

# *Research on the Impact Mechanism of Economic Policy Uncertainty on ESG Performance of Enterprises—Based on the Perspective of Enterprise Innovation*

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**Abstract:** China's economy is facing new challenges and opportunities during the critical period of transition from rapid development to high-quality development. In order to realize the goal of sustainable development, both companies and society need to focus on ESG, which is the responsibility and contribution of enterprises to the environment, society, and governance. This article analyzes the impact of economic policy uncertainty on ESG performance of all A-share listed companies in China from 2012 to 2022, as well as the role of corporate innovation. The main findings of this article include: (1) Economic policy uncertainty can stimulate enterprises to improve their ESG levels and innovation capabilities; (2) Enterprise innovation is an important way for economic policy uncertainty to affect the ESG performance of enterprises.

## 1. Introduction

ESG is an acronym for Environmental, Social and Governance, which evaluates the sustainability of business operations and the impact on social values from multiple dimensions. As the goals of carbon peaking and carbon neutrality are receiving increasing attention from all walks of life, ESG has gradually become a hot topic. Since the outbreak of the global financial turmoil in 2008, the Chinese government has launched a series of policies of enormous scale to cope with the economic crisis, which have increased the uncertainty of the economic policies. At present, China's economic development has entered a "new normal", and innovation has become an important force in promoting sustainable economic growth. Based on this, this paper selects the data of all A-share listed companies from 2012 to 2022 to analyze the relationship between economic policy uncertainty and corporate ESG, and the mediating role of corporate innovation between economic policy uncertainty and the comprehensive performance and various sub-dimensions of corporate ESG.

The main contribution of this paper is twofold: first, at the theoretical level. From the macro level, this paper studies the impact of economic policy uncertainty on the various sub-dimensions and comprehensive performance of corporate ESG, which makes up for the shortcomings of the existing literature. Secondly, at the practical level, the findings of this paper provide strong support for enterprises to focus on innovation, and also provide the necessary basis for the government to

play a leading role.

## **2. Literature review**

### **2.1. Studies related to economic policy uncertainty**

Economic policy uncertainty refers to the lack of clear expectations from economic entities regarding future policy changes by the government. Elevated economic policy uncertainty can adversely affect economic development. On the one hand, it will weaken the intermediation function of banks, trigger sharp fluctuations in the foreign exchange market and the stock market (Pastor et al, 2012)<sup>[1]</sup>, and also cause fluctuations in the economic cycle. On the other hand, it will increase the operating costs of enterprises and reduce the scale and efficiency of their investment (Nagar et al, 2019)<sup>[2]</sup>, and it will also increase the degree of risk aversion of enterprises, which will affect the production and operation of the enterprises (Gulen et al, 2016)<sup>[3]</sup>.

### **2.2. ESG related research**

The theoretical foundations of ESG mainly include stakeholder theory, sustainable development theory and principal-agent theory. With the increasingly prominent issues of global climate crisis, labor issues, and corporate ethics, the international community is paying more attention to the ESG system.

At present, there is still fierce debate about the impact of ESG practices on enterprise value. Some scholars believe that better ESG performance can attract more socially responsible investors, reduce financing costs, reduce earnings management behavior, improve internal control structures, and create long-term competitive advantages for enterprise (Flammer et al, 2019)<sup>[4]</sup>. Some scholars believe that in the process of fulfilling social responsibility, enterprises should not only consider the interests of shareholders, but also the interests of other stakeholders, which will increase the cost of the enterprise and reduce the efficiency of resource allocation (Freeman, R.E., 1984)<sup>[5]</sup>.

## **3. Theoretical analysis and research hypothesis**

### **3.1. Economic policy uncertainty and corporate ESG performance**

Economic policy uncertainty can damage the overall level of trust in society (Lins et al, 2017)<sup>[6]</sup>, reduce the liquidity of social capital, exacerbate financial friction, and limit the financing channels and capabilities of enterprises. To cope with this predicament, enterprises can improve their transparency, reduce adverse selection risks, and improve their financing channels by disclosing more non-financial information. This is the logic based on the "information effect" perspective.

