(RESEARCH ARTICLE)

Market reactions to capital increases: Insights from asset revaluation in pharmaceutical companies on the stock exchange

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Abstract

This study investigates the impact of capital increases on market reactions, focusing specifically on pharmaceutical companies listed on the Tehran Stock Exchange (TSE). We analyze stock returns over a six-month window: three months preceding and three months following the announcement of capital increases. Employing the market model, we assess investor responses and the revaluation of assets associated with these capital injections. Our comprehensive sample includes 200 pharmaceutical firms selected through systematic random sampling, covering the period from 2017 to 2023. The results reveal that asset revaluation significantly enhances investor reactions compared to capital increases stemming from cash contributions and retained earnings. Furthermore, our findings underscore the critical role of information transparency from company management in shaping market responses. This research contributes to a deeper understanding of investor behavior and informs management strategies related to capital restructuring in the dynamic pharmaceutical sector.

Keywords: Market Reaction; Capital Increase; Pharmaceutical Companies; Asset Revaluation; Retained Earnings.

1. Introduction

Capital plays a pivotal role in the realm of commerce, particularly for trading entities and more so for publicly traded companies. As these organizations develop and compete in an increasingly dynamic market, the significance of capital in trade relations continues to grow (Golarzi and Khorasani, 2023). The stock exchange, serving as the regulatory authority for the capital market, mandates that issuers provide essential details in their capital increase prospectus. This includes the percentage of the increase, the rationale and objectives behind it, the sources of financing, and the intended uses of the funds. Such disclosures are crucial within the Codal system, as they significantly impact the decision-making processes of market participants regarding investment activities, including acquisitions, disposals, and corporate financing involvement. As a result, these factors play a vital role in shaping market reactions and influencing return rates in the periods surrounding general meetings (Farzad et al., 2024; Mujib and Candraningrat, 2021). It is important to note, however, that growth is not universally advantageous for companies.

Adnan et al. (2020) provide compelling evidence that a rapid rate of asset growth correlates with reduced future stock returns. While growth can undoubtedly yield advantages—enabling firms to enhance operational efficiency, boost profitability through economies of scale, expand market power, and achieve various synergies to ultimately increase

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shareholder value—there are critical caveats to consider. When management embarks on aggressive investment strategies that inadvertently create inefficiencies, introduce conflicts, and escalate costs, the anticipated benefits of growth can quickly turn negative, adversely affecting overall company performance and diminishing shareholder wealth (Lin et al., 2019). This nuanced perspective underscores the importance of a balanced approach to growth, integrating strategic foresight with operational prudence.

Investment is defined as the deployment of income aimed at expanding a company's asset portfolio, which may include the acquisition of other firms and expenditures on research and development (R&D). Growth can be supported through either internal cash reserves or external funding sources. Numerous theories inform the choice of financing methods, including the trade-off theory, pecking order theory, signaling theory, and market timing theory (Badru et al., 2016). Roshdieh et al. (2024) examined the impact of fiscal decentralization on foreign direct investment in developing countries from 1990 to 2022, finding that a 1% increase in fiscal decentralization is associated with a 0.86% rise in foreign direct investment, suggesting that enhancing fiscal decentralization can stimulate FDI in these nations.

One critical aspect that merits attention is the function of capital within corporations, particularly its significance in the context of company dissolution, where capital is utilized to settle outstanding debts (Sari, 2021). This positions a company's capital as a crucial form of collateral for creditors. Consequently, banks and lending institutions are more likely to extend loans to businesses with robust capital support, as these financial entities assume the role of creditors upon disbursing funds to the company (Khorsandi and Bayat, 2022). This dynamic underscores the vital interplay between a company's capital structure and its access to financing, highlighting the importance of sound capital management in fostering financial stability and growth.

