Efficiency of Tehran Stock Exchange in Accounting Earnings and Stock Prices with Product Market Competition: A Mishkin Test Analysis

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ABSTRACT

Accounting earnings and their components play a crucial role in stock pricing, making them the most significant accounting items. When investors are unable to achieve abnormal returns by utilizing this information, it indicates that the capital market has efficiently incorporated accounting earnings information into stock pricing, thus rendering stock pricing rational. This research aims to examine the market's response to accounting earnings components in stock pricing while considering the moderating impact of product market competition. The statistical population of this study comprises companies listed on the Tehran Stock Exchange from 2012 to 2020, with a sample of 111 companies selected through systematic elimination. Hypothesis testing involved the use of non-linear regression analysis, simultaneous equations system, and the Mishkin test. The research findings demonstrate the rationality of stock pricing through the utilization of accounting earnings components and the moderating influence of product market competition. In essence, the capital market exhibits efficiency in assessing the effect of product market competition on the predictive ability of cash and accrual components for one-year-ahead earnings.

1 Introduction

Stock returns serve as a crucial metric for evaluating managerial performance, prompting managers to prioritize their efforts in increasing stock returns. As a result, various variables, including accounting earnings, are strategically planned to enhance stock returns [1-3]. However, in light of successive financial crises and the bankruptcy of major global companies in recent years, financial researchers and analysts have shifted their focus from solely emphasizing earnings figures to examining earnings quality. Earnings persistence, as a qualitative characteristic of earnings, evaluates the continuity and stability of earnings from one period to another. Investors are particularly interested in earnings persistence as they consider earnings figures and components when predicting one-year-ahead earnings, expected cash flows, and even stock returns. Failure to accurately predict the persistence of earnings components may result in stock mispricing. In their respective studies, Xie [4] and Kraft et al. [5] introduced additional explanatory variables into the Mishkin test to rationalize the pricing of accruals and thereby eliminate the accruals anomaly identified by Sloan [6].

While Ball and Brown originally postulated a positive relationship between earnings and stock returns, subsequent research has indicated that users of financial information struggle to correctly discern the

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information content of earnings and utilize it in their predictions. Sloan [6] provided evidence suggesting that the earnings accrual component can be misleading. Building upon Sloan's assumptions, numerous studies have investigated this phenomenon, asserting that the lower persistence of the earnings accrual component compared to the earnings cash component contributes to this misleading nature [7-12].

Understanding the pricing mechanisms of earnings and its cash and accrual components is a crucial factor in predicting stock returns [13]. Accurate stock valuation is vital to avoid market failure and suboptimal allocation of scarce resources [14]. Therefore, it is of paramount importance to identify the mispricing factors associated with earnings components that impede investors' ability to make accurate evaluations and predictions of stock returns.

Product market competition refers to the fierce competition among companies in the production and sale of goods, where no single company possesses a significant superiority over others. Monopolization of the market occurs when a firm successfully implements production methods that generate high-quality goods or supplies goods at lower prices compared to competitors, thus monopolizing the sales market. Therefore, product market competition serves as a counterforce to market monopolization. This research aims to investigate the market's efficiency in evaluating the impact of product market competition on the rational pricing of shares using cash and accrual earnings components. The innovative aspect of this study lies in examining rational stock pricing using earnings components and exploring the influence of product market competition on stock pricing (through the Mishkin test) comprehensively and for the first time. The anticipated outcomes of this research include expanding the theoretical foundations surrounding factors affecting the persistence of earnings components, providing users of accounting information, investors, and capital market analysts with valuable insights into stock pricing and its determining factors, as well as inspiring new avenues of research and generating related ideas within this research domain.

The subsequent sections of this paper present the theoretical foundations and background of the research, research methodology, analysis of the obtained results, and recommendations pertaining to the subject matter.

2 Theoretical foundations

2.1 Earnings persistence and its components

Persistence is an important and effective factor in the quality of accounting earnings because companies with regular and persistent earnings have higher earnings quality compared to companies with irregular and high fluctuating earnings. The regularity and reproducibility of earnings make the easier and more reliable prediction of one-year-ahead earnings [17,18]. According to this definition, the persistence of current earnings leads to predicting one-year-ahead earnings. It means that it is possible to predict next year's earnings by using the current earnings and its components. This ability to predict earnings depends on the level of the current earnings persistence and its components.

Much research has been done regarding the market weighting to accounting earnings components, and most of the results show that the capital market does not have the necessary power to understand the importance of earnings components. Sloan [4] initially focused on the persistence of accruals and showed that investors overestimate the persistence of accruals and this leads to the mispricing of stocks. He also stated that there is a negative relationship between accruals and stock returns.