Based on the above analysis, this article proposes the following assumptions:

H1: Economic policy uncertainty can improve the sub dimensions and comprehensive performance of enterprise ESG.

### **3.2. Economic policy uncertainty and firm innovation**

Schumpeter (1939)<sup>[7]</sup> believes that economic instability can have a cleaning effect and achieve optimal resource allocation. Meanwhile, economic policy uncertainty can lead to greater market fluctuations and risks for enterprises. In order to compensate for potential losses, enterprises will increase their investment in innovation and research and development activities. In addition, economic policy uncertainty will increase the possibility of disruptive changes in the market, and

innovative enterprises are better able to adapt to the changing market environment and gain greater competitive advantages.

Based on the above analysis, this article proposes the following assumptions:

H2: Economic policy uncertainty promotes firm innovation.

### **3.3. Economic Policy Uncertainty, Corporate Innovation and Corporate ESG Performance**

When economic policy uncertainty rises, enterprises will increase their investment in innovation in order to cope with risks, which will have an impact on the use of energy and raw material in the production process, which is the substitution effect, the optimization effect and the emission reduction effect.

Secondly, enterprises can reduce the degree of information asymmetry through innovation, enabling them to more accurately access the real needs of users and meet the expectations of stakeholders. Firms can improve employee health and safety through innovation (e.g., mechanized work instead of manual work).

Finally, enterprise innovation helps to optimize the quality of internal management and decision-making. By innovating organizational structure, enterprises can achieve a flat and hierarchical organizational structure, and improve decision-making efficiency. Enterprise innovation can effectively reduce information asymmetry and decision-making errors, effectively alleviate agency problems and conflicts of interest.

Based on the above analysis, this article proposes the following assumptions:

H3: There is a mediating effect of firm innovation between economic policy uncertainty and firms' ESG sub-dimensions and their aggregate performance.

## **4. Research design and data sources**

### **4.1. Sample selection and data sources**

In this paper, all A-share listed companies in China during the period of 2012-2022 are screened and processed: (1) the sample of companies in the financial and insurance industry is excluded; (2) the sample of companies with ST or PT status is excluded; (3) the sample of companies with too many missing values of the variables is excluded; and (4) in order to minimize the interference of extreme values, the regression analysis using the observations of the variables were subjected to two-sided 1% Winsorize shrinkage. Data for the economic policy uncertainty indicator in this paper are from [www.policyuncertainty.com](http://www.policyuncertainty.com), data for the ESG performance indicator are from the Bloomberg database, and other data are from the CSMAR database.

### **4.2. Definition of variables**

#### **4.2.1. Explained variable: ESG sub dimensions and comprehensive performance (ENV, SOC, GOV, ESG)**

The Bloomberg Information database collects ESG metrics from multiple data sources and assigns a weight to each metric to reflect how important it is to a company's ESG performance.

#### **4.2.2. Explanatory variables: economic policy uncertainty (EPU)**

This paper uses the economic policy uncertainty index proposed by Baker et al. (2016) <sup>[8]</sup>.

### 4.2.3. Mediating variable: enterprise innovation capability (Innovate)

The innovation indicator in this paper is the number of invention patents, utility model patents and design patents filed by the enterprise in the year plus one and take the natural logarithm.

### 4.2.4. Control variables

In table 1, it introduces the following control variables: total asset turnover (ATO), board size (Board), institutional investor shareholding (INST), Tobin's Q value (TobinQ), industry effect (Industry), time effect (Year).

