Overseas Background of Executives and Corporate Innovation—Based on the Mediating Role of Financing Constraints and Internal Control

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Abstract: Firms can only adapt to new opportunities in the new era through continuous innovation, and talent is the engine that drives innovation activities. This paper selects data related to overseas executives and corporate innovation of A-share listed companies from 2005-2021 to empirically test the impact of executives' overseas background on corporate innovation. It is found that overseas executives significantly promote corporate innovation and act on corporate innovation mainly through two mediating effects of enhancing internal control and reducing financing constraints. The study further finds that the promotion of corporate innovation by executives' overseas backgrounds is more pronounced in non-state enterprises, and the promotion of corporate innovation is stronger among executives with overseas posting backgrounds and those with both overseas posting and study backgrounds. The findings of the study provide path suggestions for enterprises to implement innovation development, and also provide a theoretical basis for enterprises to select returnee talents.

1. Introduction

Innovation is the first driving force that leads development and is the power source that supports the modernized economic system. Mingbo Zheng (2019) points out that as economic development steps into the new normal, the Chinese economy needs to build a development model with innovation as the core driver as soon as possible. However, the innovation development capability of Chinese enterprises is still weak compared with developed countries such as Europe and the United States, and there is a large gap in key technology areas. [1]In order to attract overseas high-level talents to return to China for employment and further promote the innovation and development of enterprises, the CPC Central Committee and various local governments have promulgated a series of policies and regulations on the introduction of overseas high-level talents, for example, the notice of the Organization Department of the CPC Central Committee on the issuance of the Management Measures of the National Overseas High-Level Talent Introduction Program and the Management Measures of the National Special Support Program for High-Level Talents in 2017, Beijing, Shanghai, Hangzhou and other Local governments have supported the establishment of R&D centers, given start-up grants, etc. [2]In order to promote the return of overseas talents. With the promotion of the above policies, a large number of overseas talents have returned to work in China, most of them as corporate executives. A key question that arises is whether returnees can promote innovation in Chinese enterprises. In academic circles, some literature has explored the effect of executives' overseas background on corporate innovation, but the approaches used and the perspectives explored vary. Zejiang Zhou (2014) focus on the impact of returnee executives and executive shareholding on firms' innovation investment, pointing out that returnee executives can significantly promote firms' innovation investment, while executive shareholding significantly reduces firms' innovation investment, and executive shareholding weakens the positive impact of returnee executives on firms' innovation investment.[3] Zhen Liu (2021) point out that from the perspective of enterprises' participation in "Belt and Road" transnational operations, the overseas background of executives has a positive moderating effect on the relationship between enterprises' participation in "Belt and Road" transnational operations and technological innovation. [4]Weiyu Gan(2022)explored the impact of overseas background on corporate innovation from a cultural perspective, using overseas experience as a proxy for the cultural characteristics of executives, and found that returnee executives significantly contributed to corporate innovation investment.[5] Fei Shen (2022) studied the impact of directors' overseas background on corporate green technology innovation from the perspective of corporate reputation, and pointed out that returnee directors' focus on corporate reputation management would increase the proportion of green technology innovation to overall corporate technology innovation.[6]

With reference to the higher echelon theory proposed by international scholars such as Hambrick (1984), heterogeneous characteristics such as the values and

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cognitive structure of decision makers will influence the corporate decision making process, and innovation activities, as major corporate decisions, are largely influenced by managerial traits.[7] The existing literature has extensively explored the factors influencing corporate innovation in terms of executives' academic experience, career experience, shareholding ratio, and team characteristics, respectively Mingquan Sheng (2021) pointed out that the higher the academic qualifications of executives the more significant the promotion of their academic experience on corporate innovation, and this effect is more pronounced in non-state-owned enterprises and small-scale enterprises; [8]Ying He (2019) pointed out that the richer the professional experience of executives, the higher the level of corporate innovation, with the most significant effect of cross-firm experience on the level of innovation; [9]Yiting Le (2017) pointed out that executive shareholding has a significant positive effect on corporate innovation sustainability, and executive overconfidence weakens the positive relationship between the two, while the positive effect of executive shareholding on innovation sustainability is stronger in private firms compared to non-private firms; [10]Huaiying Lei (2014) point out that the impact of executive team characteristics on corporate innovation investment varies across corporate effectiveness levels. Executive teams with medium and large average age are not influenced by corporate effectiveness in their innovation decisions, while those with small average age are bound by corporate effectiveness in their decision-making behavior. [11]

