

Media Attention and the Synchronization of Listed Companies' Stock Prices

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Abstract. The influence of media releases on the synchronization of listed businesses' stock prices is examined in this paper using data on the A-share market from 2009 to 2020. The study's discoveries indicate that the higher media exposure can significantly reduce the synchronization of stock prices of listed companies, thereby helping to improve the company's stock pricing efficiency. The conclusion remains robust after excluding special samples and replacing core explanatory variables for robustness analysis. Further analysis of the heterogeneity according to the size of firms listed on the stock market and the nature of their property rights shows that media reports have a substantial influence on the synchronization of stock prices of private enterprises and small-scale enterprises, and relatively little impact on the stock price synchronization of government-owned businesses and large-scale enterprises. The study's findings have theoretical merit as well as practical implications for enhancing a company's stock price effectiveness and preserving market stability.

Keywords: Media attention, Stock price synchronization, Pricing efficiency.

1. Introduction

The term "share price synchronization" describes the relationship between a single company's share price movement and the market's average change. It is generally measured by R squared indicator of the model between individual stock income and market income and industry income. A higher R^2 represents the greater portion of individual stock earnings interpreted by industry and market earnings, which is relatively influenced by market and industry fluctuations. Eun et al. calculated the synchronization level of the stock price of the world's major economies and discovered that the Chinese market has the highest level of stock price synchrony in the whole globe [1]. The previous research results have indicated that higher stock price synchronization will have certain negative effects on listed companies, such as reducing the rationality of resource allocation, reducing the possibility of identifying and replacing underperforming executives, and increasing the risk of stock price crash [2], etc. Especially under the major exogenous shocks of various uncertainties, driven by common factors in the market, the stocks of listed companies are more prone to the convergence phenomenon of "rising and falling together". Therefore, under the background of the current stock market convergence phenomenon caused by the uncertain and exogenous shock of the new crown epidemic, it is important to do study on the variables that affect listed firms' stock price synchronization.

The media, which serves as the primary source of information for investors on listed firms, will also have some influence on the investment choices of investors. For example, positive or negative media reports will expand the exposure of listed companies through information channels, which may trigger investors' "herd response", and further affect the synchronous change trend of listed companies' share prices. Based on this, this paper incorporates the synchronization between media reports and listed companies' stock prices of into a unified analysis framework. The study found that the media reports of listed companies can help lower the synchronicity of stock price and enhance stock pricing efficiency. The conclusion remains robust after multiple robustness analysis.

2. Literature review

Currently, numerous investigations have been done regarding this field. For example, Li and Shen believe that the media, as an informal external supervision mechanism, it has great significance to promote the level of corporate governance and strengthen enterprise supervision [3]. At the same time, Cu and Li believe that higher media exposure can effectively promote corporate governance and reduce agency costs [4]. In addition, higher media attention is helpful to improve the company's information disclosure quality and further improve the decision-making usefulness of fundamental information of listed companies [5-6]. When more basic news of listed companies is incorporated into the share price, in the end, it will assist in reducing stock price synchronization and enhancing efficiency.

Based on the "noise view" related research, it is found that because investors are not completely rational, media reports are likely to trigger the "herd effect" of investors, which further induces investors to converge on optimism and pessimism [7], so that the share prices of listed companies which have higher media exposure incorporate more non-fundamental information and irrational factors driven by the company, which will eventually lead to the excessive reflection of the listed company's stock price deviating from the fundamental value, thereby reducing the synchronization of stock prices [8]. In addition, under the premise of short-selling restrictions and heterogeneous beliefs, the increased investor attention brought by media reports is more likely to trigger investors' irrational behaviour [9]. Further, the irrational behavior of investors will accelerate the integration of the company's non-fundamental information and the irrational behavior driven by it into the price. Eventually, the enterprise's share price will fluctuate more than the market and industry. To sum up, the following assumptions are made: the higher media coverage can help drop the synchronization of listed companies' stock prices.