Dechow et al. [5] and Chen and Shan [19], Panagiotis and Panastasopoulos [20] focused on cash components of earnings instead of accruals. They divided the cash component of earnings into three parts: changes in cash balances and short-term investments, net distributed to shareholders, and net distributed to creditors. The accrual of earnings was also divided into two parts: discretionary and non-discretionary

accrual. Then they investigated the persistence of cash and accrual components of earnings and their ability to predict the one-year-ahead earnings. In fact, they measured the ability of the cash and accrual components of earnings in predicting the one-year-ahead earnings.

2.2. Product market competition and earnings components persistence

Today, competitiveness is a central issue at the world level. It is referred to as a means to achieve favorable economic growth and persistent development. Competitiveness is defined as the firm's ability to survive in the business market, protect the firm's various capitals, return the investment, and guarantee jobs in the future. One of the characteristics of a successful firm is its competitiveness in the market. Meanwhile, the characteristic of unsuccessful companies is the lack of this power [14]. Industrial Organization Theory states that the concentration of companies in the market is an important element in the market structure, and it is the determining factor of competition in the market. The more (less) degree of concentration in industries makes the more (less) level of competition in those industries (if other factors are constant). Increased concentration (reduced competition) will be associated with higher prices and abnormal earnings [9]. The product market competition policies of the companies have an effect on the earnings, free cash flow, and investors' valuation of these cash flows [11].

Review of the research literature about the product market competition and financial information shows that most of these studies have examined the effect of competition on the quantity of accounting information, and fewer studies have examined the effect of competition on the qualitative characteristics of accounting information, especially the earnings persistence [13].

Khajavi et al. [15] showed in their research that the degree of earnings management decreases in competitive industries. That is, in more concentrated industries, they manage and manipulate their earnings to reduce potential problems resulting from the lack of pressure in the product market competition.

Markarian and Santalo [16] investigated the effect of product market competition in reducing managers' incentives to manipulate a firm's earnings. They discussed and analyzed the existing literature on the effects of product market competition on the practices used in accounting from two contradictory perspectives. In the first view, they stated that the existence of product market competition increases managers' incentives to manipulate earnings; Because when accounting earnings indicate a competitive disadvantage (or advantage), competition causes greater punishment (or reward) in the stock market. In the second view, they stated that if shareholders or stock analysts have access to real market data, less competition can be used to justify positive and negative accruals and to inflate reported profits. When shareholders or stock analysts have the ability to see the output of the firm's productions, managers who pretend to run the firm's operations efficiently, not only do not need to manipulate accounting earnings, but also if their activities are really efficient, they need to apply it in the market. In this situation, it is very costly to mislead shareholders or stock analysts in a competitive market. Therefore, managers should do earnings management less than usual [18]. The results of some research indicate that product market competition has a negative and reverse effect on earnings persistence [16,17]. But on the contrary, the results of some other research indicate the existence of a positive and significant relationship between product market competition indicators and earnings quality criteria [10].

In the competitive literature, it is stated that intensive product market competition causes managers motivated for efficient performance [8]. The product market competition is also considered as an external mechanism of corporate governance in monitoring the management and reducing agency costs [17]. In this research, a set of earnings quality measurement criteria are used simultaneously, and the persistence of cash and accrual components of earnings is checked and, the ability to predict cash and accrual components of

earnings, normal and abnormal return of the next year's stocks is investigated under the conditions of the product market competition with a comprehensive approach.

2.3 Market efficiency and earnings components persistence

The concept of capital market efficiency has different definitions. If abnormal returns cannot be obtained by using a specific set of information, then it can be said that the market is efficient with the mentioned set of information and has reflected that information efficiently in stock prices. Studies that examine the efficiency of the capital market in reflecting a specific set of information in stock prices are in the field of studies about mispricing (irrational pricing or anomaly). In these studies, it is assumed that the intensity and speed of the stock market's reaction to various information is different. In some cases, the type of investors' reaction to information is not rational and causes anomalies such as excessive increases or decreases in prices, and consequently, abnormal returns. Although the market realizes its mistake after a period of time and returns to the state of equilibrium, this economic behavior, which is considered as an irrational behavior in the market, allows some investors to obtain abnormal returns in a short period of time. For checking the capital market efficiency in reflecting a specific set of information in stock prices, Mishkin presented a new method based on estimating the simultaneous equations system. By using the mentioned test, it is possible to check whether the capital market has been able to reflect a specific set of information in stock prices or not [19]. Accounting earnings and its components are the most important accounting system information that is used by investors in stock pricing. According to the aforementioned theoretical foundations, in this research, the reaction of Tehran's securities market will be investigated in reflecting the effect of product market competition on the ability of current cash and accrual earnings components in predicting the next year's earnings.

