

The Impact of Data Assetization on Stock Price Crash Risk

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Abstract: Data assetization significantly impacts stock price crash risk by optimizing corporate information disclosure systems and enhancing information supply quality. Based on data from A-share listed companies covering 2007-2023, this study finds that data assetization significantly suppresses stock price crash risk, with this inhibitory effect being more pronounced in asset-light firms, companies with lower audit quality, and those with greater regulatory distance. Mechanism analysis reveals that data assetization reduces crash risk by improving stock price informativeness, while institutional ownership weakens this effect. This research enriches the literature on data assetization and stock price crash risk, providing theoretical guidance for regulatory authorities, enterprises, and investors in advancing data assetization practices.

Keywords: Data Assets, Stock Price Crash Risk, Stock Price Informativeness, Institutional Ownership.

1. Introduction

The real estate sector is declining and can no longer serve as a vehicle for capital. As China's economy transitions from high-speed growth to high-quality development, it is imperative to explore new pathways beyond the "land rent economy." As the fifth factor of production, data may take the "baton" from land to become the future vehicle for capital. Relevant authorities are actively exploring the transition from "land rent" to "data rent," with corporate data assetization serving as the micro-level lever.

China's data output has grown rapidly, reaching 6.6 zettabytes (ZB) in 2021, rising to 8.1 ZB in 2022, and jumping to 32.85 ZB in 2023. If properly valued and recognized on balance sheets, this data could activate assets worth trillions of yuan, opening new space for corporate financing and expansion. In terms of policy, the Central Political Bureau emphasized in 2017 that data is a new factor of production. The Fourth Plenary Session of the 19th CPC Central Committee in 2019 proposed including data in income distribution. In 2023, the Ministry of Finance clarified that data can be capitalized, and the *Interim Provisions* took effect on January 1, 2024, marking the "first year of data asset capitalization." By the third quarter of 2025, 101 A-share listed companies had disclosed data asset information totaling 2.971 billion yuan. The *14th Five-Year Plan Recommendations* explicitly call for deepening the development and utilization of data resources, making data assetization a national strategic direction.

Financial security is crucial to national security, and capital market stability is vital to the financial system. Stock price crashes represent one of the primary risks. In the post-pandemic era of global economic turbulence, authorities are promoting data asset development, raising the question: Can data assetization reduce stock price crash risk?

Accordingly, this study examines the impact of data assetization on stock price crash risk using data from A-share listed companies from 2007 to 2023, and analyzes the underlying mechanisms. The marginal contributions are as follows: First, we construct a theoretical chain of "data assetization → improved stock price informativeness → reduced stock price crash risk." By identifying the mediating

channel of stock price informativeness, this study enriches the transmission path through which data assetization affects crash risk, deepens understanding of their relationship, and provides a theoretical framework for future research. Second, we refine the contextual conditions of data assetization's impact on crash risk from three dimensions: asset tangibility, audit quality, and regulatory distance, enhancing understanding of their relationship. Third, from a practical standpoint, as data assetization is still in its infancy with uncertain economic consequences and limited market understanding, this study provides theoretical guidance for stakeholders engaged in data asset practices.

2. Theoretical Analysis and Research Hypotheses

2.1. The Impact of Data Assetization on Stock Price Crash Risk

Stock price crash risk stems from two sources within firms: first, information asymmetry between investors and listed companies prevents investors from making timely and accurate valuations of firm value; second, managerial concealment of bad news leads to accumulated overvaluation until the risk exceeds management's control and erupts collectively (Zhang et al., 2019).

Specifically, the transformation from "data resources" to "data assets" involves three steps: data resources (organization) → data elements (rights confirmation, valuation) → data assets (productization, pricing) (Wang and Yang, 2024). Corporate data assets contain information about operating conditions and future prospects, representing non-replicable competitive resources aligned with national strategic directions, which firms disclose in financial reports (He et al., 2024). Based on information asymmetry theory, if firms possess available data elements or resources but fail to effectively communicate this to investors, information asymmetry arises, preventing accurate valuation by investors. By fully developing data elements and transforming them into data assets through capitalization (recognition on the balance sheet), firms can better disclose this information in financial reports, reducing information asymmetry and enabling investors to make timely, accurate judgments of firm value,

thereby lowering stock price crash risk. If firms use data assets as collateral to obtain external credit, creditors will effectively exercise external monitoring, enhancing information transparency and reducing information asymmetry.

