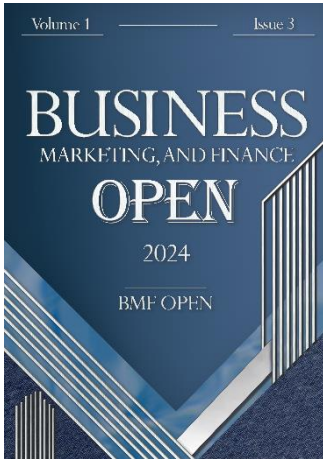


Model of the Impact of Tax Avoidance, Discretionary Accruals, and Financial Constraints on Stock Price Crash Risk



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Abstract: Stock price crash refers to a large, negative, abnormal, and sudden change in stock returns occurring in the absence of a major economic event. As it endangers the primary objective of individual investments, which is to generate profit, its escalation can lead to investor pessimism and capital withdrawal from the stock market. Considering this, the aim of this article is to present a model of the impact of tax avoidance, discretionary accruals, and financial constraints on stock price crash risk. This research is correlational in nature, utilizing regression analysis to determine model coefficients. Furthermore, based on its purpose, this research is categorized as applied research. The statistical population of this study includes all companies listed on the Tehran Stock Exchange during the period from 2012 to 2021, comprising 1,250 firm-year observations. The results indicate that corporate governance moderates the effect of tax avoidance on the future stock price crash risk. Additionally, corporate governance also moderates the effect of discretionary accruals on future stock price crash risk. Discretionary accruals have a significant effect on future stock price crash risk, and financial constraints also have a significant effect on future stock price crash risk. The findings reveal that corporate governance, as a moderating variable, does not influence the relationship between financial constraints and stock price crash risk.

Keywords: Discretionary accruals, financial constraints, stock price crash risk

1. Introduction

Undoubtedly, one of the most critical concerns of an investor is evaluating the risks associated with investments and deciding whether to enter into a specific investment. To this end, investors consider both systematic and unsystematic risks and adopt appropriate strategies to manage each. One significant risk that every investor encounters when entering the market is the risk of stock price crashes. Research shows that good or bad news about a company can lead to queues of buy or sell orders, resulting in abnormal fluctuations in stock prices [1].

The phenomenon of stock price crashes is a widespread and far-reaching domino-like chain reaction. Its foundation lies in the correlation between markets due to exposure to shared shocks and the spread of crises related to the decline in asset market values and rising public concerns [2]. This phenomenon significantly and suddenly adjusts stock prices downward, causing an exceptionally large and unusual negative change in stock returns, which rapidly affects the entire capital market [3]. Essentially, the topic of stock price crashes is a complex, ambiguous, multidimensional, and extensive phenomenon, making it impossible to attribute it conclusively to specific causes [4]. The theoretical foundations suggest that stock price crash risk is influenced by a range of internal and external factors [5].

Many researchers believe that stock price changes in a company stem from its internal management. In cases where information enters the market randomly, and its dissemination occurs systematically without regard to its positive or negative nature, the released information can be considered symmetrically distributed [1]. Managers, as those responsible for preparing financial statements, possess a comprehensive understanding of the financial status of their entities and more information than investors and creditors. They often attempt to portray a favorable image of the company. In doing so, they tend to delay disclosing bad news while promptly revealing good news [6].

In the absence of full transparency in financial reporting, managers have the opportunity to conceal negative information within the company to maintain their jobs and professional reputations. Consequently, negative information accumulates internally. Once the accumulation of negative information reaches a tipping point, it becomes increasingly costly and challenging to withhold. As a result, the negative information is suddenly released into the market, leading to a stock price crash. Under such circumstances, conservative accounting practices act as a counterbalance to management's motivations and tendencies, mitigating investment risks and the potential for stock price crashes [7].

Furthermore, increased difficulty in accessing external financing has caused companies to face numerous financial constraints, which serve as adverse signals to investors [8, 9]. Therefore, company managers often conceal negative news due to market considerations and concerns about negative investor reactions. Kim et al. (2011) noted that the accumulation of negative news could eventually lead to stock price crashes [10]. When the accumulation of such news reaches an uncontainable level, it overflows, potentially exerting severe impacts on stock prices [11].