3 Research background

3.1 Internal background

Parandin et al. [15] in research using non-linear least squares regression analysis in the form of simultaneous equations system and Mishkin test showed that the persistence of the earnings cash component is significantly higher than the earnings accrual component, and investors predict the subjective persistence coefficient of the earnings cash component and accrual in lower and higher degree respectively. They also estimate the subjective persistence of earnings cash and accrual component more than their objectivity. In other words, investors estimate the earnings persistence of pharmaceutical companies suspicious of fraud incorrectly, and the capital market is not efficient in relation to earnings components information.

Rezai and Veisihesar [17] in research using non-linear least squares regression analysis in the form of simultaneous equations system and Mishkin test showed that operating earnings are persistent and one-year-ahead earnings can be predicted based on current earnings trends. The persistence of the earnings cash component is more than the accrual component, but from the market perspective, investors show more reliance on accrual than on the cash component. Finally, there is a significant difference between the persistence of earnings and estimated earnings components by investors and the actual persistence of earnings and earnings components.

Aflatoni and Alizadeh [6] investigated the rationality of stock pricing using a simultaneous equations system, Mishkin test, and accounting earnings information and its components in the Tehran Stock Exchange. The results generally indicate the irrationality of stock pricing using accounting earnings information and its components.

Sadeghi et al. [23] showed in their research that there is a significant relationship between "conditional and unconditional persistence difference of abnormal income" and "abnormal income" with "abnormal stock return". The relationship between "conditional and unconditional persistence difference of abnormal income" and "abnormal profit" with "abnormal stock return" was not confirmed. In addition, the relationship between "conditional and unconditional persistence difference of abnormal income" and "accrual anomaly" was not confirmed.

Fakhari et al. [22] in their research entitled "Investigating the moderating effect of earnings predictive power on the relationship between product market competition and stock returns" examined the moderating effect of profit predictive power on the relationship between product market competition and stock returns. In this research, 76 companies of the Tehran Stock Exchange were selected as a statistical sample during the period of 2011 to 2015, and their data were examined and analyzed. The statistical technique used for testing the hypothesis is multivariate regression. The research results indicate that product market competition has a significant positive effect on earnings predictive power. The earnings predictive power has a moderating effect on the relationship between product market competition and stock returns.

Abbaszadeh et al. [7] in their research entitled "The effect of product market competition on various criteria of earnings quality based on accounting principles" examined the effect of product market competition on various criteria of earnings quality, including earnings persistence. They investigated the information about 230 companies during the period of 9 years from 2012 to 2020 by using multivariate regression models. In this research, various earnings quality criteria based on accounting principles, including the quality of accruals, earnings persistence, and profit predictability, as well as earnings quality criteria based on the principles of market activity, including value relevance, earnings timing, and earnings reaction coefficient are used as dependent variables and product market competition is an independent variable. The findings of the research show that product market competition has a negative and inverse effect on earnings persistence, but it does not affect other quality criteria.

3.2 External background

Pirveli [19] investigated earnings persistence and profit predictability. For testing the hypotheses of the research, the multivariate regression method has been used. The results indicated that real earnings management has a negative and significant effect on earnings persistence.

Li [18] investigated the effect of real earnings management on earnings persistence and its usefulness. For testing the hypotheses of the research, the multivariate regression method has been used. The results indicated that real earnings management has a negative and significant effect on earnings persistence.

Mahmoudzadeh and Seifi [21] investigated the impact of product market competition on the relationship between capital structure and a firm's financial performance among Iranian companies between 2005-2014. Their research method was a correlation. The results indicated that the use of debt in the capital structure of the firm has an effect on the firm's financial performance, and this effect is different in various levels of competition.

4 Research hypotheses

First hypothesis: The capital market is efficient in evaluating the effect of product market competition on the ability of changes in cash and short-term investments in predicting one-year-ahead earnings.

Second hypothesis: The capital market is efficient in evaluating the effect of product market competition on the ability of net cash distributed to shareholders in predicting the one-year-ahead earnings.

Third hypothesis: The capital market is efficient in evaluating the effect of product market competition on the ability of net cash distributed to creditors in predicting one-year-ahead earnings.
Fourth hypothesis: The capital market is efficient in evaluating the effect of product market competition on the ability of non-discretionary accruals in predicting the one-year-ahead earnings.
Fifth hypothesis: The capital market is efficient in evaluating the effect of product market competition on the ability of discretionary accruals in predicting one-year-ahead earnings.

5 Research Methodology

This research is applied research in terms of results, and it is descriptive research in terms of method, and it is retrospective research in terms of time dimension. Data collection tools are databases prepared by Tehran Stock Exchange, Stock Exchange Library, Central Bank website and Iran Statistics Center. In addition, some software programs such as Excel, Eviews (version 10) and STATA 15 were used to classify, summarize, present and analyze information. Non-linear regression analysis in the form of simultaneous equation systems and Mishkin test [24] have been used to investigate and test the hypotheses.