When a company seeks to finance its growth through the issuance of securities, how does the market respond? Do investors draw a distinction between the growth potential of the company and its effects on shareholder wealth? This study aims to investigate market reactions to capital increases, with a specific focus on pharmaceutical companies listed on the stock exchange. By examining these dynamics, this paper enriches the existing literature by offering valuable insights into how the market responds to financing proposals from companies at various stages of economies of scale. Utilizing capital increases has long been a core strategy for companies in need of financing. Pharmaceutical firms, particularly those publicly traded, exemplify this trend as they have persistently sought necessary funding through diverse avenues during their growth phases. The pharmaceutical sector stands out as one of the most vital industries within the stock market, given its crucial link to public health and its substantial economic impact. Consequently, this research also seeks to address the following secondary objectives:

- To analyze the market's reaction to capital increases resulting from asset revaluation.
- To compare investor responses to capital increases from asset revaluation versus those arising from cash contributions.
- To assess the market's response to capital increases stemming from asset revaluation as opposed to those derived from retained earnings.

2. Theoretical Foundations

2.1. Capital Increase

Capital structure theories provide insights into how markets respond to corporate capital increase events. The trade-off theory posits that an optimal leverage level is attained when the marginal benefits of tax shields precisely balance the marginal costs associated with financial distress. Consequently, market reactions to debt and equity offerings are influenced by how effectively firms align their capital structures with this optimal level. As a result, investor responses to capital increase events can differ significantly across industries and are shaped by various factors, including existing leverage levels, company size, portfolio diversification, asset tangibility, profitability, growth potential, and effective tax rates—all of which are critical in determining the optimal leverage ratio. Typically, firms operating with moderate leverage (i.e., below optimal levels) can expect favorable market reactions to debt issuances, while equity offerings often elicit negative responses (Amaroh, 2020). This behavior can be attributed to information asymmetry between managers and investors, which renders the use of internal funds and asset sales as the most cost-effective options, whereas debt financing incurs relatively higher costs, and equity financing stands as the most expensive alternative. Additionally, the market timing theory suggests that corporate financing decisions are strategically influenced by prevailing market conditions and the firm's performance: managers tend to issue equity during economic upturns and periods of overvaluation, while opting for debt financing when interest rates are more favorable (Soltani and Ebrahimnejad, 2021). This framework not only enhances our understanding of capital structure dynamics but also emphasizes the critical role

of contextual factors in shaping market perceptions, offering valuable implications for both academic research and practical applications in corporate finance. Moreover, transformational leadership fosters a culture of knowledge sharing within organizations, enabling better communication and collaboration among managers, which can mitigate information asymmetry and lead to more effective decisions (Khorsandi, Mohsenibeigzadeh, Tashakkori et al. 2024; Azimi Asmaroud, 2022).

Capital market participants are acutely aware that the announcement of an extraordinary general meeting aimed at approving a capital increase can have a substantial influence on stock prices and the associated returns for investors. Notably, one key rationale behind capital increases through asset revaluation is the reorganization of corporate capital. The decisions made regarding capital structure are pivotal as they directly impact shareholders' risk and return profiles, and various capital structure strategies can sway the market value of stocks. Stock returns play a critical role in assessing company performance and are vital indicators for decision-making in the stock market. Similarly, the application of artificial intelligence in both financial and educational contexts enhances decision-making by providing more precise and data-driven insights, such as improving capital structure strategies and enhancing overall strategic planning (Sadeghi and Niu, 2024; Darvishinia, 2023). Investors frequently rely on these returns for financial analysis and forecasting (Tashakkori et al., 2024). Unlike other methods of capital increase, such as issuing new shares, capital augmentation through asset revaluation does not result in cash inflow or liquidity outflow for the company. Instead, this approach facilitates improved liquidity without imposing a financial burden on shareholders. It is intrinsically tied to the company's financial status and, through the enhanced presentation of financial statements, attracts the attention of traders towards firms with valuable assets. This method allows companies to elevate their capital while also capitalizing on tax benefits associated with the increase. Furthermore, a significant consequence of this strategy is the potential to rescue firms that may be teetering on the brink of bankruptcy due to a decline in their capital below critical thresholds (Zeng et al., 2021). Incorporating lean, agile, resilient, and green practices into capital restructuring strategies further optimizes resource utilization, enhances adaptability to market changes, strengthens organizational resilience, and supports sustainable development goals, thereby improving overall financial and operational performance (Talebzadeh et al., 2024). By examining these dynamics, this paper seeks to provide invaluable insights into the strategic implications of capital restructuring through asset revaluation, offering a comprehensive understanding that is imperative for practitioners and academics alike. In recent years, leveraging capital increases through the revaluation of fixed assets has emerged as a compelling strategy for companies, publicly traded entities, and government organizations. This innovative approach provides valuable insights into the financial statements of companies facing distress or even bankruptcy. By adopting this method, organizations can significantly enhance the transparency of their financial disclosures, empowering stakeholders to make more informed and precise decisions (Nowroozi et al., 2021). Additionally, emerging technologies such as blockchain for secure financial transactions (Anbari et al., 2024) and virtual/augmented reality for enhanced data visualization (Zandi and Luhan, 2023; Zandi and Luhan, 2024) are revolutionizing how companies present and analyze their financial information, further increasing transparency and stakeholder engagement.