Table 1: Description and definition of variables

Variable Name	Variable symbols	Variable definition
Corporate environmental performance	ENV	Bloomberg Score on the Quality of Corporate Environmental Information Disclosure
Corporate social performance	SOC	Bloomberg Score on the Quality of Corporate Social Responsibility Information Disclosure
Corporate governance performance	GOV	Bloomberg Score on the Quality of Corporate Governance Information Disclosure
Enterprise ESG comprehensive performance	ESG	Bloomberg provides a comprehensive evaluation of the quality of information disclosure in three aspects: corporate environment, social responsibility, and corporate governance.
Economic policy uncertainty	EPU	The monthly economic policy uncertainty index created by Baker et al. (2016) is converted into annual economic policy uncertainty by taking the arithmetic mean.
Enterprise innovation capability	Innovate	Ln (patent application+invention patent application+utility model patent application+1)
Total asset turnover rate	ATO	Operating income/average total assets
Board size	Board	The natural logarithm of the number of directors
Institutional investor shareholding ratio	INST	The total number of shares held by institutional investors divided by the circulating share capital
Tobin Q value	TobinQ	(circulating stock market value+number of non circulating shares×net assets per share+book value of liabilities)/total assets
Industry fixed effects	Industry	Industry dummy variable, assigned a value of 1 when belonging to the industry, otherwise 0
Time fixed effect	Year	The annual dummy variable is assigned a value of 1 when it belongs to that year, otherwise it is 0

### 4.3. Model construction

In this paper, three regression models are set up for testing hypotheses 1 to 3 in sequence.

$$ESG_{i,t} = \alpha_0 + \alpha_1 EPU_t + \alpha_2 \sum Control_{i,t} + \alpha_3 \sum Industry_i + \alpha_4 \sum Year_t + \varepsilon_{i,t} \quad (1)$$

$$Innovate_{i,t} = \beta_0 + \beta_1 EPU_t + \beta_2 \sum Control_{i,t} + \beta_3 \sum Industry_i + \beta_4 \sum Year_t + \varepsilon_{i,t} \quad (2)$$

$$ESG_{i,t} = \gamma_0 + \gamma_1 EPU_t + \gamma_2 Innovate_{i,t} + \gamma_3 \sum Control_{i,t} + \gamma_4 \sum Industry_i + \gamma_5 \sum Year_t + \varepsilon_{i,t} \quad (3)$$

Regression models (1) and (3) use ESG as explanatory variables, responding to firms' environmental performance (ENV), social performance (SOC), corporate governance (GOV) aggregate performance (ESG). Regression model (1) to (3) have economic policy uncertainty (EPU) as the explanatory variable. Corporate innovation (Innovate) as the explanatory variable in

regression model (2) and the mediating variable in regression model (3), respectively. The regression model with  $Control_{i,t}$  are the control variables, the  $Control_{i,t}$ , and  $Year_t$  denote the control of industry and time effects in the regression model, respectively.

## 5. Empirical analysis

### 5.1. Regression analysis

#### 5.1.1. The Impact of Economic Policy Uncertainty on Firms' ESG Performance and Innovation Capacity

This article uses the Pearson correlation coefficient analysis to find a significant positive correlation between variables. Meanwhile, the mean value of variance inflation factor (VIF) of each variable in the research model 1-model 3 is lower than 10, indicating that there is no multicollinearity problem.

This article uses multiple linear regression method to estimate model (1), and Table 2 shows the estimation results. From columns (1) to (4) of Table 2, the coefficients of EPU are 0.0519, 0.0203, 0.0649, 0.0531, respectively, and all of them are significant at 1% confidence level, which indicates that economic policy uncertainty contributes to the improvement of firms' ESG performance, Hypothesis 1 is confirmed. From column (5) of Table 2, the coefficient of EPU is 0.0031, which indicates that economic policy uncertainty promotes innovative activities of firms and hypothesis 2 is supported.

