

THE IMPACT OF ECONOMIC POLICY UNCERTAINTY ON THE ECONOMIC BENEFITS OF CHINA'S LISTED IRON AND STEEL ENTERPRISES

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Abstract

In 2015, China fully launched the supply-side reform and carried out the work of reducing iron and steel production overcapacity. However, the China-United States trade war that began in 2018 and the global COVID-19 pandemic that began in 2020 have had a massive impact and uncertainty on the development of China and even the global economy, and the external business risks of enterprises have increased significantly. These have led to a rapid rise in the uncertainty of China's economic policy. Based on the above background, this paper takes China's listed iron and steel enterprises from 2015 to 2021 as the research object to explore the impacts of China's economic policy uncertainty on the benefit of iron and steel enterprises. The research results show that economic policy uncertainty can significantly affect the economic benefits of iron and steel enterprises, and can significantly improve the economic benefits of iron and steel enterprises.

Keywords: Economic policy uncertainty, enterprise economic benefits, iron, steel

1. INTRODUCTION

Since December 2015, China's Central Economic Work Conference has taken overcapacity reduction as one of the main tasks of supply-side structural reform. In order to resolve the excess capacity of steel, the steel industry needs to improve the adaptability of its own supply system and domestic demand, and improve the high-quality development of the steel industry. However, in recent years, with the impacts of the China-United States trade war and COVID-19, the mismatch between global supply and demand has been caused, and the uncertainty of the external business environment of steel enterprises has increased sharply. According to the algorithm of Baker et al. [1], the annual average value of China's economic policy uncertainty index in 2022 is four times that of when it entered into the WTO in 2008. Under the background of China's iron and steel industry's implementation of capacity reduction, carbon peak targets and uncertain economic policies, the economic benefits of iron and steel enterprises have fluctuated sharply. According to data released by the National Bureau of Statistics of China (NBS), in 2022, the ferrous metal smelting and rolling processing industry just realized a total profit of 36.55 billion yuan, a year-on-year decrease of 91.3 % from 2021 [2]. Therefore, Zhang believes that the original intention of the iron and steel industry to reduce production capacity is to govern the low-quality steel production capacity and the irregular operation of iron and steel enterprises. Now the iron and steel industry has entered the deep field of supply-side reform, the original intention of green, low consumption, low emission, and high-quality development must continue to be maintained even under the background of the uncertain external environment. It is no longer possible to use "access" and "capacity reduction" to promote supply-side reforms [3]. This paper will use the data of iron and steel enterprises listed

in China from 2015 to 2021 to conduct empirical analysis and discuss the impacts of economic policy uncertainty on the economic benefits of listed iron and steel corporations during this period.

2. LITERATURE REVIEW

Baker et al. studied the macro impacts, and they believed that rising economic uncertainty would reduce output and employment and hinder economic recovery [1]. The impacts of economic policy uncertainty make the upstream and downstream industries frequently adjust the market demand. This unstable demand will exacerbate the performance fluctuation of the enterprise and increase the business risk of the enterprise [4]. Bloom et al. found that increased economic uncertainty reduces market demand, thereby depressing business investment [5]. From the perspective of the risk of economic policy uncertainty, some scholars believe that the risk brought by economic policy uncertainty will lead to an increase in enterprise investment costs, hinder enterprise investment, and reduce enterprise R&D expenditures, which will inhibit enterprise innovation [6].

Above literature focus on the possible macro and micro risk factors for the research on economic policy uncertainty, but ignore the potential beneficial effects. Jiang analyzed from the perspective of enterprise competition. He believes that the uncertainty of economic policies is not a bad thing. It may bring losses to the enterprise, but it will also eliminate industries with poor adaptability and overcapacity and provide potential development opportunities for the growth of high-tech enterprises [7]. Li believes that enterprise growth opportunities and external demand can slightly eliminate the adverse impact of economic policy uncertainty on enterprise investment spending [8]. Segal et al. decompose aggregate uncertainty into good and bad volatility components and relates them to innovation incentives and innovation inhibition for macroeconomic growth. They demonstrate that two uncertainties have opposite effects on total growth and firm value. From the perspective of "good news" and "bad news", the cost-benefit analysis of investment behavior is carried out, and it is believed that the investment expenditure of enterprises will increase with the increase of economic policy uncertainty and both types of uncertainty risks contribute positively to the risk premium [9]. The above conclusions affirm the beneficial effects of economic uncertainty and the potential improvement of economic policy uncertainty on the economic benefits of enterprises.

