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Data Asset Recognition and Stock Price Synchronicity: PSM-DID Evidence from Chinese Listed Companies

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Abstract. In August 2023, China's Ministry of Finance issued the Interim Provisions on accounting treatment of enterprise data resources, explicitly requiring that from January 1, 2024, qualified data resources of enterprises should be included in the balance sheet for confirmation. We regard the implementation of this policy as an exogenous shock event, select a-share listed companies from 2020 to 2025 as research samples, and use PSM-DID method to analyze the actual impact of policy implementation on stock price synchronization. The final core interaction coefficient is 0.079, which is significant at the level of 1%, indicating that the implementation of the data resource entry policy will significantly improve the stock price synchronization, this result is still valid after multiple robustness tests. The results of mechanism analysis are consistent with the expectation of noise trading theory: data assets are Intangible assets with high valuation difficulty, which will increase the uncertainty of market valuation on enterprises, it urges investors to be more inclined to follow the overall trading trend of the market, which will push up the synchronization of stock prices in the short term. This policy effect is more obvious in non-state-owned enterprises, which is related to the higher level of information asymmetry of non-state-owned enterprises themselves. This study fills the gap of relevant empirical research and can provide reference for regulatory authorities to adjust valuation standards and improve information disclosure rules.

Keywords: data asset recognition, stock price synchronicity, noise trading, information asymmetry, PSM-DID

1. Introduction

In the environment of digital economy, data has become the core production factor and strategic asset to drive value creation and economic growth [1, 2]. In August 2023, China's Ministry of Finance issued the Interim Provisions on accounting treatment of enterprise data resources, explicitly requiring that data resources should be included in the balance sheet of enterprises for confirmation from January 1, 2024, this regulation marks the formal transformation of data elements from the original technical concept to capitalized assets. Globally, the data governance Act and the data act issued by the European Union regulate data sharing behavior and Internet of Things access rights, the United States has passed state-level legislation such as the California Consumer Privacy Act (CCPA) to allow enterprises to capitalize data in accordance with GAAP.

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At present, there is still a key question that has not been clearly answered: can confirming data assets really improve the information efficiency of the capital market? Considering the difficult valuation of data assets, can the confirmed data assets transmit the individual information of the enterprise or aggravate the noise transaction instead? Most of the existing researches focus on practical risks and implementation methods. There are few large samples of empirical evidence to analyze the impact of data asset confirmation on stock price synchronization. This research is aimed at this blank.

Taking A- share listed companies from 2020 to 2025 as the research sample, we take this policy introduced in 2023 as a quasi-natural experiment, and use PSM-DID method to carry out analysis, we find that the confirmation of data assets will obviously improve the synchronization of stock prices, this conclusion is still valid after several rounds of robust tests.

This study has three main contributions. First, it passed the large sample quantitative test for the first time to verify whether the data asset confirmation will affect the stock price synchronization. Secondly, the application scenario of noise trading theory is extended to the field of data assets, which illustrates how the difficulty of valuation will push up noise trading and further raise the synchronization of stock prices at the initial stage of policy implementation. Third, it provides a reference direction for regulatory authorities to optimize disclosure rules and enterprises to improve the quality of data asset disclosure.

2. Literature review

2.1. Research on data asset recognition

The research directions of the existing literature are mainly divided into three categories: Risks in actual implementation, optimization suggestions for implementation, and economic impact of policies.

The research on actual risks mainly focuses on the legal level and valuation level. At the legal level, data assets have the characteristics of non-exclusiveness and replicability, which conflicts with the core principle of "one thing, one right" in the property law; although "data Article 20" proposes a framework for the separation of three powers of data resources, the relevant content has not been incorporated into the formal legal provisions [3], as a result, the criteria for determining the ownership of data are not clear enough [4]. At the valuation level, the unique attributes of the data itself and the immature development of the current data trading market, the traditional Intangible asset valuation method cannot be directly applied [5], at the same time, the subjective adjustment space of the valuation model is large and the relevant disclosure standards are not clear enough, which will not only increase the risk of audit link [6], but also leave the operation space for enterprise financial fraud [7].