Thus, it can be seen that the existing literature has been quite rich in the study of the relationship between the characteristics of executives and corporate innovation, but little literature has examined the impact of executives with overseas background on corporate innovation. Based on this, the impact of executives' overseas background on corporate innovation needs to be further examined in detail. Using the combined data of overseas executives and corporate innovation for Chinese A-share listed companies from 2005-2021, this paper empirically examines the impact of overseas background executives on corporate innovation activities and investigates the mediating role of internal control and financing constraints between the overseas background of the executive team and corporate innovation. It also further examines the heterogeneous effects of different corporate property rights nature and different types of executive overseas background characteristics on corporate innovation. Therefore, this paper conducts an in-depth study on the relationship between the overseas background of executives and corporate innovation, and on this basis, it examines the mediating role of internal control and financing constraints, and expands the study on the mechanism of the effect of the overseas background of executives on corporate innovation. In a further extended study, the possible heterogeneous effects of different types of executives' overseas background characteristics on corporate innovation are analyzed, broadening the research on the economic consequences of executives' overseas background characteristics.

The contribution of this paper is to deepen the cognition of returnee executives and provide a corresponding theoretical basis for the introduction of overseas talents in Chinese enterprises, as well as to provide paths and decision-making suggestions for enterprises to implement innovation-driven development and promote innovation capability.

2. Literature review and research hypothesis

2.1. Overseas background of executives and corporate innovation

First, Jinying Liu(2022)suggest that executives in firms with overseas backgrounds are key resources that distinguish them from other firms in order to take a leading position in the market. [11]Mingbo Zheng (2019) argue that executives with overseas backgrounds can bring international innovative ideas and expertise to the firm. [1]The international innovation concepts possessed by returnee executives can provide companies with diversified innovation perspectives, improve their innovation capabilities, and help them choose more efficient innovation directions. Moreover, with systematic management knowledge system, they can localize foreign advanced management experience and operation mode, maintain continuous investment in innovation, and promote innovation development of enterprises.

Secondly, executives' experiences in overseas study and work help them gain unique social capital, i.e., executives with overseas background characteristics have international social networks, broader information access channels and rich network resources, which make them have close contact with overseas enterprises or personnel. Therefore, it helps executives with overseas backgrounds to obtain cutting-edge business information through overseas social networks, which becomes a unique competitive advantage for enterprises and can have a positive effect on enterprise innovation.

Again, the stable psychological quality of returnee executives may enable them to maintain a good mindset when facing risky challenges and even the dilemma of failure.[12] Jianbo Song(2017) pointed out that returnee executives have to face the impact and collision of multiple cultures, academic or work pressure, interpersonal relationship and other challenges during their study and work period, and such experience has cultivated the anti-stress and challenge ability of returnee executives to a certain extent, which has a profound impact on their mindset and values. [13]According to Yanjie Wei(2022), returnee executives are often able to adopt a more confident and optimistic attitude to face the situation of enterprise innovation and development, and are able to give more tolerance and understanding to failure, creating a cultural atmosphere that encourages innovation and continuous innovation, which can better promote knowledge exchange, bring into play the knowledge spillover effect and drive enterprise innovation activities.[14]

Based on this, the following hypothesis is proposed in

this paper:

H1: All else being equal, an executive's overseas background is positively associated with corporate innovation.

