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Stock Market Reactions to Data Assets Recognition in Firm Financial Reports

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Abstract. In August 2023, the Ministry of Finance initially proposed guidelines for the identification and accounting treatment of data assets. From the perspective of stock market reactions, this study analyzes the theoretical significance of the data assets recognition in firm financial reports and evaluates its policy effects. Text analysis is used to determine whether a firm has data assets based on data from Chinese A-share listed firms. The event study method is then used to determine that, following the announcement of the Interim Provisions, firms with data assets will experience a more positive market reaction than those without data assets, and the conclusion passes the robustness test. It demonstrates investors are optimistic about the entry of firm data assets into the Financial Statements. Investors think it will benefit shareholders by raising the firm value and more accurately reflecting its current state. Further analysis reveals that firms with lower audit quality, lower institutional investor shareholdings, and fewer analysts to follow, will experience a more positive market reaction. The conclusions of this study provide a relevant basis and reference for further promoting the reform of data assets entry into the Financial Statements.

Keywords: Data assets recognition, Text analysis, Event study method, Stock market reactions

1. Introduction

In the fields of economy and finance, the value of data is fueled by the spread and prospect of digital economy, data quikly becomes a crucial production factor on par with "land, labor, capital, and technology", and they complement each other in terms of factor requirements [1]. The use of data assets can help firms formulate the right strategy and direction, refine management, optimize the level of governance, etc., enhancing the efficiency, competitiveness and value of enterprises in an all-round way [2-4]. In this context, the impact of policies related to the entry of data assets into the financial statement can improve theoretical understanding and contribute to practice .

It is crucial to measure, process, and disclose data assets value effectively in order to support future efforts. The Interim Provisions on Accounting Treatment of Enterprise Data Resources (Finance and Accounting [2023] No. 11)—henceforth referred to as the Interim Provisions—was formally released by the Ministry of Finance of China on August 1, 2023. The promulgation of Chinese "Interim Provisions" echoes the needs of the development of the digital economy. It

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balances the financial reporting objectives of truthfulness and decision-usefulness from the accounting perspective [5]. Given that the release of the Interim Provisions affects frims' information disclosure and digital transformation strategies, the capital market should react to this policy in theory [6-8]. The purpose of this paper is to study the stock market reaction to the policy on the entry of data assets into the financial statement, and to provide micro-level insights into the impact of this policy and the digital transformation on firms.

Theoretically, the valuation of firms with data assets can be improved once the data assets are included into the financial statements from a financial and operational standpoint, particularly for data-driven and data-resource-based enterprises. Based on previous researches [9,10], this study uses the event study methodology in order to observe the short-term capital market reaction of listed firms in the wake of the Ministry of Finance's announcement of the Interim Provisions and to assess the economic effects of the policy release more thoroughly.

2. Hypothesis

Data assets can help firms screen projects, accurately grasp strategic directions and market positioning, and reduce uncertainty. The characteristics of data assets, such as non-consumability, processability and diversity of forms, determine that it can combine various data processing technologies to help firms keenly discover key information through in-depth mining and analysis, such as market trends, customer needs, differentiation advantages and product optimization directions information. So data assets can help firms evaluate, screen and optimize relevant projects in multiple dimensions, find new value growth points and opportunities, and refine brand positioning strategies [2,11,12].

Beyond strategic planning, data assets can improve overall operation and management level of the firm by optimizing resource allocation, strengthening internal communication, quantifying performance management, etc., thus maximizing the firm's interests. Data is generated by and in turn serves a highly integrated information system, which hinges on production and operation system [3,13]. With the help of information technology and models, the use of data assets analysis can provide reliable advice on the quantitative allocation of relevant resources for different goals, helping firms optimize decision-making and reduce costs [14].

Data assets can also optimize corporate governance and ensure the long-term healthy development of firms by strengthening risk management, improving information transparency, alleviating information asymmetry, and strengthening the quality of internal audit. Data assets can help firms establish a comprehensive risk management system and strengthen risk management. By connecting data assets with information systems, they can improve the efficiency of information and communication, helping firms dynamically measure risks [4].

It can be seen that data assets can empower the transformation and development of firms in multiple dimensions, which will contribute to the long-term value of firms [15,16]. After the release of the policy, firms will actively explore the value of data assets, broaden the application scenarios of data assets, empower the whole process of business, and ultimately increase the value of the firm. This is a favorable signal for the market. Due to limited attention, investors will control their choices within a certain range, while ignoring some investment opportunities. Events that attract investors' attention are more likely to enter their decision-making systems [17]. And investors' behavior can cause fluctuations in the firm's stock price [18,19].

This paper speculates that investors are more likely to pay attention to the future value of firms with data assets after the release of the Interim Provisions. They may be more optimistic about the future growth potential of firms that are supported by technology platforms, have a sense of big data

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governance, and are further able to transform data resources into data assets, thus generating better expectations, which are reflected in short-term stock price fluctuations. As a result, the stock prices of firms with data assets will rise. Therefore, if the stock prices of firms that own data assets rise after the release of the Interim Provisions, it indicates a positive market reaction and that investors have formed better expectations, believing that the entry of data assets into the financial statements can bring benefits to shareholders by increasing corporate value.