Furthermore, data assetization increases total assets and owners' equity, directly optimizing the balance sheet. As pledgeable collateral for external credit, data assets enhance financing capacity and solvency, fundamentally reducing the probability of negative information generation and subsequent crash risk from accumulated bad news.

Moreover, data assetization aligns with national strategic directions, and firms engaging in data assetization are more inclined to disclose data asset information. Prior research shows that data asset disclosure reduces stock price synchronicity (Xu and Liu, 2024), which is positively correlated with crash risk (Zhang et al., 2019). Thus, data assetization theoretically reduces stock price crash risk. Based on this, we propose Hypothesis H1.

H1: Data assetization helps reduce corporate stock price crash risk.

2.2. The Mediating Effect of Stock Price Informativeness

Data assetization enhances stock price informativeness through three channels: increasing information supply, incentivizing information demanders to conduct in-depth information mining, and promoting proactive disclosure of firm-specific information by management.

First, stock price informativeness measures the degree to which stock prices accurately reflect firm-specific information. The faster and greater the amount of idiosyncratic information incorporated into prices, the more accurately stock prices reflect intrinsic firm value (Luo et al., 2023). Through rights confirmation, governance, valuation, pricing, and third-party auditing, data assetization formally recognizes data resources as assets on financial statements, significantly improving the verifiability and reliability of information disclosure. This process naturally generates incremental firm-specific information, enriching the information supply. As trading progresses, prices incorporate increasingly rich information (Qin et al., 2025).

Second, data assetization aligns with the national strategy of data factor marketization. The "signal" sent to external markets attracts institutional investors and analysts to conduct deep information mining, facilitating the incorporation of genuine firm-specific information into stock prices through trading.

Third, this process further reduces information asymmetry. Management becomes less concerned that minor fluctuations might disrupt partnerships, as stakeholders gain fuller understanding of operations and enhanced confidence. Consequently, management becomes more likely to proactively disclose authentic, detailed firm-specific information regardless of whether it is positive or negative, forming a virtuous cycle of "increased information content—reduced information asymmetry—sustained release of specific information." Prior research finds that data assetization significantly reduces stock price synchronicity (Yang et al., 2025), and data asset disclosure reduces synchronicity while improving capital market pricing efficiency (Xu and Liu, 2024; Li et al., 2025; Li et al., 2025). Since stock price synchronicity is inversely related to stock price informativeness, data assetization enhances stock price

informativeness to some extent.

Stock price informativeness and stock price crash risk move in opposite directions. Enhanced informativeness implies that more firm-specific information—whether positive or negative—is promptly incorporated into prices through trading. When negative information is no longer concealed long-term but reflected early, management's room for "hiding bad news" compresses, reducing crash risk. Academics generally use stock price synchronicity as an inverse proxy for informativeness, with consensus on its relationship with market crash risk: higher synchronicity indicates less firm-specific information in prices, lower costs for management to conceal bad news, and consequently higher future crash risk (Weng and Lai, 2024). Therefore, stock price informativeness theoretically bears an inverse relationship with crash risk. Based on this, we propose Hypothesis H2.

H2: Corporate data assetization suppresses stock price crash risk by improving stock price informativeness.

2.3. The Moderating Effect of Institutional Ownership

Institutional investors constitute a crucial component of China's capital market. Compared with individual investors, they possess significant comparative advantages in professional expertise, information processing efficiency, and capital concentration, thereby assuming multiple market functions such as risk pricing and corporate governance.

