

Research on the Relationship Between Economic Policy Uncertainty and Executive Pay Gap

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Abstract. In recent years, with the prosperity of China's economy and the increasing comprehensive national power, changes in macroeconomic policies have become more frequent, and the resulting external uncertainty has had a significant impact on firms' adjustment of their executive compensation gaps. This paper explores the relationship between economic policy uncertainty and the internal pay gap of corporate executives based on the data of 2009-2019 China's Shanghai and Shenzhen A-share listed companies. The study shows that economic policy uncertainty significantly widens the intra-executive pay gap, and there is significant heterogeneity in the nature of corporate ownership, board size, the size of the proportion of female executives and whether they are high-tech enterprises. Further analysis shows that it significantly reduces the external pay gap for executives. The findings of this paper improve the research on the impact of macroeconomic policy changes on executive compensation gap in micro enterprises in China, and also provide a reference for further promoting compensation system reform in China.

Keywords: Economic Policy uncertainty, Internal pay gap among executives.

1. Introduction

Economic policy uncertainty refers to all the uncertainties brought about by changes in macroeconomic policies (Rao et al., 2017). When facing the pressure of economic downturn, the Chinese government tends to adjust relevant economic policies to improve the economic environment and achieve stable economic operation through policy intervention. In today's world, with the increasingly complex domestic and international economic environment, the selection and implementation of China's macroeconomic policies are facing huge challenges, and the frequency of policy adjustments is also increasing, leading to the rising economic policy uncertainty year by year (Baker et al., 2016).

Enterprises, as important participants in economic activities, face greater unpredictability in their operating environment due to changes in economic policies, which increases their business risks and decision-making difficulties (Pastor and Veronesi, 2013). Currently, many scholars have paid attention to the impact of economic policy uncertainty on enterprises. Through literature review, it is found that existing literature has extensively studied the impact of economic policy uncertainty on the adjustment of enterprise business strategies, mainly focusing on corporate financing activities (Jiang et al., 2018), cash holding strategies (Wang Hongjian et al., 2014; Li Fengyu and Shi Yongdong, 2016), innovation activities (Zhang Feng et al., 2019; He et al., 2020), and investment activities (Wang et al., 2017; Gulen and Ion, 2016). However, it is noteworthy that the adjustment of enterprise business strategies is mainly decided by senior management, but few studies have explored how economic policy uncertainty will affect senior management, ignoring its impact on corporate governance. Senior management, as important decision-makers in enterprises, plays a key role in responding to external risks, especially in the business environment of economic policy uncertainty. The grasp and interpretation of economic policies by senior management can either enable enterprises to enjoy policy benefits or face greater risks. It is evident that when economic policy uncertainty is transmitted to enterprises, senior management plays a crucial role in responding to external uncertainties, and their further response measures will have a significant impact on enterprise development. Therefore, exploring how to effectively motivate senior management to make wise

decisions under the risk of economic policy uncertainty and promote the healthy development of enterprises should become an important focus of corporate governance.

Executive internal pay gap is a widely used executive incentive mechanism, which refers to the use of pay differences between different levels of executives to achieve motivational effects, playing an important role in motivating managers to improve their abilities and promoting the convergence of interests between executives and shareholders (Lazear et al., 1981). Currently, most research on executive pay gaps focuses on their economic consequences, demonstrating their positive effects in mobilizing the work enthusiasm of executives (KoEun Park, 2016), promoting corporate earnings management (Yang Zhiqiang and Wang Hua, 2014), and increasing corporate innovation investment (Xu et al., 2017). As for their influencing factors, existing literature mainly starts from the internal perspective of the enterprise, discussing the impact of factors such as the enterprise's incentive system (Leiting and Zhou Jiana, 2014), manager's ability (Chen Deqiu and Budanlu, 2015), manager's power (Li Wenjing and Hu Yuming, 2012), and executive characteristics (Liu Guangqiang and Kong Gaowen, 2018). Existing research has less directly focused on the impact of economic policy uncertainty in the external environment on the internal pay gap of executives, and the research conclusions are not unified. Among them, Xu Yude et al. (2022) found that economic policy uncertainty significantly inhibits the internal pay gap of executives. In contrast, Liang Shenglan (2021) believes that with the increase of economic policy uncertainty, it will significantly expand the internal pay gap within the enterprise. Against the backdrop of the continuous rise in economic policy uncertainty, studying the relationship between the two is of great reference significance for how enterprises optimize the executive incentive system and how the government scientifically grasps the policy control strength.

Based on the above analysis, this paper is based on the background of the increasing economic policy uncertainty in our country year by year. Starting from the perspective that economic policy uncertainty at the macro level will lead to the gap in executive compensation at the micro level, it theoretically analyzes the close relationship between the two and conducts empirical tests. The results show: (1) Economic policy uncertainty will significantly widen the gap in executive internal compensation; (2) This positive effect exists significant heterogeneity in the nature of corporate ownership, the size of the board of directors, the proportion of female executives, and whether it is a high-tech enterprise. Further analysis shows Economic policy uncertainty will significantly narrow the gap in executive external compensation.