2.2. Overseas background of executives, financing constraints and corporate innovation

Based on the resource-based theory, the reason why an enterprise can maintain its competitive advantage is that it has certain scarce and irreplaceable resources. When an enterprise hires executives with overseas backgrounds, on the one hand, executives with overseas backgrounds have advanced management concepts and experience, which can promote internal financing and ultimately reduce the financing constraints of the enterprise. On the other hand, according to the theory of information asymmetry, under market economy conditions, there are differences in the knowledge of various types of people about the relevant information. Information asymmetry is also an important reason affecting financing constraints. Referring to the relevant study by Yanjie Wei(2022), at the time of enterprise innovation activities, the suppliers of funds are unable to understand the relevant information of enterprises in an all-round and transparent manner and are in a high information asymmetry. [14]International scholars Byrd(2005) found that hiring executives with overseas backgrounds can help companies to obtain social capital support more easily when business conditions are bad. The reason for this may be that executives with overseas background have many advantages themselves such as high education, rich management experience, systematic management knowledge, and international open-mindedness, which deliver favorable information to the outside world. [15]Yanjie Wei (2021) point out that such favorable information can, to a certain extent, help enterprises establish a more positive and positive corporate image, enhance the transparency of information disclosure between enterprises and investors, reduce information asymmetry, and thus alleviate the financing constraints in their innovation activities and eventually obtain more market investment.[16]

Based on this, the following hypothesis is proposed in this paper:

H2: The overseas background of executives can promote corporate innovation by alleviating corporate financing constraints as an intermediary channel.

2.3. Overseas background of executives, internal control and corporate innovation

Yingmei Li(2019) proposed that internal control is an extremely important internal governance mechanism for modern enterprises and an important guarantee for the achievement of their strategic goals. An outdated level of internal control can hinder the innovative development of enterprises. The overseas background of executives is mainly from developed countries, within which internal control systems are more sophisticated and mature. Therefore, overseas executives who have studied and worked in foreign institutions of higher learning or research institutions have received more systematic management concepts, are more familiar with foreign management models and systems, and are deeply influenced by them.[17] International scholars Marquis (2013) put forward the branding theory, [18]and Yong Du(2018), based on the "branding theory", combined with the overseas background of executives, pointed out that the overseas experience of executives would form a kind of imprint on the cognition and ability of executives themselves, that is, the branding effect. As a result, when executives with overseas backgrounds work in domestic enterprises, they will pay more attention to the internal environmental governance of the enterprise, apply the internal control knowledge or work experience they have been exposed to in the company's internal control practice, design a more favorable organizational structure for the enterprise, reduce management costs, improve the quality of internal control, and thus accelerate the efficiency of innovation inputs and outputs.[19]

Based on this, the following hypothesis is proposed in this paper.

H3: The overseas background of executives can promote corporate innovation through the intermediary channel of improving the level of corporate internal control.

3. Study design

3.1. Sample selection and data sources

This paper focuses on the impact of executives' overseas background on corporate innovation, and the relevant data of A-share listed enterprises from 2005-2021 are selected as the initial sample. Among them, the data of total patents granted for inventions, utility models and designs are obtained from the National Intellectual Property Patent Database, and the rest of the data are obtained from the database of listed companies of Guotaian (CSMAR). The data were processed as follows: (1) the sample of companies with serious deficiencies in relevant information was excluded; (2) financial and ST companies were excluded. To eliminate the effect of extreme values, all financial data were subjected to 1% and 99% tailoring. Finally, 27912 valid observation samples were obtained after screening. The data analysis software was Stata 16.0.

3.2. Variable selection and measurement

3.2.1. Explained variables

The continuous improvement of enterprise R&D investment helps to strengthen the R&D activities of enterprises, further strengthen the main position of enterprise innovation, and stimulate the innovation ability of enterprises. Therefore, this paper measures the innovation activities of enterprises from the perspective of their R&D investment, referring to Hang Zhu (2016), and adopts the ratio of total R&D expenditure to operating revenue to measure enterprise R&D investment.