In areas with low institutional ownership, information asymmetry is typically more severe, making it difficult for outsiders to observe internal operational details and providing greater leeway for management to conceal bad news. Under these circumstances, data assetization—by increasing information supply, incentivizing information demanders to conduct in-depth mining, and encouraging management to proactively release firm-specific information—enhances stock price informativeness and more significantly suppresses crash risk. Institutional ownership may create a "channel" that weakens this mechanism, exhibiting a negative moderating effect. Additionally, institutional investors exhibit herding behavior; Xu et al. (2013) confirm that such herding increases stock price synchronicity and exacerbates future crash risk.

However, shareholder activism theory posits that institutional investors play an active role in corporate governance, continuously monitoring and intervening when necessary to curb managerial opportunism and protect their investment value. Specifically, this monitoring alleviates management's short-term performance pressures that might lead to high-risk or detrimental decisions, thereby reducing potential crash risk. Moreover, such supervision significantly reduces information asymmetry, compressing management's room to hide negative information or exaggerate positive developments. Once firms capitalize data assets—confirming rights, valuing, and continuously disclosing operational data—information transparency improves, lowering the barriers for institutional monitoring and trading. With verifiable and traceable data asset information, institutions can identify negative signals at lower cost, timely reduce holdings or exercise voting rights, and block the long-term accumulation of bad news, thereby amplifying their traditional function of stabilizing stock prices—a positive moderating effect. Gao et al. (2017) confirm that institutional monitoring significantly weakens firms' hoarding of negative information and reduces the probability of extreme price

fluctuations.

Whether institutional ownership weakens or strengthens data assetization's inhibitory effect on crash risk depends on the relative strength of these two effects. Therefore, we propose the following competing hypotheses:

H3a: Institutional ownership weakens the inhibitory effect of data assetization on stock price crash risk.

H3b: Institutional ownership strengthens the inhibitory effect of data assetization on stock price crash risk.

3. Research Design

3.1. Sample Selection and Data Sources

Since relevant indicators became available only after the implementation of new accounting standards in 2007, and the dependent variable requires a one-period lag, this study selects A-share listed companies from 2007 to 2023 as the sample (with explanatory and control variables covering 2007–2023 and the dependent variable covering 2008–2024). Data assetization data is hand-collected, while other financial data is obtained from CSMAR and Wind databases. To ensure reliability, the following sample screening criteria are applied: (1) excluding firms with ST or PT histories; (2) excluding financial sector firms, which are subject to strict regulatory constraints and have significantly different financial reporting formats that compromise comparability; (3) excluding observations with missing values for data assetization, stock price crash risk, stock price informativeness, or control variables; and (4) Winsorizing all continuous variables at the 1st and 99th percentiles to mitigate extreme value effects.

3.2. Variable Definitions

3.2.1. Dependent Variable

The dependent variable in this study is stock price crash risk, defined as the probability of sudden, extreme, and substantial declines in individual stocks or market indices without obvious warning. Following prior studies (Hutton et al., 2009; Kim et al., 2011; Li Wengui and Lu Jun, 2022), we measure stock price crash risk using the negative skewness of

returns (NCSKEW) and the down-to-up volatility (DUVOL). Higher values of both indicators indicate greater stock price crash risk.

3.2.2. Independent Variable

Following He et al. (2024), this study measures data assetization (DA) by statistically analyzing the frequency of data assetization-related keywords using text analysis, followed by logarithmic transformation. Higher values indicate a greater degree of corporate data assetization.

3.2.3. Mediating and Moderating Variables

(1) Mediating Variable

Following the approach of Morek et al. (2000) and Zhong et al. (2018), this study constructs the measure of stock price informativeness (PI) as follows:

$$PI_i = \ln \frac{1-R_i^2}{R_i^2} \quad (1)$$

Higher PI values indicate richer firm-specific information incorporated into stock prices, reflecting higher stock price informativeness.

(2) Moderating Variable

This study measures institutional ownership by the proportion of shares held by institutional investors.