6 How to measure research variables

6.1 Discretionary and non-discretionary accrual

In this research, the total accruals are calculated first, then discretionary and non-discretionary accruals are calculated using the modified Jones model.

$$\mathrm{ACC_{it}} = \mathrm{E_{it}} - \mathrm{OCF_{it}}$$

$$\left(\frac{\mathrm{ACC_{it}}}{\mathrm{AT_{it-1}}}\right) = \gamma_1\left(\frac{1}{\mathrm{AT_{it-1}}}\right) + \gamma_2\left[\frac{\left(\Delta\mathrm{REV_{it}} - \Delta\mathrm{REC_{it}}\right)}{\mathrm{AT_{it-1}}}\right] + \gamma_3\left(\frac{\mathrm{PPE_{it}}}{\mathrm{AT_{it-1}}}\right) + \varepsilon_{it} \quad (1)$$

ACC_{it} :Total accruals (difference between operating earnings and cash from operations).
E_{it} : Operating earnings.
OCF_{it} :Cash from operations.
NDA_{it} : Non-discretionary accruals
DA_{it}:Discretionary accruals.
AT_{it-1} : Book value of total assets in the first period.
ΔREV_{it}: Changes in sales income between two years (t) and (t-1)
ΔREC_{it}: Changes in account receivable between two years (t) and (t-1)
PPE_{it} :Property Plant and Equipment
The above model is estimated cross-sectionally every year. The sum of the first three terms of this equation represents non-discretionary accruals, so the remaining component of the model (it) represents discretionary accruals.

6.2 Normal stock return

The normal stock return is equal to the set of earnings that accrue to the stockholder during a financial period.

$$\mathrm{R_{it}} = \frac{(\mathrm{P_1} - \mathrm{P_0}) + \mathrm{DPS} + ((\mathrm{P_1} - 1000) * \alpha) + (\mathrm{P_1} * \beta)}{\mathrm{P_0}} \quad (2)$$

6.3 Abnormal stock return

Abnormal stock return is equal to the difference between the real stock return and the market return. In this research, the market return is calculated based on the price index and the cash return of the Tehran Stock Exchange and according to the following relationship [23].

$$R_{mt} = \frac{I_{mt} - I_{mo}}{I_{mo}} \quad (3)$$

$$AR_{it} = R_{it} - R_{mt} \quad (4)$$

R_{it}: Normal stock return

P_0: Stock price at the beginning of the period.

AR_{it}: Abnormal stock return

P_1: Stock price at the end of the period.

I_{mt} :Total stock market index at the beginning of the month (t)

α: Percentage of capital increase from receivables and cash receipts.

I_{mo} :Total stock exchange index at the end of month (t).

β: Capital increase from accumulated earnings and reserves.

R_{mt} :The return of stock price index and cash return of stock exchange in month (t).: DPS :Cash dividend per share.

6.4 product market competition

In this research, we use the following criteria to measure product market competition:

Herfindahl and Hirschman Index: This index is obtained from the square root of the market share of all companies that are active in the industry and measures the level of competitiveness in different industries. If this index is high, the degree of concentration will be higher, and there will be less competition, and vice versa [23].

$$Herfindahl - Hirschman\ \ Index(HHI) = \sum_{i=1}^{n} \left(\frac{s_i}{S}\right)^2 \quad (5)$$

s_i: Firm's sale (i)

S: Total sales income of companies in the industry in which firm (i) operates.

n :the number of companies in the industry

After calculating the competition index, the median is calculated for all year-firms and the mentioned ratio of each firm is compared with the median in each year. If the index is smaller than median, it is equal to one, otherwise it is equal to zero.

7. Description of the models used to test the hypotheses

In this research, the following models are used to test the hypotheses. They are taken from the studies of [11,14].

For testing the first, second and third hypothesis, the simultaneous equations system (1) are formed:

The system of equations (1):

$$NI_{t+1} = \gamma_0 + \gamma_1 M_{t+} + \gamma_2 NDA_{t+} \gamma_3 DA_t + \gamma_4 \Delta CASH_t + \gamma_5 DIST_{E_t} + \gamma_6 DIST_{D_t} + \gamma_7 M_{t*} \Delta CASH_t^{\square} + \gamma_8 M_{t*} DIST_{D_t} + \gamma_9 M_{t*} DIST_{E_t} + \gamma_{10} Size_{t+} \gamma_{11} Lev_{t+} \gamma_{12} Beta_{t+} \vartheta_{t+1}$$

$$ARET_{t+1} = \beta[NI_{t+1} - (\gamma_0{}^* + \gamma_1{}^* M_t + \gamma_2{}^* NDA_t + \gamma_3{}^* DA_t + \gamma_4{}^* \Delta CASH + \gamma_5{}^* DIST_{E_t} + \gamma_6{}^* DIST_{D_t} + \gamma_7{}^* M_{t*} \Delta CASH_t + \gamma_8{}^* M_{t*} DIST_{D_t} + \gamma_9{}^* M_{t*} DIST_{E_t} + \gamma_{10}{}^* Size_t + \gamma_{11}{}^* Lev_t + \gamma_{12}{}^* Beta_t + \vartheta_{t+1}$$

For testing the fourth and fifth hypothesis, the simultaneous equations system (2) is formed:
The system of equations (2):

$$NI_{t+1} = \gamma_0 + \gamma_1 M_t + \gamma_2 NDA_t + \gamma_3 DA_t + \gamma_4 \Delta CASH_t + \gamma_5 DIST_{E_t} + \gamma_6 DIST_{D_t} + \gamma_7 M_{t*} NDA_t + \gamma_8 M_{t*} DA_t + \gamma_9 Size_t + \gamma_{10} Lev_t + \gamma_{11} Beta_t + \vartheta_{t+1}$$

$$ARET_{t+1} = \beta \left[NI_{t+1} - \left(\gamma_0{}^* + \gamma_1{}^* M_t + \gamma_2{}^* NDA_t + \gamma_3{}^* DA_t + \gamma_4{}^* \Delta CASH_t + \gamma_5{}^* DIST_{E_t} + \gamma_6{}^* DIST_{D_t} + \gamma_7{}^* M_{t*} NDA_t + \gamma_8{}^* M_{t*} DA_t + \gamma_9{}^* Size_t + \gamma_{10}{}^* Lev_t + \gamma_{11}{}^* Beta_t \right) \right] + \vartheta_{t+1}$$

$ARET_{t+1}$: Abnormal stock return in the next year.
NDA_t : Non-discretionary accrual.
DA_t : Discretionary accrual.
$\Delta CASH_t$: Changes in cash and short-term investments.
$DIST_{E_t}$: Net Cash Distributions to Debit holders which is equal to:
(change in long-term financial facilities - change in current maturing portion of long-term debt)(-1)/ Average assets
$DIST_{D_t}$: Net cash distributions to Equity holders which is equal to:
(net earnings - change in total liabilities - change in total assets)(-1)/ Average assets
Size: Firm's size (natural logarithm of book value of total assets)
Lev: The degree of financial leverage (the ratio of total debt to total assets)
M : Product market competition .
$Beta$: Systematic risk index, the sensitivity of the firm's stock price to fluctuations. It shows the stock market index. Beta is obtained from the ratio of the covariance (relative dispersion) between the firm's stock return and the market return to the variance of the market return.

$$B_i = \frac{cov(R_i, R_{m,})}{\sigma^2{}_m} \quad (6)$$

The method of simultaneous equations based on the Mishkin test is used for testing the market efficiency in the earnings components pricing. The reason for using simultaneous equations is that the dependent variable in one model is entered as an explanatory variable in another model. In the above equation system,

the first equation is called prediction equation and the second equation is called valuation (pricing) equation. The coefficient of earnings components in the prediction equation is called the objective persistence coefficient, and it is called the subjective persistence coefficient in the valuation (pricing)equation. If the stock price correctly reflects the persistence level of the earnings components, the valuation (pricing) equation will show the same level of persistence of the earnings components as the prediction equation shows (in other words, the objective and subjective persistence levels of the earnings components are equal). In this case, the corresponding coefficients of earnings components in both equations will be equal ($\gamma i^*=i$), [3,7].

7.1 The way of collecting data and the time period of the research

The target population in this research includes all the companies that have been accepted in Tehran Stock Exchange until the end of March 2020. The time period of this research is from 2012 to the end of 2020. The sampling of the research has also been purposeful. Thus, among all the existing companies, the companies that did not meet the following conditions were eliminated in each stage and finally all the remaining companies were selected for testing:

*The statistical sample does not include investment, insurance, leasing companies, and banks.

*Companies whose fiscal year does not end at the end of March.

*Companies whose symbols do not stop for more than three months during the financial year.

*Companies that do not have enough information to perform the test.

According to the aforementioned set of conditions, finally 111 firms in a 9-year period (including 999 year-firm) were selected as a sample for this research, which is in accordance with the table below.