Financial constraints place pressure on companies, preventing them from accessing external funding sources. This issue acts as a warning sign for investors, heightening uncertainty about the company's future. He (2015) explains that when managers are unable to effectively conceal negative news, this inability can result in stock price

crashes [12]. Companies facing financial constraints often resort to tax avoidance as a means to secure additional resources. Tax avoidance can serve as a financial resource, enabling companies to enhance their capacity to meet financial obligations [8]. Edward et al. (2016) argue that tax avoidance allows companies to acquire more cash by reducing their tax burden. These additional resources can strengthen a company's financial position and improve its ability to meet financial commitments [13].

However, while tax avoidance saves taxes, it also increases risks related to oversight and legal consequences. Investors may worry that such practices could attract negative media attention, legal actions, or changes in tax regulations. These concerns can amplify risks for stock prices and accelerate stock price crashes [3, 14].

When the market reacts negatively to a specific industry or company, it directly impacts financial valuations. These concerns may lead investors to shy away from investing in that industry, potentially causing a decline in prices [15]. Market reactions depend on a combination of economic, political, and social factors that directly influence stock price crash risk. Positive or negative market reactions to news and events affect investor confidence. Reduced confidence can lead to stock sales, consequently driving down prices. Mahmoudi and Mohaghegh (2011) highlighted that the stock market responds to changes in dividend distributions [16]. Shareholders and market participants perceive company information as either good or bad news, reacting with positive or negative price responses accordingly [17].

Discretionary accruals may increase a company's financial burden. If a company fails to meet these obligations, investors may worry about its financial viability, undermining confidence in the market and reducing stock prices. Excessive avoidance of discretionary accruals can generate tensions and conflicts within management, negatively affecting employee morale and leading to poor decision-making and economic performance. Conversely, discretionary accruals can help companies better manage their cash flow and prevent stock price crashes during challenging times [2]. Seyedabadi et al. (2021) observed a significant relationship between discretionary accruals and crash risk [14].

Understanding how the market reacts to news or specific changes, such as tax avoidance, can help managers make informed decisions when facing challenges and opportunities. It also enables more accurate forecasting of a company's future performance. Additionally, examining the effects of discretionary accruals and financial constraints helps identify potential risks. This understanding allows managers to develop effective strategies to manage and mitigate these risks. Analyzing these variables can predict downward stock price trends and market reactions. However, as indicated, attributing stock price crashes to a single factor is not definitive, underscoring the complexity and importance of studying this phenomenon.

Considering this, the present study proposes a market reaction model, focusing on the role of corporate governance and its influence on the effects of tax avoidance, discretionary accruals, and financial constraints on stock price crash risk.

2. Methodology

The aim of this research is to examine the impact of tax avoidance, discretionary accruals, and financial constraints on stock price crash risk. To achieve this objective, the research hypotheses and regression models designed to test each hypothesis are outlined as follows:

Hypothesis 1: Corporate governance moderates the effect of tax avoidance on future stock price crash risk.

Hypothesis 2: Corporate governance moderates the effect of discretionary accruals on future stock price crash risk.

Hypothesis 3: Corporate governance moderates the effect of financial constraints on future stock price crash risk.

The following regression model will be used to test Hypotheses 1 to 3:

$$SPCR_{it} = \alpha_0 + \beta_1 KZIR_{it} + \beta_2 DissACC_{it} + \beta_3 BTD_{it} + \beta_4 INST_{it} \times KZIR_{it} + \beta_5 INST_{it} \times DissACC_{it} + \beta_6 INST_{it} \times BTD_{it} + \beta_7 AR_{it} + \beta_8 MA_{it} + \beta_9 X_{it} + \varepsilon_{it}$$

Hypothesis 4: Discretionary accruals significantly affect future stock price crash risk.

Hypothesis 5: Financial constraints significantly affect future stock price crash risk.

The following regression model will be used to test Hypotheses 4 and 5:

$$SPCR_{it} = \alpha_0 + \beta_1 KZIR_{it} + \beta_2 DissACC_{it} + \beta_3 BTD_{it} + \beta_4 AR_{it} + \beta_5 MA_{it} + \beta_6 INST_{it} + \beta_7 X_{it} + \varepsilon_{it}$$

Where:

- SPCR = Stock price crash risk
- KZIR = Financial constraints
- DissACC= Discretionary accruals or earnings management
- BTD = Tax avoidance
- AR= Market reaction
- MA= Managerial ability
- INST = Corporate governance
- X = Vector of control variables, including return on assets, the book value of shareholders' equity divided by the market value of equity at the end of the year, and firm size.