3.2.4. Control Variables

Following prior studies (Xu et al., 2012; Wang et al., 2015; Wu et al., 2019; He et al., 2024), this study controls for a series of variables that may affect the research conclusions. These variables include: firm size (Size), firm age (Age), return on assets (ROA), leverage ratio (LEV), CEO duality (DUAL), board size (Board), firm growth (Growth), proportion of independent directors (Indep), audit opinion (Opinion), monthly average excess turnover ratio (Dturn), stock return (Ret), standard deviation of returns (Sigma), information transparency (ABACC), and market-to-book ratio (MB). Additionally, to control for differences across years and industries, this study includes year and industry fixed effects (Year, Ind). Detailed definitions of all variables are presented in Table 1.

Table 1. Variable Definitions

Types of variables	Variable name	Symbols	Definition and calculation
Dependent variable	Negative Coefficient of Skewness	NCSKEW	See above
	Down-to-Up Volatility	DUVOL	See above
Independent variables	Data Assetization	DA	See above
Mediating variables	Stock Price Informativeness	PI	See above
Moderating variables	Institutional Ownership	Ins	Institutional Ownership (%)
Control variables	Firm Size	Size	Ln (1 + total assets)
	Firm Age	Age	Ln (1 + years since company establishment)
	Return on Assets	ROA	Average ROA
	Leverage Ratio	LEV	Total liabilities/total assets
	CEO Duality	DUAL	1 if Chairman = CEO, 0 otherwise
	Board Size	Board	Number of Board Members
	Firm Growth	Growth	(Current Year Sales Revenue - Prior Year Sales Revenue) / Prior Year Sales Revenue
	Monthly Average Excess Turnover Ratio	Dturn	Change in monthly average turnover from year t to year t+1
	Return	Ret	Average Weekly Return (Annual)
	Standard Deviation of Returns	Sigma	Standard Deviation of Market-Adjusted Weekly Returns
	Year/Industry Fixed Effects	Year/Ind	Year and Industry Dummies

3.3. Model Construction

3.3.1. Baseline Regression Model

To test Hypothesis H1, and following prior studies (Xie et al., 2016; Ma et al., 2022), this study employs the following model to conduct multiple regression analysis examining the impact of corporate data assetization on stock price crash risk:

$$\text{NCSKEW}_{i,t+1} \text{ and } \text{DUVOL}_{i,t+1} = \alpha_0 + \alpha_1 \text{DA}_{i,t} + \alpha_2 \text{Controls}_{i,t} + \xi \quad (2)$$

Where i and t denote firm and year, respectively. The dependent variable, stock price crash risk, is measured by the negative skewness of returns (NCSKEW) and down-to-up volatility (DUVOL) for firm i in year $t+1$. The core explanatory variable $\text{DA}_{i,t}$ represents the degree of data assetization of firm i in year t , Controls denotes the set of control variables, and ξ is the stochastic error term. Additionally, year and industry fixed effects are controlled for, with all standard errors clustered at the firm level. To alleviate endogeneity concerns, both the key explanatory variables and control variables are lagged by one period relative to the dependent variable. If α_1 is significantly negative, it indicates that corporate data assetization significantly reduces stock price crash risk.

3.3.2. Mediation Analysis Model

Furthermore, to test Hypothesis H2, and following the methodology of Qin et al. (2025), this study constructs the following models:

$$\text{PI}_{i,t} = \beta_0 + \beta_1 \text{DA}_{i,t} + \beta_2 \text{Controls}_{i,t} + \xi \quad (3)$$

$$\text{NCSKEW}_{i,t+1} \text{ and } \text{DUVOL}_{i,t+1} = \gamma_0 + \gamma_1 \text{DA}_{i,t} + \gamma_2 \text{PI}_{i,t} + \gamma_3 \text{Controls}_{i,t} + \xi \quad (4)$$

Where the dependent variable $\text{PI}_{i,t}$ represents stock price informativeness of firm i in year t , and the core explanatory variable $\text{DA}_{i,t}$ represents the degree of corporate data assetization. Controls denotes the set of control variables, and ξ is the random error term. Furthermore, year and industry fixed effects are included, with standard errors clustered at the

firm level. A significantly positive β_1 would indicate that corporate data assetization significantly enhances stock price informativeness.