The research contributions of this paper are as follows: First, it supplements the relevant research on the impact of economic policy uncertainty on corporate governance. Previous literature mainly focuses on how economic policy uncertainty affects the specific operational strategy adjustments of enterprises. This paper explores the impact of changes in economic policy uncertainty on the executive compensation gap system by clarifying its close correlation with executive decision-making, thus supplementing the relevant literature on its economic consequences for corporate governance and providing reference value for the Chinese government to scientifically grasp the intensity of policy regulation. Second, it broadens the research on the factors affecting the gap in executive compensation. Previous literature mainly examines the factors from the internal perspective of enterprises, paying little attention to the impact of external factors such as economic policy uncertainty. This paper starts from the perspective that the uncertainty of external economic policy can be transmitted to enterprises, and through theoretical analysis and empirical testing of the close relationship between the two, it can provide reference for China to further regulate the executive compensation system.

2. Research Hypothesis

Against the backdrop of continuously rising economic policy uncertainty, the difficulty of enterprises in predicting future events has increased (Rao et al., 2017), making it more challenging for enterprises to sustain their operations and posing greater risks. This also brings greater difficulties

to the operational decision-making of senior management and the effective supervision of shareholders. Based on this, this paper will elaborate on the further impact of economic policy uncertainty on the internal pay gap of senior management, starting from the increased pressure on senior management performance assessment, the exacerbation of information asymmetry between shareholders and senior management, and the enhancement of senior management's motivation to use power to maintain their own interests.

Firstly, the uncertainty of economic policy will increase the pressure on senior executives' performance evaluation. As an important decision-making force in the enterprise, senior executives are responsible for planning and adjusting the overall strategy of the enterprise, playing a crucial role in the development of the enterprise. According to the principal-agent theory and the tournament theory, in order to strengthen the incentive and supervision of senior executives, enterprises tend to formulate senior executive compensation based on observable performance indicators, thus often linking the performance evaluation of senior executives with the operating performance of the enterprise, which makes senior executives have a common interest in pursuing personal interests and improving the interests of the enterprise, and stimulates the enthusiasm of senior executives. Liu Shaowei and Wan Dayan (2013) found through their research on the relationship between senior executive compensation and corporate performance that there is a significant positive correlation between the two. Fang Junxiong (2009) showed that the compensation of senior executives in China has shown a significant sensitivity to performance, and found that the increase in performance growth is significantly higher than the decrease in performance decline. When the level of economic policy uncertainty increases, due to the continuous fluctuation and unpredictability of economic policies, it leads to an increase in uncertain factors in the business environment of enterprises (Pastor and Veronesi, 2013). The risk shocks brought by external uncertainty make it more difficult for enterprises to maintain their competitive advantage, and also increases the difficulty for senior executives to accurately grasp the trend of economic policy changes and adjust their business decisions (Miao Jianbo and Zhao Jing, 2012), and the pressure on senior executives' performance evaluation and management risks will also increase accordingly. Chen Zhen and Ling Yun (2013) found that when enterprises are in a high-risk environment, a higher sensitivity to performance can bring great pressure to senior executives. In order to reduce the occurrence of moral risk behavior of senior executives, enterprises tend to reduce the sensitivity of compensation to performance. Therefore, when the level of economic policy uncertainty increases, senior executives, under the pressure of increased performance pressure and management risks, may propose more lenient standards for performance evaluation to the board of directors, or require a higher level of compensation, so as to obtain compensation that matches the pressure and risks they undertake. And in order to maintain high-quality senior executive human resources in the face of the risk shocks of rising economic policy uncertainty, the board of directors will also tend to reduce changes in senior executives, prefer to select senior executives from within (Rao Pinggui and Xu Zihui, 2017), reduce the correlation between compensation and performance (Chen Zhen and Ling Yun, 2013), and enterprises are likely to adopt lenient compensation systems to alleviate the pressure on senior executives' performance and encourage the internal promotion of senior executives, thus increasing the internal salary gap of senior executives.

Secondly, the uncertainty of economic policy will exacerbate the information asymmetry between shareholders and senior management. The increase in uncertainty levels makes the external macro policy environment of enterprises more difficult to predict, and as the actual managers of the company, senior management often has more timely internal information than shareholders, which expands the degree of information asymmetry between the two. Additionally, since shareholders usually supervise the due diligence of senior management based on the performance of the company, whether the performance can maintain stable growth plays an important role in senior management compensation. However, with the rising uncertainty of economic policy, it increases the possibility that enterprises will frequently change their business strategies to adapt to policy changes, leading to greater fluctuations in business performance. At this point, the relationship between the company's business