This research is correlational in nature, employing regression analysis to estimate the model coefficients. Furthermore, based on its purpose, the study is classified as applied research. Investors, stakeholders, and decision-makers can use the findings of this study to gain a deeper understanding of stock price crash risk and incorporate this knowledge into their economic decisions, ultimately contributing to the optimal allocation of resources.

The statistical population of this study includes all companies listed on the Tehran Stock Exchange. To ensure the sample is representative of the population, the systematic elimination method was applied. Four criteria were

considered, and companies that met all the criteria were selected as the sample, while the rest were excluded. Consequently, the observations over the 2012–2021 period amount to 1,250 firm-year observations.

3. Findings

The results of the descriptive analysis of the data for the entire sample are presented in Table 1.

Table 1. Descriptive Analysis of the Research Data for the Sample Companies

Variable	Indicator	Symbol	Mean	Maximum	Minimum	Standard Deviation
Stock Price Volatility Risk	Stock Price Crash	CRASH	0.04	1.00	0.00	0.20
	Negative Skewness of Returns	NSCKEW	0.84	1.00	-1.00	0.37
	Down-to-Up Volatility	DUVOL	-0.69	2.65	-4.71	0.83
Financial Constraints	Kaplan-Zingales Index	KZIR	-5.88	33.98	-1485.2	61.05
Discretionary Accruals	Earnings Management	DissACC	0.00	1.73	-0.59	0.20
Tax Avoidance	Effective Tax Rate	BTD	0.03	0.14	-0.002	0.03
Firm Size	Size	SIZE	14.51	20.77	11.04	1.54
Return on Assets	ROA	ROA	13.36	63.13	-58.11	14.82
Firm Age	Age	AGE	1.59	1.85	1.08	0.15
Book-to-Market Ratio	Book-to-Market Ratio	MTB	31.05	1336.5	-6016.4	195.5

Before analyzing and testing the hypotheses, the stability of the research variables was examined. The stability of the variables ensures that the mean and variance of the variables remain constant across different years, thereby avoiding spurious regression in the model. The Phillips-Perron test was used for this purpose, and the results are shown in Table 2.

Table 2. Unit Root Test Results

Indicator	Symbol	Test Statistic	P-Value
Stock Price Crash	CRASH	240.47	0.00
Negative Skewness of Returns	NSCKEW	633.91	0.00
Down-to-Up Volatility	DUVOL	846.72	0.00
Discretionary Accruals	DissACC	490.35	0.00
Tax Avoidance	BTD	358.58	0.00
Leverage	LEV	322.58	0.001
Firm Size	SIZE	373.58	0.00
Return on Assets	ROA	328.85	0.001
Firm Age	AGE	2302.6	0.00
Book-to-Market Ratio	MTB	482.86	0.00

The results indicate that the p-values for all variables are less than 5%, confirming that all variables in the study period are stable.

The results of the F-Limer test for determining the type of data and the Hausman test for identifying fixed or random effects are presented in Table 3. Based on the results, the p-value for the F-Limer test for the models related

to stock price crash indicators and down-to-up volatility in Hypothesis 1 is less than the critical value of 0.05, rejecting the null hypothesis. Therefore, the model used is a panel data model. Additionally, the p-value of the Hausman test for these models is less than 0.01, rejecting the null hypothesis of random effects at a 95% confidence level, indicating that the models are panel data models with fixed effects.

For the other models, the F-Limer test results show p-values greater than 0.05, confirming the null hypothesis. Consequently, the data for these models are considered pooled data.

Table 3. F-Limer and Hausman Test Results

Hypothesis	Model	F-Limer Test	P-Value	Result	Hausman Test	P-Value	Result
Hypotheses 1–3	Stock Price Crash	1.16	0.29	Pooled Data	-	-	-
	Negative Skewness of Returns	1.03	0.43	Pooled Data	-	-	-
	Down-to-Up Volatility	1.31	0.18	Pooled Data	-	-	-

The results in Table 3 show that, based on the F-statistic and its p-value, which are less than the critical value of 0.05, all three models related to Hypotheses 1–3 are statistically significant and valid. Additionally, the Durbin-Watson statistic for the models ranges between 1.5 and 2.5, indicating no autocorrelation issue.