2.2. Capital Increase through Cash Contributions and Shareholder Rights

A company with existing reserves or accumulated profits has the option to increase its capital, as noted by Pinegar and Ravichandran (2010). However, in scenarios where the company lacks such reserves or prefers not to utilize them, it can still secure capital through the cash contributions of its shareholders. In this context, current shareholders are invited to inject new funds to enhance the company's equity, thereby safeguarding their preemptive rights. This capital increase via cash contributions requires approval from the extraordinary general assembly, highlighting the collective decision-making of the shareholders. To facilitate this process, the company first grants its shareholders the exclusive right to participate in the capital increase, thereby creating documents referred to as "shareholder preemptive rights" (Delshad & Sadeqi Sharif, 2018). During the designated transaction period for these documents, shareholders have two primary options (Nowroozi et al., 2021):

Cash Payment: Shareholders may choose to directly pay a specified amount to the company for each share. This payment could either match the nominal value of each share, set at 1,000 Rials in Iran, or it may exceed this value based on the prevailing market price at the time of the transaction.

Sale of Preemptive Rights: Alternatively, shareholders have the option to sell their preemptive rights documents within a designated timeframe. Should shareholders decide not to exercise their rights for any reason, they can transfer these documents to other investors. This transaction can be facilitated through brokerage firms operating in both stock exchange and over-the-counter markets. It is essential for the buyer of these preemptive rights to not only compensate the seller for the rights but also to deposit the required amount into the company's account.

By providing these mechanisms, companies can effectively engage their shareholders in capital increases while ensuring a transparent and efficient process for both existing and prospective investors.

2.3. Capital Increase through Reserves or Retained Earnings (Stock Dividend)

A pivotal method for financing a company through internal means is the strategic utilization of retained earnings (Mansley et al., 2023). This practice involves companies setting aside a portion of their annual profits into a retained earnings account or reserves. When deemed appropriate, these accumulated funds are then transferred to the capital account, allowing the company to issue new shares and effectively enhance its capital base. These newly issued shares are allocated to shareholders in accordance with their existing ownership proportions. Essentially, this approach leverages undistributed profits from previous fiscal years to support investment needs and operational costs, without necessitating any additional cash inflows for the company (Boeh and Dunbar, 2021).

2.4. Capital Increase through Revaluation of Assets

In light of the pronounced mismatch between the historical cost of fixed assets and long-term investments and their current market values, revaluation of assets emerges as an effective strategy to mitigate the inadequacies and obsolescence of financial information. The value determined during the revaluation process is termed the revaluation surplus. This approach entails recognizing any increase in the book value of tangible fixed assets as unrealized non-operating income or capital increases stemming from revaluation, which is subsequently recorded as revaluation surplus. This surplus not only enhances shareholders' equity on the balance sheet but is also reflected in the income statement, thereby providing a clearer picture of the company's financial health and value (Song, 2021).

