Are Large Shareholders Willing to Pay Top Executives Equity-Based Compensation in China? The Moderating Role of Female Executives

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ABSTRACT

The purpose of this paper is to examine the relationship between equity concentration and equity-based executive compensation (EBEC), and the moderating role of female executives in such a relationship between the two. Multiple statistical methods including Multiple Linear Regression Based on OLS, Random Effect Regression Analysis, and One-period Lagged-Term Regression have been applied to analyze the data drawn from a research sample of non-financial A-share listed companies from 2010 to 2018, which consists of 22151 observations in China. Empirical results show that large shareholders of Chinese listed companies have negative attitudes towards the adoption of EBEC; besides, female executives not only improve the adoption of EBEC directly, but enhance the adoption of EBEC indirectly by mitigating the negative link between large shareholders and the adoption of EBEC in Chinese listed companies. The rich robustness tests and endogeneity tests have confirmed the findings. Moreover, large shareholders intend to limit the cash compensation level of top executives, while female executives can not only directly improve top executives' cash compensation level by participating in the compensation setting process, but also indirectly increase top executives' cash compensation level by mitigating the negative attitudes of large shareholders towards executives' cash compensation.

Keywords: *Large shareholders, Equity concentration, Equity-based executive compensation (EBEC), Female executive, Chinese listed companies, Top executives' cash compensation level.*
JEL Classification: *M12.*

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Highlights of this paper

- The purpose of this paper is to examine the relationship between equity concentration and equity-based executive compensation (EBEC), and the moderating role of female executives in such a relationship between the two.
- Multiple statistical methods including Multiple Linear Regression Based on OLS, Random Effect Regression Analysis, and One-period Lagged-Term Regression have been applied to analyze the data drawn from a research sample of non-financial A-share listed companies from 2010 to 2018, which consists of 22151 observations in China.

1. INTRODUCTION

At the heart of the issue of the executive compensation's effect on shareholders' value is the conflict of interests between corporate shareholders and top executives. The basic assumption of the optimal contract theory is that compensation contracts may resolve or alleviate such conflicts. With the purpose of resolving such conflicts, the explosive growth of equity-based executive compensation (EBEC) over the last couple of decades aims at aligning the interests of executives and shareholders for the most part. However, the granting of EBEC does not necessarily result in a perfect alignment between these two interests. In fact, EBEC has been blamed for triggering fraudulent earnings announcements, unnecessary mergers and acquisitions, inflated asset values, and understated liabilities within companies.

Two opposite views regarding EBEC's consequences both can be found in the existing literature. On the one hand, rather a few typical studies hold a positive view. First, with the purpose of examining the efficacy of compensation in encouraging corporate executives to promote corporate social responsibility, Okafor and Ujah (2020) have found positive effects of a golden parachute long-term EBEC on an executive's behavior toward corporate social responsibility. Second, with the purpose of investigating the relative firms' performances of EBEC schemes, Guo, Shiah-Hou, and Yang (2006) have concluded that there exist positive associations between the amount of EBEC and firm performance for the firms in Taiwan of China. Third, with the purpose of identifying means of better associating executive pay with managerial decision making and firm performance, Li, Henry, and Wu (2019) have found that accounting conservatism is positively related to the adoption of EBEC by evaluating the influence of conditional accounting conservatism on CEO compensation.

On the other hand, some other typical studies hold the negative view. First, when Prezas, Tarimcilar, and Vasudevan (2007) examined CEO compensation for firms that announce layoffs during the 1993-2001 period, it was found that the observed small improvements in operating performance following the announcement of layoffs only manifest themselves in the low but not the high EBEC firms. In other words, higher EBEC may be linked with zero performance improvements after downsizing. Second, aiming to examine the relationship between executives' compensation schemes and corporate social responsibility activities in the restaurant industry, Park, Song, and Lee (2019) have concluded that CEOs with a higher proportion of EBEC, which induces a greater propensity for extra risk-taking, are prone to invest less in corporate social responsibility. Third, Dey-Tortella, Gomez-Mejía, de Castro, and Wiseman (2005) have argued that the design characteristics of EBEC schemes foster perverse incentives for loss-averse agents. In other words, the loss-averse executives will try to protect the endowed value of that equity through self-serving decisions that do not enhance shareholder wealth.

In this case, the extents that shareholders shape the EBEC turn out to be distinctive in different literature. On one side, some scholars hold a positive expectation on this issue. For instance, in a study carried out by Denton, Fleischman, Kaden, and Sanchez (2018) the relationships among CEO pay-performance sensitivity, pay-risk sensitivity, the ratio of EBEC and shareholder voting outcomes have been explored by adopting American companies. The authors' findings are consistent with theoretical predictions that larger shareholders approve of

adopting higher equity incentives as a means of aligning executives' interests with those of themselves. Moreover, Baek and Fazio (2015) have found the similar results by adopting S&P SmallCap600 index firms during 1999-2007, while Pattarin and Tak (2016) have also confirmed positive attitudes of larger shareholders on the adoption of EBEC based on the data from 215 large Australian listed companies over the years from 2005 to 2009.

However, on the other side, some scholars hold a negative expectation on this issue. For instance, Lilian, Valeriy, Qinghai, and Nataliya (2011) the effect of the 2003 SEC Regulation requiring shareholder approval of all EBEC plans on executive compensation policies and practices of S&P 500 firms has been explored. Results show that the quality of EBEC proposals improves in the after-regulation period, and larger shareholders exhibit greater scrutiny and monitoring of executive compensation through increased voting rights. The most important finding is that a decline in the equity pay component while an increase in the cash component of total executive compensation has been found when larger shareholders are conscientious and responsible.