For heteroskedasticity, the results of the White test and its p-value for all three models exceed 0.05, indicating no heteroskedasticity issue. The Jarque-Bera test for normality of residuals indicates that only the model for down-to-up volatility in the next year has normally distributed residuals. However, given the large data volume (greater than 30) and the validity of other classical tests, the non-normal distribution of residuals does not affect the results.

The coefficient of determination for the models related to stock price crash indicators, negative skewness of returns, and down-to-up volatility for the next year are 0.17, 0.14, and 0.76, respectively, indicating the high explanatory power of the model for down-to-up volatility compared to others.

For Hypothesis 1, the t-statistic for the interaction variable (corporate governance \times tax avoidance) in the models related to negative skewness of returns and down-to-up volatility is less than 0.05. Therefore, Hypothesis 1 is confirmed at a 95% confidence level for these indicators.

For Hypothesis 2, the t-statistic for the interaction variable (corporate governance \times discretionary accruals) in the models related to stock price crash and negative skewness of returns is also less than 0.05, confirming Hypothesis 2 at a 95% confidence level.

Regarding Hypothesis 3, the interaction variable (corporate governance \times financial constraints) has a p-value greater than 0.05 across all models. Thus, Hypothesis 3 is not confirmed at a 95% confidence level.

Table 4. Results of the Analysis of the Fourth Model for Testing Hypotheses 10, 11, and 12

Variable	Symbol	CRASH (Coeff, Prob., Result)	NSCKEW (Coeff, Prob., Result)	DUVOL (Coeff, Prob., Result)
Financial Constraints	KZR	-0.0003, 0.03, Supported	0.001, 0.47, Rejected	-0.001, 0.43, Rejected
Discretionary Accruals	DISSACC	0.0003, 0.98, Rejected	0.14, 0.045, Supported	0.04, 0.83, Rejected
Tax Avoidance	BTD	0.04, 0.79, Rejected	3.15, 0.002, Supported	8.13, 0.00, Supported

Corporate Governance × Financial Constraints	INST × KZR	0.00002, 0.91, Rejected	-0.00001, 0.72, Rejected	-0.0001, 0.30, Rejected
Corporate Governance × Discretionary Accruals	INST × DISSACC	0.001, 0.01, Supported	0.003, 0.01, Supported	0.0003, 0.92, Rejected
Corporate Governance × Tax Avoidance	INST × BTD	-0.005, 0.09, Rejected	-0.06, 0.00, Supported	-0.09, 0.00, Supported
Market Reaction	AR	0.20, 0.002, Supported	-0.86, 0.00, Supported	8.64, 0.00, Supported
Managerial Ability	MA	-0.01, 0.72, Rejected	-0.06, 0.52, Rejected	-0.25, 0.16, Rejected
Financial Leverage	LEV	0.08, 0.001, Supported	0.001, 0.98, Rejected	0.47, 0.001, Supported
Return on Assets	ROA	0.001, 0.71, Rejected	-0.001, 0.54, Rejected	0.01, 0.00, Supported
Firm Age	AGE	0.04, 0.04, Supported	0.04, 0.81, Rejected	-0.42, 0.00, Supported
Book-to-Market Ratio	MTB	-0.0002, 0.00, Supported	0.0004, 0.32, Rejected	-0.001, 0.24, Rejected
Intercept	C	-0.08, 0.01, Supported	0.78, 0.005, Supported	-0.33, 0.08, Rejected
F-Statistic (P-Value)	3.41 (0.00)	2.61 (0.003)	52.31 (0.00)	F-Statistic (P-Value)
Durbin-Watson Statistic		1.79	1.95	1.99
R-Squared		0.17	0.14	0.76
Adjusted R-Squared		0.12	0.09	0.75
White Test Statistic (P-Value)		1.03 (0.43)	0.78 (0.84)	1.12 (0.30)
Jarque-Bera Statistic (P-Value)		1414.2 (0.00)	40.37 (0.00)	0.60 (0.74)

The results from Table 5 indicate that, based on the F-statistic and its p-value, which are less than the critical value of 0.05, all three models related to Hypotheses 1 to 3 are statistically significant and acceptable. Additionally, the Durbin-Watson statistic for all three models falls within the range of 1.5 to 2.5, indicating the absence of autocorrelation issues in the models.