2.5. Different Opinions on the Impact of Capital Increase on Stock Price and Return

Positive Impact Theory: Proponents of the positive impact theory assert that capital increases lead to a reduction in stock prices, which allows small investors to afford shares. Consequently, the demand for shares rises, resulting in an increase in stock prices (Hassanein et al., 2023).

Negative Impact Theory: Advocates of the negative impact theory argue that factors leading to a decline in stock prices following a capital increase include:

- The high cost of financing through the issuance of common stock compared to other methods.
- The issuance of new shares increases the total number of shares outstanding, leading to an excessive supply of shares.
- The asymmetric information hypothesis states that the announcement of new share issuance is perceived as bad news. This is because it is expected that company managers, having access to confidential information, will only issue new shares when they estimate the firm's value to be above its intrinsic value.

Neutral Impact Theory: According to this theory, capital increases and the issuance of new shares have no effect on the return and wealth of shareholders. This is because the theoretical price of a share adjusts in accordance with the amount of new shares issued.

3. Literature Review

The literature presents a comprehensive examination of various factors affecting market reactions, particularly focusing on Iranian firms listed on the Tehran Stock Exchange (TSE). Soltani and Ebrahimnejad (2021) explored the impact of asset revaluation on firms' access to financial facilities, revealing that while asset revaluation may improve financial ratios, it often leads to a theoretical decline in share prices due to the issuance of bonus shares. Their regression analysis using panel data from 2011 to 2019 concluded that asset revaluations do not significantly enhance access to financial facilities, thus challenging the hypothesis linking asset revaluation with improved market reactions. Sabzalipour et al. (2024) investigated long-term growth expectations and their relationship with market reactions to cost stickiness. Analyzing data from 155 companies between 2015 and 2021, they found that firms with high growth expectations exhibited greater asymmetric cost stickiness and that the capital market reacted negatively to unexpected cost stickiness. Notably, the negative market reaction was less pronounced for companies with higher long-term growth expectations. Nowroozi et al. (2021) focused on the seasonal earnings behavior of firms and its effect on market reactions. Their study, which included 240 companies from 2007 to 2017, confirmed an inverse relationship between unexpected earnings and first earnings forecasts. Additionally, a direct correlation was established between earnings expectations and investor behavior, indicating that stable earnings expectations could lead to increased forecasting errors and affect stock returns. Delshad and Sadeqi Sharif (2018) examined managerial myopia's effects on market

reactions, analyzing 170 companies from 2007 to 2016. The study found that institutional shareholder presence did not significantly impact the relationship between abnormal returns and managerial short-termism, highlighting that the capital market showed no significant reaction to managerial short-termism. Heidari et al. (2018) assessed the impact of exchange rates on pharmaceutical stock returns using a Markov switching approach on monthly data from 2005 to 2015. Their findings indicated varied effects of exchange rates across different market regimes, with negative impacts in one regime and positive ones in others. They further determined that inflation's influence on stock returns also varied by regime. Overall, these studies emphasize the complex interplay of financial metrics, market expectations, and economic factors in shaping market behaviors and reactions among firms on the TSE.

4. Research Methodology

This study is categorized as applied research, given its objective of addressing practical concerns. Methodologically, it employs a descriptive-correlational research design to explore the relationships outlined in the research hypotheses. Drawing conclusions from existing data aligns this study with positivist theoretical frameworks. The statistical data collected are systematically summarized and categorized using descriptive statistical measures. The temporal scope of the research extends from 2017 to 2023, focusing on pharmaceutical companies listed on the TSE. Data were rigorously extracted from the financial statements of these companies, as well as their official websites.

After identifying the sample companies and gathering the necessary information to evaluate the research hypotheses, data analysis was performed using Microsoft Excel, alongside specialized software packages SPSS 25 and EViews 10. The research hypotheses investigated in this study are as follows:

- H1: The market reaction to capital increases resulting from asset revaluation is positive.
- H2: The market reaction to capital increases from asset revaluation exceeds the reaction to capital increases from cash contributions.
- H3: The market reaction to capital increases from asset revaluation surpasses the reaction to capital increases derived from retained earnings.