The optimization suggestions for implementation are mainly aimed at value measurement, confirmation operation methods and disclosure standards. The existing research proposes that a structured index system and corresponding algorithm model can be built to improve the accuracy of data asset valuation [8, 9]. At the same time, it is suggested to establish "compliance first, the disclosure framework of giving consideration to value" [10] also proposes to supplement and improve the relevant contents of the current accounting standards for enterprises No. 6-Intangible assets [11].

In terms of economic impact, at the enterprise level, data asset confirmation can reduce the earnings management behavior of enterprises [12] and improve the investment efficiency of enterprises [13]; relevant information disclosure can reduce the risk of share price crash and various

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ESG-related risks [14, 15]. At the market level, the disclosure of information related to data assets can reduce the synchronization of stock prices and improve the market pricing efficiency [16], but the characteristics of high valuation difficulty may also aggravate the noise trading in the market in the short term [17]. At the macro level, data asset confirmation can provide support for the development of new productive forces [18], and can also help the reform of local government financing platforms [19].

2.2. Research on influencing factors of stock price

Stock price synchronicity is used to measure the linkage degree between the earnings of a single stock and the earnings of the whole market, and the specific calculation method is to do logarithmic conversion on the R^2 obtained by market model regression [20]. The higher the stock price synchronization is, the more systematic information the stock pricing contains, the less trait information at the enterprise level, and the lower the information efficiency of the corresponding market [21]. At present, the core influencing factors that have been confirmed include the information environment of the enterprise, the structure of market investors, the level of corporate governance, and the overall institutional environment [22, 23]. The increase of information transparency will reduce the stock price synchronization, while the increase of noise trading will push up the stock price synchronization..

3. Theoretical analysis and research hypothesis

The impact of data asset confirmation on stock price synchronization is mainly generated through two mechanisms with opposite directions. From the perspective of information asymmetry theory, forcing enterprises to disclose their data resources can reduce the information difference between investors and enterprises, help investors to price individual information of enterprises more accurately, thus reducing the synchronization of stock prices. From the perspective of noise trading theory, data assets lack reliable fair value reference standards, and at the beginning of the policy, market parties have different perceptions of them, it will lead investors to make decisions more inclined to follow the overall trend of the market rather than refer to the individual signals of enterprises, which will increase noise trading and push up the synchronization of stock prices.

In the initial stage of policy implementation, the supporting guidelines are not perfect, and the impact of noise trading will dominate. Therefore, we put forward the following assumptions:

H1: After the implementation of the policy, compared with enterprises that have not confirmed data assets, the stock price synchronization of enterprises that have completed the confirmation of data assets is significantly higher.

4. Empirical design

4.1. Variable definition

Explained variable: stock price synchronization (SYN), calculated by referring to Morck et al's research method [21].

Core explanatory variable: treat is a group virtual variable. If the enterprise confirms the data asset in the report in 2020 and later, the value is 1, otherwise it is 0, and the variable does not change over time. post is a time virtual variable. The observed values in 2024 and later are assigned 1, and

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the previous observed values are assigned 0. The interaction item treat*post is used to capture the net impact of data asset confirmation on stock price synchronization.

Control variables: including enterprise size (size, taking the natural logarithm of total assets), asset-liability ratio (lev), Tobin Q value (tq), operating cash flow ratio (cfo), cash holding ratio (cash), fixed assets ratio (fa), listing years (list), property of enterprise ownership (soe), rate of return on assets (roa).

4.2. Model specification

We use PSM-DID. Propensity scores are estimated via logit on 2023 cross-sectional data; 1:1 nearest-neighbor matching (caliper = 0.05) selects comparable treatment and control firms. The following two-way fixed effects model is estimated on the matched sample:

$$SYNit = \beta 0 + \beta 1 \cdot treat\_postit + \beta 2 \cdot postit + \gamma Controlsit + \mu i + \lambda t + \varepsilon it \quad (1)$$

where μi and λt are firm and year fixed effects. β_1 identifies the net effect of data asset recognition on synchronicity.