The formulation of enterprise development and management strategies not only depends on the development goals of the enterprise itself but also is greatly affected by the economic environment, monetary policy and industrial policy. Williams and Mitchell believed that the instability of the external environment is significantly related to the performance of the enterprise, and the external environment has a direct relationship with the current operating performance and future growth of the enterprise [10]. Chant analyzed the relationship between monetary policy and enterprise performance and believed that money supply and enterprise operating performance have a significant positive effect [11]. Zhao found that enterprises encouraged by industrial policies have more sufficient credit funds and mainly long-term credit; among them, state-owned enterprises have more sufficient credit resources than private enterprises. In addition, the increase in bank credit under the guidance of industrial policies has a significant positive impact on enterprise economic benefit [12]. Under the background of the supply-side reform with the goal of "cutting overcapacity" in the industrial policy, at this stage, my country's iron and steel industry has achieved certain results in reducing overcapacity, and "zombie enterprises" have been eliminated; "ground strip steel" has been fully banned; illegal production capacity ineffective and low-efficiency production capacity has been effectively controlled; ineffective and low-efficiency production capacity has been withdrawn from the market in an orderly manner; while the iron and steel industry is "eliminating the fittest", "high-quality enterprises" are encouraged to upgrade and develop, and the overall operation quality and efficiency of the entire industry have shown a trend of steady improvement [13].

3. THEORETICAL ANALYSIS AND RESEARCH HYPOTHESES

As an important part of the market economy, micro-enterprises will respond to changes in the external environment of enterprises brought about by changes in macroeconomic policies through different enterprise

behaviors, and the final reaction will be reflected in enterprise performance. Due to China's special economic system and the important position of national macro-control, economic policy uncertainty may have more complicated impacts on enterprise economic benefit. Especially in the context of China's iron and steel production capacity reduction, the government policies have a greater degree of regulation and intervention in economic operations. Therefore, the operation of iron and steel enterprises is affected by both policy and market factors. This paper draws on Segal's method and divides the impacts of economic policy uncertainty into "good impact" and "bad impact" [9]. On this basis, it discusses the role of positive economic uncertainty on the performance of China's listed iron and steel enterprises.

3.1 Negative impacts of economic policy uncertainty on enterprise economic benefit

From the perspective of business operations, economic policy uncertainty means frequent changes in economic policies, and the direction is unclear, which increases the volatility of the external economic environment of enterprises, and the market demand will also fluctuate accordingly. Due to the large risk, the management of the enterprise cannot clarify the direction of the operation policy, which finally leads the enterprise to make a more conservative operation strategy.

From the perspective of enterprise financing, the uncertainty of economic policies will increase enterprise financing constraints, which will hinder the enterprise's financing channels. At present, China's listed iron and steel enterprises are all leveraged operations. External financing is the most important source of funds for business development. Difficulties in external financing will directly affect the enterprise's cash flow problems, endanger the enterprise's daily operations, and cause a significant decrease in enterprise performance.

Hypothesis 1: Economic policy uncertainty will reduce the economic benefits of iron and steel enterprises.

3.2 Positive impacts of economic policy uncertainty on enterprise economic benefit

When the macroeconomic environment fluctuates, relevant government departments will adopt a more cautious attitude when formulating economic policies, and the introduction of government policies has the characteristics of time lag, resulting in increased policy uncertainty. However, at this time, the policy is in the process of being promulgated and implemented, and has not yet been implemented in the enterprises. The degree of government intervention in the market is relatively low, and enterprises rely more on the economic level for operation and management. This kind of forced mechanism urges enterprises to improve their own development, enhance the strength on which the enterprise depends for survival, and find its own core competitiveness, which is conducive to the favorable position of industry competition.