Table 1: Sample Selection

Total number of firms accepted in Tehran Stock Exchange at the end of 2012	341
Number of investment firms, insurance, leasing, banks…	49
Number of firms that fiscal year end is not the end of March	50
Number of firms that were not active for more than three months	21
Number of firms that had incomplete information	110
Number of remaining firms as a sample	111

8 Research findings

8.1 Descriptive statistics of research variables

The status of the descriptive analysis related to the research variables is shown in Table 2.

Table 2: Descriptive statistics of research variables

Variable	Symbol	Mean	Median	Min	Max	Std. Dev.
Product market competition	M	0/499	0	0	1	0/500
Net profit	NI	0/117	0/092	-0/436	1/005	0/159
Abnormal stock return	ARET	-0/077	-0/247	-1/850	6/980	0/850
Discretionary accruals	DA	0/000	-0/002	-1/994	0/664	0/163
Non-discretionary accruals	NDA	0/086	0/076	-0/335	1/094	0/104
Changes in cash and short-term investments	CASH	0/012	0/002	-0/538	1/755	0/096
Net cash Distributions to Equity holders	DISTE	0/049	0/041	-1/781	0/669	0/152
Net cash Distributions to Debit holders	DISTD	-0/031	-0/015	-0/626	1/446	0/121
Firm's Size	SIZE	14/173	13/923	10/952	19/350	1/495
Financial Leverage	LEV	0/631	0/625	0/084	3/060	0/265
Systematic risk index	BETA	0/056	0/042	-0/258	0/361	0/068

Source: Researcher's Findings

As seen in Table 2, the average product market competition is 0.499, which shows that the level of product market competition in the studied companies is almost high [21]. The average net cash distributed to shareholders (0.049) is greater than the average net cash distributed to creditors (-0.031); Which shows that in most of the companies, financing is through equity, and the companies have prioritized payment to shareholders [24,25]. The average of discretionary accrual (0.000) is smaller than the average of non-discretionary accrual (0.086); This indicates that accruals that can be a tool for earnings management (discretionary) are less than accruals that management cannot control on them (non-discretionary) [14]. The average change in cash and short-term investment is positive (0.012), which indicates that the balance of this account has increased compared to the first period [11]. The average abnormal return is negative (-0.077) and this indicates that the sampled companies have achieved a return lower than the average return of the market [11].

8.2 Inferential statistics of research hypotheses

The purpose of this research is to investigate the reaction of the capital market in evaluating the effect of product market competition on the ability of the earnings cash and accrual components of in predicting the next year's earnings. For this purpose, according to the proposed theoretical foundations, five hypotheses have been formulated, which will be examined and tested in the following.

8.2.1 Test results of the first, second and third hypotheses

For testing the first to third hypotheses of the research, the simultaneous equations system (1) has been formed, which is estimated using the simultaneous equations method based on the Mishkin test. The test results of these three hypotheses are given in Table 3.

Table 3: The results of the first, second and third hypothesis test

A - Forecasting equation:

$$NI_{t+1} = \gamma_0 + \gamma_1 M_t + \gamma_2 NDA_t + \gamma_3 DA_t + \gamma_4 \Delta CASH_t + \gamma_5 DIST_{E_t} + \gamma_6 DIST_{D_t} + \gamma_7 M_{t*} \Delta CASH_t + \gamma_8 M_{t*} DIST_{D_t} + \gamma_9 M_{t*} DIST_{E_t} + \gamma_{10} Size_t + \gamma_{11} Lev_t + \gamma_{12} Beta_t + \vartheta_{t+1}$$

Variable	Symbol	Coefficient	Z	*p-value*
Intercept	C	0/000	-	-
Product market competition	M	-0/017	-1/910	0/056
Non-discretionary accruals	NDA	0/548	11/624	0/000
Discretionary accruals	DA	0/614	16/762	0/000
Changes in cash and short-term investments	DCASH	0/773	9/969	0/000
Net cash distributions to equity holders	DISTE	0/762	18/701	0/000
Net cash distributions to debt holders	DISTD	0/652	12/244	0/000
Product market competition in changes in cash and short-term investment	M*DCASH	-0/013	-0/151	0/881
Product market competition in net cash distributions to equity holders	M*DISTE	-0/081	-1/518	0/129
Product market competition in net cash distributions to debt holders	M*DISTD	0/008	-0/126	0/900
Firm Size	SIZE	0/003	0/892	0/372
Financial Leverage	LEVE	-0/060	-3/418	0/000
Systematic risk index	BETA	-0/081	-1/302	0/193
The coefficient of determination (R^2)				0/516
B -Pricing equation $ARET_{t+1} = \beta[NI_{t+1} - (\gamma_0^* + \gamma_1^* M_t + \gamma_2^* NDA_t + \gamma_3^* DA_t + \gamma_4^* \Delta CASH + \gamma_5^* DIST_{E_t} + \gamma_6^* DIST$ $\gamma_7^* M_{t*} \Delta CASH_t + \gamma_8^* M_{t*} DIST_{D_t} + \gamma_9^* M_{t*} DIST_{E_t} + \gamma_{10}^* Size_t + \gamma_{11}^* Lev_t + \gamma_{12}^* Beta_t)] + \vartheta_{t+1}$				
one-year-ahead earnings	NI_{t+1}	1/305	5/303	0/000
Intercept	C	0/000	-	-
Product market competition Index	M	0/048	0/920	0/358
Non-discretionary accruals	NDA	1/520	4/719	0/000
discretionary accruals	DA	0/931	4/341	0/000
Changes in cash and short-term investments	DCASH	1/198	2/703	0/007
Net cash distributions to equity holders	DISTE	1/008	4/316	0/000
Net cash distributions to debt holders	DISTD	0/632	2/110	0/035
Product market competition in changes in cash and short-term investment	M*DCASH	-0/599	-1/161	0/246