5. Findings

This study employs regression analysis to explore the relationships between key variables. We began by gathering data on companies that have executed capital increases through the revaluation of their fixed assets. Following this, we conducted an analysis of the market's response to these capital increases stemming from asset revaluation. To test our first hypothesis, we specifically employed relationship (1) in our analysis.

$$CAR_{i,t} = \beta_0 + \beta_1 REV_{i,t} + \beta_2 LEV_{i,t} + \beta_3 ROA_{i,t} + \beta_4 FAI_{i,t} + \beta_5 INST_{i,t} + \beta_6 ABACC_{i,t} + \beta_7 LIQ_{i,t} + \beta_8 MTB_{i,t} \qquad (1)$$
$$+ \varepsilon_{i,t}$$

Table 1 Definitions of Research Variables

Dependent Variable	$CAR_{i,t}$	The dependent variable representing the cumulative abnormal return of company (i) during period (t)
Independent Variable	$REV_{i,t}$	The independent variable representing the revaluation of fixed assets of company (i) during period (t);
Control Variable	$LEV_{i,t}$	The control variable representing the financial leverage of company (i) during period (t);
Control Variable	$ROA_{i,t}$	The control variable representing the rate of return on assets of company (i) during period (t);
Control Variable	$FAI_{i,t}$	The control variable representing the fixed assets intensity of company (i) during period (t);
Control Variable	$INST_{i,t}$	The control variable representing the amount of ownership by institutional shareholders of company (i) during period (t);
Control Variable	$ABACC_{i,t}$	The control variable representing the quality of profits of company (i) during period (t);

Control Variable	$LIQ_{i,t}$	The control variable representing the liquidity of company (i) during period (t);
Control Variable	$MTB_{i,t}$	The control variable representing the market value to book value ratio of shareholders' equity of company (i) during period (t);

To investigate the second hypothesis of this study, we have established a sample comprising two distinct groups of companies:

- Companies that have augmented their capital through asset revaluation.
- Companies that have enhanced their capital via cash contributions.

For the first group, we analyzed the cumulative abnormal return (CAR) for each share during the three-month period preceding the announcement of the capital increase through asset revaluation and extending to three months following the announcement. Similarly, for the second group, we assessed the CAR during the corresponding periods related to the announcement of capital increases through cash contributions. To compare the market reactions between these two groups, we applied an independent samples t-test. The same methodology was employed to assess our third hypothesis, focusing on companies that increased their capital through retained earnings. Moreover, we present descriptive statistics for the model variables, detailing individual parameters such as maximum, minimum, mean, and median values, along with measures of dispersion like standard deviation. Among these, the mean serves as the most pivotal central indicator, representing the equilibrium point within the data distribution and providing an effective summary of the central tendency observed in our findings.

Table 2 Descriptive Statistics of Research Variables

Variable	Symbol	Companies that have increased capital through the revaluation of assets					Companies that have made no capital increases				
		Mean	Median	Max	Min	SD	Mean	Median	Max	Min	SD
Abnormal Return	CAR	0.162	0.163	0.621	-0.121	0.188	-0.014	-0.005	0.058	-0.082	0.037
Revaluation	REV	1	1	1	1	0	0	0	0	0	0
Financial Leverage	LEV	0.653	0.615	0.952	0.344	0.194	0.636	0.606	0.879	0.369	0.147
Rate of Return on Assets	ROA	-0.017	-0.002	0.066	-0.103	0.043	0.115	0.07	0.387	-0.093	0.133
Fixed Assets Intensity	FAI	0.411	0.406	0.793	0.008	0.235	0.367	0.293	0.585	0.024	0.160
Institutional Ownership	INST	0.029	0.027	0.814	0.002	0.229	0.033	0.033	0.062	0.011	0.174
Absolute Value of Discretionary Accruals	ABACC	0.684	0.696	0.851	0.208	0.141	0.732	0.808	0.912	0.353	0.166
Liquidity	LIQ	0.841	0.704	1.393	0.210	0.335	0.624	0.636	0.982	0.137	0.239
Market-to-Book Ratio of Shareholders	MTB	1.883	1.871	3.577	0.552	0.799	3.456	2.819	6.472	1.631	1.544

