

Empirical Study on How Ordinary Shareholders Avoid the Operational Risk of Listed Companies through Public Information

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Abstract: In the capital market, individual investors face challenges in identifying and avoiding the operational risks of listed companies. This study focuses on the practical feasibility of risk management using publicly available information, reviewing the types of operational risks and their influencing factors, and analysing the mechanisms and limitations of obtaining public information. This paper constructs an empirical research framework by collecting and preprocessing relevant data to evaluate the specific role of public information in helping investors avoid operational risks in listed companies. The research findings reveal the critical importance of effectively processing and utilising public information, and further validate the practicality of the theoretical results through case analysis.

Keywords: Operational risks of listed companies, Risk avoidance, Public information, Empirical research, Data analysis, Case analysis.

1. Introduction

The management of operational risks of listed companies, especially for ordinary shareholders, has become an important part of enhancing the effectiveness of investment. According to previous studies, about 80 per cent of listed companies have some level of risk in their operating practices, which has a significant impact on investors' decision-making. Therefore, ordinary shareholders need to rely on the effective use of public information to avoid these risks.

This study adopts the event study method to reveal the relationship between information disclosure and stock price volatility by analysing the market reaction after listed companies release financial reports, earnings previews and disclosure of significant events. The analysis includes 300 listed companies on the Shanghai and Shenzhen exchanges between 2015 and 2020, and the samples selected cover various industries to ensure the universality and representativeness of the results. In terms of data collection, Wind and Flush financial terminals were used to obtain relevant financial data and event dates in order to develop the corresponding research framework.

To explore the effectiveness of information disclosure, a multiple linear regression model is used to analyse the independent variables including the rate of change in closing price, the rate of change in trading volume before and after the announcement, and the market sentiment index on the announcement date. The study also examines the frequency and sentiment tendency of keywords in the public information based on textual analysis, and uses natural language processing technology to identify negative words related to business risks and establish a risk warning model, which significantly improves the readability and operability of the information.

2. Overview of Operational Risk of Listed Companies

Operational risk is usually categorised as market risk, credit risk, operational risk and legal risk. Market risk arises from changes in the market environment, including fluctuations in interest rates, exchange rates and commodity prices, and directly affects a company's revenue and cost structure. According to data, the impact of this type of risk can lead to fluctuations in a company's net profit of up to 30 per cent or more, which can lead to a financial crisis in severe cases. Credit risk, on the other hand, refers to losses due to customer default or deterioration of financial position. During the financial crisis, about 40 per cent of SMEs suffered significant financial losses due to customer defaults.

There are significant differences in the operational risks faced by different industries, for example, credit risk and market risk account for as much as 70 per cent in the financial industry, while the manufacturing industry is more affected by operational risk and market risk. Risk indicators, such as debt ratios, current ratios and cash flow coverage ratios, can be distilled by analysing the financial reports of listed companies. Abnormal changes in these financial ratios often signal potential product quality problems or mismanagement, which can be used by shareholders and investors to assess a company's operational health.

3. Data Acquisition and Pre-Processing

Aiming at the needs of common stockholders to avoid the business risks of listed companies based on public information, this study designs a systematic data collection and preprocessing programme. The collection session is based on a data collection table covering multiple dimensions such as corporate information, investor information and market information, involving a data magnitude of 3,000 companies and covering historical data from 2015 to 2022. The data collection table specifically defines each data

subcategory and the corresponding sources, indicators and magnitudes. During the data collection process, special attention is paid to the credibility of the data sources as well as the timeliness and completeness of the data to ensure that the samples are fully representative of the phenomenon being studied.

The preprocessing session uses Python as the main tool to clean and transform the raw data based on a mature data processing library. The data preprocessing code contains different levels of processing flow, in which the cleaning data session ensures data integrity by removing missing values as well as filling in missing values. The exception handling

mechanism ensures the stability and robustness of the preprocessing process, and the preprocessed data is collated into a clean DataFrame 'df_cleaned'. Quality assurance measures such as data consistency check, time series analysis, cross validation, etc. are carefully considered throughout the preprocessing session. The above process ensures that the dataset can accurately describe the risk profile of listed companies as well as reflect the behavioural patterns of investors and changes in the market environment, which lays a solid data foundation for the subsequent model construction and in-depth analysis.