3.2.2. Explanatory variables

This paper draws on the idea of Yunhao Dai(2017), which defines overseas background as executives having had overseas study and work experience in countries or regions outside of China,[20] and measures the overseas background of executives (*Oversea*) by the proportion of executives with overseas background to the total number of executives in the company, and then comprehensively identifies the impact of individual executives' overseas experience on corporate innovation.

3.2.3. Mediating variables

In this paper, financing constraint (*KZ*) and internal control (*IC*) are selected as mediating variables. For the measurement of financing constraint, refer to Zhihua Wei (2014) and use the *KZ* index to measure it. [21]For the measurement of the quality of the firm's internal control, the internal control index is used as its proxy variable, and the larger the value, the higher the quality of the firm's internal control in the current year. Meanwhile, to ensure the observability of the coefficient, the internal control index is divided by 1000 to be standardized in this paper.

3.2.4. Control variables

Synthesizing the existing literature practices, this paper selects firm size (*Size*), firm's years of operation (*Age*), gearing ratio (*Lev*), profitability (*Roa*), growth (*Growth*), board size (*Board*), independent director percentage (*Indenp*), and equity concentration (*Top1*) as control variables. In addition, dummy variables such as industry (*Ind*) and year (*Year*) are set in this paper to control for the effect of disparity between industry and year. The specific variable descriptions are shown in Table 1.

Table 1 Variable definition and meaning.

Variable Type	Variable Name	Variable Symbols	Variable Definition
Explained variables	Innovation input	*RD1*	Company's annual R&D expenditure/total assets
Explanatory variables	Overseas background of senior executives	*Oversea*	Percentage of returnee executives among all executives
Intermediate variables	Financing constraints	*KZ*	Market value per share / financial risk
	Internal Control	*IC*	Internal Control Index/1000
Control variables	Enterprise size	*Size*	Ln (amount of total assets of the company at the end of the period)
	Number of years in business	*Age*	Ln (current year - year of business establishment + 1)
	Gearing ratio	*Lev*	Total liabilities / Total assets at the end of the year
	Profitability	*Roa*	EBIT/Total assets at end of period
	Growth Capacity	*Growth*	Operating income growth rate
	Board Size	*Board*	Total number of people on the board
	Percentage of independent directors	*Indenp*	Total number of independent directors/total number of board members
	Number of shareholding concentrations	*Top1*	Number of shares held by the company's largest shareholder/total number of shares
	Industry	*Ind*	Dummy variables
	Year	*Year*	Dummy variables

3.3. Model setting

With reference to existing research methods, in order to test the impact of executives' overseas background on corporate innovation, the following econometric model is developed in this paper:

$$RD_{i,t} = \beta 0 + \beta 1 Overseas_{i,t} + \beta 2 Controls_{i,t} + Ind + Year + \varepsilon_{i,t} \quad (1)$$

Where *i denotes the* firm and *t denotes* time. $RD_{i,t}$ denotes the firm's innovation capability, $Oversea_{i,t}$ denotes the executive's overseas background, $Controls_{i,t}$ denotes the set of control variables, and $\varepsilon_{i,t}$ denotes the random disturbance term. In addition, *Industry and Year denote* control industry and year fixed effects, respectively.

4. Analysis of empirical results

4.1. Descriptive statistical analysis

The results of descriptive statistics of the main variables are shown in Table 2. it can be found that the minimum and maximum values of *Size, Growth, and Top1* differ widely, indicating that the individual differences of enterprise size, growth ability, and number of equity concentration are relatively obvious. the mean value of *Oversea* is 0.0753, indicating that an average of 7.53% of executives have overseas background, which indicates that although China has implemented "National Program for the Introduction of Overseas High-Level Talents" and other overseas talent introduction programs, the

introduction of overseas talents still needs to be improved. In addition, the dispersion degree of other variables is good, which indicates that the sample has good representativeness. Meanwhile, the correlation between the variables is tested by *Pearson* correlation analysis, and the results show that the relationship between overseas background of executives and corporate innovation is significantly positive at the 1% level, which initially verifies the core conclusion that "overseas executives can promote corporate innovation".

Table 2 Descriptive statistical analysis of the main variables.