From another perspective, the risk of loss brought about by economic policy uncertainty may eliminate a group of enterprises with poor management and low production capacity, which will have a vigilant effect on enterprises operating normally. To avoid this kind of situation, out of the consideration of market competition and long-term development, managers should come up with active management methods to solve the unfavorable factors of economic policy uncertainty on business operations, and try to find new growth drivers. For example, by increasing R&D expenditure and innovation expenditure, promoting production efficiency and achieving product differentiation, the economic benefits of enterprises can be improved.

The purpose of reducing production capacity in China's steel industry is to eliminate backward production capacity, improve the supply environment, and provide a fair and orderly competitive environment for high-quality steel companies. At present, the supply-side reform of China's iron and steel industry is deepening, and the uncertainty of the external operating environment and economic policies will force iron and steel enterprises to strengthen internal governance, improve product quality, improve product market price competitiveness and enterprise viability, and make them in the better position of market competition.

Hypothesis 2: Economic policy uncertainty will improve the economic benefits of iron and steel enterprises.

4. EMPIRICAL RESEARCH DESIGN

4.1. Empirical Model and Sample Selection

In order to accurately identify the impact of economic policy uncertainty on the economic benefits of iron and steel enterprises, this paper takes the economic policy uncertainty with a lag of one period as the explanatory variable, and takes the economic benefits of iron and steel enterprises as the explained variable to construct the following econometric model:

$$ROA_{i,t} = \beta_0 + \beta_1 EPU_{t-1} + \delta X_{i,t} + \mu_i + \varepsilon_{i,t} \quad (1)$$

where:

$ROA_{i,t}$ - the economic benefits of China's listed iron and steel enterprise

EPU_{t-1} - the value of China's economic policy uncertainty

β - the regression coefficients

$X_{i,t}$ - the control variables

μ_i - the enterprise fixed effects

$\varepsilon_{i,t}$ - the random disturbance term

In the above regression equation, the β_1 is the regression coefficient we mainly pay attention to. If β_1 is positive, it means that the increase in economic policy uncertainty will increase the economic benefits of sample enterprises, and vice versa, it will reduce the economic benefits of sample enterprises. The subscripts i and t represent the enterprise and the year, respectively. What needs to be added is that this paper does not control the time-fixed effect. Due to the economic policy uncertainty in the annual data, adding the time fixed effect will cause multicollinearity problems, which will affect the estimation results of this paper. Therefore, only individual fixed effects are considered in the equation in the benchmark regression.

This paper selects steel companies listed on Shanghai and Shenzhen A-shares from 2015 to 2021 as the initial research sample, and performs the following processing. First, remove steel trading enterprises; second, remove the samples that have been delisted during the period; third, in order to avoid the influence of outliers, this paper performs 1 % and 99 % shrinkage treatment on all continuous variables at the micro level. The raw data are all from Wind Economic Database (EDB).

4.2. Variable definition

The quantitative indicators currently used to measure the economic benefits of enterprises include return on assets (ROA), earnings per share (EPS), return on Equity (ROE) or Tobin Q. This paper will use ROA as an explanatory variable to measure the economic benefits of China's listed iron and steel enterprises. ROA is used to measure how much net profit is generated per unit of assets. The larger the ratio, the better the effect of Chinese iron and steel enterprises in increasing income and saving funds, indicating that the effect of enterprise asset utilization is better.

This paper draws on the Chinese economic policy uncertainty index constructed by Baker [1], which uses the text analysis method to construct the policy uncertainty index (EPU) as an explanatory variable to measure economic policy uncertainty at a specific time. For the original data, this paper follows the existing research method [14], and takes the annual average and divides it by 100 to obtain the annual economic policy uncertainty index. The larger the index, the higher the degree of economic policy uncertainty.