3. Study Design

3.1 Source of Data and Selection of Sample

In this paper, data from the A-share market is collected and the final study sample is obtained through the following processing: First, exclude financial listed companies. Since real estate companies in China have strong financial attributes, the sample of real estate companies is further excluded; Second, eliminate listed companies with abnormal financial status or other conditions; Third, remove the relevant variables with more serious sample missing; Fourth, this article removes the sample data with sample observations less than 5 years based on the principle of "five-year coherence"; Fifth, in order to reduce the influence of outliers, in this paper, 1% and 99% tails of all continuous variables at the micro level are reduced. After the above processing, a total of 25,113 company annual samples were obtained.

Calculation of key indicators and description of variables

①stock price synchronicity (Synch). Learn from the ideas of Durnev et al. and Xu et al [10, 11]. The following model (1) is adopted to calculate R² of individual stocks of listed companies, which is used to measure the synchronization of listed companies' stock prices.

$$r_{i,t} = \alpha_i + \beta_{i,1}r_{m,t} + \beta_{i,2}r_{I,t} + \varepsilon_{i,t} \quad (1)$$

In model (1), $r_{i,t}$ indicates the weekly yield of the stock, $r_{m,t}$ represents the weekly yield of the stock market index in t week, $r_{I,t}$ means the weekly rate of yield of industry I in week t . The data comes from the CSMAR database and the classification of industries shall refers to the classification standards published by China Securities Association.

Lower R² indicates that the stock price reflects more heterogeneity messages, and the pricing efficiency is higher, while the larger R² indicates that the pricing efficiency is lower and that less specific information about the firm is reflected in the stock price.

②Media attention (Media). The total number of news reported by the media each year of listed companies is used as a measure of media attention, and the data comes from the CNRDS database.

③Control variables. Other influencing factor show negligible impact on the stock return, for the sake to comprehensively explore the issue, this paper chose several indicators according to Xiao and Shen [12]. Detailed definitions of main variables are shown in Table 1.

Table 1. The selected variables

Symbol	Explanation	Definition
Synch	stock price synchronicity	R2
Media	Media attention	Total annual news coverage of listed companies
Size	Enterprise scale	Logarithm of total annual assets
Lev	Asset-liability ratio	Total liabilities at year end / total assets at year end
Growth	Operating income growth rate	Current year operating Income/previous year operating income -1
Top1	Ownership concentration	Shares owned by the greatest shareholder/the total number of shares
SOE	Nature of the enterprise	Enterprise nature. 1 for state-controlled enterprises, 0 for others

3.2 Descriptive Statistical Analysis

Table 2 indicates the descriptive results of these selected variables in this paper. Based on the statistical results of the sample, the mean and standard deviation of stock price synchronization (Synch) of listed companies are 0.459 and 0.193, respectively. The minimum value and the maximum value are quite different, indicating that there are great differences in stock price synchronicity changes among diverse listed companies. In addition, from the sample statistics of media reports, it can be seen that the difference between the minimum and maximum values of media reports is as high as 9.682, indicating that media attention is significantly different for different companies, and there is a certain preference for media reports.

Table 2. Descriptive Statistics

Variable	Mean	Std.dev	Min	Median	Max
Synch	0.459	0.193	0.001	0.465	1.000
Media	5.101	1.043	0.693	5.056	10.375
Size	22.253	1.298	19.350	22.088	26.395
Lev	0.442	0.208	0.027	0.438	0.990
Growth	0.166	0.452	-0.732	0.100	4.806
Top1	0.344	0.149	0.084	0.321	0.758
SOE	0.397	0.489	0.000	0.000	1.000

3.3 Correlation coefficient

As can be seen from Table 3, almost all selected variables are positively connected with the synchronicity expect for the operating income growth rate. However, correlation analysis does not have a causal relationship. Theoretically, media reports can supervise listed companies in a certain degree and improve the efficiency of stock pricing on a certain level. Therefore, it is necessary to test the correlations for media reports and stock price synchronization by empirical methods.