performance and the actual efforts of the managers will weaken (Li Fengyu and Shi Yongdong, 2016), so the practice of evaluating the actual contribution of senior management based on their performance may be ineffective. According to the principal-agent theory, the increased information asymmetry between the principal and agent makes it more difficult for shareholders to effectively supervise the agency behavior of senior management. Under the pressure of performance and to maintain their own interests, senior management is very likely to beautify the performance level of the company or exaggerate their actual contribution to it (Miao Yi and Hu Yiming, 2016). Additionally, according to the tournament theory, expanding the internal salary gap of senior management can bring strong incentives to senior management (Lin Junqing et al., 2003), which helps to motivate the internal competition among the senior management team, ultimately promoting the effective supervision of the principal over the agent, thus reducing the agency cost of the enterprise. Based on the above analysis, it is inferred that the increased degree of information asymmetry will increase the difficulty of enterprise supervision, leading to an increase in agency costs, thus prompting the increase in the internal salary gap of senior management.

Furthermore, economic policy uncertainty will enhance the motivation of senior executives to use their power to maintain their own interests. According to the theory of managerial power, senior executives can negotiate salaries with the board of directors and use various means to seek higher interests (Xiao Feng et al., 2010). Lu Rui (2007) found that in companies where managers have more power compared to other companies, the salary gap within the senior management team is larger. Against the backdrop of increasing economic policy uncertainty, companies place higher demands on the decision-making ability of senior executives, and they also bear greater performance evaluation pressure and business decision-making risks, which strengthens the confidence and motivation of senior executives and the board of directors to negotiate salaries (Zhou Zijiang et al., 2018). It can be inferred that in the process of formulating and implementing the senior executive salary gap system, senior executives are more likely to engage in self-interested behavior under the multiple pressures brought about by economic policy uncertainty, using their own power for artificial intervention to protect their own interests from being damaged. Miao Yi and Hu Yiming (2016) found through the study of senior executive salary defense that powerful executives would increase the weight of favorable performance in salary evaluation, while less powerful ones would fabricate performance through earnings management. This shows that senior executives with different levels of power have differences in using their power to maintain their own interests and all have the motivation to defend their salaries. Fang Junxiong (2011) found that when corporate performance rises, senior executives receive a greater salary increase than ordinary employees, while when performance falls, the salary decrease of senior executives is not lower than that of ordinary employees, suggesting that managerial power dominates this phenomenon. According to the tournament theory, due to the different levels of senior executives, when economic policy uncertainty increases, core senior executives and other senior executives face different performance evaluation pressures, and the risks and power they bear vary with their levels, but all senior executives have the motivation to use their power to maintain their personal interests, and the increase in economic policy uncertainty will further increase this self-interested motivation. It can be inferred that economic policy uncertainty makes senior executives at higher levels play a greater role in bargaining with the board of directors and intervening through the use of managerial power, thereby further expanding the internal salary gap among senior executives.

In summary, the rising uncertainty of economic policies will increase the performance pressure on corporate executives, prompting them to propose more lenient standards for evaluating compensation to the board of directors. At the same time, it will also increase the degree of information asymmetry between shareholders and executives, making it more difficult for shareholders to supervise executives. Moreover, executives at different levels are more motivated to manipulate compensation by exercising their managerial power to maintain their personal salary interests and promotion desires. Therefore, this paper proposes the hypothesis.

H1: The level of economic policy uncertainty increases the gap in internal executive compensation.

3. Research Design

3.1. Data source and sample selection

This article takes A-share listed companies in Shanghai and Shenzhen as the research sample and selects the period from 2009 to 2019 as the sample period. The main reason for choosing this time range is based on the following considerations: the outbreak of the 2008 financial crisis and the outbreak of the COVID-19 pandemic at the beginning of 2020 both led to a sharp fluctuation in economic policy uncertainty. The economic recession caused by sudden events will have a certain impact on the compensation strategy of corporate executives. In order to better reflect the impact brought about by economic policy uncertainty, this article selects the period from 2009 to 2019 as the research period. The corporate data comes from the CSMAR database and the following treatments are made: (1) Exclude financial companies; (2) Exclude ST companies; (3) Exclude samples with a debt-to-asset ratio greater than 1 or less than 0; (4) Exclude samples with missing data; (5) All continuous variables are subjected to a 1% trimming treatment. In the end, 20,016 observation values are obtained.

3.2. Variable selection and definition

The explained variable in this article is the internal pay gap (IPG) of senior executives, which measures the salary difference between core and non-core senior executives in the senior management team. This article follows the approach of Lingtong and Jiaonan Zhou (2014), defining it as the ratio of the average salary of the top three highest-paid executives to the average salary of all senior executives, where salary is limited to monetary compensation and does not include equity incentives.

The explanatory variable in this article is the Economic Policy Uncertainty (EPU) in China. Due to the high accuracy of the index compiled by Baker et al. (2016) based on the South China Morning Post, this index has been widely used in the literature on China's economic policy uncertainty, and therefore, it is adopted to measure the explanatory variable. In addition, to match other annual data, this article calculates the arithmetic mean of the monthly EPU index according to the year it belongs to, as the economic policy uncertainty index for that year. Moreover, to eliminate the differences in magnitude between the data, this article further processes it by dividing by 100.