The first question we are interested in is whether large shareholders are more willing to pay top executives EBEC in Chinese listed companies. Moreover, referring to a reasonable logic, the existing contradictory results of the relationship between large shareholders and the adoption of EBEC captured by extant literature make us believe that such a relationship between the two is contingent on some critical moderating variables. Because the positive moderating roles of female executives in affecting many other stakeholders' (i.e., CEOs', shareholders', directors', debtors', supervisors', etc.) decision preferences have been accepted by a growing number of researchers with the steady improvement of female executives' participation in corporate governance, we expect female executives can positively moderate the link between large shareholders and EBEC. Hence, the second question we are interested in is that how female executives would moderate the intention of large shareholders in paying top executives EBEC in Chinese listed companies.

According to the discussion above, two expected contributions should be reached by this paper: (1) Large shareholders in Chinese listed companies have negative attitudes towards providing top executives with EBEC; (2) An increase of female executives' participation in corporate governance in China would mitigate the negative link between larger shareholders and EBEC. The two contributions can enrich the literature both in the antecedents of executive compensation and the consequences of female executives' participation in corporate governance. Moreover, this study promotes the localization research process of principal-agent theory and upper echelon theory in China.

The remainder of this paper is arranged as follows. Section II gives literature review and makes hypotheses. Section III is the methodology, providing the sample selection, variables design as well as empirical models. Section IV reveals empirical results and lays out discussion. Section V arrives at conclusions.

2. LITERATURE REVIEW AND HYPOTHESES

From the following aspects, we expect large shareholders in Chinese listed companies to hold negative attitudes towards affording top executives with EBEC.

First, large shareholders have weak confidence in EBEC's positive performance consequences, while they hold strong concern on potential weakening of their control power. Some studies do have reported that equity incentives are positively related to shareholder value (Fabrizi, 2014; MinChung Kim, Eric Boyd, & Yi., 2016) and that higher EBEC could align managers' interests with those of shareholders, leading to a lesser degree of agency problems and lower cost of equity capital (Huang, Wang, & Zhang, 2009). Nonetheless, many other studies have reported different results. For example, in examining the relation among executive compensation, firm size and firm performance on a panel of firms in the USA over the period 1996-2002, Canarella and Gasparyan (2008) have

concluded that the effect of firm performance on CEO equity-based compensation is insignificant. Worse, the sensitivity of EBEC to market-adjusted returns is significantly negative for high-tech companies when news of bad earnings is announced in another study (Kwon, 2012). At the same time, more EBEC would necessarily lead to the diffusion of equity held in large shareholders, which may essentially result in the weakening of their control power over the responding listed companies. Moreover, existing evidence suggests that higher managerial ownership due to the adoption of EBEC would substitute for shareholder rights in affecting the cost of equity capital, which makes strong shareholders' rights less important in a high managerial ownership setting (Huang et al., 2009). Hence, uncertain performance consequences and definite reduction of control power would lead large shareholders to hold negative attitudes towards paying top executives EBEC.

Second, from the perspective of risk-taking intention of top executives, large shareholders of Chinese listed companies may hold negative attitudes towards the adoption of EBEC. Today, many firms across the world provide EBEC to their top managers with the purpose of encouraging their risk-taking behavior. However, existing viewpoints show both supportive and critical attitudes towards such development (Hoi & Robin, 2004). According to the positive side, a few studies have indicated that EBEC improves top executives' risk-taking behavior and reduces agency costs arising from managerial risk aversion (D'Mello & Miranda, 2014). Some other literature further provides evidence that EBEC does actually promote the alignment of interests between large shareholders and top executives (Lorenzo & Ja, 2017). However, under the circumstances that China has relative poor internal corporate governance mechanisms and weak effectiveness in stock market in China, the higher risk-taking behaviors of executives would do harm to firm value. Since the internal monitoring intensity is rather poor, EBEC would drive a CEO to take more unnecessary acquisitiveness (Thomas, Braga-Alves, & Schlingemann, 2014). This is because executives' compensation gets much higher due to much larger firm size instead of pursuing some other valuable risky activities, such as investing more resources in R&D activities or in training employees. Since the external stock market has a rather weak effectiveness, top executives with higher EBEC would take advantage of lucky external events in stock market (Jouber & Fakhfakh, 2012). To be specific, higher EBEC in an invalid stock market would provide top executives with asymmetric effects—namely, top executives are rewarded more for good luck than penalized for bad luck.

Third, higher EBEC would lead to unethical practices instead of value-adding policies, especially in China, where both the external and internal monitoring mechanisms are rather poor. The use of EBEC is an increasingly popular means by which to align the incentives of top executives with those of the shareholders. However, recent theoretical and empirical research indicates that the use of EBEC has the unintended consequence of creating the incentive to commit managerial fraud of the type being reported in the press (David, McKee, & Santore, 2008). Powerful executives with higher EBEC intend to employ the unethical strategies of managing earnings excessively, or manipulating stock price to further enhance their personal income (Denton et al., 2018). And executives with higher ownership can use their power and influence more easily to negotiate shorter incentive pay duration to maximize the present value of their performance-based compensation. Moreover, Dey-Tortella et al. (2005) have argued that the design characteristics of EBEC schemes foster unreasonable incentives for loss-averse agents. In other words, the loss-averse executives will try to protect the endowed value of that equity through self-serving decisions that do not enhance shareholder wealth.

According to the above three reasons, H1 would be proposed as follows.

H1: Large shareholders of Chinese listed companies would have negative attitudes towards the adoption of EBEC.

Large shareholders have two basic motivations, i.e., one is to encourage top executives to work hard and fully utilize the discretion towards maximizing the firm value, and the other is to monitor the top executives with the

purpose of preventing them from doing harms to firm value. If the large shareholders can fulfill the two motivations more effectively under the condition of higher EBEC, the negative attitudes towards EBEC would be mitigated to a certain degree.