As indicated in Table 2, the analysis reveals insightful findings regarding abnormal returns—our primary dependent variable—among companies that have enhanced their capital through asset revaluation. Specifically, this group experiences a remarkable maximum abnormal return of 0.621 and a minimum value of -0.121. This trend suggests that as the abnormal return approaches its peak value of 0.621, there is a corresponding increase in stock performance. Moreover, the average and median abnormal stock returns for this category are notably 0.162 and 0.163, respectively. In contrast, companies that have not pursued capital increases show significantly lower abnormal returns, with a maximum of 0.058 and a minimum of -0.082. The mean and median abnormal stock returns for these firms stand at -0.014 and -0.005, respectively, highlighting a stark difference in performance when compared to their revaluing counterparts. Additionally, in our research, the revaluation variable serves as a key independent factor, demonstrating maximum and minimum values of 1 and 0, respectively. Further details on additional variables are also presented in Table 2, providing a comprehensive overview of the data under consideration.

Table 3 Pearson Correlation Coefficients Matrix

Variable Type	REV	LEV	ROA	FAI	INST	ABACC	LIQ	MTB
REV	1							
LEV	-0.150	1						
ROA	-0.436	-0.262	1					
FAI	0.388	0.506	-0.230	1				
INST	-0.103	0.203	0.041	-0.255	1			
ABACC	0.139	-0.045	-0.207	0.273	-0.075	1		
LIQ	0.057	-0.146	0.276	-0.493	0.069	-0.146	1	
MTB	-0.344	0.004	0.170	-0.029	-0.083	-0.111	-0.015	1

Based on the findings presented in Table 3, it can be concluded that the correlation among the independent variables is neither significantly strong nor excessively weak, with all correlation coefficients falling below ±0.7. This indicates the absence of correlation among the independent variables included in our analysis. Furthermore, it is crucial to recognize that utilizing non-stationary data can lead to misleading conclusions. Specifically, even when there is no underlying logical relationship between the independent and dependent variables, a high coefficient of determination may appear, potentially resulting in erroneous inferences regarding the connections among these variables. Consequently, non-stationary data can give rise to spurious regressions. In our study, we tested for stationarity with the null hypothesis suggesting the presence of a unit root, while the alternative hypothesis indicates that at least one variable is stationary. The results of our stationarity tests are summarized in Table 4.

Table 4 Results from the Unit Root Test with Trend and Intercept

Variable	Trend	Intercept	Number of Lags	ADF Statistic	MacKinnon's Critical Values			P-Value
					1%	5%	10%	
CAR	-	C	0	-9.989	-4.067	-3.462	-3.157	0.000
LEV	-	C	0	-7.775	-4.067	-3.462	-3.157	0.000
ROA	-	C	0	-7.291	-4.067	-3.462	-3.157	0.000
FAI	-	C	0	-7.151	-4.067	-3.462	-3.157	0.000
INST	-	C	0	-8.545	-4.067	-3.462	-3.157	0.000
ABACC	-	C	0	-8.163	-4.089	-3.473	-3.163	0.000
LIQ	-	C	0	-8.029	-4.067	-3.462	-3.157	0.000
MTB	-	C	0	-8.947	-4.078	-3.468	-3.161	0.000

The analysis of the results reveals that the absolute values of the ADF statistic for all examined variables exceed the corresponding absolute values of McKinnon's critical values. This finding strongly suggests the absence of a unit root, confirming the stationarity of the variables under consideration.

5.1. Results of the Chow Test (Comparison of Pooled Data Method and Fixed Effects Method)

The results obtained from the Chow test are presented in Table 5.