Referring to existing relevant research, this paper selects property rights nature, enterprise scale, asset-liability ratio, total asset return rate, marketization degree, whether the two positions are integrated, board independence, board size, and senior management shareholding ratio as control variables, taking into account the characteristics of the company, governance characteristics, industry characteristics, and senior management characteristics. At the same time, it also controls the year and industry variables. Table 1 lists the specific indicators selected and their measurement methods.

Table 1. Variable definitions

Variable Name	Definition
IPG	Average compensation of top three executives divided by the average of all executives
EPU	China's economic policy uncertainty index compiled by Baker et al
Size	Assets at the end of the period are expressed in natural logarithms
Lev	Total liabilities at year-end divided by total assets
ROA	Net profit divided by average balance of total assets
MI	Market-oriented index compiled by Fan Gang et al
State	1 for state-owned enterprises and 0 for the rest
Same	The chairman and the general manager are the same person as 1, otherwise it is 0
Indep	Number of independent directors divided by total number of directors
Board	Number of Board Members
ES	Total number of shares held by executives divided by total number of shares
year	Annual dummy variables
industry	Industry dummy variables

3.3. Model Construction

To study the relationship between economic policy uncertainty and the internal pay gap of senior executives, based on the research hypothesis, this paper constructs a regression model (1) for testing:

$$IPG_{i,t} = \beta_0 + \beta_1 EPU_t + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 ROA_{i,t} + \beta_5 MI_{i,t} + \beta_6 State_{i,t} + \beta_7 Same_{i,t} + \beta_8 Indep_{i,t} + \beta_9 Board_{i,t} + \beta_{10} ES_{i,t} + \mu_i + v_t + \varepsilon_{i,t} \quad (1)$$

Among them, $IPG_{i,t}$ represents the internal pay gap of senior management in the i company in the t year, EPU_t represents the economic policy uncertainty index in China in the t year; β_0 represents the intercept term; μ_i represents the year fixed effect, v_t represents the industry fixed effect; $\varepsilon_{i,t}$ represents the random disturbance term.

4. Empirical Test

4.1. Descriptive analysis

Table 2 lists the descriptive statistics of the main variables in this paper. It can be seen that during the sample period of 2009-2019, the internal pay gap (IPG) of senior management was as low as 1.183, with a very small gap, but it reached 3.266 at the highest, indicating a significant difference between different enterprises. In addition, the Economic Policy Uncertainty Index (EPU) of our country is within the range of 0.989-7.919, indicating a significant fluctuation during this sample period. In terms of control variables, the Marketization Index (MI) is between 2.880 and 10.960, but the mean reaches 8.088, indicating that although there are differences between regions in our country, the overall level of marketization is relatively high. The average size of enterprises (Size) is 22.240, with a small gap between the minimum and maximum values, indicating that there are both small and large enterprises in the sample, but on the whole, the scale is relatively considerable. The Return on Assets (ROA) reflects the profitability of enterprises, with the minimum being -0.192 and the maximum reaching 0.190, indicating that the profitability of enterprises in the research sample is different, and there are also loss-making enterprises in the sample. The size of the board of directors (Board) reflects the ability of the board of directors to objectively supervise the management, with an average of 8.775, but there is a 6-fold difference between the minimum size (3 people) and the maximum size (18 people), which reflects the differences in the setting of board size among the sample enterprises, but on the whole, it is relatively balanced. The proportion of senior management holding (ES) is as low as 0, with an average of only 0.055, indicating that the holding level of senior management in listed companies in our country is generally low.

Table 2. Descriptive statistical tables

Variable	Number	Mean	Std	Min	Max
IPG	20,016	1.894	0.425	1.183	3.266
EPU	20,016	3.068	2.110	0.989	7.919
MI	20,016	8.088	1.894	2.880	10.960
ROA	20,016	0.040	0.054	-0.192	0.190
Size	20,016	22.240	1.280	19.850	26.220
Lev	20,016	0.447	0.206	0.059	0.902
Indep	20,016	0.372	0.052	0.333	0.571
Board	20,016	8.775	1.736	3.000	18.000
ES	20,016	0.055	0.126	0.000	0.599

4.2. Benchmark regression

In order to test the hypothesis H1, this paper establishes a model (1) to perform a regression analysis on economic policy uncertainty and the internal pay gap of executives, and the regression results are shown in Table 3.

The coefficient between economic policy uncertainty (EPU) and the internal pay gap (IPG) of senior executives is 0.01 after introducing relevant control variables, control for years, and industry fixed effects, and it is significantly positive at the 1% significance level. This indicates a significant positive relationship between economic policy uncertainty and the internal pay gap of corporate senior executives, i.e., the higher the degree of economic policy uncertainty, the greater the internal pay gap of senior executives, and the regression results of the model support the hypothesis H1.

