification power. The Durbin–Watson d has acceptable value (around 2) so it indicates no multicollinearity among variables. Therefore, H_0 hypothesis is rejected and H_1 hypothesis is confirmed.

5.2.2 Testing the Second Hypothesis

The second hypothesis is stated as follows:

H_0. There is relationship between discretionary accruals and earnings management efficient perspective in Iran Stock Exchange.

H_1. There is no relationship between discretionary accruals and earnings management efficient perspective Iran Stock Exchange.

Value relevance for test of efficient perspective has been used In this study. On the basis of prior researches, earnings management would be efficient when it can predict as a value market e.g. stock price. In other word, earnings management measure as a variable can provide relevance information for anticipating of stock price. Value relevance model is definite on basis Feltham and Ohlson model as following:

$$\mathbf{P_{it} = a_0 + a_1NI_{it} + a_2BV_{it} + \varepsilon} \qquad (8)$$

Where P denotes stock price, NI denotes net profit and BV denotes book value of per share.

We test adjusted R^2, F stat and Durbin-Watson d for equation (8) on the basis of year to year. Table.6 show results of test. As you see in Table.6, all of statistics are significant.

Tabel 6. Results of test equation(8)

Year	Adjusted R^2	F stat.	Sig. F	Durbin-atson d
2005	0.535	41.785	0.000	2.287
2006	0.783	130.830	0.000	2.033
2007	0.810	154.806	0.000	2.088
2008	0.339	19.467	0.000	1.927
2009	0.247	12.787	0.000	2.365
2010	0.298	16.264	0.000	2.079

Then we add earnings management measure to Feltham and Ohlson model (equation (8)) on the basis of Modified Jones-Kothari model.

$$\mathbf{P_{it} = a_0 + a_1NI_{it} + a_2BV_{it} + a_3\, EM_{it} + \varepsilon} \qquad (9)$$

Once again, we test adjusted R^2, F stat and Durbin-Watson d for equation (9) on the basis of year to year. Table.7 show results of test. As you see in table.7, all of statistics are significant.

Tabel 7. Results of test equation(9)

Year	Adjusted R^2	F stat.	Sig. F	Durbin-atson d
2005	0.541	84.552	0.000	2.271
2006	0.786	265.397	0.000	2.034
2007	0.812	312.608	0.000	2.081
2008	0.346	39.106	0.000	1.928
2009	0.257	25.881	0.000	2.365
2010	0.307	32.871	0.000	2.086

Again we add earnings management measure to Feltham and Ohlson model (equation (8)) on the basis of Jones-Kothari model:

$$\mathbf{P_{it} = a_0 + a_1 NI_{it} + a_2 BV_{it} + a_3\, EM_{it} + \varepsilon} \qquad (10)$$

Once again, we test adjusted R^2, F stat and Durbin-Watson d for equation(10) on the basis of year to year. Table.8 show results of test. As you see in table.8, all of statistics are significant.

Tabel 8. Results of test equation(10)

Year	Adjusted R^2	F stat.	Sig. F	Durbin-atson d
2005	0.534	41.722	0.000	2.264
2006	0.784	131.924	0.000	1.974
2007	0.810	154.163	0.000	2.079
2008	0.337	19.292	0.000	1.928
2009	0.253	13.167	0.000	2.360
2010	0.297	16.206	0.000	2.088

According to results of testing of the second hypothesis and non effective of earnings management measure in the hypothesis test, it assumes that earnings management criterion has no predicting value and necessary efficiency to anticipation of price in Iran Stock Exchange.

6. DISCUSSION AND CONCLUSION

Discretionary or abnormal accruals are often used as a proxy for earnings management. We evaluated the ability of five measures derived from the extant discretionary accruals models to detect earnings management. We find that the performance-matching model (Kothari et al., 2005) provides the most powerful test of earnings management. Our results fail to confirm the findings reported by Agayee and chalaki(2010), Beharmoghadam and Kohei(2010) and Akhgar(2011).

We also used value relevance measure on the basis of Feltham and Ohlson model for efficient earnings management perspective.

While adjusted R^2 amount of equation(9) and equation(10) models to equation(8) has not important variation in any years. Therefore, it can argue that earnings management measure has no provide predicting value for anticipating of price and no necessary efficiency. Hence, the efficient perspective of earnings management isn't acceptable in Iran capital market. This is consistent with Beaver (2002). On the basis of Beaver study, in the research of value relevance should pay attention to capital market efficiency.

While Iran capital market isn't efficient, therefore, the efficient earnings management approach isn't confirmed and it can be concluded that earnings management in Iran is followed by opportunistic approach for meeting private interest of management e.g. reward.

Our findings have important implications for several constituents who use financial statements and researchers who employ models of discretionary accruals to discern earnings management as well as for those who interpret empirical evidence on accrual-based earnings management. Auditors, managers, regulators and standard setting body could devise analytical procedures based on accruals to capital market efficiency.

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