Table 5 Results of the Chow Test

Test	Hypothesis	F Statistic	P-Value	Interpretation	Test Method
F Limer	First Hypothesis	1.012	0.370	Accept H0	Pooled

The findings presented in Table 5 suggest that the pooled data method demonstrates a higher level of statistical significance compared to the fixed effects method, highlighting its superiority in this context.

5.2. Testing the First Hypothesis of the Research

The first hypothesis of the research states that the market reaction to capital increases resulting from asset revaluation is positive. The results of testing the first hypothesis are presented in Table 6.

Table 6 Results of the Hypothesis Testing of the First Research Hypothesis

Variable	Symbol	Coefficient	Standard Error	t-Statistic	*P-Value*
Revaluation	REV	0.132	0.019	6.984	0.0000
Financial Leverage	LEV	-0.148	0.060	-2.454	0.0172
Rate of Return on Assets	ROA	-0.067	0.043	-1.566	0.1228
Fixed Assets Intensity	FAI	-0.051	0.053	-0.956	0.3433
Institutional Ownership	INST	-0.034	0.017	-2.024	0.0477
Absolute Value of Discretionary Accruals	ABACC	0.082	0.027	2.996	0.0040
Liquidity	LIQ	-0.069	0.039	-1.759	0.0840
Market-to-Book Ratio of Shareholders	MTB	0.010	0.004	2.534	0.0140
Intercept	C	0.142	0.073	1.957	1.957
Coefficient of Determination (R^2)	0.563		F-Statistic		9.170
Adjusted R^2	0.501		Significance of F-Statistic		0.0000
Standard Error of the Model	0.137		Durbin-Watson Statistic		2.263

The first hypothesis of this research asserts that the market reacts positively to capital increases derived from asset revaluation. Our findings reveal a robust independent coefficient (REV) of 0.132, with a significance level below 0.05, indicating a statistically significant positive correlation between market reactions and capital increases originating from asset revaluation. Additionally, the model exhibits a coefficient of determination of 0.563, signifying that 56.3% of the variation in the dependent variable can be accounted for by the independent variables, underscoring the model's explanatory power. Importantly, the Durbin-Watson statistic falls within the acceptable range of 1.5 to 2.5, indicating the absence of first-order autocorrelation and further validating the reliability of our results. These findings contribute valuable insights into the relationship between asset revaluation and market perceptions, enhancing the relevance of our research to both academic discourse and practical implications in financial markets.

5.3. Testing the Second Research Hypothesis

The second research hypothesis suggests that the market response to capital increases resulting from asset revaluation is significantly more pronounced than that to capital increases derived from cash contributions. To investigate this hypothesis, we analyze a seven-month period for the calculation of cumulative abnormal returns. A two-sample t-test

is employed to assess the differences between these two distinct groups of companies. The findings pertaining to the second hypothesis are detailed in Table 7, providing crucial insights into the varying market reactions to these different types of capital increases.

Table 7 Statistics of Group One and Two Companies

Group	Mean	Standard Deviation	Standard Error Mean
1	0.445	0.912	0.130
2	0.033	0.083	0.011

Table 8 Results of Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F-statistic	P-Value	t-statistic	P-Value	Mean Difference	Standard Deviation Difference
Assumption of Equal Variances	20.521	0.000	3.150	0.003	0.412	0.123

In this study, we begin by examining the results of Levene's test for equality of variances, as illustrated in Table 8. The findings reveal an F statistic of 20.512, with a significance level that is notably less than 0.05. This result prompts us to reject the null hypothesis of equal variances. Additionally, the T-test results further support our analysis, also indicating a significance level below 0.05, leading us to reject the hypothesis of equal means between the two groups. These statistical outcomes demonstrate a significant difference between the groups at a 95% confidence level. Consequently, we accept the second hypothesis of our research, which states that market reactions to capital increases resulting from asset revaluation are significantly stronger than those stemming from cash contributions. This finding underscores the critical role that the nature of capital changes plays in influencing market perceptions and investor behavior.