3.3.3. Moderation Analysis Model

To test Hypotheses H3a and H3b, this study introduces the moderating variable and its interaction term with the explanatory variable ($\text{DA} \times \text{Ins}$) into the baseline regression model, constructing the following model:

$$\text{NCSKEW}_{i,t+1} \text{ and } \text{DUVOL}_{i,t+1} = \gamma_0 + \gamma_1 \text{DA}_{i,t} + \gamma_2 \text{Ins}_{i,t} + \gamma_3 \text{DA}_{i,t} \times \text{Ins}_{i,t} + \gamma_4 \text{Controls}_{i,t} + \xi \quad (5)$$

Where $\text{Ins}_{i,t}$ denotes the level of institutional ownership of firm i in year t . If γ_3 is statistically significant and shares the same sign as coefficient α_1 in Model (5), it indicates that institutional ownership strengthens the effect of data assetization on stock price crash risk; conversely, it indicates that institutional ownership weakens this effect.

4. Empirical Analysis

4.1. Hypothesis Testing

4.1.1. Empirical Results on Data Assetization and Stock Price Crash Risk

This study first examines the relationship between data assetization and stock price crash risk to test H1. The regression results are presented in Table 2. Columns (1) and (2) show the regression results without control variables, where the regression coefficients for data assetization (DA) are -0.0451 and -0.0386, respectively, both significantly negative at the 1% significance level, indicating that higher levels of data assetization are associated with lower stock price crash risk. Columns (3) and (4) present the regression results after adding control variables, where the regression coefficients for DA are -0.0331 and -0.0309, respectively, remaining significantly negative at the 1% level. Specifically, a one standard deviation increase in DA reduces NCSKEW by 7.12% and DUVOL by 10.2%. These results verify Hypothesis H1, demonstrating that data assetization helps suppress corporate stock price crash risk.

Table 2. Baseline Regression Results

Variables	(1) NCSKEW	(2) DUVOL	(3) NCSKEW	(4) DUVOL
DA	-0.0451***	-0.0386***	-0.0331***	-0.0309***
	(-5.67)	(-7.22)	(-4.31)	(-5.95)
Controls	NO	NO	YES	YES
Industry/Year	YES	YES	YES	YES
R ²	0.037	0.043	0.101	0.105

Note: *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

4.1.2. Mediation Analysis Results

This study further examines the mediating effect of data assetization on stock price crash risk through improved stock price informativeness to test H2. The regression results are presented in Panel A of Table 3. In Column (1) of Panel A, the regression results show that data assetization (DA) is positively correlated with stock price informativeness (PI) at the 1% significance level, with a coefficient of 0.0424. This result indicates that higher levels of corporate data assetization are associated with higher stock price

informativeness. Columns (2) and (3) show that the coefficients of stock price informativeness (PI) on the two measures of stock price crash risk are both significantly negative at the 1% level, fully demonstrating that PI is a key factor affecting corporate stock price crash risk. Meanwhile, the coefficients of data assetization (DA) on the two crash risk measures remain significantly negative at the 1% level, but their absolute values are slightly smaller compared to the baseline regression coefficients. In summary, these findings indicate that stock price informativeness plays a partial mediating role between data assetization and stock price crash risk, supporting Hypothesis H2.

Table 3. Mechanism Test Results

Variables	Panel A			Panel B	
	(1) PI	(2) NCSKEW	(3) DUVOL	(1) NCSKEW	(2) DUVOL
DA	0.0424*** (3.66)	-0.0322*** (-4.19)	-0.0306*** (-5.87)	-0.0595*** (-4.41)	-0.0451*** (-5.07)
PI		-0.0200*** (-4.87)	-0.0077*** (-2.90)		
DA×Ins				0.0007** (2.56)	0.0004** (2.06)
Ins				-0.0008 (-0.90)	-0.0003 (-0.50)
Controls	YES	YES	YES	YES	YES
Industry/Year	YES	YES	YES	YES	YES
R ²	0.407	0.102	0.106	0.103	0.107

Note: *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

4.1.3. Regression Results on the Moderating Effect of Institutional Ownership

This study further examines how institutional ownership affects the inhibitory effect of data assetization on stock price crash risk to test Hypotheses H3a and H3b. The regression results are presented in Panel B of Table 3. In Panel B, the interaction term between data assetization and institutional ownership (DA×Ins) is negatively correlated with stock price crash risk (NCSKEW and DUVOL) at the 5% significance level. The sign of the interaction term coefficient is opposite to and significant compared to the baseline regression coefficients, indicating that institutional ownership weakens the inhibitory effect of data assetization on stock price crash risk.