Table 3. The Impact of Economic Policy Uncertainty on the Intra-executive Pay Gap

	IPG
EPU	0.0100*** (4.3354)
MI	-0.0077*** (-4.6162)
ROA	0.2511*** (4.1066)
Size	0.0033 (1.0916)
Lev	0.0139 (0.7302)
State	-0.3044*** (-44.9760)
Same	0.0857*** (11.4037)
Indep	-0.5761*** (-10.2394)
Board	0.0291*** (14.2368)
ES	0.0333 (1.3289)
year	Control
industry	Control
Constant	1.8963*** (28.1386)
N	20016
adj. R2	0.167

4.3. Heterogeneity analysis

4.3.1 Property ownership nature

Under the current system background in our country, the nature of corporate ownership will closely affect the standards for determining executive compensation, and the impact of economic policy uncertainty on enterprises with different ownership properties is also different. From a theoretical perspective, as an important material basis of Chinese characteristic socialism, the impact of macroeconomic policies on state-owned enterprises is often stronger than that on non-state-owned enterprises. However, compared with private enterprises, state-owned enterprises often appoint and appoint executives through administrative methods, which leads to a closer relationship between the executives of state-owned enterprises and the government, and a more informed access to policy change information. Therefore, under the environment of economic policy uncertainty, political connections and administrative experience often enable the executives of state-owned enterprises to more accurately grasp the introduction and trends of policies, resulting in less external risk shocks for state-owned enterprises. In addition, the difference in ownership properties also affects the incentive effect of the gap in executive compensation (Bu Dianlu et al., 2017). Zhou Lian'an (2017) believes

that the career prospects of executives in state-owned enterprises are not established by better market reputation to obtain higher remuneration, but hope to obtain the recognition of superior government departments to achieve administrative promotion. From this inference, the internal salary gap of executives has a limited incentive effect. Based on the above considerations, this article groups the samples according to the nature of ownership, and the regression results are shown in Table 4.

It can be seen that the coefficient before EPU in the state-owned enterprise group is significant at the 10% level, while the non-state-owned enterprise group is significant at the 1% level, and its coefficient is even larger. This indicates that compared to state-owned enterprises, the economic policy uncertainty faced by non-state-owned enterprises has a stronger impact on the gap in executive compensation. This suggests that in non-state-owned enterprises without political connections, the external risk shocks brought about by economic policy uncertainty may be stronger, thus more significantly affecting the gap in executive compensation. It also means that the executive selection system, which is not subject to government intervention, creates a fair promotion environment, and the executive compensation gap system may play a stronger incentive role when facing uncertain.

Table 4. Test results grouped by property nature

	(1) Non state-owned IPG	(2) State-owned IPG
EPU	0.0140*** (0.00373)	0.00542* (0.00305)
MI	-0.00928*** (0.00244)	-0.00447* (0.00233)
ROA	0.0997 (0.0810)	0.412*** (0.0909)
Size	0.0311*** (0.00485)	-0.0167*** (0.00383)
Lev	-0.0986*** (0.0272)	0.117*** (0.0265)
Same	0.0627*** (0.00894)	0.141*** (0.0137)
Indep	-0.360*** (0.0927)	-0.477*** (0.0709)
Board	0.0464*** (0.00356)	0.0202*** (0.00242)
ES	0.0666** (0.0265)	1.593*** (0.275)
year	Control	Control
industry	Control	Control
Constant	1.128*** (0.114)	2.000*** (0.0848)
N	10,895	9,121
adj. R2	0.068	0.050

4.3.2 Board size

Due to the existence of agency relationships, the management and operational behaviors of senior executives need to be supervised by the company's shareholders. In the governance system of listed companies, shareholders elect or appoint directors to form the board of directors, representing shareholders in exercising supervisory power. The size of the board of directors to some extent reflects the intensity and effectiveness of supervision, as a larger size represents a concentration of more professional talents, which is conducive to absorbing more opinions and can reduce the possibility of colluding with senior executives. According to the aforementioned analysis, senior

executives can manipulate the level of remuneration by exercising their managerial power, and this self-interested behavior will seriously harm the interests of shareholders. Therefore, the board of directors needs to constrain the self-interested behavior of senior executives in formulating the senior executive remuneration system and evaluating their performance-related remuneration. As the larger the board of directors, the better the supervisory effect, it is speculated that its constraint effectiveness is stronger, which is conducive to constraining the manipulation of senior executives' remuneration.