Regarding homoscedasticity, the results of the White test and its p-value for all three models exceed the critical value of 0.05, indicating that there are no heteroscedasticity issues in the models.

For Hypothesis 4, the results show that the significance level of the t-test for the discretionary accruals variable in the model related to the negative skewness of stock-specific returns (NSCKEW) for the upcoming year is less than the critical value of 0.05. Therefore, Hypothesis 4, which posits the effect of discretionary accruals on future stock price crash risk, is confirmed only for the NSCKEW indicator in the upcoming year.

Additionally, for Hypothesis 5, the results demonstrate that the significance level of the financial constraint variable in the models related to stock price crash (CRASH) and down-to-up volatility (DUVOL) for the upcoming year is less than 0.05. Thus, Hypothesis 5, which suggests the impact of financial constraints on future stock price crash risk, is confirmed for both the CRASH and DUVOL indicators for the upcoming year.

Table 5. Results of the Analysis of the First Model for Testing Hypotheses 4 and 5

Variable	Symbol	CRASH (Coeff, Prob., Result)	NSCKEW (Coeff, Prob., Result)	DUVOL (Coeff, Prob., Result)
Financial Constraints	KZR	0.0005, 0.04, Supported	0.001, 0.11, Rejected	0.004, 0.03, Supported
Discretionary Accruals (Earnings Management)	DISSACC	0.09, 0.19, Rejected	0.21, 0.004, Supported	-0.63, 0.09, Rejected
Financial Leverage	LEV	-, -, -	0.12, 0.28, Rejected	0.39, 0.42, Rejected
Firm Size	SIZE	-0.01, 0.09, Rejected	-0.01, 0.50, Rejected	0.25, 0.09, Rejected
Return on Assets	ROA	-0.001, 0.05, Supported	-0.001, 0.67, Rejected	-0.03, 0.02, Supported
Firm Age	AGE	0.25, 0.00, Supported	0.02, 0.93, Rejected	-5.79, 0.01, Supported
Book-to-Market Ratio	MTB	-, -, -	0.001, 0.15, Rejected	0.002, 0.15, Rejected
Intercept	C	0.18, 0.14, Rejected	1.02, 0.001, Supported	4.61, 0.03, Supported
F-Statistic (P-Value)		2.06 (0.01)	2.43 (0.01)	4.63 (0.00)
Durbin-Watson Statistic		2.21	1.87	2.49
R-Squared		0.16	0.17	0.45
Adjusted R-Squared		0.10	0.11	0.35
White Test Statistic (P-Value)		1.10 (0.32)	0.65 (0.98)	1.24 (0.14)
Jarque-Bera Statistic (P-Value)		1671.5 (0.00)	105.21 (0.00)	4.45 (0.11)

These findings highlight that financial constraints significantly affect the CRASH and DUVOL indicators, while discretionary accruals significantly affect the NSCKEW indicator. This emphasizes the role of these variables in explaining future stock price crash risk.

4. Discussion and Conclusion

Hiding bad news carries minimal risk of detection by outsiders, as it is challenging for them to determine whether managers are concealing bad news or are simply unaware of it. However, as hidden bad news accumulates, continued hoarding becomes increasingly difficult for managers. The maximum amount of bad news that managers can conceal varies unpredictably with changes in a company's environment, making it challenging for managers to predict when they will reach the threshold and to prevent stock price crashes. When agency conflicts exist between shareholders and corporate management, the likelihood of bad news increases. Such bad news may be attributed to managerial rent-seeking or opportunistic behaviors.

Concerns about job security, personal reputation, discretionary benefits, and bonus schemes incentivize managers to withhold bad news. However, strong corporate governance imposes stringent oversight on managers, reducing their ability to hoard bad news and thereby lowering crash risk. Managers in well-governed companies are less likely to conceal bad news, resulting in a lower risk of future stock price crashes for their companies. These findings align with prior studies [11, 12, 18].