Table 3. Correlation Analysis

Variable	Synch	Media	Size	Lev	Growth	Top1	SOE
Synch	1.000						
Media	0.082	1.000					
Size	0.221	0.444	1.000				

Lev	0.010	0.170	0.482	1.000			
Growth	-0.056	0.054	0.035	0.020	1.000		
Top1	0.095	0.084	0.218	0.071	0.017	1.000	
SOE	0.170	0.061	0.326	0.278	-0.059	0.259	1.000

4. Empirical analysis

4.1 Benchmark regression analysis

To estimate the influence of media reports of listed companies on stock price synchronicity, this article sets up the following model (2) for estimation, and further adds a year dummy variable (year) and an industry dummy variable (Industry) to the model in order to reduce the impact of time exogenous shocks and industry common shocks on firm performance.

$$Synch_{i,t} = \alpha_0 + \alpha_1 Media_{i,t} + \Sigma Control_{i,t} + \Sigma Industry_{i,t} + \Sigma Year_{i,t} + \varepsilon_{i,t} \quad (2)$$

In model (2), $Synch_{i,t}$ means stock price synchronicity of company i in t year; $Media_{i,t}$ shows the level of media coverage of enterprise i in year t ; $Control_{i,t}$ means the control variables; both $Year_{i,t}$ and $Industry_{i,t}$ are the industry dummy variables; $\varepsilon_{i,t}$ is a random disturbance term. The regression estimation of model (2) is carried out using ordinary OLS plus robust standard errors in this article

Table 4 shows the benchmark regression results of model (2). To make sure the regression conclusions are accurate and prevent the influence of missing variables on the reliability of the results, this paper adopts a progressive regression strategy to estimate model (2). Columns (1)-(5) in Table 4 all control the year and industry dummy variables. Column (1) only controls the size of the company. The estimated results indicate that the regression coefficient of media reports on stock price synchronicity is -0.0184, which has passed the 1% statistical significance test. The asset-liability ratio is added in Column (2) based on Column (1). The regression coefficient of "media coverage - stock price synchronicity" is -0.0188, which has also passed the 1% statistical significance test. Column (3) adds the operating income growth rate based on column (2), the regression coefficient is -0.0181, and it has also passed the 1% statistical significance test. Column (4) further adds the proxy variable of the company's equity concentration based on column (3). The results indicate that the regression coefficient is -0.0183 and has passed the 1% statistical significance test. Column (5) adds all control variables and indicates that the regression coefficient of media reports on stock price synchronicity is -0.0171, which has also passed the 1% statistical significance test. The above stepwise regression results demonstrate that media reports are helpful to lower stock price synchronicity and enhance stock pricing efficiency.

Table 4. Benchmark regression results

	(1)	(2)	(3)	(4)	(5)
Media	-0.0184*** (-13.7162)	-0.0188*** (-14.0638)	-0.0181*** (-13.6347)	-0.0183*** (-13.7459)	-0.0171*** (-12.8434)
Size	0.0485*** (44.6492)	0.0573*** (49.3832)	0.0579*** (49.8982)	0.0584*** (49.6480)	0.0561*** (46.9603)
Lev		-0.1230*** (-20.6615)	-0.1230*** (-20.6854)	-0.1240*** (-20.7921)	-0.1325*** (-22.0086)
Growth			-0.0357*** (-15.2108)	-0.0357*** (-15.2053)	-0.0338*** (-14.4347)
Top1				-0.0165** (-2.2098)	-0.0284*** (-3.7934)
SOE					0.0258*** (10.6033)
Constant	-0.3360*** (-13.5046)	-0.4647*** (-18.1886)	-0.4778*** (-18.7093)	-0.4805*** (-18.8094)	-0.4490*** (-17.5176)
Year / industry	Y	Y	Y	Y	Y

Observed value	25,113	25,113	25,113	25,113	25,113
R2	0.297	0.309	0.315	0.315	0.318

Note: In parentheses are t values adjusted by robust standard error, ***p<0.01, **p<0.05, *p<0.1, the same below.