4.3. Samples and data sources

The research sample is A- share listed companies in Shanghai and Shenzhen stock markets from 2020 to 2025. According to the 2012 Industry Classification Standard of CSRC, ST-type enterprises and financial industry enterprises are excluded. The calculation data of enterprise financial data and stock price synchronization are all from CSMAR database; The confirmation of enterprise data assets is obtained through manual retrieval of annual reports of listed companies. After data cleansing and PSM matching, the final research sample includes 781 enterprises, including 278 state-owned enterprises and 503 non-state-owned enterprises.

5. Empirical results

5.1. Descriptive statistics

Table 1 reports descriptive statistics for all variables.

Table 1. Descriptive statistics

Variable	Count	Mean	Std. Dev.	Min	Max
SYN	955	0.401	0.198	0.002	0.966
treat	955	0.501	0.500	0.000	1.000
post	955	0.360	0.480	0.000	1.000
treat_post	955	0.180	0.384	0.000	1.000
size	955	23.482	1.628	20.258	28.360
lev	955	0.492	0.203	0.053	1.085
tq	955	1.907	1.609	0.634	16.896
cfo	955	0.043	0.066	-0.263	0.322
cash	955	0.176	0.121	0.007	0.761
fa	955	0.195	0.171	0.002	0.778
list	955	15.335	9.438	0.000	35.000

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Table 1. (continued)

soe	947	0.891	0.750	0.000	4.000
roa	955	0.024	0.061	-0.556	0.300

Note: Variable definitions follow Section 4.1. The variable soe has 8 missing observations (N = 947 vs. 955) due to incomplete ownership classification records in the CSMAR database; these observations are excluded from regressions involving ownership type.

5.2. PSM matching quality

Post-matching balance tests show that standardized bias (%bias) is substantially reduced across all covariates, with t-tests uniformly insignificant ($p > 0.1$), confirming covariate balance between treatment and control groups.

5.3. Benchmark regression results

When the control variable is not put in, the coefficient of influ_post is 0.056($p < 0.05$). After adding control variables, the coefficient rises to 0.079($p < 0.01$). Compared with the control group, the synchronization of the stock price of the enterprises that confirm the data assets increases by 0.079 units, assuming H1 is verified..

6. Robustness tests and further analysis

6.1. Parallel trend inspection

Taking 2024 as the base period, the interaction coefficient before the implementation of the policy (2020-2023) is not significant, and the confidence interval contains zero point, which indicates that there is no trend difference between the treatment group and the control group before the implementation of the policy. After the implementation of the policy (2024-2025), the coefficient is significantly positive, which is consistent with the benchmark regression results.

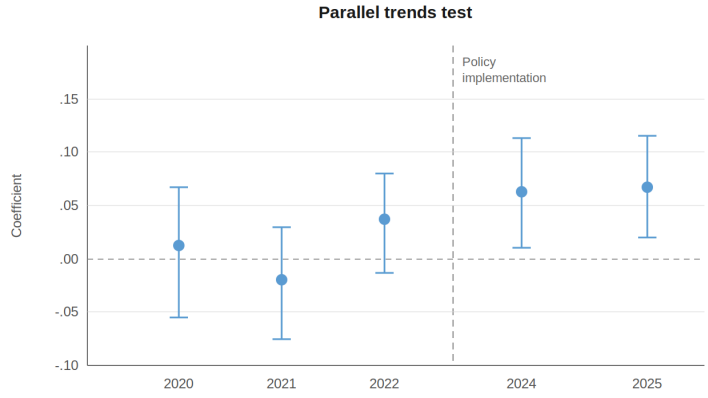

Figure 1. Parallel trends test

6.2. Placebo test

After 500 times of random allocation to the processing group, the logarith_post coefficient obtained by simulation is basically close to 0 and follows the normal distribution. The coefficient of 0.079

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obtained from the actual regression is at the right tail of the distribution ($p < 0.05$), indicating that the effect obtained from the study is not randomly generated.