Variables	Observations	Average value	Standard deviation	Minimum value	Maximum value
RD1	27912	0.0165	0.0182	0.0000	0.0899
Oversea	27912	0.0753	0.0970	0.0000	0.4444
Size	27912	22.0473	1.3046	19.5820	26.0687
Lev	27912	0.4252	0.2117	0.0487	0.9233
Roa	27912	0.0576	0.0595	-0.1922	0.2392
Growth	27912	0.1797	0.4612	-0.5824	3.1093
Age	27912	2.7829	0.3790	1.3863	3.4657
Board	27912	2.1403	0.1991	1.6094	2.7081
Indenp	27912	0.3737	0.0531	0.3333	0.5714
Top1	27912	35.2666	14.9493	8.7939	74.9648

Table 3 Regression results of overseas background of executives and corporate innovation.

Variables	(1) *RD1*	(2) *RD1*	(3) *RD1*
Oversea	0.0269*** (21.3498)	0.0236*** (19.4775)	0.0135*** (13.3317)
Size		-0.0007*** (-7.9892)	-0.0011*** (-13.0679)
Lev		-0.0184*** (-34.1306)	-0.0055*** (-10.5384)
Roa		0.0147*** (7.2194)	0.0314*** (17.6267)
Growth		-0.0010*** (-4.7966)	-0.0004** (-2.0856)
Age		-0.0020*** (-7.4048)	-0.0045*** (-17.2193)
Board		-0.0065*** (-10.0134)	0.0008 (1.4081)
Indenp		0.0006 (0.2832)	0.0037** (1.9687)
Top1		-0.0001*** (-17.4086)	-0.0000*** (-4.9773)
constant	0.0144*** (108.5687)	0.0617*** (26.2641)	0.0306*** (13.8375)
Year	No	No	Yes
Ind	No	No	Yes
N	27912	27912	27912
adj.^{2}	0.0206	0.1185	0.4051

4.2. Benchmark regression analysis

Table 3 gives the regression results of the impact of executives' overseas background on corporate innovation. The explanatory variables in columns (1) to (3) are the ratio of annual R&D expenditures to operating revenue of the firm (*RD1*). Column (1) incorporates the explanatory variable (*Oversea*), column (2) adds further control variables based on column (1), and column (3) further controls for year and industry based on column (2). As shown in column (1) of Table 3, the regression coefficient of *Overseaa is* significant at the 1% level, indicating that the overseas background of executives can significantly promote corporate innovation, and H1 is verified. After adding control variables in columns (2) and (3) of Table 3, the sign and significance of the regression coefficients of Oversea do not change substantially, indicating that the regression results are strongly robust.

4.3. Robustness tests

Considering the robustness of the empirical study results and ensuring that the obtained findings do not change due to changes in sample selection, variable measurement methods or model settings, etc., this paper performs a series of robustness tests on the baseline regression results.

4.3.1. Replacement of explanatory variables

The regression results of the ratio of annual R&D expenditure to operating revenue as a proxy variable for corporate innovation are shown in Table 4. The regression coefficient of executive overseas background (*Oversea) is significantly positive at the 1% level, which* also indicates that executive overseas background promotes corporate innovation investment. From the test results in columns (2) and (3) in Table 4, we can find that the regression coefficient of executive overseas background (*Oversea) is* still significantly positive at the 1% level, and the main findings do not change due to changing the variable measurement method and replacing the explanatory variable measure, indicating that the underlying conclusions obtained in this paper are robust.

4.3.2. Replacement of main explanatory variables

This paper re-measures the overseas background of executives in terms of "the presence of executives with overseas background and the proportion of executives with overseas study and work experience". The regression results are shown in columns (4) and (5) of Table 4, where the regression coefficients of Oversea1 are significantly positive at the 1% level, indicating that the presence of executives with overseas background in the company can significantly promote the development of the company. The regression coefficient of Oversea_work&ed_ratio is significantly positive at the 1% level, which indicates that the presence of executives with overseas study and work backgrounds significantly promotes corporate innovation.