In order to further control other relevant factors that may affect the economic benefit (ROA) of the enterprise, this paper will refer to Deng's method and select the enterprise size (SIZE), asset-liability ratio (LEV), cash flow (CF), ownership concentration (OC1), and the ratio of independent directors to the total number of board members (RID) and the ownership of property (OP) are the control variables [15]. At the same time, according

to the existing research, when the economic policy uncertainty rises, the investment opportunities of iron and steel enterprises are facing changes. In order to avoid the interference of the changes in investment opportunities on the causal identification in this paper, the Tobin Q value (Tobin Q) of enterprises is further controlled here. On this basis, considering that economic policy uncertainty is an annual variable, time-fixed effects cannot be added to the regression model. In order to control the characteristics of the period, this paper draws on the ideas of Liu et al. to control economic growth (GDP) and money supply (M2) [16]. The detailed measurement methods of each variable are shown in **Table 1**.

Table 1 The specific definition of each variable

Variable symbol	Variable name	Variable specification
ROA	Economic benefit	Net income/Average total assets
EPU	Economic policy uncertainty	Annual arithmetic mean of economic policy uncertainty index/100
SIZE	Enterprise size	Natural logarithm of total assets
LEV	Asset-liability ratio	Total liabilities/Total assets
CF	Cash flow	Net cash flow from operating activities/Total assets
OC1	Ownership concentration	Shareholding percentage of the largest shareholder
RID	Independent directors	Number of independent directors/Total number of board members
TobinQ	Investment opportunities	Circulating market value/Total assets
OP	Ownership of property	The value is 1 when the enterprise is a state-owned enterprise, otherwise it is 0
GDP	Macroeconomic growth	Growth rate of GDP per capita
M2	Money supply	Money growth rate

5. EMPIRICAL RESULTS AND ANALYSIS

In this paper, the LM test and Hausman test were first carried out on the regression model, and the test results showed that the P values are all less than 0.01. The test results show that the regression analysis in this paper chooses the fixed effect model is optimal.

5.1 Benchmark regression

Table 2 shows the benchmark regression results of economic policy uncertainty on enterprise economic benefit. Among them, column (1) is the estimated result of only adding economic policy uncertainty, and the regression coefficient of economic policy uncertainty is significantly positive. The results in columns (2) and (3) show that after adding financial and macroeconomic variables, the economic policy uncertainty regression coefficient is still significantly positive. This paper selects column (3) as the benchmark regression estimation result. The results show that the regression coefficient of economic policy uncertainty is 0.012, which is significant at the 1% statistical level, that is, the positive effect of economic policy uncertainty is greater than the negative on the economic benefits of listed iron and steel enterprises. To a certain extent, this demonstrates the "winner effect" of Liu et al., that is, when enterprises face the impact of economic policy uncertainty, the effect of the "winner effect" is higher than that of the enterprise's "prevention effect" [17]. Given the risks brought about by the uncertainty of economic policies, listed iron and steel enterprises pay more attention to the opportunities for potential lucrative returns in the market.

Table 2 The benchmark regression results

Variable	(1) ROA	(2) ROA	(3) ROA
EPU	0.027*** (0.001)	0.014*** (0.001)	0.012*** (0.001)
SIZE		0.080*** (0.009)	0.070*** (0.010)
LEV		0.011 (0.033)	0.033 (0.033)
CF		-0.011 (0.033)	-0.027 (0.034)
OC1		-0.177*** (0.052)	-0.147*** (0.053)
RID		-0.053 (0.073)	-0.080 (0.074)
TobinQ		0.014*** (0.002)	0.009*** (0.002)
OP		-0.008 (0.021)	-0.002 (0.021)
GDP			-0.492*** (0.061)
M2			-0.240*** (0.056)
FE	NO	NO	NO
N	1638	1638	1638
R ²	0.683	0.697	0.699

Notes. *, ** and ***, respectively, denote significance at 10 %, 5 % and 1 %.

5.2 Endogeneity analysis

It is difficult to control all factors that may affect the economic benefits of enterprises in this paper, that is, there are endogenous problems caused by omitted variables. In order to eliminate the interference of other macroeconomic factors, this paper draws on the practice of Meng et al. to further control the uncertainty of monetary policy, stock market prices, stock market volatility and inflation rate at the macro level [18]. Among them, the monetary policy uncertainty is measured by the annual standard deviation of the inter-bank 7-day interbank offered rate, the stock market price is measured by the annual mean of the Shanghai Composite Index, the stock market volatility is measured by the yearly standard deviation of the Shanghai Composite Index, the consumer price index measures the inflation rate. See column (1) of **Table 3** for the estimated results after adding the above variables.