First, female executives are regarded to be more ethical in performing their responsibilities by most of the literature investigating female executives. In practice, large shareholders would believe more in female executives, since female executives are more willing to share weal and woe with enterprises and more willing to monitor top executives according to the requirements of firm value. Therefore, when the ratio of female executives within a top management team gets higher, paying the top executives more EBEC would be helpful to improve firm performance without leading to much higher risk of firm value loss. As demonstrated in the Introduction, existing literature argues that higher EBEC in an invalid stock market would provide top executives with asymmetric effects—namely, top executives are rewarded more for good luck than penalized for bad luck. It is expected to be less generous for companies to provide top executives with lucky pay under stronger corporate governance, the quality of which can be enhanced by higher female executives' participation.

Second, female executives are regarded to be more risk-averse than their male peers. When female executives get higher participation opportunities in corporate governance, their risk-aversion would moderate the overconfidence of the male executives in determining investment issues of excessively high risks. Therefore, in this case, large shareholders do not have to worry too much about the market manipulation or other high-risk investment by the senior executive team as insiders with the purpose of obtaining higher personal income from EBEC, so as to ensure the value of the company. Instead, large shareholders may need to worry that, in the case of higher level of female executives' participation in corporate governance, the decision-making of the executive team may be excessively risk averse, which will lead to the decrease of company value. Therefore, considering the risk-aversion of female executives, large shareholders would show relatively more positive attitudes towards EBEC in the case of a higher ratio of female executives compared to the case of lower or even zero ratio of female executives. Moreover, female executives have much less threat to the control power of large shareholders.

According to the above two reasons, H2 would be proposed as follows.

H2: Female executives would mitigate the negative link between large shareholders and the adoption of EBEC in Chinese listed companies.

3. METHODOLOTY

3.1. Sample and Data

All the non-financial A-share listed companies in China are taken as the initial sample framework. The following steps are executed to refine our final research sample: (1) Select the listed companies during the period of 2010-2018; (2) Select the companies that have not ever been publicly punished in each responding sampling year; (3) Select the companies that have not ever been marked with ST or PT in each responding sampling year; (4) Remove the listed companies with unexplained performance decline in each responding sampling year, or with more than three zero paid executives in each responding sampling year, or with a negative pay gap between top executives and non-executive employees in each responding sampling year; (5) Select listed companies which have fully disclosed the required data in each responding sampling year.

All the sample data of this paper come from CSMAR and the annual reports of listed companies disclosed by Cninfo.com. After selecting the data, the main continuous variables have been arranged in ascending order, and the extreme values on both sides are processed with 1% winsorize tail reduction to eliminate the potential distortions of

extreme data on empirical results. Based on the above procedures, a panel data consisting of 22151 firm-year observations are reached as the final research samples. The main data processing tools are SPSS23 and STATA12.

3.2. Variables

(1) Referring to the existing literature on equity concentration (Yasser & Al Mamun, 2015; Zuoping, 2010) the shareholding ratio of the first largest shareholder (SRFLS) represents the equity concentration degree determined by large shareholders. DUMMY_SRFLS50%, an alternative measure of equity concentration is coded as 1 when a sample firm's shareholding ratio of the first largest shareholder is above 50% (i.e., an absolutely controlling shareholder); otherwise, it is coded as 0.

(2) Equity-based executive compensation ratio relative to the total share (EBEC_RATIO) represents the magnitude of EBEC, while whether top executives have received EBEC or not (EBEC_STAUS) is the alternative measure of EBEC for robustness test. EBEC_STATUS is coded as 1 when top executives are awarded EBEC; otherwise, EBEC_STATUS is coded as 0.

(3) Ratio of female executives (RFE) represents the participation degree in corporate governance of female executives, while the BLAU index within top executive teams (BLAU) and the number of female executives (NFE) are the alternative measures of RFE for robustness test. The calculation method of BLAU index refers to Issa, Fang, and Chaichan (2019) and Lim, Lye, Yuen, and Teoh (2019).

(4) Control variables. Referring to related literature on the antecedents of EBEC (Deschenes, Boubacar, Rojas, & Morris, 2015; Li et al., 2019; Zheng, 2010) firm size (FSIZE), asset liability ratio (ALR), ratio of independent directors (RID), size of board of directors(SBD) and return on assets(ROA) are chosen as the control variables. Among the five control variables, FSIZE is the natural logarithm of total assets; ALR is the ratio of liability to total assets; RID is the ratio of directors' number to the size of the board of directors; ROA is the ratio of net profits to total assets. Moreover, eight year dummy variables and eighteen industry dummy variables are designed to control the year effects and industry effects.

3.3. Description of Data Characteristics

a. Variable Description in Distribution Characteristics

Descriptive statistics results of the main research variables are reported in Table 1. The average shareholding ratio of top executives is about 11.44%, while about 57.2% of firms have afforded top executives with EBEC. The average shareholding ratio of the first largest shareholder is about 35.36%. The average ratio of female executives is about 17.92%.

Table-1. Descriptive statistics results of the main research variables (N=22151).

