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Research on Asymmetric Causality between Background Characteristics of Top Management Team and Enterprise Performance

Jiapan Wang, Jia Huang*
School of Government
Beijing Normal University
Beijing, China

***Abstract*—This study utilizes data from 30 domestic listed real estate companies to study the asymmetric causality between the background characteristics of top management team and corporate performance by qualitative comparative analysis. The research finds that for listed real estate companies, the essential conditions for high corporate financial performance are high educational level, high average salary and low political connection of the top management team; while the necessary conditions for a company to have low financial performance are low educational level, low tenure, low average salary, low shareholding ratio and low political connection of the top management team.**

Keywords—Qualitative comparative analysis; Background characteristics of top management team; Enterprise performance

I. INTRODUCTION

Domestic and overseas scholars interpret the relationship between the background traits of top management team and enterprise performance through various theories and methods, so the research perspective becomes increasingly microscopic. The author finds that the current research approaches are mainly based on regression analysis, in addition to different special emphasis on the research theme, the research conclusions are also manifold, which makes it difficult to systematically scan this issue. Therefore, this paper comes up with new empirical research thoughts, and provides a possibility for the "systematicness" of the research.

II. LITERATURE REVIEW

A. Review of research topics

In terms of theme, the existing studies have covered variables from age, gender, tenure, educational level, salary, stock right, occupational background, political connection and other levels. Through a classification retrieval of literature topics, the author finds that in recent years, the research topics of domestic scholars in this area concentrates mainly on remuneration, political relevance, educational background, equity and tenure. The writer believes that the focus of the current research themes on these five background features can be explained from two angles of theoretical basis and conceptual scope.

1) The advantages of theoretical basis

First of all, regarding the characteristics of senior executive compensation and equity, most researchers take the Principal-agent Theory and Incentive Theory as the starting point. Their viewpoints can be generalized as follows: remuneration and stock ownership incentive can improve the work efficiency of managers and realize the integration of interests, and then promote enterprise performance; the impact of executive political association on firm performance can also be unscrambled from multiple theoretical perspectives, specifically including Upper Echelon Theory and Social Capital theory, etc. Luo Mingxin (2015), based on the higher-order theory, combined with the views of resource base and the social capital theory, interpreted the impact of political connection on the innovative performance of enterprises from the perspective of internal and external enterprise[1]; The theory of the relationship between the features of executive education background and corporate performance mainly includes the theory of upper-echelon and the theory of human capital. Human capital theory focuses on the educational background itself, and believes that the accumulation of human capital by education, training and other means can bring competitiveness to enterprises, while the high-level echelon theory emphasizes that demographic characteristics can "externalize" the psychological characteristics of managers to affect the strategic decision-making of enterprises; And finally, the characteristics of senior executive tenure, in this aspect, it is mainly supported by Life-cycle Approach (or Seasonal Model), Seasonal Model can be interpreted as the theory of the direct relationship between entrepreneur tenure and performance, which effectively explains the non-linear relationship between CEO tenure and business performance [2].

2) The advantage of the concept scope

From the perspective of conceptual scope, the tenure, salary, shareholding status, educational background and political connection of senior executives describe the situation of a senior executive team at multiple levels, such as characteristics of the population and economic and social status. Taking tenure as an example, tenure overlaps with the age and professional background of senior executives in a way, but it can better reflect the working situation of senior executives in enterprises. Different from age, tenure directly reflects the working time of senior management personnel in the enterprise, while age cannot directly represent the employment record,

and career background merely depicts whether the executive has working experience in a particular field. So it can be said that tenure avoids the indirectness of age and professional background to some extent, which is also the reason why scholars take it as a study variable.

B. Study conclusion collation

Considering that most research methods are on the basis of quantitative analysis, the conclusions are principally divided into four classes: positive association, negative association, other forms of association and no significant association. Specifically, in addition to the studies that simply verify the positive and negative correlation, other studies also show that the relationship between the tenure, salary, stock ownership incentive and political connection of senior executives and corporate performance is not simple linear correlation, but there are intermediary conduction, adjusting, being adjusted, nonlinearity and other forms of correlation[2]-[4].