5.4. Testing the Third Hypothesis of the Research

The third hypothesis of this research posits that the market response to capital increases resulting from asset revaluation is significantly more pronounced than that associated with capital increases derived from retained earnings. To test this hypothesis, we constructed a sample comprising two distinct groups of pharmaceutical companies:

- Companies that have increased their capital through asset revaluation.
- Companies that have raised capital through retained earnings.

For our analysis, we observed a seven-month period to calculate cumulative abnormal returns. To facilitate a robust comparison between the two groups, we employed a two-sample t-test. The findings of this hypothesis testing are detailed in Tables 9 and 10.

Table 9 Statistics for Companies in Groups One and Two

Group	Mean	Standard Deviation	Standard Error Mean
1	0.445	0.912	0.130
2	0.064	0.099	0.014

In this section, we present the findings from Levene's test, which assesses the equality of variances between groups, as detailed in Table 9. The test yields an F statistic of 16.318, with a corresponding significance level below 0.05. This result leads us to reject the null hypothesis of equal variances. Furthermore, the T-test results also indicate a significance level below 0.05, allowing us to reject the hypothesis of equality of means between the two groups. This analysis

demonstrates, with 95 percent confidence, that the two groups exhibit statistically significant differences. Consequently, our third hypothesis is supported: the market reaction to capital increases stemming from asset revaluation is significantly greater than that associated with capital increases derived from accumulated profits.

Table 10 Results of Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F-statistic	P-Value	t-statistic	P-Value	Mean Difference	Standard Deviation Difference
Assumption of Equal Variances	16.318	0.000	2.905	0.005	0.381	0.131

6. Conclusion

This study explored the dynamics of return volatility in the context of sudden market events and new information, specifically focusing on the announcement of capital increases within the pharmaceutical sector. By analyzing the returns over the three months leading up to and following these announcements, the researchers employed the market model to gauge investors' responses to asset revaluation stemming from capital injections. The sample encompassed 200 pharmaceutical companies listed on the TSE, which were meticulously selected through systematic random sampling, covering the period from 2017 to 2023. The findings revealed a positive and statistically significant relationship between asset revaluation and investor reactions, highlighting that the market's response to capital increases resulting from asset revaluation tended to exceed that of increases derived from cash contributions or retained earnings. However, the study's limitations include its focus on quantitative measures, potentially overlooking qualitative factors influencing investor sentiment and decision-making. Future research should delve into qualitative analysis to uncover these factors more comprehensively by following the step-by-step approach developed by Ghorashi et al. (2024). Additionally, employing advanced methods such as Fusion Models (Askari & Karami, 2024), system dynamics (Khameneh et al., 2024), Artificial Neural Networks (Ebrahimi Orimi et al., 2017; Esmaeili et al., 2016; Refahi Oskouei, and Esmaeili, 2013), and machine learning (Ramezani, 2024) could enhance forecasting accuracy by integrating diverse data sources and improving model predictive capabilities.

In light of these insights into the capital market's response to asymmetric cost behavior, greater transparency among publicly traded companies is advocated. It is recommended that information regarding cost behavior be proactively disclosed by these firms to enhance market awareness among analysts and investors, thereby improving the informational efficiency of the capital market. Moreover, it is encouraged that non-linear and asymmetric characteristics of cost behavior be incorporated into profit prediction models by investors and analysts, recognizing their influence on profit predictions. This shift from traditional cost models towards a more nuanced approach could result in enhanced accuracy of profit forecasts. Additionally, it is noted that when adverse information is concealed by managers, sudden disclosure of accumulated bad news may occur when the cost of maintaining this information outweighs its benefits, leading to abrupt declines in stock prices. Thus, a greater degree of information asymmetry between managers and stakeholders translates to higher investment risks. By emphasizing these critical findings, valuable insights are hoped to be provided that not only contribute to the existing body of literature but also offer practical implications for investors, analysts, and corporate managers navigating the complexities of the capital market.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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