Table 5 shows the regression results after grouping the samples by the size of the board of directors. Comparing the results in columns (1) and (2), it can be concluded that in the samples with a small board of directors, the positive impact of economic policy uncertainty on the internal pay gap of senior management is significant at the 1% level, while in the samples with a large board of directors, the coefficient of EPU is not significant. This indicates that the size of the board of directors significantly affects the impact of economic policy uncertainty on the internal pay gap of senior management, and the smaller the board of directors, the less conducive it is to effective supervision of senior management behavior. Under the influence of economic policy uncertainty, the role of small boards of directors in curbing the exercise of senior management's power to manipulate salaries is limited, thus still leading to an increase in the internal pay gap of corporate senior management.

Table 5. Test results grouped by board size

	(1) Small scale IPG	(2) Large scale IPG
EPU	0.0104*** (0.00251)	0.00267 (0.00581)
MI	-0.0104*** (0.00184)	0.00185 (0.00403)
ROA	0.145** (0.0647)	0.864*** (0.180)
Size	0.00856*** (0.00328)	-0.00193 (0.00680)
Lev	-0.00252 (0.0205)	0.136*** (0.0526)
Same	0.0706*** (0.00767)	0.184*** (0.0287)
State	-0.296*** (0.00713)	-0.322*** (0.0203)
Indep	-0.991*** (0.0504)	-0.525*** (0.198)
ES	0.0774*** (0.0256)	-0.203* (0.112)
year	Control	Control
industry	Control	Control
Constant	2.148*** (0.0739)	2.254*** (0.157)
N	16,535	3,481
adj. R2	0.165	0.198

4.3.3 Percentage of female executives

Under the pressure of economic policy uncertainty, senior executives may manipulate compensation by exercising their managerial power, leading to an expansion of the internal pay gap among senior executives. However, the occurrence of self-interested behavior of senior executives is largely influenced by individual characteristics of senior executives. In order to examine the role of

the heterogeneity of gender characteristics of senior executives, this paper selects the proportion of female senior executives in the team to group the samples.

The existing literature suggests that the gender of senior executives is an important factor affecting corporate non-compliant decisions, and female senior executives are considered more inclined to avoid risks and comply with ethical norms (Zhang Changzheng and Zhang Jiao, 2018). When there are female members or a higher proportion of female senior executives in the senior management team, the probability of non-compliant operations of the company will significantly decrease (Gan Weiyu et al., 2015). This indicates that a higher proportion of female senior executives is conducive to curbing the selfish behavior of the management, and can reduce the possibility of senior executives manipulating their salaries.

Table 6 shows the regression results after grouping. The results show that in samples with a low proportion of female executives, the positive impact of economic policy uncertainty on the internal pay gap of executives is significant at the 1% level, while in samples with a high proportion of female executives, the coefficient of EPU is not significant. This indicates that the heterogeneity of executive gender plays a significant role in the process of economic policy uncertainty affecting the internal pay gap of executives. Under the risk of economic policy uncertainty, a low proportion of female executives is more likely to trigger executive pay manipulation behavior, increasing the internal pay gap among executives.

Table 6. Test results grouped by the proportion of female executives

	(1) Low proportion IPG	(2) High proportion IPG
EPU	0.0154*** (0.00314)	0.00393 (0.00338)
MI	-0.00853*** (0.00231)	-0.00718*** (0.00241)
ROA	0.294*** (0.0845)	0.190** (0.0880)
Size	-0.00685* (0.00406)	0.0225*** (0.00454)
Lev	0.0577** (0.0260)	-0.0270 (0.0276)
Same	0.114*** (0.0112)	0.0569*** (0.0101)
State	-0.287*** (0.00921)	-0.311*** (0.0101)
Board	0.0305*** (0.00271)	0.0300*** (0.00308)
Indep	-0.584*** (0.0746)	-0.538*** (0.0850)
ES	0.0499 (0.0397)	0.0264 (0.0323)
year	Control	Control
industry	Control	Control
Constant	2.079*** (0.0918)	1.481*** (0.101)
N	10,541	9,475
adj. R2	0.180	0.154

4.3.4 High-tech enterprise

Due to the different industry nature of various enterprises, there are differences in the weight of various influencing factors when setting the evaluation criteria for their senior management remuneration. High-tech enterprises are a very representative category, and their distinguishing feature from other enterprises lies in the fact that high-tech enterprises pay more attention to the transformation of scientific and technological achievements and the iteration of new products and new technologies. The ability of technological innovation is the most core driving force for the development of high-tech enterprises and also an important reference standard for setting their senior management remuneration.

Under the risk impact of economic policy uncertainty, senior executives may beautify their performance levels or exaggerate their actual contributions in order to meet performance assessments and maintain their salary levels. However, for high-tech enterprises, the completion rate of converting technological achievements into core intellectual property rights is difficult to fabricate. Compared to other enterprises, there may be more room for beautification in performance, and important indicators of senior executive compensation such as the conversion of scientific research achievements and the success rate of research project applications are more easily measured accurately, leaving less room for manipulation by senior executives. Therefore, it can be inferred that non-high-tech enterprises show a more significant performance in the impact of economic policy uncertainty on the internal salary gap of senior executives compared to high-tech enterprises.