The diversity of research conclusions reflects the contradiction, which is mainly embodied in the relevancy form and degree of correlation of variables. In the studies on the tenure, payment, shareholding status, political association and corporate performance of senior executives, there are obvious non-uniform in the research conclusions. Luo Mingxin (2015) pointed out that there are significant differences in the direction of political association influencing innovation, which are reflected as positive influence, negative influence and "inverted U-shaped" influence respectively, whose mechanism of action is also direct and indirect[1]. Not only that, but in terms of shareholding ratio and tenure, there are inconsistent or even contradictory research results.

The author believes that the major reason for the contradiction lies in the discrepancy of research thought and entry point. Taking the relationship between executive compensation and business performance as an example, researchers conduct a further study by means of introducing regulating variables such as management power and government salary restriction order. Some researchers also directly explored the regulating and mediating effects of "managerial compensation" on corporate performance. Researchers' manifold researches are the development and supplement of current research, but it also causes confusion. The effect of numerous variables on enterprise performance may be different, which leads to different research results, and over diversified research conclusions mean that it is difficult to prioritize and systematically examine the relation between background traits of top managers and enterprise performance.

C. Brief summary

In general, the main characteristics of the current research are manifold quantitative studies, various forms of research conclusions and disunity viewpoints. Due to the advantages in theoretical support and conceptual scope, the executive compensation level, shareholding situation, political relevance, educational background and tenure features have attracted the attention of scholars. Hereby, the writer of this paper adopts the Qualitative Comparative analysis method to scan this issue, regarding background characteristics at different levels as the combination of variables, to probe into its asymmetric causal relationship with enterprise performance.

III. Introduction of Qualitative Comparative Analysis Method

Different from the elements to be inspected in traditional quantitative analysis, Qualitative Comparative Analysis (QCA) holds that whether the result occurs or not is the result of the synthetic action of correlative elements (the combination of elements is called "configuration"). Through a certain number of cross-case comparisons and on the basis of counterfactual analysis, QCA reduces the configurations by applying Boolean algebra method, so as to unearth a variety configurations to achieve the outcomes[5].

The advantages of QCA are: (a) The relationship between the elements and the results is analyzed from a systematic perspective, which considers that there can be several configurations to achieve the results. (b)The focus of dissymmetric causation between cause and effect breaks through the limitation of symmetry thinking based on correlation coefficient in traditional quantitative research. (c) Different from the traditional element measurement which concerns about the objectivity variation, it pays more attention to the "validity variation" of the element[5].

IV. Definition of Data Specification and Variable Operation

A. Sources of data

This paper selects real estate listed enterprises as the research object; the main reasons are as follows:

1) The real estate industry has experienced many years of development in China, with high degree of systematism and structuration of enterprises and more complete information, which guarantees the credibility of the research.

2) As required by the “Management Measures on Information Disclosure of Listed Companies” issued by the China Securities Regulatory Commission, the contents disclosed in the annual report shall include the service status of directors, supervisors and senior executives, changes in their shareholding and annual compensation.

On account of the above reasons, 30 real estate enterprises are selected as samples by random sampling in this study, and their 2017 annual reports are used as the key data source for data extraction.

B. Definition of variable operation

TABLE I. MEASUREMENT METHODS OF VARIABLES

Variable Name	Variable Symbol	Measurement Method
Educational Level	E	Assign values according to the educational level of each top management team member, and take the arithmetic average[6].
Actual Tenure	T	An arithmetic average of the actual tenure of each member is calculated. The calculation formula is: actual tenure = (December 31 of the statistical year - the date of first appointment) /365[7].
Compensation Level	AR	Calculate the average payment of the top three executives[8].
Share Proportion	S	Calculate the proportion of the total number of shares held by senior executives in the total number of shares at the end of the year[6].

Cont. to TABLE I		
Political Connection	P	Calculate the proportion of senior executives with government background[3].
Enterprise Performance	ROA	Calculate the return on assets according to the financial statement data of the enterprise's annual report.

The measurement methods of each variable are as follows:

It is particularly noted here that this study defines the variable of political association as: if the members of the top management team of an enterprise are current or former government officials, deputies to the National People's Congress members or members of the Chinese People's Political Consultative Conference, then the enterprise is considered to have political association; otherwise, there is no political association[3].