4.2. Robustness Checks

4.2.1. Alternative Clustering of Standard Errors

Considering that differences in years, regions, and industries where firms operate lead to varying circumstances, and that the specification of clustered standard errors directly affects coefficient significance, this study further tests the robustness of conclusions to clustering dimensions. Specifically, the clustering level of standard errors is replaced with three alternative levels: "province," "province-industry," and "year-province-industry." The regression results reported in Table 4 show that the coefficients of the core explanatory variable DA (data assetization) are all significantly negative at the 1% level. Thus, regardless of the clustering method used, the baseline conclusion that "corporate data assetization suppresses stock price crash risk" remains robust.

Table 4. Regression Results with Alternative Clustered Standard Errors

Variables	(1) NCSKEW	(2) DUVOL	(3) NCSKEW	(4) DUVOL	(5) NCSKEW	(6) DUVOL
	Province		Province-Industry		Year-Province-Industry	
DA	-0.0265*** (-3.63)	-0.0268*** (-5.71)	-0.0265*** (-3.78)	-0.0268*** (-6.40)	-0.0265*** (-3.74)	-0.0268*** (-5.68)
Controls	YES	YES	YES	YES	YES	YES
Industry/Year	YES	YES	YES	YES	YES	YES
R ²	0.091	0.095	0.091	0.095	0.091	0.095

Note: *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

4.2.2. Controlling for Interaction Fixed Effects

To further verify the robustness of the baseline conclusions, this study controls for the interaction fixed effects of "year × industry" to account for shocks or fluctuations that industries may face in different years. As shown in Table 5, the coefficient of the core explanatory variable DA (data assetization) remains significantly negative at the 1% level, consistent with the baseline regression results. This indicates that the baseline conclusions are not altered by higher-dimensional fixed effect specifications.

Table 5. Regression Results with Joint Fixed Effects

Variables	(1) NCSKEW	(2) DUVOL
DA	-0.0289*** (-7.10)	-0.0283*** (-12.24)
Controls	YES	YES
Industry/Year	YES	YES
R ²	0.105	0.108

Note: *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

4.2.3. Changing the Sample Period

Table 6. Regression Results with Alternative Sample Period

Variables	(1) NCSKEW	(2) DUVOL
DA	-0.0252*** (-3.20)	-0.0265*** (-4.97)
Controls	YES	YES
Industry/Year	YES	YES
R ²	0.095	0.098

Note: *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Considering the extreme shocks caused by the 2008 global financial crisis and the 2015 Chinese stock market crash on the capital market, these major events may trigger abnormal market fluctuations and irrational trading behavior, thereby causing systematic interference in the measurement of stock price crash risk. To avoid bias in research conclusions due to the special market conditions in these extreme years, this study excludes sample observations from 2008 and 2015 and re-conducts regression analysis to verify whether the core conclusions still hold. The regression results are shown in Table 6, where the regression coefficients of data assetization

(DA) remain significantly negative at the 1% level, consistent with the findings in Table 2.

5. Heterogeneity Analysis

To further deepen the understanding of how corporate data assetization affects stock price crash risk and its underlying mechanisms, this study conducts heterogeneity analysis across three dimensions: asset tangibility, audit quality, and regulatory distance.

5.1. Asset Tangibility

Heavy-asset firms primarily rely on tangible assets such as plants and equipment, with transparent values and relatively low information asymmetry; light-asset firms depend on intangible resources like patents and technology, which are difficult to verify and suffer from severe information asymmetry. Data assetization enhances stock price

informativeness by recognizing and disclosing internal data, facilitating timely reflection of negative news and constraining management's "bad news hoarding." Therefore, the inhibitory effect of data assetization on crash risk is more pronounced in light-asset firms.