Based on the above analysis, this study proposes the following hypothesis:

Hypothesis 1: Compared to firms without data assets, those with data assets will have a more favorable market reaction following the publication of the Interim Provisions.

3. Data and variables

3.1. Sample selection and data source

A-share listed firms comprise the initial research sample for this study. The annual reports of listed firms in 2022 are used for text analysis, the control variables use data from 2022, and the calculation of the excess return rate uses data from 2023 for individual stock returns and market returns. The sample is further screened based on the following criteria: samples of ST, ST*, financial industry firms, and those with missing relevant variables are excluded; firms with an estimation window of less than 30 trading days are excluded when calculating the excess returns. In the end, 4382 observations are obtained. Continuous variables are shrink-tailed at the bilateral 1% level to lessen the effect of extreme values.

The annual reports of A-share listed firms, which are crawled and text analyzed by Python, come from Juchao Information Network. Other financial data is derived from the CSMAR database. This study uses STATA18 for data processing.

3.2. Modeling and variable definitions

3.2.1. Modeling

To gauge how the market would react to data assets being added to the table, the following empirical model is set up:

$$CAR^{MM}{}_i \ or \ CAR^{FF}{}_i = \beta_0 + \beta_1 Dataasset_i + Controls + \varepsilon_i \quad (1)$$

where i stands for A-share listed firms, CAR_i^{MM} denotes the cumulative abnormal return calculated by the market model, CAR_i^{FF} denotes the cumulative excess return calculated by the Fama-French three-factor model, and $Dataasset_i$ denotes whether the listed firms are affected by the Interim Provisions. $Controls$ are a series of control variables, and ε_i is a random disturbance term. Robust standard error-adjusted t-statistics are used in all regression equations to mitigate the effect of heteroskedasticity.

Table 1. Descriptive statistics

Variable	Obs.	Mean	S.D.	Minimum	Median	Maximum
CAR^{MM}	4382	0.002	0.047	-0.132	0.001	0.165
CAR^{FF}	4382	-0.038	0.049	-0.191	-0.036	0.128

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Table 1. (continued)

Dataasset	4382	0.056	0.230	0.000	0.000	1.000
ROA	4382	0.032	0.068	-0.220	0.036	0.223
Lev	4382	0.393	0.203	0.051	0.378	0.900
Size	4382	22.173	1.248	19.810	21.973	26.130
Indshare	4382	40.539	24.715	0.500	39.683	91.726
Age	4382	9.885	8.991	0.000	7.000	29.000
TobinQ	4382	1.848	1.084	0.813	1.491	7.248
BM	4382	0.660	0.243	0.138	0.671	1.231
EC	4382	31.777	14.189	8.130	29.625	71.440
Duality	4382	0.372	0.483	0.000	0.000	1.000
SOE	4382	0.242	0.428	0.000	0.000	1.000
Growth	4382	-0.509	2.674	-17.615	-0.149	5.330
Lnvalue	4382	22.675	1.182	20.173	22.502	26.372

4. Empirical results

4.1. Baseline regressions

In Table 2, multiple regression analysis is used to estimate the market reaction resulting from data assets being added to the table. In line with the descriptive statistics, the findings indicate that data assets being added to the table causes a positive market reaction, which in turn raises the firm's value. The regression coefficients of Dataasset are significantly positive at the 1% confidence level regardless of whether control variables are included or not, and whether the market model or the Fama-French three-factor model is used to measure cumulative abnormal returns.

In terms of economic significance, when using the market model to calculate the cumulative abnormal return, the regression coefficient of Dataasset is basically stable at 0.020. This indicates that when the Interim Provision is published, the shareholder wealth of firms with data assets can increase by 2% on average, compared to firms without data assets. After adding different risk factors, using the Fama-French three-factor model to calculate the cumulative abnormal returns (CAR), the regression coefficient of Dataasset is basically stable at 0.011, indicating that the risk factors will have an impact on CAR, but hypothesis H1 still holds. In summary, hypothesis H1 holds, i.e., after the announcement on accounting treatment of data assets, firms with data assets will have a more positive market reaction compared to firms without data assets.

Table 2. Capital market reaction to data asset entry

Variable	(1)	(2)	(3)	(4)
	CAR^{MM}	CAR^{MM}	CAR^{FF}	CAR^{FF}
Dataasset	0.022***	0.020***	0.012***	0.011***
	(6.43)	(5.96)	(3.35)	(2.95)
ROA		-0.056***		-0.061***

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Table 2. (continued)