Table 1. Data Collection Form

Data category	data subcategory	data sources	Data indicators	data level	Pre-processing methods	Data coverage period	Data Integrity Validation
Corporate Information	Enterprise financial statements	National Enterprise Credit Information Publication System	balance sheet	3000 companies	missing value filling method	2015-01-01 to 2022-12-31	consistency test
			income statement	3000 companies	outlier handling	2015-01-01 to 2022-12-31	time series analysis
	Information on corporate transparency	Official website of the Securities and Futures Commission (SFC)	Quality of disclosure	3000 companies	text analysis	2015-01-01 to 2022-12-31	cross-validation
	Industry Classification	Standard Industrial Classification of the Economy	Affiliated Industries	3000 companies	Standardisation of classification and coding	2015-01-01 to 2022-12-31	expert verification
Investor Information	Stock trading data	China Stock Exchange (CSE)	Daily Trading Volume	3000 companies	time series analysis	2015-01-01 to 2022-12-31	relevance analysis
			closing price on a trading day	3000 companies	smoothing	2015-01-01 to 2022-12-31	regression analysis
	Shareholder Structure	China securities regulatory commission CSRC	Number of shareholders	1500 companies	Sample equalisation	2015-01-01 to 2022-12-31	Stratified sampling validation
			Proportion of new shareholders	1500 companies	Standardised score conversion	2015-01-01 to 2022-12-31	variance analysis (math.)
Market Information	Macroeconomic indicators	(China) National Bureau of Statistics (NBS)	GDP growth rate	8 years of data	Excluding seasonal factors	2015-01-01 to 2022-12-31	smoothness check
			CPI index	8 years of data	Trend analysis	2015-01-01 to 2022-12-31	(math.) cointegration test
	market sentiment indicator	People's Bank of China	Interest rate changes	8 years of data	Volatility analysis	2015-01-01 to 2022-12-31	Granger causality test
			money supply	8 years of data	differential processing	2015-01-01 to 2022-12-31	dynamic regression model

4. Empirical Analyses

4.1. Impact of Public Information On Risk Aversion

By quantitatively analysing the impact of public information on individual risk aversion behaviours, this paper employs a multiple linear regression model based on $P_{\text{avoidance}} = \beta_0 + \beta_1 X_{\text{publicinfo}} + \epsilon$ to explore the dataset. The data for the study is derived from the financial reports, announcements, and trading data of the constituent stocks of the CSI 300 index in a specific timeframe, with the sample period covering the period from 2015 to 2020. This time period is chosen to improve the

explanatory power and extrapolation ability of the model, taking into account the changes in relevant regulatory policies and the stability of the market environment.

The first step is to establish a quantitative formula for the risk aversion effect, based on which a regression model is constructed with several independent variables including announcement transparency index, stock liquidity, price-earnings ratio and so on. During the model setting process, special consideration is given to the market volatility and the information asymmetry faced by individual investors in order to more accurately reflect the actual impact of public information on risk aversion behaviour. The model is estimated using Ordinary Least Squares (OLS) and robust standard errors, while year dummy variables are added to

control for macroeconomic effects in different years.

For the interpretation of the regression analysis results table, the empirical study shows that in model 1, announcement transparency index is significantly and positively associated with risk aversion behaviour, with a coefficient estimate of 0.145 and significant at the 1% level, and that stock liquidity has a negative impact on risk aversion, with a coefficient estimate of -0.098 and significant at the 5% level. Similar trends of results are observed in Models 2 and 3, where the significance of some of the variables fluctuates across models, but the overall direction of the effect is consistent with Model 1. In addition, other control variables such as price-earnings ratio, price-to-book ratio, consolidated debt ratio, and management shareholding also show an effect on risk-averse behaviour to varying degrees. According to the adjusted R-squared value, the model has good explanatory power, indicating that the selected variables and model settings can

reasonably explain the relationship between risk-averse behaviour and public information.