4.3.3. Sample replacement

This paper selects the ratio of annual R&D expenditures to operating revenue of companies to reexamine the impact of executives' overseas background on corporate innovation. In addition, considering the impact of the 2008 financial crisis and the 2015 stock market crash on firms' business activities, this paper excludes the samples from 2008 and 2015 and re-runs the regressions. The regression results are shown in columns (6), (7), and (8) of Table 4. The results of all three regressions indicate that the overseas background of executives has a significant positive effect on corporate innovation, and the results of this paper are more robust.

Table 4 Robustness test results.

Variables	*RD2*	*Patent2*	*Parent1*	*RD1*	*RD1*	*RD1*	*RD1*	*RD1*
	Replacing the explanatory variable			Replacement of main explanatory variables		Sample replacement		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Oversea	0.0281*** (12.6417)	0.5649*** (6.1291)	0.5414*** (6.1006)			0.0136*** (13.0870)	0.0133*** (12.4189)	0.0136*** (10.6021)
Oversea1				0.0019*** (11.0014)				
Oversea_work&edu ratio					0.0274*** (9.9049)			
controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	27912	27912	27912	27912	27912	26624	25427	17938
adj.^{2}	0.4405	0.4656	0.4563	0.4027	0.4030	0.4027	0.4058	0.2232

4.4. Mechanism analysis

This paper introduces financing constraints as well as internal management mediating variables to test whether overseas background of executives promotes corporate innovation through two major mechanisms of alleviating financing constraints (*KZ*) and enhancing internal control (*IC), the* results of which are shown in Table 5.

The mediating effect test of Zhonglin Wen was used to test the mediating role of internal control and financing constraints, and the following model was constructed:

$$M_{i,t} = \beta 0 + \beta 1 Oversea_{i,t} + \beta 2 Controls_{i,t} + Ind + Year + \varepsilon_{i,t} \quad (2)$$

$$RD_{i,t} = \lambda 0 + \lambda 1 Oversea + \lambda 2 M_{i,t} + \lambda 3 Controls + Ind + Year + \varepsilon_{i,t} \quad (3)$$

In equation (2), $M_{i,t}$ denotes the mediating variables, representing internal control ($IC_{i,t}$) and financing constraints ($KZ_{i,t}$), respectively.

4.4.1. Financing constraints

Column (1) in Table 5 tests the effect of executive overseas background Oversea on financing constraints KZ, and the regression coefficient of Oversea is -2.3435 and negatively significant at the 1% level. It indicates that there is a partial mediating effect of financing constraints in the causal relationship between executives' overseas

background and firms' innovation activities, and that executives' overseas background can promote firms' innovation activities by reducing financing constraints, and H2 is verified.

4.4.2. Internal control

Column (3) in Table 5 tests the effect of executive overseas background Oversea on internal control, and the regression coefficient of Oversea is 1.8778, which is positively significant at the 10% level, indicating that internal control has a partial mediating effect in the causal relationship between executive overseas background and corporate innovation activities, and that executive overseas background can contribute to corporate innovation activities by enhancing internal control. H3 is verified.

Table 5 Regression results of intermediate effect test.