		(-3.98)		(-4.04)
Lev		0.006		0.016***
		(1.45)		(3.35)
Size		-0.037***		-0.042***
		(-2.64)		(-2.94)
Indshare		-0.000		-0.000
		(-1.25)		(-0.42)
Age		0.001***		0.001***
		(6.45)		(8.17)
TobinQ		-0.005*		-0.004
		(-1.74)		(-1.24)
BM		0.045***		0.054***
		(3.09)		(3.70)
EC		-0.000		-0.000
		(-1.35)		(-1.37)
Duality		0.001		0.001
		(0.68)		(0.69)
SOE		-0.000		-0.005**
		(-0.22)		(-2.42)
Growth		-0.000		-0.000
		(-0.09)		(-0.47)
Lnvalue		0.043***		0.045***
		(3.09)		(3.17)
Constant	0.001	-0.176***	-0.039***	-0.165***
	(0.99)	(-9.26)	(-51.58)	(-8.25)
N	4382	4382	4382	4382
R^2	0.012	0.086	0.003	0.075

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

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5. Robustness checks

5.1. Propensity Score Matching (PSM)

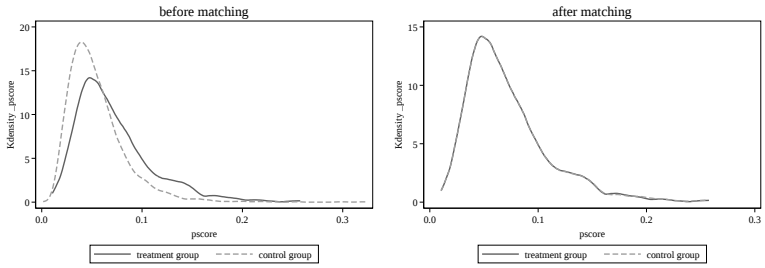

Figure 1. Kernel density before and after propensity score matching

Robustness tests are conducted using the Propensity Score Matching (PSM) method for a more reliable counterfactual. The sample is divided into the experimental group and control group based on whether the firms owned data assets or not, using the neighborhood matching method in PSM. All control variables in the model (1) are used as matching variables according to the 1:1 no-relaxation neighboring PSM method. Fig. 1 shows the density function distribution plots before and after matching.It is discovered that, prior to pairing, there is a significant difference in the relevant characteristics between the experimental group and the control group; after pairing, the difference decreases and the paired samples have a better degree of fit. After that, the regression is conducted using the sample after matching. As shown in Table 3, the regression coefficients of the Dataasset are still significantly positive.

Table 3. Regression results after PSM

Variable	(1) CAR^{MM}	(2) CAR^{MM}	(3) CAR^{FF}	(4) CAR^{FF}
Dataasset	0.025***	0.024***	0.016***	0.014***
	(5.59)	(5.52)	(3.39)	(3.16)
Controls	No	Yes	No	Yes
Constant	-0.002	-0.277***	-0.043***	-0.284***
	(-0.66)	(-5.18)	(-14.29)	(-4.93)
N	490	490	490	490
R^2	0.058	0.132	0.021	0.084

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

6. Heterogeneity test

6.1. A test based on audit quality

Model (1) is regressed based on whether the enterprise is audited by the international "Big Four", and the sample is split into two groups according to audit quality. Table 4 illustrates this relationship:

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the lower quality audit group's coefficient of Dataasset is significantly positive at the 1% level, higher than the other group by 0.035, and significantly different from zero at the 1% level. In summary, the enactment of the Interim Provisions will result in a more positive market reaction from firms with lower audit quality compared to firms with higher audit quality.

Table 4. Regression results by the category of audit quality

Variable	(1) Higher quality audit	(2) Lower quality audit
	CAR^{MM}	CAR^{MM}
Dataasset	-0.011	0.024***
	(-1.37)	(5.20)
Difference in coefficients between groups	0.035***	
P-value for Fisher's combined test	0.006	
Controls	Yes	Yes
Constant	-0.179**	-0.174***
	(-2.40)	(-7.04)
N	252	4125
R^2	0.096	0.065

6.2. A test based on the investor's ability to identify information

The results of regression show that firms with lower institutional shareholding will have a more positive market reaction after the release of the Interim Provisions.

6.3. A test based on the role of analyst messaging

The results of the subsample regressions show that the firms with less analysts tracking will have a stronger positive market reaction after the enactment of the Interim Provisions.

7. Conclusions

This paper offers the following insights: Firstly, the release of the Interim Provisions can have an effect on enterprises. In order to empower the entire business process and increase competitiveness, enterprises should actively explore data resources and creatively use them in specific scenarios, focusing on valorizing and assetizing data assets. Additionally, enterprises should actively disclose pertinent information to investors to demonstrate their development potential and competitiveness. Secondly, the government should make full use of the incentive role of the capital market on the behavior of enterprises in discovering, applying, and disclosing data assets, improving the efficiency of resource allocation. This paper emphasizes the significance of data assets while also revealing to the market that these assets are essential to the growth of businesses in the future, and that firms with strong data exploration and utilization practices can gain market recognition and improve their value. Thirdly, policymakers should refine the pertinent rules in the light of the conduct and related impact of data asset entry by enterprises. Legislators ought to monitor the standardization of data assets into the table while also making necessary modifications and enhancements based on the

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current circumstances. Lastly, the inclusion of data assets into the table represents a fresh effort. Future academic study needs to be focused on how to successfully increase the completeness and quality of data assets disclosure, with the goal of supplying investors, businesses, and policymakers with useful information.

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