This study measures asset tangibility as (total assets - net intangible assets - net goodwill) / total assets and groups firms by the median. Regression results in Table 7 show that in the heavy-asset group [columns (1) and (3)], DA coefficients on NCSKEW and DUVOL are significantly negative at the 10% and 5% levels, respectively; in the light-asset group [columns (2) and (4)], both coefficients are significantly negative at the 1% level, with larger absolute values. Bootstrap tests for coefficient differences yield empirical p-values significant at the 10% and 5% levels. These findings indicate that data assetization more significantly suppresses stock price crash risk in light-asset firms.

Table 7. Regression Results of Heterogeneity Analysis on Asset Tangibility

Variables	NCSKEW		DUVOL	
	(1) Heavy-asset	(2) Light-asset	(3) Heavy-asset	(4) Light-asset
DA	-0.0186*	-0.0330***	-0.0185**	-0.0340***
	(-1.77)	(-3.13)	(-2.56)	(-4.87)
Controls	YES	YES	YES	YES
Industry/Year	YES	YES	YES	YES
R ²	0.106	0.110	0.110	0.116
Empirical p-value	0.090		0.020	

Note: *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively. The empirical p-value is used to test the significance of coefficient differences between groups, calculated using Fisher's Permutation test (1000 replications).

5.2. Audit Quality

High-quality audit compresses the space for management to hide bad news, reducing information asymmetry and crash risk; low-quality audit leads to murky information environment, stronger incentives for management to conceal negative information, and higher crash risk. Data assetization has more significant marginal contribution in firms with low audit quality: enhancing stock price informativeness through recognition and disclosure, facilitating timely feedback on negative news, and compressing the "bad news hiding" space,

forming a governance channel. Therefore, the inhibitory effect of data assetization on stock price crash risk is more pronounced in firms with low audit quality.

This study measures audit quality by "Big 4 audit" and groups firms accordingly, where Big 4 audit represents high audit quality and non-Big 4 represents low audit quality. Regression results in Table 8 show that in the high audit quality group [columns (1) and (3)], regression coefficients are insignificant; in the low audit quality group [columns (2) and (4)], regression coefficients are significantly negative. Additionally, Bootstrap tests for coefficient differences yield empirical p-values significant at the 5% and 10% levels. These findings indicate that data assetization more significantly suppresses stock price crash risk in firms with low audit quality.

Table 8. Regression Results of Heterogeneity Analysis on Audit Quality

Variables	NCSKEW		DUVOL	
	(1) High Audit Quality	(2) Low Audit Quality	(3) High Audit Quality	(4) Low Audit Quality
DA	0.0166	-0.0309***	-0.0061	-0.0291***
	(0.55)	(-4.02)	(-0.28)	(-5.60)
Controls	YES	YES	YES	YES
Industry/Year	YES	YES	YES	YES
R ²	0.132	0.092	0.141	0.096
Empirical p-value	0.050		0.080	

Note: *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively. The empirical p-value is used to test the significance of coefficient differences between groups, calculated using Fisher's Permutation test (1000 replications).

5.3. Regulatory Distance

Geographic distance is an important variable affecting transactions and interactions among microeconomic entities. For Chinese listed companies, the China Securities Regulatory Commission (CSRC) and its dispatched

regulatory agencies play a dominant role in supervision and evaluation. Therefore, the geographic distance between securities regulators and listed companies is a significant factor affecting corporate information disclosure, supervision, and punishment (Xiao et al., 2021).

Firms with greater regulatory distance face weaker supervision, poorer information environments, stronger incentives for management to hide bad news, and higher crash risks. Data assetization compresses the space for hiding bad news through continuous information disclosure and third-party verification, effectively compensating for insufficient supervision at a distance, with stronger inhibitory effects. Conversely, firms closer to regulators are already under stronger supervision with lower information asymmetry, where data assetization has limited marginal contribution.