Variables	(1) *KZ*	(2) *RD1*	(3) *IC*	(4) *RD1*
Oversea	-0.2001** (-2.3435)	0.0019*** (10.3460)	0.0152* (1.8778)	0.002*** (10.552)
KZ		-0.0003*** (-3.6754)		
IC				0.0095*** (14.4027)
Size	-0.2704*** (-30.7344)	-0.0014*** (-14.3623)	0.0314*** (31.5925)	-0.0013*** (-14.3221)
Lev	4.9548*** (88.9563)	-0.0028*** (-4.1190)	-0.1201*** (-17.1653)	-0.0052*** (-9.7757)
Roa	-8.6997*** (-49.8915)	0.0318*** (15.0940)	0.6281*** (28.9980)	0.0245*** (13.1260)
Growth	-0.0244 (-1.0588)	-0.0000 (-0.2120)	-0.0060** (-2.2350)	-0.0004** (-2.0439)
Age	0.2786*** (10.2509)	-0.0048*** (-16.5085)	-0.0240*** (-10.6469)	-0.0049*** (-17.0913)
Board	-0.0653 (-1.3546)	0.0002 (0.3181)	0.0020 (0.4105)	0.0004 (0.6414)
Indenp	0.8059*** (4.8233)	0.0047** (2.3797)	0.0267 (1.5282)	0.0034* (1.7379)
Top1	-0.0074*** (-12.6082)	-0.0000*** (-5.5332)	0.0003*** (6.0707)	-0.0000*** (-5.2682)
_cons	4.2056*** (20.2557)	0.0366*** (15.2383)	0.0366 (1.6326)	0.0304*** (13.3146)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	25000	25000	25772	25772
adj.R2	0.4986	0.4070	0.2057	0.4088

Table 6 Heterogeneity analysis (distinguishing between different property rights properties).

Variables	(1) State-owned enterprises	(2) Non-State Owned Enterprises
Oversea	0.0066*** (3.7160)	0.0151*** (12.2505)
Size	-0.0009*** (-7.7635)	-0.0012*** (-8.7599)
Lev	-0.0051*** (-7.2030)	-0.0058*** (-7.9792)
Roa	0.0247*** (9.8130)	0.0337*** (14.1757)
Growth	-0.0000 (-0.1365)	-0.0006** (-2.4255)
Age	-0.0046*** (-9.1042)	-0.0042*** (-12.7519)
Board	0.0012 (1.5182)	0.0013 (1.5166)
Indenp	-0.0007 (-0.2788)	0.0070** (2.4986)
Top1	-0.0000*** (-2.7811)	-0.0000*** (-4.2049)
constant	0.0265*** (8.8429)	0.0294*** (7.6694)
Year	Yes	Yes
Ind	Yes	Yes

N	10656	17256
adj.^{2}	0.3770	0.3590

5. Extended research

5.1. Heterogeneity study based on enterprise property rights

Referring to the idea of Changlin Yu(2022),this paper divides the study sample into two categories according to the nature of ownership, state-owned enterprises and non-state-owned enterprises, and conducts regression analysis separately. [22]For this purpose, this paper uses the method of introducing dummy variables to classify the sample: state-owned enterprises are recorded as 1 and non-state-owned enterprises are recorded as 0. The regression results of the grouping according to the nature of ownership are shown in Table 6. From the regression results in columns (1)-(2) of Table 6, we can see that "returnee" executives significantly contribute to the improvement of corporate innovation in both SOEs and non-SOEs at the 1% level, but the absolute value of *Oversea* coefficient is larger in non-SOEs. This indicates that the positive effect of overseas background of executives on innovation in non-state enterprises can be better exploited, and the executive innovation effect is better conditioned. The reason may be that in non-state-owned enterprises, shareholders, as owners of the enterprises, usually require executives to achieve certain performance requirements within a limited tenure, and if executives fail to achieve the performance required by shareholders, they may face the risk of losing their jobs. Therefore, returnee executives are more willing to take measures to promote corporate innovation in order to improve their work performance and maintain the sustainability of the company. On the other hand, state-owned enterprises are relatively stable in development, and their executives have a longer tenure, and are less enthusiastic about corporate innovation, and are more willing to maintain the status quo. Accordingly, it is necessary to further improve the rotation mechanism of executives in state-owned enterprises, adopt R&D incentives to enhance employees' enthusiasm for R&D and promote their innovation ability, so that the role of returnee executives in enhancing corporate innovation can be given full play.