Variables	Minimum	Maximum	Mean	Std.	Skewness	Kurtosis
FSIZE	14.760	28.520	22.043	1.346	0.736	1.319
ASSETS	2567866.23	2.43E12	1.434E10	7.320E10	19.170	488.563
ALR	0.007	0.999	0.419	0.214	0.257	-0.696
RID	0.000	0.800	0.374	0.056	1.628	4.119
BSIZE	4	26	10.080	2.592	1.076	2.329
ROA	-0.987	0.921	0.042	0.076	-3.895	59.940
EBEC_RATIO	0.000	0.891	0.114	0.187	1.564	1.263
EBEC_STATUS	0.000	1.000	0.574	0.494	-0.300	-1.910
SRFLS	2.197	89.986	35.356	15.124	0.493	-0.211
RFE	0.000	0.667	0.179	0.109	0.645	0.245

Moreover, the scale of sample enterprises varies greatly. The maximum of total assets is about 243 billion Yuan, the mean of total assets is about 1.43 billion Yuan, and the minimum of total assets is about 2.57 million Yuan. The size of the largest enterprise is 946000 times that of the smallest enterprise. As for other control variables, the average assets liability ratio is about 41.9%, the average ratio of independent directors is about 37.4%, the average board size is about 10, and the average return on total assets is about 4.16%. All the descriptive statistics results of the control variables are basically consistent with those of the existing studies, confirming the validity of the data in this research.

b. Correlation Analysis

Pearson correlation coefficients among the main research variables are shown in Table 2. There is a significant negative correlation between SRFLS and EBEC_RATIO (P<0.01), which initially meets the expectation of H1. However, a more accurate conclusion needs to be verified by further rigorous empirical analysis. RFE is positively related to EBEC_RATIO (P<0.01), primarily indicating female executives may improve the adoption of EBEC. Most of the correlations confirm to prior research results, which can verify the rationality of variable design and data collection in this study.

Table-2. Correlation coefficients among main research variables (Pearson).

Variables	FSIZE	ALR	RID	BSIZE	ROA	SRFLS	RFE	EBEC_RATIO
FSIZE	1							
ALR	.494**	1						
RID	.020**	-.001	1					
BSIZE	.266**	.170**	-.293**	1				
ROA	-.037**	-.317**	-.031**	-.066**	1			
SRFLS	.213**	.057**	.045**	.005	.097**	1		
RFE	-.191**	-.133**	.062**	-.135**	.034**	-.057**	1	
EBEC_RATIO	-.361**	-.352**	.075**	-.206**	.135**	-.091**	.139**	1

Note:** represents the responding coefficient is significant at the level of 0.01(Bilateral).

c. Multicollinearity Analysis

In regression, multicollinearity refers to the extent to which independent variables are correlated. Multicollinearity exists when one independent variable is correlated with another independent variable, or when one independent variable is correlated with a linear combination of two or more independent variables. The analysis of regression coefficients is contingent on the extent of multicollinearity. If the set of independent variables is characterized by a little bit of multicollinearity problem, the analysis of regression coefficients should be valid and straightforward. If there is a serious multicollinearity problem, the analysis will be hard to interpret and can be skipped. Hence, the analysis of regression coefficients should be preceded by an analysis of multicollinearity.

Two methods are adopted to deal with the problem of multicollinearity, one is the correlation coefficients examination, and the other is the Variance Inflation Factor(VIF). As for the correlation coefficients examination, all the coefficients in Table 1 are all less than 0.5, which indicates that there is a rather limited multicollinearity problem needing to be concerned. As for the VIF method, the maximum value of VIF in Model(1) and Model(2), empirical models designed for testing H1 and H2, is 2.548, which is far smaller than 5. The fact indicates an acceptable multicollinearity problem in this study.

Model(1)
$$EBEC\_RATIO_{it} = \alpha + \alpha_1 SRFLS_{it} + \alpha_2 CONTROLS + \alpha_3 \sum YEAR + \alpha_4 \sum INDUSTRY + \varepsilon_{it}$$

$$EBEC\_RATIO_{it} = \alpha + \alpha_1 SRFLS_{it} + \alpha_2 RFE_{it} + \alpha_3 RFE_{it} * SRFLS_{it} + +\alpha_4 CONTROLS + \alpha_5 \sum YEAR + \alpha_6 \sum INDUSTRY + \varepsilon_{it}$$

Model(2)

d. Autocorrelation Problems Analysis

Autocorrelation is a mathematical representation of the degree of similarity between a given time series and a lagged version of itself over successive time intervals. The main consequence is that although the estimator of the regression coefficient may be unbiased, it does not have the minimum variance. It may underestimate the variance of the error term and result in that the regression equation cannot predict explained variables effectively. In other words, a high degree of autocorrelation would lead to invalid prediction. There are two main methods of autocorrelation test, i.e., Durbin-Watson test and Generalized Least Square test. In this paper, the result of Durbin-Watson test, i.e., DW value, is used to judge the potential autocorrelation problem. DW values of all empirical models in this paper are calculated, and all of the DW values are very close to 2, indicating a fact that the autocorrelation problem is weak and the model designed in this paper is effective.

4. RESULTS

4.1. Hypotheses Test

In order to test H1, Model(1) is adopted to fit the whole sample data, and the results are shown in Table 3[1]. The standardized coefficient of SRFLS on EBEC_RATIO is significant and negative (Beta=-0.029, P=0.000), indicating large shareholders have negative attitudes towards affording top executives with higher EBEC. H1 holds. Moreover, the regression results of control variables on SRFLS indicate that firm size, board size and assets liability ratio have significant and negative effects on the adoption of EBEC, while the ratio of independent directors and return on assets have significant and positive effects on the adoption of EBEC, which basically confirm to the existing literature on the determination mechanisms of EBEC (Deschenes et al., 2015).

In order to test H2, Model(2) is adopted to fit the whole sample data, and the results are shown in Table 3. The standardized coefficient of RFE* SRFLS on EBEC_RATIO is significant and positive (Beta=0.017, P<0.01), indicating female executives can positively moderate the negative link between large shareholders and the adoption of EBEC. H2 holds.