Table 7. Test results grouped by whether they are high-tech enterprises

	(1) Non high-tech IPG	(2) High-tech IPG
EPU	0.0122*** (0.0028)	0.0027 (0.0042)
MI	-0.0107*** (0.0020)	0.0007 (0.0030)
ROA	0.1870** (0.0769)	0.3600*** (0.0999)
Size	-0.0051 (0.0035)	0.0313*** (0.0060)
Lev	0.0363 (0.0229)	-0.0379 (0.0339)
State	-0.3040*** (0.0081)	-0.3060*** (0.0125)
Same	0.0900*** (0.0090)	0.0751*** (0.0138)
Indep	-0.5560*** (0.0659)	-0.6460*** (0.1090)
Board	0.0305*** (0.0024)	0.0235*** (0.0039)
ES	0.0580* (0.0308)	0.0043 (0.0437)
year	Control	Control
industry	Control	Control
Constant	2.0580*** (0.0767)	1.3730*** (0.1250)
N	14,403	5,613
adj. R2	0.1720	0.1610

Table 7 shows the regression results grouped by whether they are high-tech enterprises. In the sample of non-high-tech enterprises, the EPU coefficient is significantly positive, while in the sample of high-tech enterprises, the EPU coefficient is not significant. This indicates that compared to high-tech enterprises using more easily observable and measurable performance evaluation criteria, other

enterprises have a greater difficulty in distinguishing the authenticity of performance, and their remuneration systems may be more easily manipulated. Therefore, when facing economic policy uncertainty, it is more likely to trigger the selfish behavior of senior management and power intervention, thereby increasing the internal salary gap.

4.4. Further analysis

The above regression results mainly arise from the tournament theory, treating the internal salary gap as an effective incentive for senior management, believing that senior management will work hard for the purpose of internal promotion and to improve salary levels. However, in addition to the internal salary gap among senior management, the external salary gap of senior management is also an important reference in the design of the salary system. The former refers to the degree of difference between core and non-core senior management within the enterprise, while the latter refers to the horizontal comparison within the same industry. In order to comprehensively examine the internal and external impacts of economic policy uncertainty on the salary gap of senior management, this paper will further explore the relationship between it and the external salary gap of senior management.

Referring to the approach of Li Wenjing et al. (2014), define the Executive External Pay Gap (EPG) as equal to the average of the company's executive compensation divided by the industry executive compensation, and establish regression model (2):

$$EPG_{i,t} = \beta_0 + \beta_1 EPU_t + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 ROA_{i,t} + \beta_5 MI_{i,t} + \beta_6 State_{i,t} + \beta_7 Same_{i,t} + \beta_8 Indep_{i,t} + \beta_9 Board_{i,t} + \beta_{10} ES_{i,t} + \mu_i + v_t + \varepsilon_{i,t} \quad (2)$$

Among them, $EPG_{i,t}$ represents the external pay gap of senior management in the i company in the t year, with the rest of the variables retaining their original meanings.

Table 8. The Impact of Economic Policy Uncertainty on the external executive Pay Gap

	EPG
EPU	-0.0053*** (-17.2215)
MI	0.0059*** (28.2862)
ROA	0.2174*** (26.6260)
Size	0.0227*** (50.5723)
Lev	-0.0061*** (-2.8198)
State	0.0004 (0.3835)
Same	-0.0021** (-2.2253)
Indep	0.0133* (1.6648)
Board	0.0002 (0.8540)
ES	-0.0314*** (-11.3277)
year	Control
industry	Control
Constant	-0.4303*** (-42.8606)
N	20016
adj. R2	0.2890

It can be seen from Table 8 that the coefficient between EPU and EPG is significantly negative, indicating that the higher the economic policy uncertainty, the smaller the gap in external compensation for senior executives. Possible reasons for this phenomenon may include: when economic policy uncertainty increases, companies tend to reduce changes in senior management (Rao Pinggui and Xu Zihui, 2017), in order to maintain the stability of their management teams, companies, in addition to increasing the internal compensation gap for senior executives to motivate internal competition among them, are also inclined to weaken the gap in external compensation for senior executives to prevent talent outflow.

5. Robustness Test

5.1. Replace the EPU variable

The EPU index compiled by Baker et al. was used to measure the explanatory variables in the benchmark regression. Since the compilation of this index is based on the Hong Kong newspaper "South China Morning Post". To ensure the reliability of the conclusions, this paper further adopts the index compiled by Davis et al. based on the mainland newspapers "People's Daily" and "Guangming Daily" for measurement. The regression results are shown in column (1) of Table 9. The EPU coefficient remains positive and significant, indicating that the regression results are relatively robust.