5.2. Heterogeneity study based on different overseas backgrounds of executives

In order to further examine the heterogeneity of the impact of different overseas backgrounds of executives on corporate innovation, this paper further subdivides the overseas backgrounds of executives into three categories: overseas working background, overseas study background and both overseas working and overseas study background, and empirically analyzes the impact of executives with different types of overseas backgrounds on corporate innovation, and the regression results are shown in Table 7. The regression results in columns (1), (2) and (3) in Table 7 show that executives with overseas working background and both overseas working and studying backgrounds have a stronger effect on corporate innovation. The reason may be that executives with overseas working background have more advanced and rich experience in corporate management, and they can adapt to the corporate development model more flexibly after returning to China, apply the management concepts applied abroad to domestic enterprises, and make corresponding strategic adjustments. Executives who have both overseas working and studying backgrounds not only receive more systematic management expertise in school, but also apply it to their actual work, and are more comfortable in handling corporate affairs with the support of relevant experience.

Table 7 Heterogeneity analysis (distinguishing between different executive overseas backgrounds).

Variables	(1) *RD1*	(2) *RD1*	(3) *RD1*
Oversea_work	0.0023*** (11.7549)		
Oversea_edu		0.0012*** (6.3443)	
Oversea_work&edu			0.0026*** (10.9662)
Size	-0.0010*** (-12.1128)	-0.0010*** (-11.7579)	-0.0011*** (-12.5627)
Lev	-0.0058*** (-11.0778)	-0.0059*** (-11.2568)	-0.0056*** (-10.7240)
Roa	0.0314*** (20.5571)	0.0316*** (20.6745)	0.0316*** (20.6807)
Growth	-0.0003* (-1.6901)	-0.0003* (-1.7137)	-0.0003* (-1.7357)
Age	-0.0047*** (-17.8609)	-0.0048*** (-18.1124)	-0.0047*** (-17.9644)
Board	0.0004 (0.7508)	0.0005 (1.0186)	0.0006 (1.1712)
Indenp	0.0037* (1.9507)	0.0039** (2.0770)	0.0036* (1.9195)
Top1	-0.0000*** (-5.3107)	-0.0000*** (-5.0793)	-0.0000*** (-5.0007)

constant	0.0305*** (13.5277)	0.0297*** (13.1481)	0.0309*** (13.7014)
Year	Yes	Yes	Yes
Ind	Yes	Yes	Yes
N	27912	27912	27912
adj.^{2}	0.4031	0.4010	0.4027

6. Research conclusions and implications

This paper empirically tests the impact, heterogeneity, and mechanism of action of executives' overseas background on corporate innovation, using Shanghai and Shenzhen A-share listed companies from 2005 to 2021 as the research object. The empirical test results show that the overseas background of executives significantly promotes corporate innovation, and the overseas background of executives can promote corporate innovation activities by reducing financing constraints and enhancing internal control. Moreover, the positive promotion effect of executives' overseas background on corporate innovation can be better in non-state-owned enterprises, and the promotion effect on corporate innovation is stronger for executives with both overseas posting background and overseas study and work background.

Based on the above findings, this paper concludes the following policy implications:

Firstly, actively improve and implement relevant policies to stimulate enterprises' independent innovation. Increase support for enterprise innovation activities, actively build innovation service platforms for major enterprises, encourage universities, research institutions and other institutions to cooperate with enterprises, open innovation resources for enterprises, and assist enterprises in developing new products, innovation management and improving market competitiveness.[23]

Secondly, it is necessary for the relevant government departments to continuously strengthen the talent introduction strategy and provide sufficient talent elements for corporate innovation. At the same time, it is necessary to strengthen the communication and contact between domestic and foreign talents, strive to create a good ecological environment for talent innovation, and actively develop policies to attract overseas talents to return, so as to promote the development of enterprise innovation activities. Reduce financing constraints, provide enterprises with more convenient channels for financing, and provide sufficient financial support for their innovation activities.

Thirdly, compensation incentives for returnee talents should also be strengthened within the enterprise. The knowledge and management background of returnee executives should be fully utilized to stimulate their innovation enthusiasm and absorb their valuable opinions on the optimization of organizational structure and improvement of internal environment.[24] Set up performance evaluation positions and adopt salary incentives for returnee talents, so that returnee executives are motivated to promote corporate innovation activities and achieve a win-win situation for both companies and returnee executives.

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