In order to test H2 further, the whole sample has been divided into two sub-samples according to the level of RFE by taking the average RFE as the cut point: one is named as sub-sample with a lower ratio of female executives (Sub_Sample_LOW_RFE), and the other is named as sub-sample with a higher ratio of female executives (Sub_Sample_HIGH_RFE). Model(1) is used to respectively fit the two sub-samples, and results are reported in Table 3. In the Sub_Sample_LOW_RFE, the regression coefficient of SRFLS on EBEC_RATIO is not significant any more (Beta=-0.013, P>0.1) , while in the Sub_Sample_HIGH_RFE, the regression coefficient of SRFLS on EBEC_RATIO is significant and negative(Beta=-0.051, P<0.01). It can be concluded that female executives actually can mitigate the negative link between female executives and EBEC. H2 still cannot be rejected.

[1]We have also run the univariate linear regression, and further executed the multiple linear regression without considering year effects and/or industry effects. The results of H1 still hold.

Table-3. Empirical results of H1 and H2.

Sample	Whole Sample				Sub_Sample_ HIGH_RFE		Sub_Sample_LOW_RFE	
Model	(1)		(2)		(1)		(1)	
	Beta	t	Beta	t	Beta	t	Beta	t
SRFLS	-.029***	-4.678	-.029***	-4.568	-.013	-1.423	-.051***	-5.969
RFE	.046***	7.343	.047***	7.407	.016*	1.673	.033***	4.068
RFE* SRFLS			.017***	2.707				
FSIZE	-.234***	-30.634	-.232***	-30.298	-.235***	-21.341	-.240***	-23.047
ALR	-.201***	-26.715	-.201***	-26.703	-.198***	-17.881	-.200***	-19.525
RID	.051***	7.995	.051***	8.003	.043***	4.335	.055***	6.474
BSIZE	-.085***	-12.812	-.084***	-12.724	-.075***	-7.429	-.098***	-11.097
ROA	.071***	10.871	.070***	10.765	.078***	8.012	.062***	7.069
YEAR	YES	YES	YES	YES	YES	YES	YES	YES
INDUSTRY	YES	YES	YES	YES	YES	YES	YES	YES
Aj-R^2	.206		.207		.186		.212	
F(Sig.)	175.177 (.000)		170.289 (.000)		69.705 (.000)		101.032 (.000)	

Note: Constants are considered in the regression analysis.

4.2. Robustness Test

a. Robustness Tests on H1

Three steps have been executed to make robustness on H1[2]. (1) To replace SRFLS in Model(1) with DUMMY_SRFLS35%, Model(1*) is built. DUMMY_SRFLS35% is coded as 1 when a sample firm's shareholding ratio of the first largest shareholder is above the average (about 35%); otherwise, it is coded as 0. The regression coefficient of DUMMY_SRFLS35% on EBEC_RATIO is still significantly negative (Beta=-0.016, P<0.01), indicating H1 still holds. (2) To replace SRFLS in Model(1) with DUMMY_SRFLS50%, Model(1**) is built. The regression coefficient of DUMMY_SRFLS50% on EBEC_RATIO is still significantly negative (Beta=-0.044, P<0.01), indicating H1 still holds. (3) To replace EBEC_RATIO in Model(1*) with EBEC_STATUS, Model(1***) is built. The regression coefficient of DUMMY_SRFLS50% on EBEC_STATUS is still significantly negative (Beta=-0.172, P<0.01), indicating H1 still cannot be rejected.

b. Robustness Tests on H2

Six steps have been adopted to make robustness tests on H2[3]. (1) To replace RFE in Model(2) with BLAU, Model(2*) is built. The regression coefficient of BLAU* SRFLS on EBEC_RATIO is still significantly positive (Beta=0.012, P<0.05), indicating H2 still holds. (2) To replace RFE in Model(2) with NFE, Model(2**) is built. The regression coefficient of NFE* SRFLS on EBEC_RATIO is still significantly positive (Beta=0.013, P<0.05), indicating H2 still holds. (3) To replace SRFLS in Model(2**) with DUMMY_SRFLS35%, Model(2***) is built. The regression coefficient of NFE* DUMMY_SRFLS35% on EBEC_RATIO is still significantly positive (Beta=0.019, P<0.01), indicating H2 still holds.

[2] If we take market value of top executives' shares of the responding sampling year or EBEC_RATIO of the next year as the dependent variable instead of EBEC_RATIO of the responding sampling year, or if we take the sum of the shareholding ratio of the top three (or five) shareholders as the predictor variable instead of SRFLS, the negative effect of large shareholders on the adoption of EBEC would not change—namely, H1 still holds.

[3] We have also tried to combine and integrate each alternative measure of SRFLS, RFE and EBEC_RATIO into the other potential possible models, and then used them to fit the whole data. And if we further conduct all the possible group regression analysis and compared the coefficients of DUMMY_SRFLS50%, DUMMY_SRFLS35%, or the sum of the shareholding ratio of the top three (or five) shareholders on EBEC_RATIO or EBEC_STATUS between sub-samples with different female participation degree respectively determined by RFE, NFE or BLAU, H2 still holds.

Table-4 Robustness test results.