4.2 Robustness Test

The above benchmark regression basically proves that media reports significantly reduce the synchronization of listed companies' stock prices. For making this conclusion more reliable, this article further uses the following two methods to conduct robustness tests. First, exclude the 2020 company sample. Due to the impact of the new crown epidemic on listed companies in 2020, the stock prices of listed companies on the whole show violent fluctuations. Including the 2020 samples into the unified analysis may affect the regression results. Based on this, this paper further removes the 2020 samples to re-estimate model (2). Second, replace the core explanatory variables. In order to investigate the impact of different media attention types on stock price synchronicity, this article further splits the total media reports into positive, neutral, and negative media reports.

Table 5 indicates the regression results after excluding the 2020 sample. The results in columns (1)-(5) of Table 5 indicate that, after excluding the samples in 2020, the regression coefficients of media reports on the synchronization of stock prices are less than zero, which all have passed the 1% statistical significance tests, showing that without considering the exogenous impact of the COVID-19 in 2020, media reports have an obvious inhibitory effect on the synchronization of listed companies' stock prices, which is helpful to enhance stock pricing efficiency.

Table 5. Excluding special samples

	(1)	(2)	(3)	(4)	(5)
variable	Synch	Synch	Synch	Synch	Synch
Media	-0.0186*** (-13.0984)	-0.0191*** (-13.5002)	-0.0183*** (-13.0247)	-0.0185*** (-13.1662)	-0.0174*** (-12.3565)
Size	0.0466*** (40.3514)	0.0553*** (44.2096)	0.0558*** (44.6853)	0.0564*** (44.6520)	0.0542*** (42.2186)
Lev		-0.1157*** (-17.9259)	-0.1151*** (-17.9062)	-0.1165*** (-18.0635)	-0.1258*** (-19.2846)
Growth			-0.0379*** (-15.2345)	-0.0379*** (-15.2319)	-0.0357*** (-14.3895)
Top1				-0.0220*** (-2.8138)	-0.0337*** (-4.2883)
SOE					0.0263*** (10.2532)
Constant	-0.2908*** (-11.0641)	-0.4205*** (-15.4391)	-0.4337*** (-15.9340)	-0.4373*** (-16.0585)	-0.4047*** (-14.8131)
Year / industry	Y	Y	Y	Y	Y
Observed value	22,574	22,574	22,574	22,574	22,574
R2	0.283	0.294	0.301	0.302	0.305

Table 6 shows the regression results after changing the key explanatory variables. The core explanatory variables in columns (1)-(3) in Table 6 represent positive, neutral and negative media reports, respectively. According to the regression findings in column (1), the coefficient of positive media news on the synchronization of listed businesses' share prices is -0.0104, which has passed the 1% statistical significance test. In column (2), the impact coefficient of media neutral reports on the synchronization of stock prices is -0.0098, which has passed the 1% statistical significance test. The regression coefficient of negative media reports on the synchronization of stock prices in column (3) is -0.015, which passed the statistical significance test of 5%. The influences of three different types of media reports on the synchronization of listed companies' stock prices are different. Among them, negative media reports have a relatively great influence on stock price synchronicity, while neutral

media reports have relatively little influence. The above regression results all indicate that after changing the core explanatory variables, media attention has a obvious inhibitory impact on stock price synchronicity, and it can still help promote the stock pricing efficiency of listed companies. It is further proved that the basic conclusion of this paper is reliable.

Table 6. Replacing core explanatory variables

	(1)	(2)	(3)
Positive	-0.0104*** (-7.4028)		
Neutral		-0.0098*** (-7.6165)	
Negative			-0.0150*** (-10.9679)
Size	0.0531*** (43.9285)	0.0532*** (43.8740)	0.0539*** (46.8264)
Lev	-0.1352*** (-22.3535)	-0.1340*** (-22.1898)	-0.1310*** (-21.7439)
Growth	-0.0336*** (-14.3004)	-0.0343*** (-14.6077)	-0.0353*** (-14.9987)
Top1	-0.0252*** (-3.3665)	-0.0252*** (-3.3553)	-0.0275*** (-3.6612)
SOE	0.0274*** (11.2383)	0.0272*** (11.1442)	0.0264*** (10.8441)
Constant	-0.4276*** (-16.3345)	-0.4423*** (-16.4736)	-0.4404*** (-17.1329)
Year / industry	Y	Y	Y
Observed value	25,113	25,113	25,113
R2	0.315	0.315	0.317

