

Using AI to Improve Corporate Governance

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Abstract. This paper mainly discusses the relationship between corporate governance and dynamic business performance in semiconductor industry. Although there have been many discussions on the relationship between corporate governance and corporate performance in the past, there is no consistent conclusion. We intend to analyze and compare the corporate governance variables group, the expression of long-term performance and the differences between upstream, midstream and downstream of semiconductor industry. In addition, because the existing problems of corporate governance can not be solved by the current rigid system, we attempt to cut in from the perspective of AI and propose the effect of automatic warning.

1 Introduction

This study focuses on the relationship between corporate governance and long-term business performance in the semiconductor industry in mainland China.

Firstly, the influence of corporate governance variable groups on corporate performance is discussed. Through the characteristics of the board of directors, insider ownership structure external equity structure, sub industry and asset size, a more complete governance variable is integrated.

Secondly, the structure of variable groups is carried out, and we try to confirm them.

Finally, through further in-depth analysis, we can verify whether there are positive significant differences among the variable groups.

2 Literature Review

There have been many discussions on the relationship between corporate governance and corporate performance in the past.

The main ideas are from the perspective of agency theory, including those from the perspective of managers, such as the convergence hypothesis of managers' interests and the theory of information transmission, the higher the manager's shareholding ratio, the better the company's performance (Coles, McWilliams and Sen, 2001; Färe, Grosskopf and Brännlund, 1996; Tone and Tsutsui, 2010; Tone and Tsutsui, 2014) [1] [3] [8] [9]; while the opposite view is that the higher the proportion of shares held by the managers, the more job security will lead to the dereliction of duty, or the anti takeover action against the valuable merger and acquisition case

based on the consolidation of equity, which will lead to the worse business performance of the company.

Otherwise, from the perspective of shareholders, there are positive views that the higher the proportion of shares held by the board of directors will promote the better performance of the company (Shleifer and Vishny, 1986; Xu and Wang, 1999; Coles, McWilliams and Sen, 2001) [6] [10] [1]. In addition, Steiner (1996) found that the higher the proportion of directors and supervisors of the largest shareholder, the lower the value of the company, showing a negative relationship [7].

Another more detailed study points out that the relationship between the pledge proportion of directors and supervisors and corporate performance and value depends on their motivation. If the pledge motivation of directors and supervisors is to protect the market or increase their control, the pledge proportion of directors and supervisors will have a negative relationship with corporate performance. From the Perspective of cross industry, there are also different results, such as the pledge ratio and corporate performance of various industries in Taiwan (Chong-Hao Qiu, 2013) [2]. The results show that: (1) there is no significant correlation between the pledge ratio of directors and supervisors and corporate performance in technology industry and traditional industry; (2) there is a positive correlation between the pledge ratio of directors and supervisors and corporate performance in plastic industry, and there is no significant correlation between the pledge ratio of directors and supervisors and corporate performance in other single industry. Besides, Her-Jiun Sheu and Chi-Yih Yang (2005) taking Taiwan listed electronic industry as the research object, and they find that the relationship between the shareholding of senior managers and corporate efficiency decreases first and then increases [4].

In addition to the above agency theory perspective, there are also analysts from the perspective of

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institutional investors' supervision. For example, the efficiency monitoring hypothesis holds that institutional investors have more professional knowledge and can monitor the company management more effectively than the general investment public. Therefore, the shareholding ratio of institutional investors is positively correlated with the company value. Taking listed companies as samples, McConnell and Servaes (1990) discussed the shareholding ratio of institutional investors, and they found that there is a non-linear relationship between the ratio and the shareholding ratio of major shareholders [5]. At first, there is a positive correlation, but after more than 50%, there is a negative correlation.

Looking at the above empirical results of domestic and foreign literature, there is no consistent conclusion. Obviously, due to the difference of input observation variables, the discussion on the impact of performance will produce different results. Therefore, we attempt to re-examine the impact on the above related variables through cross-phase observation from the perspective of continuous performance.

3 Research Method

This research focuses on the relationship between corporate governance and long-term business performance of the semiconductor industry in mainland China. The impact of corporate governance variables on corporate performance is explored by using board characteristics (four sub-variables), insider ownership structure (two sub-variables), external ownership structure (three sub-variables), and sub industry and asset size as control variables. To integrate a more complete group of governance variables than in the past.