	(1*)	(1**)	(1***)	(2*)	(2**)	(2***)	(2****)	(2*****)	(2******)
	EBEC_RATIO	**EBEC_RATIO**	**EBEC_STATUS**	**EBEC_RATIO**	**EBEC_RATIO**	**EBEC_RATIO**	**EBEC_STATUS**	**EBEC_STATUS**	**EBEC_STATUS**
	Beta(t)	**Beta(t)**	**Beta(t)**	**Beta(t)**	**Beta(t)**	**Beta(t)**	**Beta(t)**	**Beta(t)**	**Beta(t)**
SRFLS	-	-	-	-.029*** (-4.547)	-.028*** (-4.474)	-	-.171*** (-26.576)	-.171*** (-26.524)	-
RFE	.046*** (7.353)	.046*** (7.311)	.056*** (8.587)	-	-	-	.056*** (8.676)	-	.055*** (8.485)
RFE* SRFLS	-	-	-	-	-	-	.023*** (3.681)	-	-
DUMMY_SRFLS35%	-.016*** (-2.660)	-	-	-	-	-.016*** (-2.613)	-	-	-
DUMMY_SRFLS50%		-.044*** (-7.134)	-.172*** (-26.736)						-.138*** (-21.443)
RFE* DUMMY_SRFLS50%	-	-	-	-	-	-	-	-	.014** (2.255)
BLAU	-	-	-	.048*** (7.579)	-	-	-	.060*** (9.225)	-
BLAU* SRFLS	-	-	-	.012** (1.960)	-	-	-	.022*** (3.466)	-
NFE	-	-	-	-	.023*** (3.593)	.023*** (3.664)	-	-	-
NFE* SRFLS	-	-	-	-	.013** (2.145)	-	-	-	-
RFE* DUMMY_SRFLS35%	-	-	-	-	-	.019*** (3.065)	-	-	-
CONTROLS	YES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR	YES	YES	YES	YES	YES	YES	YES	YES	YES
INDUSTRY	YES	YES	YES	YES	YES	YES	YES	YES	YES
Aj-R^2	.207	.207	.162	.206	.205	.204	.162	.163	.152
F(Sig.)	176.285 (.000)	176.285 (.000)	130.314 (.000)	169.994 (.000)	168.286 (.000)	167.947 (.000)	126.951 (.000)	127.689 (.000)	118.224 (.000)

Note: Constants are considered in the regression analysis.

(4) To replace EBEC_RATIO in Model(2) with EBEC_STATUS, Model(2****) is built. The regression coefficient of RFE* SRFLS on EBEC_STATUS is still significantly positive (Beta=0.023, P<0.01), indicating H2 still holds. (5) To replace RFE in Model(2****) with BLAU, Model(2*****) is built. The regression coefficient of BLAU* SRFLS on EBEC_STATUS is still significantly positive (Beta=0.022, P<0.01), indicating H2 still holds. (6) To replace SRFLS in Model(2****) with DUMMY_SRFLS50%, Model(2******) is built. The regression coefficient of DUMMY_SRFLS50%* SRFLS on EBEC_STATUS is still significantly positive (Beta=0.014, P<0.05), indicating H2 still holds.

4.3. Endogeneity Test

a. Endogeneity Test with IV-2SLS

Considering the endogenous problem of reverse causality between equity concentration (i.e., the shareholding ratio of the first largest shareholder, SRFLS) and EBEC, we use the average industry SRFLS(SRFLS_INDUSTRY) as the instrument variable. Hausman endogeneity test results have shown that Wald statistics result is significant at the 1% level(P=0.000), indicating that there is indeed an endogenous problem between variables.

Taking SRFLS_INDUSTRY as the instrument variable of SRFLS, the Two Stage Least Square Method (2SLS) has been used for regression, and the results are shown in Column A of Table 5. The sign of the regression coefficient of SRFLS(INSTUMENTED) remains negative and significant, which proves that the conclusion of H1 is still valid even considering the issue of endogeneity between equity concentration and EBEC.

Moreover, to fit Sub_Sample_HIGH_RFE and Sub_Sample_LOW_RFE with 2SLS by taking SRFLS_INDUSTRY as the instrument variable of SRFLS, the results are shown in Column B and Column C of Table 5. Results show that when the ratio of female executives is higher, the negative impact of SRFLS(INSTUMENTED) on EBEC_RATIO is mitigated. Hence, the conclusion of H2 is still valid even considering the issue of endogeneity between equity concentration and EBEC.

Table-5. Results of 2SLS by taking SRFLS_INDUSTRY as the instrument variable[4]

	Column A		**Column B**		**Column C**	
	Whole sample		**Sub_Sample_HIGH_RFE**		**Sub_Sample_LOW_RFE**	
	EBEC_RATIO		EBEC_RATIO		EBEC_RATIO	
	Coef.	P>| z |	Coef.	P>| z |	Coef.	P>| z |
SRFLS(Instumented)	-0.823165	.000	-0.007488	.000	-0.009629	.000
RFE	0.090322	.000	0.121391	.001	0.081402	.004
CONTROLS	YES	YES	YES	YES	YES	YES
YEAR	YES	YES	YES	YES	YES	YES
INDUSTRY	YES	YES	YES	YES	YES	YES
R-squared	.153		.165		.136	
Prob > chi²	.000		.000		.000	

Considering the endogenous problem of reverse causality between female executives and EBEC, we use average industry RFE(RFE_INDUSTRY) as the instrument variable. Hausman endogeneity test results have shown that Wald statistics result is significant at the 5% level(P<0.05), indicating that there is indeed an endogenous problem between the two variables.

[4] We have also completed the regression analysis based on 2SLS by taking SRFLS_INDUSTRY as the instrument variable and taking EBEC_STATUS as the dependent variable. H1 and H2 still cannot be rejected.

Table-6. Results of 2SLS by taking RFE_INDUSTRY as the instrument variable[5]

	Column A		Column B		Column C	
	Whole sample		Sub_Sample_HIGH_RFE		Sub_Sample_LOW_RFE	
	EBEC_STATUS		EBEC_STATUS		EBEC_STATUS	
	Coef.	P>| z |	Coef.	P>| z |	Coef.	P>| z |
SRFLS	-0.000364	.000	-0.005020	.000	-0.006130	.000
RFE(Instumented)	0.150388	.000	0.596141	.000	0.529435	.004
CONTROLS	YES	YES	YES	YES	YES	YES
YEAR	YES	YES	YES	YES	YES	YES
INDUSTRY	YES	YES	YES	YES	YES	YES
R-squared	.208		.223		.174	
Prob > chi²	.000		.000		.000	

Taking RFE_INDUSTRY as the instrument variable of RFE, Two Stage Least Square Method (2SLS) has been used for regression, and the results are shown in Column A of Table 6. The sign of the regression coefficient of SRFLS remains negative and significant, which proves that the conclusion of H1 is still valid even considering the issue of endogeneity between female executives and EBEC.