Product market competition in net cash distribution to equity holders	M*DISTE	-0/004	-0/013	0/990
Product market competition in net cash distributions to debt holders	M*DISTD	-0/644	1/657	0/098
Firm Size	SIZE	0/018	1/059	0/290
Financial Leverage	LEV	-0/181	-1/809	0/071
Systematic risk index	BETA	0/720	1/899	0/058
The coefficient of determination (R^2)	0/078			
C- Mishkin Test *The first hypothesis $\gamma 7^* = \gamma 7$ 1/250 (0/264) *The second hypothesis $\gamma 8^* = \gamma 8$ 0.640 (0.800) *The third hypothesis $\gamma 9^* = \gamma 9$ 2.600 (0.107)				

Source: Researcher's findings

The results presented in Table 4 show that in the prediction equation, the current period earnings can explain about 52% of the one-year-ahead earnings changes. The estimation results of the valuation equation also indicate that the independent variables explain about 14% of the one-year-ahead earnings changes. The results of Mishkin test are as follows: The non-significance of Mishkin statistics (1.250, 0.064, 2.600) shows that there is no significant difference in the coefficients of the interactive variable of the product market competition in changes in cash and short-term investment, in net cash distributed to Shareholders and in the net cash distributed to creditors of the prediction and valuation (pricing) equations ($\gamma 7^* = \gamma 7$, $\gamma 8^* = \gamma 8$ and $\gamma 9^* = \gamma 9$). In other words, the capital market is efficient in evaluating the impact of product market competition on the ability of changes in cash and short-term investments, net cash distributed to shareholders and net cash distributed to creditors in predicting the next year's earnings. Therefore, the first, second and third hypotheses are not rejected.

8.2.2 The results of the fourth and fifth hypotheses test

For testing the fourth and fifth hypotheses of the research, the simultaneous equations system (2) has been formed, which is estimated using the simultaneous equations method based on the Mishkin test. The test results of these two hypotheses are given in Table 4.

Table 4: The results of the fourth and fifth hypothesis test

A - Forecasting equation:

$$NI_{t+1} = \gamma_0 + \gamma_1 M_t + \gamma_2 NDA_t + \gamma_3 DA_t + \gamma_4 \Delta CASH_t + \gamma_5 DIST_{E_t} + \gamma_6 DIST_{D_t} + \gamma_7 M_{t*} NDA_t + \gamma_8 M_{t*} DA_t + \gamma_9 Size_t + \gamma_{10} Lev_t + \gamma_{11} Beta_t + \vartheta_{t+1}$$

Variable	Symbol	Coefficient	*Z*	*p-value*
Intercept	C	0/000	-	-
Product market competition	M	-0/027	-2/602	0/009
Non-discretionary accruals	NDA	0/518	8/284	0/000
Discretionary accruals	DA	0/653	13/813	0/000