V. Empirical Research Process

A. Data calibration

This paper chooses fuzzy-set qualitative comparative analysis for data processing and analysis, and the calibration mode is "four-value fuzzy set", that is, the data of each variable are divided into four parts in accordance with the numerical value -- "1", "0.67", "0.33" and "0", the higher the value between "0" and "1", the higher the subordination degree of the enterprise in the dimension of this variable. Finally, the fuzzy set assignment table of each variable is obtained, and some results (10 of 30 firms) are shown in the table[9].

TABLE II. Fuzzy set assignment results of each variable

Firm Code	E	T	S	AR	P	ROA
1	0.67	1.00	1.00	1.00	0.33	0.33
2	1.00	0.33	0.00	0.67	0.67	0.67
3	0.00	0.67	1.00	1.00	0.67	0.33
4	0.67	0.00	0.00	0.67	1.00	0.33
5	1.00	0.67	0.00	0.00	1.00	0.33
6	0.33	0.33	0.00	0.00	0.67	1.00
7	0.00	1.00	0.67	1.00	0.00	0.33
8	0.00	0.33	0.00	0.33	0.33	0.33
9	0.67	0.67	0.67	1.00	0.00	1.00
10	0.00	1.00	1.00	0.33	0.33	1.00

B. Analysis of necessary conditions

The analysis of necessary conditions aims to precheck the necessity of a single condition variable in advance, that is, to measure the consistency score of each condition variable before the Boolean algebra simplification of the combination of variables after calibration. When the consistency score is above 0.9, the variable can be considered as a necessary condition of the result[9]. The consistency and coverage inspection results of each variable are shown in the following table.

TABLE III. Analysis of Necessary Conditions

Variables	Consistency (ROA)	Coverage (ROA)	Consistency (~ROA)	Coverage (~ROA)
E	0.608611	0.651082	0.475801	0.487090
~E	0.520548	0.509253	0.659168	0.617103
T	0.629485	0.673412	0.453988	0.464759
~T	0.499674	0.488832	0.680982	0.637524
S	0.455969	0.635455	0.363326	0.484545
~S	0.630137	0.508421	0.726653	0.561053
AR	0.651011	0.730066	0.476483	0.511339
~AR	0.564253	0.529700	0.748466	0.672382
P	0.607958	0.582864	0.612134	0.561601
~P	0.542727	0.593862	0.545331	0.571021

From the consequences of the analysis of the necessary conditions, the Consistency score of single variable in the table do not exceed 0.9. Therefore, it is deemed that all the explanatory variables in the table are unable to be regarded as the necessary conditions of the consequences alone. Therefore, it is necessary to explore the combined effect of multiple variables.

C. Truth table construction

Based on former research experience, this paper sets the consistency threshold as 0.8 and the case threshold as 1. The truth table is constructed with the assigned data, and the logical remainders without case support are deleted to obtain the truth table (the outcome variables are ROA and ~ROA).

TABLE IV. Truth table (outcome: ROA)

E	T	S	AR	P	number	ROA	Raw consist.	PRI consist.	SYM consist
1	1	0	1	0	2	1	1	1	1
1	0	0	1	0	1	1	1	1	1
1	0	1	1	1	1	1	1	1	1
1	1	1	1	0	2	1	0.87218	0.74626	0.746269
1	0	0	1	1	2	1	0.87218	0.66336	0.663366
0	0	0	1	1	1	1	0.83417	0.50746	0.507463

TABLE V. Truth table (outcome: ~ROA)

E	T	S	AR	P	number	~ROA	Raw consist.	PRI consist.	SYM consist
0	0	0	0	0	4	1	0.9175	0.90119	0.90119
0	0	0	1	1	1	1	0.8291	0.49253	0.49253

D. Conditional combination analysis

Utilizing fs QCA software to conduct standardization analysis on the truth table, three schemes can be gained: Complex solution, Parsimonious solution, and Intermediate solution. The complex solution is obtained according to the existing cases in reality and the Boolean algebra solution is carried out in accordance with the conditional assembly corresponding to the cases; The reduction solution is solved by all the conditional assembly; The intermediate solution is first needed to screen the conditional assembly of the case without reality, and then the solution is obtained. For complex solution, any counterfactual cases are not used for solution, and there is a certain one-sidedness; For simplification solution, because both simple counterfactual analysis and complex

counterfactual analysis are included in the simplification process, the obtained solutions are likely to be inconsistent with reality. Therefore, the intermediate solution is of more reference value[10]. The three schemes reached in this study are shown in the following table:

TABLE VI. SOLUTIONS (OUTCOME: ROA)

	Raw Coverage	Unique Coverage	Consistency
Complex solution			
~T*~S*AR*P	0.216569	0.0652316	0.83208
E*T*AR*~P	0.260274	0.0652316	0.921478
E*~T*AR*P	0.195042	0.0437052	0.897898
E*~S*AR*~P	0.238748	0	1
E*~T*~S*AR	0.216569	0	0.907104
Parsimonious solution			
E*AR	0.434442	0.086758	0.868318
~S*AR	0.412264	0.0215265	0.904149
~T*AR	0.368558	0.0215265	0.893987
Intermediate solution			
E*AR*~P	0.303979	0.217873	0.932
~T*AR*P	0.2818	0.195695	0.865731

1) Analysis on the configuration of high enterprise performance

In terms of the consequences, there are two configurations of high enterprise performance: E*AR*~P and T*AR*P. Configuration 1, "E*AR*~P" (consistency is 0.93), can be expressed as when the characteristics of the executive team have three conditions of high education level, high average salary, low political correlation, the corporate financial performance shows a high level; Configuration 2 "~T*AR*P" (consistency is 0.86) can be expressed as that when the characteristics of the executive team are at low tenure level, high average salary and high political relevance, the corporate financial performance presents a higher level. However, since the consistency level of configuration 1 is higher than that of configuration 2, and the consistency level of configuration-2 is lower than 0.9, the necessary condition criterion has not been reached, the actual explanatory power of the former is higher than that of the latter.

TABLE VII. SOLUTIONS (OUTCOME: ~ROA)

	Raw Coverage	Unique Coverage	Consistency
Complex solution			
~E*~T*~S*~AR*~P	0.25017	0.227676	0.9175
~E*~T*~S*AR*P	0.112474	0.0899796	0.829146
Parsimonious solution			
~E*~T*~P	0.272665	0.205181	0.801603
~E*~S*AR	0.179959	0.0449898	0.725275
~E*~T*AR	0.157464	0	0.697885
Intermediate solution			
~E*~T*~S*~AR*~P	0.25017	0.227676	0.9175
~E*~T*~S*AR*P	0.112474	0.0899796	0.829146

2) Analysis on the configuration of low enterprise performance

There are also two configurations with low enterprise performance: ~E*~T*~S*~AR*~P and ~E*~T*~S*AR*P, and the intermediate solution is the same as the complex solution under this circumstance, indicating that no counterfactual cases are involved in the simplification process. Configuration 1, "~E*~T*~S*~AR*~P" (consistency is 0.92), can be expressed as when the senior management team has low educational level, low tenure, low average salary, low shareholding ratio, low political connection and other features, the financial performance of the enterprise is poor; Configuration 2, "~E*~T*~S*AR*P" (consistency is 0.83), can be expressed as when the executive team has low educational level, low tenure, low shareholding ratio, high average salary, high political association and other characteristics, the performance of the enterprise is poor. Likewise, configuration 1 is more explanatory.

VI. SUMMARY

The conclusions of this study can be summarized as the following two points:

1) For listed real estate companies, senior management team who at the same time, possess higher education levels, higher average remuneration and low political association is necessary condition of the enterprise high financial performance, and the senior management team who at the same time, have lower education level, lower term of office, lower average remuneration, lower proportion of shareholding and lower political association, is the necessary condition to low corporate financial performance.

2) Through the comparison of the two configurations, we can see that the executive team's educational level, average salary and political connection seem to be principal elements affecting the enterprise. Meanwhile, the low degree of political correlation in the two main configurations indicates that the impact of political connection on enterprise performance may exist interaction relationship with other variables, which provides clues for the follow-up research.

The limitations in this study are:

1) The research technique and measurement of variables used in this paper are one-sided and lack of analysis on the net effect of a single variable. From the perspective of existing studies, the detailed classification of variables such as tenure, remuneration and political correlation can produce quite other research conclusions. Therefore, there is room and necessity for further refinement in the selection of variables.

2) In the selection of sample data, this paper only selects the data of listed real estate enterprises, which cannot avoid the influence of industry differences, so the research conclusion is difficult to be generalized. Subsequent researchers can either broaden the sample range or conduct comparative studies to eliminate the effect of industry differences.

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