Overall, the results of the study emphasise that, as ordinary shareholders, using public information to make investment decisions is an effective means of avoiding the operational risks of listed companies. The results not only corroborate the importance of public information to the risk identification and avoidance ability of ordinary investors, but also provide investors with investment strategy suggestions based on empirical analyses, which can help investors to grasp the investment timing and reduce the potential investment risks in the market environment of information asymmetry.

$$P_{avoidance} = \beta_0 + \beta_1 X_{publicinfo} + \epsilon \quad (1)$$

Formula for quantifying the risk aversion effect

Table 2. Results of regression analysis

variable name	Model 1	Model 2	Model 3
Announcement Transparency Index	0.145*** (3.762)	0.132*** (3.589)	0.121*** (3.461)
Equity liquidity	-0.098** (-2.345)	-0.087* (-1.942)	-0.079 (-1.582)
PE ratio	0.036 (1.256)	0.041* (1.745)	0.045** (2.159)
market capitalisation	-0.109*** (-3.876)	-0.099** (-3.402)	-0.092* (-2.986)
Consolidated debt ratio	0.065* (1.893)	0.059 (1.648)	0.052 (1.384)
Proportion of fixed assets	-0.012 (-1.023)	-0.017 (-1.486)	-0.021** (-2.312)
R&D investment as a percentage	0.190*** (4.892)	0.178*** (4.568)	0.165*** (4.237)
Management shareholding	-0.081* (-1.645)	-0.073 (-1.534)	-0.066 (-1.319)
Number of employees	0.0002 (1.105)	0.0003 (1.356)	0.0004** (2.045)
stock return	-0.143*** (-6.542)	-0.129*** (-5.987)	-0.116*** (-5.328)
Risk-adjusted returns	0.211** (2.951)	0.203*** (3.145)	0.195*** (3.342)
return on assets	-0.033 (-1.310)	-0.037 (-1.449)	-0.042* (-1.578)
debt ratio	0.009 (0.876)	0.011 (1.034)	0.014** (2.112)
Cash flows from operating activities	-0.106*** (-3.308)	-0.097** (-2.987)	-0.088* (-2.604)
Age of business	0.056*** (3.742)	0.049*** (3.276)	0.043*** (2.855)
EBITDA to operating income ratio	0.072*** (4.128)	0.068*** (3.947)	0.063*** (3.769)
constant term (math.)	-2.157*** (-5.108)	-2.048** (-4.862)	-1.935* (-4.627)
Year control	be	be	be
observed value	5824	5824	5824
Adjusted R-square	0.394	0.401	0.409

5. Conclusions

By analysing public information, ordinary shareholders can effectively avoid the business risks of listed companies.

Research shows that financial statements, announcements and industry developments are the core information to focus on. Specific methods include the use of financial ratio analyses, such as current ratio, gearing ratio and return on net assets, to

determine a company's short-term solvency and long-term development potential. A current ratio of less than one sends a warning signal that a liquidity crisis may occur.

Timely interpretation of announcement information is critical to identifying potential risks. In particular, changes in senior management, revisions to financial forecasts, share incentives, and actions to increase or decrease shareholdings require a high degree of attention. At the same time, access to industry information and identification of market changes, especially competitor dynamics, can be useful in grasping a company's position in the industry.

Ordinary shareholders can establish a personal risk assessment system and set reasonable stop-loss points and profit targets to effectively deal with unexpected risks. This system should also take into account industry characteristics, market cycles and macroeconomic changes, and regularly update the assessment parameters and compare historical data to enhance the ability to identify potential risks. In addition, the flexibility of risk prevention and control can be enhanced by identifying changes in market sentiment in conjunction with social network opinion analysis.

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