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The Impact of Economic Policy Uncertainty on the Profitability of China's Listed Export Enterprises

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ABSTRACT

Based on the empirical data of 6110 listed export companies in China from 2010 to 2019, this paper studies the impact of China's economic policy uncertainty (EPU) index on the profitability of listed companies from the specific perspective of export companies, and analyzes the moderating effects of different factors on this impact. The results show that China's EPU index has a significant negative impact on the profitability of listed export companies, and the increase in R&D investment and wage returns will aggravate this negative impact. In addition, listed export enterprises with different enterprise characteristics have different responses to EPU. State-owned enterprises and enterprises located in coastal areas are relatively less negatively affected by EPU.

KEYWORDS

Economic policy uncertainty; Profitability; Foreign trade

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1. Introduction

Since Baker et al. (2016) pioneered the use of keywords in the news to quantify economic policy uncertainty in their paper, most scholars have recognized and used the quantitative method of the EPU index. Subsequently, most of the studies on the EPU index continued Baker et al.'s news index quantitative method, expanded the breadth and representativeness of newspapers as a retrieval platform, and compiled an EPU index that is more suitable for measuring China's policy changes. For example, Jin et al. (2019) compiled China's EPU index with four representative newspapers in mainland China and revealed that EPU will significantly increase the risk of stock market crashes, Huang and Luk (2020) Compile a monthly index of China's macroeconomic uncertainty with ten influential and representative newspapers in China. After the introduction of the EPU index, it has become one of the important variables in the study of macro- and micro-economic changes and has long attracted the attention of all walks of life. Earlier research can be traced back to Bernanke's analysis of uncertainty and corporate investment decisions (Bernanke, 1983). His research pointed out that the uncertainty increase will significantly inhibit corporate investment decisions due to the irreversibility of investment. Subsequent studies on economic policy uncertainty and the economy are mainly carried out from macro and micro dimensions.

On the one hand, the adjustment of economic policy is directly related to the operating conditions of the macroeconomy. On the other hand, the uncertainty of the macroeconomic environment will in turn affect the important factors of corporate decision-making behavior. Profitability, which is the ultimate goal of a business, is directly or indirectly affected by EPU. Some studies start from the relationship between the EPU and the macroeconomy, arguing that the impact of EPU harms the unemployment rate and that the impact of uncertainty is greater than the impact of monetary policy (Caggiano et al., 2014). Antonakakis et al. (2013) point out that a country's EPU will suppress the return of the country's stock market. Kido (2016) studies the spillover effect of economic policy uncertainty on the real effective exchange rate and found that there is a significant negative correlation between EPU and high-yield currencies, and this correlation tends to increase during economic recessions.

By using keywords such as budget deficit, tax expenditure, and inflation rate to measure EPU, Phan et al. (2021) analyze the determinants of financial stability in 23 countries, finding that there is a significant correlation between EPU and financial stability. Meanwhile, the extent of EPU impact depends on the characteristics of the country's financial system. EPU affects the bank's operating risk by affecting the bank's investment return and return volatility. The research of Lee et al. (2017) shows that the EPU has a negative effect on the financial leverage of financial institutions, which means that the increase in the level of policy uncertainty will prompt financial institutions to reserve more funds to deal with uncertainty.

Some other research is conducted from the perspective of enterprises, believing that EPU will increase the external uncertainty of enterprise operation, cause certain pressure on the future cash holdings of enterprises (Im et al., 2017), and intensify the risk-bearing of enterprises (Wen et al., 2020). Dang et al. (2019) believe EPU positively correlates with corporate taxation. The reason is that in the case of large EPU fluctuations, the government's financial pressure is relieved to a certain extent by the increase in corporate tax burdens.

Although a large number of studies have shown that EPU is closely related to the decision-making and business activities of micro-enterprises, the impact of EPU on the profitability of export enterprises has received less attention. However, the relationship between EPU and the profitability of export-oriented firms remains undetermined. When the domestic EPU index is relatively large, export enterprises can mitigate the impact of policy uncertainty on their own profitability through export behaviour to a certain extent. Therefore, for export enterprises, is the impact of uncertain domestic economic policies an inevitable risk, and will it inevitably bring about negative impacts? The answer to this question is the research purpose and contribution of this paper.