Moreover, to fit Sub_Sample_HIGH_RFE and Sub_Sample_LOW_RFE with 2SLS by taking RFE_INDUSTRY as the instrument variable of RFE, the results are shown in Column B and Column C of Table 6. Results indicate that when the ratio of female executives is higher, the negative impact of SRFLS on EBEC_RATIO is mitigated. Hence, the conclusion of H2 is still valid even considering the issue of endogeneity between female executives and EBEC.

b. Endogeneity Test with Residual Model

Table-7. Robustness test with residual model: EBEC_RATIO as the dependent variable.

Variables	Nonstandardized coefficient		Standardized coefficient	t	Sig.
	B	Std.	Beta		
(Constant)	.872	.023		38.508	.000
CONTROLS	YES	YES	YES	YES	YES
YEAR	YES	YES	YES	YES	YES
INDUSTRY	YES	YES	YES	YES	YES
RFE	.079	.011	.046	7.279	.000
SRFLS_RESIDUAL	-.005	.001	-.027	-4.558	.000
RFE*SRFLS_RESIDUAL	.005	.001	.026	4.223	.000

Model(3)

$$SRFLS_{it} = \alpha + \alpha_1 RFE_{it} + \alpha_2 CONTROLS + \alpha_3 \sum YEAR + \alpha_4 \sum INDUSTRY + \text{SRFLS\_RESIDUAL}_{it}$$

Model(4)

$$EBEC\_RATIO_{it} = \alpha + \alpha_1 RFE_{it} + \alpha_2 \text{SRFLS\_RESIDUAL}_{it} + \alpha_3 CONTROLS + \alpha_4 \sum YEAR + \alpha_5 \sum INDUSTRY + \varepsilon_{it}$$

Considering the potential endogeneity problem between SRFLS and other predictors in Model(2), Model(3) is built to estimate the residual of SRFLS(SRFLS_RESIDUAL), which represents the exogenous given equity concentration more effectively. To replace SRFLS in Model(2) with SRFLS_RESIDUAL, Model(4) is built. The

5 We have also completed the regression analysis based on 2SLS by taking RFE _INDUSTRY as the instrument variable and taking EBEC_RATIO as the dependent variable. H1 and H2 still cannot be rejected.

regression results of Model(4) are shown in Table 7. The coefficient of RFE*SRFLS_RESIDUAL on EBEC_RATIO is positive and significant(Beta=0.026, P=0.000), indicating the positive moderating role of female executives in affecting the link between large shareholders and EBEC still holds even considering the potential endogeneity problem among predictors.

c. Endogeneity test with PSM

The ownership structure of an enterprise is not random, but is determined by certain enterprise characteristics. Therefore, to alleviate the self-selection bias of research samples, PSM is used. To be specific, we select the sample firms with the top 10% of SRFLS as the Experimental Group, use the five control variables mentioned above as covariates, eliminate the samples that do not meet the Common Support Hypothesis, and adopt the Nearest Neighbor Matching Method (1:1) in order to design the control group with the closest matching characteristics for the experimental group. After matching, the matched sample contains 2215 pairs of (i.e., 4230) observations. The regression results using the matched samples are shown in Table 8. The results are consistent with the expectations of H1 and H2, indicating that the conclusions of this paper are still valid after considering the self-selection bias of research samples.

Table-8. Endogeneity test results with PSM.

	Column A		Column B		Column C		Column D	
	Ebec_Ratio		Ebec_Status		Ebec_Ratio		Ebec_Status	
	Coef.	P>| z |	Coef.	Coef.	Coef.	P>| z |	Coef.	P>| z |
SRFLS	-.000580	.000	-.005445	.000	-.000583	.000	-.005422	.000
RFE* SRFLS	.005056	.000	.026498	.000				
BLAU					.009143	.611	.240994	.000
Blau* Srfls					.004291	.001	.026924	.000
Controls	YES	YES	YES	YES	YES	YES	YES	YES
YEAR	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	.187		.198		.187		.201	
Prob > chi²	.000		.000		.000		.000	

4.4. Further Exploration

We further explore the effects of equity concentration and female executives on top executive compensation (NLTEC), non-executive employee compensation (LNNEC), executive-employee compensation gap (LNEECG) and CEO compensation (LNCEOC). Here, "LN" represents the operation of taking the natural logarithm. To respectively replace EBEC_RATIO in Model(2) with NLTEC, LNNEC, LNEECG and LNCEOC, four new models are built. The regression results of the four models are respectively shown in Column A, Column B, Column C and Column D of Table 9.

Column A shows that large shareholders intend to limit the compensation level of top executives. Moreover, female executives can not only improve top executives' compensation level directly, but also improve top executives' compensation level indirectly by mitigating the negative attitudes of large shareholders towards executives' compensation.

Column B shows that, large shareholders intend to improve the employee compensation level to a moderate degree, while female executives have no significant and direct effects on employees' compensation level. Instead, female executives can reduce employees' compensation level indirectly by mitigating the positive attitudes of large shareholders towards employees' compensation.

Table-9. Empirical results of further exploration.