5.2. Alleviating endogeneity issues

Table 9. Robustness Test

	(1) IPG	(2) IPG
EPU	0.0276*** (4.3354)	0.0233*** (5.0288)
MI	-0.0077*** (-4.6162)	-0.0082*** (-4.5038)
ROA	0.2511*** (4.1066)	0.2373*** (3.5291)
Size	0.0033 (1.0916)	0.0051 (1.5452)
Lev	0.0139 (0.7302)	0.0070 (0.3323)
State	-0.3044*** (-44.9760)	-0.3116*** (-42.7412)
Same	0.0857*** (11.4037)	0.0889*** (10.8455)
Indep	-0.5761*** (-10.2394)	-0.6309*** (-10.4870)
Board	0.0291*** (14.2368)	0.0283*** (12.7131)
ES	0.0333 (1.3289)	0.0331 (1.1775)
year	Control	Control
industry	Control	Control
Constant	1.8754*** (27.7394)	1.8663*** (25.1315)
N	20016	16830
adj. R2	0.1670	0.1720

Since the uncertainty of economic policy belongs to macro-level economic policy changes, and the gap in internal executive compensation within senior management is a micro-level corporate governance behavior, generally speaking, the gap in internal executive compensation at the micro level is difficult to affect macro-level economic policy fluctuations. It is relatively unlikely that reverse causality leads to endogeneity problems. However, for the sake of caution, this paper adopts the method of regressing the EPU lagged by one period. In addition, in order to alleviate the endogeneity problem caused by interference among individual enterprises, this paper strictly controls annual and industry effects. The regression results are shown in column (2) of Table 9, where the EPU coefficient is significantly positive, consistent with the aforementioned conclusion.

6. Conclusion

6.1. Research conclusions and recommendations

This paper, based on the background trend of increasing economic policy uncertainty in China's economic policies and the continuous advancement of the reform of senior management remuneration systems, analyzes relevant data of China's Shanghai and Shenzhen A-share listed companies from 2009 to 2019. Based on principal-agent theory, tournament theory, and manager power theory, it empirically tests the impact of changes in economic policy uncertainty on the internal salary gap of senior management. The specific conclusions are as follows: (1) Economic policy uncertainty has a significant positive impact on the internal salary gap of senior management; (2) In the heterogeneity analysis, significant differences were found among different samples after grouping by property rights nature, board size, proportion of female senior managers, and whether it is a high-tech enterprise. In addition, this paper has carried out further research, and its conclusions show Economic policy uncertainty will narrow the external salary gap of senior management.

Based on the above research conclusions, this paper proposes the following suggestions. For the government, the adjustment of macroeconomic policies in the long run is to create a better business environment for enterprises and promote the healthy and sustainable development of enterprises. However, in addition to focusing on its positive effects, government departments should also pay attention to the negative impacts of frequent changes in economic policies on enterprises, and strive to reduce the operating risks faced by enterprises due to the uncertainty of economic policies in the process of policy transmission. Therefore, when formulating and implementing policies, government departments should carefully consider the consistency and unity of economic policies and try to avoid unnecessary fluctuations. In addition, when formulating relevant economic policies, government departments should fully consider the adaptability and response differences of different micro entities to changes in macroeconomic policies.

For enterprises, facing the increasing economic policy uncertainty in our country, enterprises should enhance their ability to respond to external risks, and be brave and skilled in seeking better development in uncertainty. Additionally, this article discusses the transmission mechanism that the rise in economic policy uncertainty will increase information asymmetry between senior management and shareholders, making it easier for senior management to manipulate compensation by exercising managerial power, thereby widening the internal compensation gap among senior management. This suggests that enterprises should make greater efforts to increase the effectiveness of shareholder supervision. Furthermore, enterprises should continuously improve their senior management compensation systems, strengthen the assessment criteria based on the actual capabilities of senior management, and closely link the establishment of performance assessment criteria to the characteristics of enterprise operations, to comprehensively evaluate senior management performance to constrain senior management from beautifying performance levels. At the same time, enterprises should further strengthen their supervision mechanisms, give full play to the supervisory role of shareholders and the board of directors, and link the individual characteristics of senior management to constrain their self-interested behavior. Regarding the mechanism of how economic policy uncertainty affects enterprise innovation efficiency through the internal compensation gap among

senior management, it is recommended that enterprises pay attention to the adverse effects of the internal compensation gap on the senior management team, and fully consider the fairness and necessity of the compensation gap in the design of the senior management compensation system, and make the rationality of the compensation gap transparent. This will reduce the unfair perception within the senior management team and transform it into an incentive effect through optimizing the compensation system.

6.2. Research limitations and prospects

The research in this article has certain limitations: when defining the scope of executive compensation, due to considerations of data availability, this article only uses the monetary compensation disclosed in the annual reports of listed companies to measure it, ignoring equity incentives and some hidden compensation. In the future, it is possible to conduct more representative research based on a more comprehensive sample of data. In addition, the economic policy uncertainty index adopted in this article describes the degree of economic policy uncertainty in China as a whole, without being subdivided into specific levels of economic policy uncertainty. In the future, it can also explore how to classify and measure it, and use it for more in-depth research.

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