The research object of this research is the top ten companies listed in Hong Kong, Shanghai and Shenzhen from 2000 to 2017, which are the three upstream, middle and downstream sub industries of semiconductor industry in mainland China.

The data source is the annual report data published by the stock exchanges of Hong Kong, Shanghai and Shenzhen, and based on the year-end data. It is estimated that the number of sample companies in this study is less than 30. As the research materials are public information, the research results are highly attainable.

The plan is divided into three directions, but the main framework basically includes introduction of the current situation of the semiconductor industry in mainland China; discussion and collation of relevant literature; construction and rationality of research model; description of sampling sources; empirical results and conclusions and suggestions.

In addition, the expected results of this research are whether there are groups of corporate governance variables in the semiconductor industry, whether there are differences in the influence strength among groups, and whether there is a correlation between groups and performance.

4 Research Results

Semiconductor industry is the basic support industry of national economy and national science and technology, which is very important and difficult to replace. The government's support attitude to the industry is also very firm.

According to CIC consultant's forecast of China's semiconductor market sales in 2020-2024, the sales volume of China's integrated circuit industry in 2018 is 653.2 billion yuan, with a year-on-year growth of 20.7%. It is estimated that by 2025, China's semiconductor industry will be in the next seven years, and China's semiconductor market will continue to grow at a compound annual growth rate of 6%. The global share of China's semiconductor market will increase from 50% in 2018 to 56% in 2025.

Therefore, in the process of industry growth, enterprises can promote the development of enterprise performance through reasonable and orderly corporate governance, and form strong and powerful competition conditions, which is worthy of the attention of the industry and academia.

At this time, the semiconductor industry is in transition and facing strong international competition. There are three types of technical division between upstream, midstream and downstream enterprises in the industry, and they are facing different competition challenges. Therefore, it is necessary to construct an effective and reasonable corporate governance structure to support the sustainable development of the industry.

Based on the analysis of the impact of the imperfection and lack of research methods in the past on the research variables, the research intends to use more accurate model and more comprehensive variables, and put forward the viewpoint of variable group, to explore the correlation and adaptability between corporate governance and long-term enterprise performance of semiconductor industry from more perspectives and comprehensively.

Through variable group and dynamic performance research methods, we analyze the characteristics of upstream, midstream and downstream semiconductor enterprises, from different perspectives, hoping to develop in this industry, and we make relevant contributions to strategic suggestions at critical moments (see Table 1).

5 Conclusions and Suggestions

The innovation of this research is that, in view of the previous research on the impact of corporate governance on corporate performance, there is no consistent conclusion, and there is no detailed distinction between the internal formats of the industry, so the strategic suggestions are not suitable.

This topic is discussed step by step from three directions. A more accurate performance measurement model should be used to analyze a more complete group of corporate governance variables in groups, across time and in different industries. It should be able to obtain a

more comprehensive view, enhance the strength of research conclusions, and provide stronger support for Strategic opinions.

Besides, the semiconductor industry has a significant national strategic position, and at the time of the country's strong support for the semiconductor industry, if we can classify and compare the corporate governance status of various industries in the industry, the policy opinions will be more targeted and appropriate..

In addition, in view of the fact that the existing corporate governance mechanism sometimes can not play a normal role, we propose to establish an early warning function of AI, so that when there is a problem in corporate governance, we can immediately give a warning, so that enterprises can find problems ahead of time, solve problems effectively, and then enhance the ability of corporate governance and enterprise competitiveness.

Table 1. Related variables of governance group.

Classification	Variable
Board Characteristics	Shareholding Ratio of Directors and Supervisors
	Ratio of directors to supervisors
	Ratio of Independent Directors and Supervisors
	Shareholding Ratio of Foreign Directors and Supervisors
Insider Ownership Structure	Manager Shareholding Ratio
	Shareholding Ratio of Major Shareholders
External Equity	Shareholding Ratio of External Shareholders
	Foreign Corporate Shareholding Ratio
	Shareholding Ratio of Domestic Legal Person
Control	Asset Size

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