Therefore, data assetization more significantly suppresses stock price crash risk in firms with greater regulatory distance.

Following Xiao et al. (2021), this study measures regulatory distance as the natural logarithm of the geographic distance between the firm's registered location and the local CSRC bureau, and groups firms by the median distance. Regression results in Table 9 show that in the high-distance group [columns (1) and (3)], DA coefficients on NCSKEW and DUVOL are significantly negative at the 1% level; in the low-distance group [columns (2) and (4)], DA coefficients are insignificant. Bootstrap tests for coefficient differences yield empirical p-values significant at the 1% level. These findings indicate that data assetization more significantly suppresses stock price crash risk in firms with greater regulatory distance.

Table 9. Regression Results of Heterogeneity Analysis on Regulatory Distance

Variables	NCSKEW		DUVOL	
	(1) Far Regulatory Distance	(2) Near Regulatory Distance	(3) Far Regulatory Distance	(4) Near Regulatory Distance
DA	-0.0573***	0.0027	-0.0461***	-0.0103
	(-4.66)	(0.29)	(-5.71)	(-1.58)
Controls	YES	YES	YES	YES
Industry/Year	YES	YES	YES	YES
R ²	0.088	0.098	0.095	0.099
Empirical p-value	0.000		0.000	

Note: *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively. The empirical p-value is used to test the significance of coefficient differences between groups, calculated using Fisher's Permutation test (1000 replications).

6. Conclusions and Policy Implications

Based on data from A-share listed companies from 2007 to 2023, this study examines the relationship between data assetization and stock price crash risk and its underlying mechanisms. The empirical results indicate that: (1) corporate data assetization suppresses stock price crash risk; (2) mechanism analysis reveals that data assetization inhibits crash risk by improving stock price informativeness; (3) institutional ownership weakens the inhibitory effect of data assetization on crash risk; and (4) heterogeneity analysis shows that the effect of data assetization on crash risk is more pronounced in light-asset firms, companies with low audit quality, and those with greater regulatory distance.

Data represents the aggregation of knowledge and information. Against the backdrop of real estate no longer serving as a viable vehicle for capital and the urgent need for new capital carriers, data assets may become the future vehicle for capital. Relevant authorities are actively exploring pathways beyond the "land rent economy," such as "data rent," with corporate data assetization potentially serving as the micro-level lever for this transition. Based on these findings, this study offers the following recommendations:

First, for government authorities, proactive guidance and support should be provided to facilitate corporate data assetization, exploring new pathways from "land rent" to "data rent." This study's finding that data assetization suppresses crash risk by improving stock price informativeness provides micro-level evidence for understanding how data empowers the real economy and enhances financial stability. Relevant departments should

fully recognize the mechanism through which data assetization inhibits crash risk, actively guide and regulate corporate data assetization practices, accelerate the experimentation and exploration of transitioning from "land rent," thereby serving as a stabilizer in capital markets. Specifically, authorities can establish specialized talent teams, provide targeted subsidies, reduce barriers to data assetization, increase incentives, and standardize practices, acting as a "catalyst" for data-driven market vitality.

Second, for listed companies, those with market value management objectives may consider data assetization as a means to stabilize stock prices, particularly for light-asset firms, companies with low audit quality, and those with greater regulatory distance, where data assetization more effectively suppresses crash risk. However, companies should avoid using data assetization as a tool for chasing trends or "concept speculation" to seek improper gains; instead, it should be utilized as a tool that genuinely benefits the firm's operations.

Finally, for investors, data asset information can assist investment decisions. Based on the finding that data assetization suppresses crash risk, investors seeking stability and averse to extreme crash risks may identify promising investment targets among firms that have implemented data assetization, while distinguishing between genuine needs and trend-chasing. Understanding that data assetization inhibits crash risk through improved stock price informativeness, investors should recognize that data assets provide an entry point for deeper mining of firm-specific information to inform investment decisions. Furthermore, based on heterogeneity analysis, investors should consider firms' asset tangibility, audit quality, and regulatory distance—the degree to which data assetization suppresses crash risk—for individual stock position management.

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