To avoid the interference of uncertainty at the industry level on the estimation results, this paper draws on the practice of Nie et al. to count the number of uncertain words in the industry by identifying the content in the "Management Discussion and Analysis" section of the enterprise's annual report. The mean value of the ratio of the total number of words is used to measure the degree of uncertainty at the industry level and included in the benchmark regression [19]. The results are shown in column (2) of **Table 3**.

In addition, in order to avoid the interference of regional macroeconomic factors on the estimated results, this paper further controls the marketization degree and the opening degree of the province where the enterprise is located. Among them, the degree of marketization is measured by the marketization index compiled by Wang et al. [20], and the degree of openness is measured by the ratio of the total import and export trade of each province to GDP. The corresponding estimated results are shown in column (3) of **Table 3**.

Table 3 Endogeneity Analysis

Variable	(1)	(2)	(3)
EPU	0.008***	0.011***	0.009
CV	YES	YES	YES
FE	YES	YES	YES
N	1638	1638	1638
R ²	0.702	0.699	0.704

5.3 Robustness testing

In order to improve the reliability of the estimated results in this paper, this paper also considers changing the explained variables, changing the explanatory variables, considering the time factor, etc., and retests the regression estimation results.

In the benchmark regression analysis, this paper uses ROA as the explained variable to measure the economic benefits of iron and steel enterprises. In order to ensure the credibility of the regression results, this paper will use ROE as a substitute variable for the explained variable to explain its relationship with economic policy uncertainty. The corresponding estimated results are shown in column (1) of **Table 4**, and the results are consistent with the baseline regression.

In order to avoid the interference of the regression estimation results by the calculation method of economic policy uncertainty, this paper measures the economic policy uncertainty within the year by taking the median of the monthly data. At the same time, this paper also uses the current value of economic policy uncertainty for regression. The corresponding regression estimates are shown in columns (2) and (3) of **Table 4**, and the results are still robust.

Although this paper controls the relevant factors at the macro level and reduces the interference of the time trend on the estimation results as much as possible, this method cannot completely eliminate the influence of the time effect. This paper draws on the approach of Shen et al. to perform temporal cluster analysis on the benchmark regression in the time dimension [21]. The corresponding regression estimation results are shown in column (4) of **Table 4**, and the conclusion still holds.

Table 4 Robustness testing

Variable	(1) ROE	(2) Median of EPU	(3) Current EPU value	(4) Temporal clustering
EPU	0.064*** (0.004)	0.011*** (0.001)	0.013*** (0.001)	0.011*** (0.001)
CV	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes
N	1638	1638	1638	1638
R ²	0.708	0.699	0.701	0.699

6. CONCLUSION

By analyzing the panel data of Chinese iron and steel enterprises from 2015 to 2021 and China's economic uncertainty index during the same period, this study finds through empirical analysis that economic policy uncertainty will increase the economic benefits of China's listed iron and steel enterprises, and the hypothesis 2 has been verified. The purpose of China's steel industry to shut down backward production capacity and steel enterprises producing inferior products is to improve the quality and competitiveness of products and

provide high-quality steel products to society. Its purpose, from the perspective of the development of the iron and steel industry, is to shift from focusing on the balance of "quantity" to focusing on the balance of "quality". However, China's listed iron and steel enterprises already occupy the leading position in the industry and have the "winner effect". Therefore, with the increase in economic policy uncertainty, the external risks faced by listed iron and steel enterprises have increased. In order to maintain their own survival, enterprises have to pay attention to policy changes and adjust their business strategies at any time to prevent enterprises from going bankrupt. The risks brought about by the uncertainty of economic policy will form a "reverse force" effect on listed iron and steel enterprises and promote the improvement of their economic benefit.

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