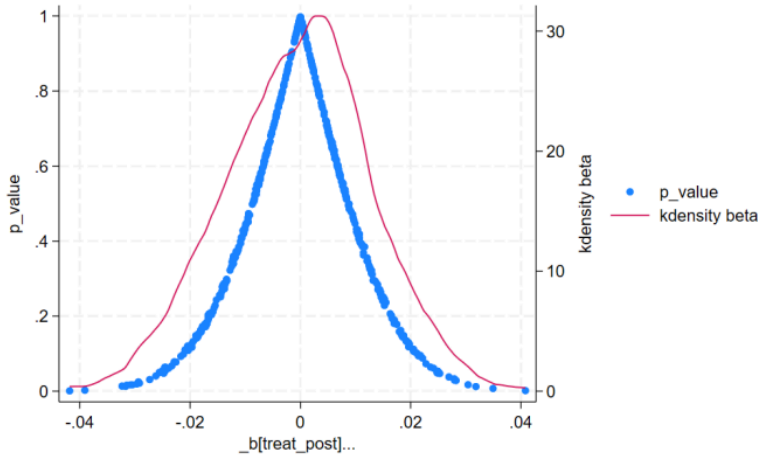

Figure 2. Placebo test

6.3. Other robustness tests

Shrink the tail. After all the continuous variables are indented at 1% and 99%, the influ_post coefficient is 0.076($p < 0.01$), which is consistent with the benchmark regression result.

The time point of the virtual policy. Advance the effective time of the policy to 2022 (that is, the post' value is 1 in 2022 and later), and the obtained_post coefficient is 0.011, but the result is not significant, it shows that the effect of benchmark regression is not caused by the existing trend before the implementation of the policy.

6.4. Heterogeneity analysis

Non-State-owned enterprises receive relatively less analyst coverage and supervision from institutional investors, face more prominent information asymmetry problems, and make it more difficult for investors to evaluate them. We group the samples according to the nature of enterprise ownership, and the relevant results are listed in table 2.

The influ_post coefficient of the state-owned enterprise group is not significant (column 1), but the coefficient of the non-state-owned enterprise group is significantly positive (Column 2), which is higher than the degree of information asymmetry of the non-state-owned enterprise group, investors are consistent with the characteristics of greater uncertainty in their valuation.

Table 2. Regression results by ownership type

Variable	(1) SOEs	(2) Non-SOEs
	SYN	SYN
treat_post	0.152*** (0.047)	0.036 (0.032)
post	0.000 (.)	0.000 (.)
size	-0.083* (0.049)	0.086** (0.039)

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Table 2. (continued)

lev	0.157 (0.199)	-0.266** (0.121)
tq	-0.012* (0.006)	-0.035** (0.014)
cfo	0.047 (0.131)	-0.022 (0.214)
cash	-0.146 (0.146)	-0.340* (0.195)
fa	-0.543* (0.289)	-0.209 (0.162)
list	0.000 (.)	−0.039 (0.031)
roa	0.220 (0.241)	-0.053 (0.215)
Constant	2.298** (1.082)	-0.601 (1.079)
N	278	503

*Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.*

7. Conclusion

Taking the data asset confirmation policy implemented in 2024 as a quasi-natural experiment, after PSM-DID and analyzing the-share panel data from 2020 to 2025, we found that the data asset confirmation will significantly improve the stock price synchronization, this effect is more obvious in non-state-owned enterprises, and it is still valid after several rounds of steady tests.

The above research results are consistent with the expectation of noise trading theory: the valuation of data assets itself is difficult, which will lead to market cognitive divergence at the initial stage of confirming the implementation of policies, and urge investors to carry out more noise trading, and then push up the synchronization of stock prices. This effect is more significant in non-state-owned enterprises, which is related to the situation that such enterprises have higher information asymmetry and investors have greater uncertainty in their valuation.

Based on the research results, two policy implications can be drawn. For regulatory authorities, it is necessary to further improve the valuation standards and disclosure requirements of data assets, reduce the difficulty of interpreting relevant rules, and gradually release the long-term effect of data asset confirmation policies on improving information efficiency. For enterprises, it is necessary to improve the readability and comparability of data asset disclosure content, so as to facilitate investors to accurately carry out valuation work.

The main limitation of this study is that the observation window after the implementation of the policy is relatively short, covering only 2024-2025. In the future, with the gradual maturity of valuation methods and the increasing market familiarity with data assets, the role of information transmission mechanism is expected to dominate, which may reverse the changing direction of stock price synchronization, this problem can be further explored by subsequent research.

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