Changes in cash and short-term investments	DCASH	0/758	15/473	0/000
Net cash distributions to equity holders	DISTE	0/735	21/743	0/000
Net cash distributions to debt holders	DISTD	0/655	14/365	0/000
Product market competition in non-discretionary accruals	M*NDA	0/082	1/113	0/266
Product market competition in discretionary accruals	M*DA	-0/064	-1/305	0/192
Firm Size	SIZE	0/003	0/881	0/378
Financial Leverage	LEVE	-0/060	-3/419	0/000
Systematic risk index	BETA	-0/075	-1/206	0/228
The coefficient of determination (R^2)				0/516
B-Pricing equation: $ARET_{t+1} = \beta \left[NI_{t+1} - \left(\gamma_0^* + \gamma_1^* M_t + \gamma_2^* NDA_t + \gamma_3^* DA_t + \gamma_4^* \Delta CASH_t + \gamma_5^* DIST_{E_t} + \gamma_6^* DIST_{D_t} + \gamma_7^* M_t * NDA_t + \gamma_8^* M_t * DA_t + \gamma_9^* Size_t + \gamma_{10}^* Lev_t + \gamma_{11}^* Beta_t \right) \right] + \vartheta_{t+1}$				
one-year-ahead earnings	NI_{t+1}	1/295	5/251	0/000
Intercept	C	0/000	-	-
Product market competition	M	0/010	0/173	0/862
Non-discretionary accruals	NDA	1/430	3/617	0/000
Discretionary accruals	DA	0/818	3/028	0/003
Changes in cash and short-term investments	DCASH	0/785	2/824	0/005
Net cash distributions to equity holders	DISTE	1/058	5/251	0/000
Net cash distributions to debt holders	DISTD	0/914	3/470	0/000
Product market competition in non-discretionary accruals	M*NDA	0/199	0/473	0/636
Product market competition in discretionary accruals	M*DA	0/201	0/708	0/479
Firm Size	SIZE	0/019	1/101	0/271
Financial Leverage	LEV	-0/170	-1/692	0/091
Systematic risk index	BETA	0/702	1/845	0/065
The coefficient of determination (R^2)		0/074		
C- Mishkin Test *The forth hypothesis ($\gamma=7^* \gamma7$) (.785)0.074 *The fifth hypothesis ($\gamma8^*= \gamma8$) (0.357)0.847				

*Source: Researcher's findings

The results presented in Table 4 show that in the prediction equation, the current period earnings can explain about 52% of the one-year-ahead earnings changes. The estimation results of the valuation equation also indicate that the independent variables explain about 7% of the one-year-ahead earnings changes. The results of Mishkin test are as follows:

The non-significance of Mishkin statistics (0.074 and 0.847) shows that there is no significant difference in the coefficient of the interaction variable of the product market competition in non-discretionary and discretionary accrual of the prediction and valuation (pricing) equations ($\gamma=7^* \gamma 7$) and ($\gamma 8^*= \gamma 8$). In other words, the capital market is efficient in evaluating the level of the product market competition on the ability of non-discretionary and discretionary accruals in predicting the next year's earnings; Therefore, the fourth and fifth hypotheses are not rejected.

9 Conclusion

The accrual anomaly, which refers to the negative relationship between accruals and future stock returns, is recognized as one of the anomalies in the capital market. Sloan [4] conducted a study to investigate whether stock prices fully reflect the information related to cash and accrual components of profit. The findings of this research indicated that the continuity of current earnings behavior in predicting one-year-ahead earnings is somewhat dependent on the significance of earnings cash and accrual components [7]. An important question arises as to whether stock returns reflect investors' anticipation of the lower persistence of accrual components and higher persistence of cash components, and their relationship with earnings persistence. If investors understand this concept, there should be no relationship between accruals and future stock returns. However, if investors fail to predict the lower persistence of accrual components compared to cash components due to their inexperience, a negative relationship between accrual components and stock returns should emerge. This suggests that the market is inefficient in reacting to the persistence of various earnings components, thus rendering stock returns incapable of reflecting the persistence of these components. It is assumed in these studies that the intensity and speed of the stock market's reaction to different information vary. In some cases, investors' reactions to information are irrational, leading to anomalies such as excessive increases or decreases in prices and, consequently, abnormal returns. To evaluate the efficiency of the capital market in reflecting a specific set of information in stock prices, Mishkin introduced a new method based on estimating a simultaneous equations system [3].

In this research, we employed the simultaneous equations system and Mishkin's test to investigate how accounting earnings components are reflected in stock prices and how the rational pricing of these components occurs. The results of testing the five hypotheses of this study demonstrate that the capital market efficiently evaluates the impact of product market competition on the predictive ability of earnings cash and accrual components (changes in cash balance and investments, net cash distributed to shareholders, net cash distributed to creditors, discretionary and non-discretionary accruals) for next year's earnings. In other words, the effect of product market competition on the pricing of earnings cash and accrual components is rational, and these components are free from anomalies. The test results of these hypotheses align with the findings of [23,26].

The following proposals and limitations emerge from this research:

- Encourage actual and potential investors in the capital market to consider the persistence of earnings cash and accrual components and factors influencing it, including product market competition.
- Ensure the complete and timely reflection of information by the Stock Exchange Organization.

- Encourage managers to implement appropriate policies that create an environment conducive to increasing earnings quality and improving firm efficiency.
- Explore alternative models for measuring product market competition.

In conclusion, this research sheds light on the rational pricing of accounting earnings components in the stock market and highlights the efficient evaluation of these components in the presence of product market competition. The findings contribute to the existing body of research, provide valuable insights for investors, and stimulate further investigations in this field.

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