The results for the first hypothesis confirm the moderating role of corporate governance in the relationship between tax avoidance and stock price crash risk. Corporate governance amplifies the inverse relationship between tax avoidance and stock price crash risk. In other words, strong corporate governance reduces stock price crash risk

by increasing oversight on bad news hoarding and decreasing the time managers spend on tax avoidance efforts, as well as reducing the potential risk of detection by tax authorities.

The findings for the second hypothesis also confirm the moderating role of corporate governance in the relationship between discretionary accruals and stock price crash risk. These results indicate that corporate governance amplifies the impact of discretionary accruals on stock price crash risk. This can be explained by managers leveraging their relationships with board members and audit committees to increase their influence in the company. Thus, managerial influence can exacerbate the relationship between discretionary accruals and stock price crash risk, highlighting the alignment between corporate governance indicators, such as board characteristics, and managerial behavior.

Finally, the results show that corporate governance does not significantly moderate the relationship between financial constraints and stock price crash risk. This suggests that corporate governance may not play a role in financing decisions; instead, company management influences financial constraints. The inability of corporate governance to mitigate bad news hoarding and default risk stemming from financial constraints could be attributed to the intrinsic focus of governance mechanisms on managerial oversight and bad news hoarding rather than default-related risks.

Accounting information plays a critical role in investor decision-making. Accrual and cash components of current profits in financial statements enable the evaluation of future earnings. Managers believe that earnings management enhances investor valuation of their companies. Consequently, managers exploit earnings management to mislead investors and influence stock prices. Opportunistic managers prefer strategies that maximize their self-interest, using earnings management to portray a favorable company performance and attract new investors. Such tactics lead to overvalued stock prices, prompting investors to adjust their expectations upward.

However, these strategies increase stock price crash risk when the market discerns the company's true condition. Opportunistic earnings management behavior (agency theory perspective) diminishes shareholder wealth and heightens stock price crash risk. Conversely, stewardship theory (non-opportunistic behavior) predicts increased shareholder wealth and reduced stock price crash risk due to lower earnings management.

The results of the fourth hypothesis confirm a significant positive and direct effect of discretionary accruals on stock price crash risk (negative skewness of stock-specific returns). Thus, agency theory regarding earnings management and stock price crash risk is supported. These findings are consistent with prior studies [19-22].

Financial constraints are defined as frictions that hinder a company's ability to finance desired investments. Bad news hoarding and default risk are potential mechanisms that make financially constrained firms prone to stock price crashes. Bad news hoarding is a fundamental cause of stock price crashes. Financially constrained firms, compared to financially stable ones, are more likely to accumulate bad news regarding investments and operations due to inadequate liquidity. Managers of financially troubled firms may hide bad news for extended periods to secure external financing, as disclosing bad news could increase the costs of equity and debt issuance.

Despite the limited capacity for bad news hoarding, managers often fail to anticipate when this threshold is reached due to constant and unpredictable business environment changes. Once the threshold is reached, all concealed bad news becomes uncontrollable, leading to sudden and substantial stock price crashes. Companies

with strong motivations for external financing are more likely to conceal bad news, making them more vulnerable to future stock price crashes than financially stable firms.

Moreover, financially constrained firms require additional cash to fund critical investments and avoid default. Since external financing is often expensive for such firms, they rely heavily on limited internal resources, exposing them to greater risks of default and stock price crashes caused by business failures.

Based on the findings, shareholders should implement measures to limit opportunistic managerial behaviors, as prolonged bad news hoarding can lead to severe stock price crashes. The Tehran Stock Exchange should establish mechanisms to evaluate financial constraints and provide strategies for mitigating them through enhanced oversight. Investors and creditors are advised to monitor indicators such as high tax avoidance, discretionary accruals, and financial constraints in companies before investing. Companies should focus on high-quality information disclosure to improve public perception and reduce stock price crash risk. Establishing committees to monitor managerial actions can prevent opportunistic behavior, ensuring efficient resource allocation. Additionally, the Tehran Stock Exchange should prioritize privatization efforts to align managerial actions with shareholder interests, while investors should consider the expertise and shareholding of institutional investors before making investment decisions.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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