4.3 Heterogeneity Analysis

To examine whether the impact of media reports on the synchronization of stock prices of different types of listed companies has differences in system and scale, this paper divides the whole sample into the following ways to test for heterogeneity. Firstly, the heterogeneity test is carried out according to the size of the enterprise. The enterprise size is divided according to the median of the year-end assets of listed companies. The company's year-end asset size is larger than the median of the annual asset size of all companies is divided into large enterprises, and smaller than the median is divided into small enterprises. Secondly, according to the property rights of enterprises, all sample enterprises are divided into government-owned and private enterprises to test the influence of media attention on the synchronization of stock prices of listed companies with different property rights. Table 7 shows the heterogeneity test regression results.

Columns (1) - (2) in Table 7 report the impact of media attention on the synchronization of share prices of listed enterprises of different sizes. The results in columns (1) - (2) show that the impact coefficient of media reports on the synchronization of share prices of large-scale enterprises is -0.007, and the impact coefficient of media reports on small-scale enterprises is -0.0321, both of which have passed the 1% statistical significance test. In addition, it indicates that there are obvious differences in the influence of media reports on stock price synchronicity of listed enterprises which have different sizes. Media reports show different impacts for small-scale and large-scale companies. In addition, the results in column (3) indicate that media reports on state-owned enterprises significantly affects the synchronicity. A similar result can also be found in Column (4). The above results indicate that higher media exposure has a relatively large effect on the synchronization of private companies' share prices, and a relatively small impact on state-owned enterprises.

Table 7. Heterogeneity analysis

	(1)	(2)	(3)	(4)
	large-scale enterprises	small-scale enterprises	state-owned enterprises	private enterprises
Media	-0.0070*** (-3.7871)	-0.0321*** (-16.2860)	-0.0099*** (-4.9140)	-0.0249*** (-13.8712)
Size	0.0620*** (29.5479)	0.0522*** (19.5909)	0.0604*** (33.3418)	0.0496*** (30.6017)
Lev	-0.1256*** (-13.1905)	-0.1175*** (-14.8451)	-0.1280*** (-13.2858)	-0.1158*** (-14.7590)
Growth	-0.0366*** (-11.1047)	-0.0272*** (-8.1695)	-0.0333*** (-8.1547)	-0.0341*** (-11.9319)
Top1	-0.0373*** (-3.6793)	-0.0290*** (-2.6191)	-0.0196* (-1.6736)	-0.0510*** (-5.1253)
SOE	0.0344*** (10.2632)	0.0156*** (4.4065)		
Constant	-0.5917*** (-13.1984)	-0.3498*** (-6.0902)	-0.5281*** (-14.5937)	-0.3219*** (-8.3357)
Year / industry	Y	Y	Y	Y
Observed				
value	12,553	12,560	9,970	15,143
R2	0.342	0.293	0.364	0.277

5. Conclusion

The synchronicity is a key indicator to evaluate the efficiency of stock pricing, besides, it is of significance to study the influencing factors of synchronization of listed companies' stock prices, for enhancing a company's stock price effectiveness and preserving market stability. This paper finds that the higher media exposure of listed enterprises has a more obvious effect on the synchronization, and the higher media attention can help to enhance the efficiency of stock pricing. After excluding the exogenous impact of the COVID-19 in 2020 and doing the robustness analysis according to the type of media reports, it is found that the inhibitory effect of media reports on the synchronization of stock prices remains stable. Further, based on the heterogeneity regression of the property rights and scale differences of listed companies, it is found that media reports have a relatively large impact on the stock price synchronization of small-scale enterprises and private enterprises, and a relatively small influence on state-owned enterprises and large-scale enterprises.

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