	Column A		Column B		Column C		Column D	
	LNTEC		LNNEC		LNEECG		LNCEOC	
	Coef.	P>|t|	Coef.	P>|t|	Coef.	P>|t|	Coef.	P>|t|
SRFLS	-.004462	.000	.001820	.000	-.005962	.000	-.004467	.000
RFE	.355719	.000	.037077	.194	.413658	.000	.348771	.000
RFE* SRFLS	.024655	.000	-.015331	.000	.034088	.000	.024996	.000
FSIZE	.265924	.000	.104164	.000	.299254	.000	.266238	.000
ALR	-.230464	.000	-.131290	.000	-.296589	.000	-.232326	.000
RID	-.295010	.000	.201363	.000	-.458904	.000	-.299456	.000
BSIZE	.000220	.895	.007706	.000	-.002306	.260	9.770E-005	.954
ROA	1.285972	.000	.169667	.000	1.563823	.000	1.287865	.000
YEAR	YES	YES	YES	YES	YES	YES	YES	YES
INDUSTRY	YES	YES	YES	YES	YES	YES	YES	YES
R-Square	.317		.293		.269		.315	
Prob > F	.000		.000		.000		.000	

Column C shows that large shareholders intend to limit executive-employee compensation gap to a moderate degree. Moreover, female executives can not only improve executive-employee compensation gap directly, but also improve executive-employee compensation gap indirectly by mitigating the negative attitudes of large shareholders towards executive-employee compensation gap.

Column D shows that large shareholders intend to limit the CEO compensation level. Moreover, female executives can not only improve CEO compensation level directly. In addition, female executives would improve CEO compensation level indirectly by mitigating the negative attitudes of large shareholders towards CEO compensation.

5. CONCLUSIONS

5.1. Theoretical Findings

The research objective is to examine the role of female executives in moderating the link between large shareholders and EBEC. The research sample, a set of panel data, covering all industries except financial industry, is drawn from Chinese A-share listed companies from 2010 to 2018 consisting of 22151 observations. Multiple methods including Multiple Linear Regression Based on OLS, Random Effect Regression Analysis, One-period Lagged-Term Regression, IV-2SLS, IV-GMM and PSM have been used to empirically analyze the data. According to the empirical analysis, we have following conclusions:

(1) Large shareholders of Chinese listed companies would have negative attitudes towards the adoption of EBEC; (2) Female executives not only improve the adoption of EBEC directly, but enhance the adoption of EBEC indirectly by mitigating the negative link between large shareholders and the adoption of EBEC in Chinese listed companies; (3) Large shareholders intend to limit the compensation level of top executives, while female executives can not only improve top executives' compensation level directly, but improve top executives' compensation level indirectly by mitigating the negative attitudes of large shareholders towards executives' compensation ; (4) Large shareholders intend to improve the employee compensation level to a moderate degree, while female executives have no significant and direct effects on employees' compensation level. Instead, female executives can reduce employees' compensation level indirectly by mitigating the positive attitudes of large shareholders towards employees' compensation.; (5)Large shareholders intend to limit executive-employee compensation gap to a moderate degree, while female executive can not only improve executive-employee compensation gap directly, but can improve executive-employee compensation gap indirectly by mitigating the negative attitudes of large shareholders towards executive-employee compensation gap; (6) Large shareholders intend to limit the CEO compensation level, while female executives can not only improve CEO compensation level directly, but improve

CEO compensation level indirectly by mitigating the negative attitudes of large shareholders towards CEO compensation.

5.2. Practical Suggestions

According to the findings, several meaningful suggestions would be proposed as follows. (1) Suggestions for the large shareholders, especially the first largest shareholder: With regards to whether and how much EBEC should be granted to top executives, large shareholders should not dogmatically take self-serving executives or risk-averse executives for granted, but should reasonably make decisions of the granting of EBEC based on the comprehensive and long-term evaluation results over the current top management team of the enterprise. For the top management teams with high capability and strong ethics baseline, it is necessary to grant more EBEC with better conditions, while paying attention to giving full play to the support and resource functions of the shareholders and the board of directors; while for the top management teams with an insufficient ability or weak ethics baseline, EBEC should be cautiously granted, while giving full play to the advisory and supervisory functions of the shareholders and the board of directors.

(2) For female executives, there are two suggestions to follow: On one hand, female executives need to maintain and strengthen positive expectations of their traditional gender roles, such as higher ethical preferences, being good at transformational leadership style, being good at communication, being more tenacious, having stronger attention to detail, more likely to moderate financial prudence, and diverse perspectives from males. In this way, female executives can gain more trust from the shareholders and the board of directors, and win a higher voice from male executives, and maximize the effectiveness of EBEC from monitoring the potential unethical behavior the male executives derived from the adoption of EBEC; On the other hand, female executives need to overcome and avoid their negative descriptions of traditional gender stereotypes, such as excessive risk aversion, lack of overall view, lack of paying attention to the external environment, being indecisive, not being fully engaged, and being more emotional and so on. In this way, the problem that EBEC can't stimulate the reasonable risk-taking behavior of executives would be alleviated under the situation of a higher female executives' participation.

5.3. Research Limitations

There are a few research limitations in this study. First, the moderating role of female executives in the link between large shareholders and the adoption of EBEC has been identified in this study, which indicates the contingent nature of the relationship between the two. Therefore, it is of good theoretical significance for further studies to explore the moderating mechanisms of some other corporate governance mechanisms on the links between the two. For instance, it can be expected that, CEO duality or ownership attributes may have moderating effects on the links between the two. Second, the impacts of female executives and equity concentration on the adoption of employees' equity-based compensation should be addressed further. Third, how to measure the extent of female executives' participation in corporate governance practice more exactly and comprehensively should be concerned. Finally, the links among female executives, large shareholders and the adoption of EBEC would vary among different culture backgrounds, and they need further exploration.

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