Table 2: Test results for the effect of economic policy uncertainty on firms' ESG performance

variant	(1)	(2)	(3)	(4)	(5)
	ENV	SOC	GOV	ESG	Innovate
EPU	0.0519*** (0.0011)	0.0203*** (0.0006)	0.0649*** (0.0009)	0.0531*** (0.0006)	0.0031*** (0.0001)
Controls	containment	containment	containment	containment	containment
N	10258	10258	10258	10258	10258
r2	0.3589	0.2880	0.7297	0.6904	0.2830
Industry	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes

#### 5.1.2. The Impact of Economic Policy Uncertainty, Firm Innovation on Firms' ESG Performance

In this section, we will test whether firm innovation plays a mediating role in the positive relationship between economic policy uncertainty and firms' ESG performance, and the test results are shown in Table 3.

Columns (1) and (5) of Table 3 show that Economic Policy Uncertainty has a significant positive effect on both firms' Environmental Performance and firms' Innovation; the coefficient of Economic Policy Uncertainty is significantly smaller in column (1) of Table 3 compared to column (1) of Table 2, and column (1) of Table 3 that firms' Innovation also has a significant positive effect on firms' Environmental Performance. Thus, firm innovation plays a mediating role in the relationship between economic policy uncertainty and firm environmental performance. Similarly, corporate innovation plays a mediating role in the relationship between economic policy uncertainty and firms' social performance, corporate governance, and firms' overall ESG performance. Therefore hypothesis 3 is supported.

Table 3: The mediating effect test results of enterprise innovation on the relationship between the two

	(1)	(2)	(3)	(4)
	ENV	SOC	GOV	ESG
EPU	0.0192*** (0.0007)	0.0145*** (0.0004)	0.0455*** (0.0006)	0.0236*** (0.0003)
Innovate	0.2308*** (0.0826)	0.2324*** (0.0466)	0.0679* (0.0787)	0.1579*** (0.0442)
Controls	containment	containment	containment	containment
N	9559	9559	9559	9559
r2	0.2734	0.2962	0.7256	0.6702
Industry	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes

## 5.2. Robustness Tests

(1) Replace independent variables. In this paper, we use the weighted average method to calculate the proxy variable of economic policy uncertainty EPU1 to further analyze the extent to which economic policy uncertainty affects firms' ESG performance. Table 4 demonstrates the test results, the coefficients of EPU1 are all significantly positive, indicating that the research findings are robust.

Table 4: Replace independent variables

	(1)	(2)	(3)	(4)
	ENV	SOC	GOV	ESG
EPU1	0.0612*** (0.0013)	0.0239*** (0.0007)	0.0766*** (0.0011)	0.0625*** (0.0007)
Controls	containment	containment	containment	containment
N	10258	10258	10258	10258
r2	0.3589	0.2880	0.7297	0.6904
Industry	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes

(2) To control for endogeneity issues that may arise from omitted variables, this paper retests Hypothesis 1 after controlling for firms' individual fixed effects, discovering that the test results are still significant.

(3) Considering the potential endogeneity issues between variables, the explanatory variables and control variables are lagged one period, and the test results still support the hypothesis. As shown in Table 5.

Table 5: Test results of economic policy uncertainty lagged one periods on firms' ESG performance

variant	(1)	(2)	(3)	(4)
	ENV	SOC	GOV	ESG
L.EPU	0.0295*** (0.0007)	0.0093*** (0.0003)	0.0404*** (0.0005)	0.0302*** (0.0003)
Controls	containment	containment	containment	containment
N	9300	9300	9300	9300
r2	0.3576	0.2615	0.7384	0.6902
Industry	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes

## 6. Conclusions

This article analyzes the impact of economic policy uncertainty on corporate ESG performance, as well as the role of corporate innovation in it. This study provides important reference basis for enterprises to make correct decisions and governments to formulate appropriate policies.

Firstly, the micro level. This paper confirms that corporate innovation can promote corporate ESG practices, which can create long-term value for enterprises. So, firms need to improve their innovation capabilities.

Secondly, the macro level. This paper confirms the mediating role of corporate innovation between economic policy uncertainty and corporate ESG practices. Therefore, the government should objectively evaluate the impact of economic policy uncertainty on enterprise technological innovation when formulating economic policies, and stimulate the innovation vitality of enterprises.

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