2. Hypothesis

2.1. EPU and corporate profitability

In the process of international trade, export enterprises make full use of the comparative advantages and internalization advantages of various countries to carry out global production and operation. EPU is an inevitable systematic risk for all enterprises in the market, and it is an important external influencing factor for the rapid development of enterprises. In other words, the change in the domestic EPU index will promote or inhibit the profitability of export enterprises by influencing the business scale, financial leverage, R&D investment, and other factors. However, exporting enterprises can mitigate the adverse effects of policy uncertainty, or even reverse the adverse situation, by operating overseas businesses. The other is that the export enterprises will face the common impact of domestic and foreign economic policy uncertainty, thus strengthening the negative impact.

H1: For export enterprises, the increase of EPU has an inhibitory effect on the profitability of export enterprises.

2.2. EPU, export strength, R&D investment, and profitability

Since the R&D investment of enterprises can bring stronger development momentum to enterprises in terms of intellectual property rights and human capital, it can effectively deal with policy and environmental instability, which increases the ability of enterprises to expand R&D to a certain extent. It can be seen that the impact of EPU on the explained variables will be regulated by R&D investment, which may exacerbate the negative impact of EPU, and may also promote the relationship between them. Export companies may adjust their global business strategies to cope with adverse effects due to changes in economic policies in the previous period. Due to the impact of changes in business strategies, the profitability of enterprises will also be inevitably affected, which indicates that export strength will have a regulatory effect on EPU and profitability to some extent. Therefore, this paper attempts to make the following two assumptions to verify the regulatory effect of R&D investment and export intensity.

H2a: Regulation of R&D investment.

H2b: Adjustment of export strength.

3. Methodology and Data

3.1. Model setting

Based on the theoretical analysis and literature about this issue mentioned above, we construct the measurement model as follows:

$$Roait = \beta_0 + \beta_1 Epu_{t-1} + \gamma' X_{it} + \alpha_{year} + \delta_{industry} + \varepsilon_{it} \quad (1)$$

Where, t represents the time, i represents the enterprise, t-1 represents the EPU index lagging behind by one period, and X represents the control variable, α_{year} is the time fixed effect variable, $\delta_{industry}$ is an industry fixed effect variable, ε_{it} is a random error term. In the actual estimation process, this paper refers to the processing method of Zhu et al. (2020) that carry out a simple arithmetic average on the monthly data of the EPU index and convert it to annual data, then divide by 100. In addition. Considering the effectiveness of regression, this paper takes natural logarithms for important control variables such as enterprise size and wage cost.

To analyze the impact mechanism of EPU on corporate profitability, we construct the following extended model for further inspection:

$$Roait = \beta_0 + \beta_1 Epu_{t-1} + \beta_2 X_{it} + \beta_3 Epu_{t-1} \cdot X_{it} + \gamma' X_{it} + \alpha_{year} + \delta_{industry} + \varepsilon_{it} \quad (2)$$

Where X_{it} represents different enterprise characteristics. Besides, as a regulatory variable, it represents

different enterprise characteristics and the interaction term with the EPU index of the lagging period.

3.2. Discription of variables

3.2.1. Selection of explained variable

This paper focuses on whether domestic EPU has a significant impact on the profitability of export enterprises under the specific conditions of foreign trade. Therefore, profitability is an important explained variable in this paper. In this paper, we adopt the return on assets (ROA) index, which is defined as the profitability that each asset can bring, and also indicates the profitability in the business process. Some studies also take single indicators such as return on equity (ROE) or operating profit rate as proxy variables.

3.2.2. Selection of core explanatory variables

Regarding the measurement of EPU, we select the China EPU index compiled by Huang and Luk (2020). Followed by Zhu (2020), we use the formula $EPU_t = \sum_{i=1}^{12} EPU_i / 12$ to convert the data frequency into a year and divides it by one hundred.

3.2.3. Selection and measurement of other control variables

Except from the two core explanatory variables above and considering the robustness of measurement results and the explanatory power of the explained variables, the following control variables are considered in the measurement model as shown in the following table:

Table 1. The definition of all the variables.

Variable Type	Variable	Definition
Interpreted variable	Return on Assets (ROA)	Net profit/total assets * 100%
	Return on equity (ROE)	Net profit/average shareholders' equity * 100%
Explanatory variable	Economic Policy Uncertainty Index (EPU)	simple arithmetic average of EPU index then divided by 100
Control variable	Enterprise size (SIZE)	The natural logarithm of the company's assets at the end of the period
	Financial leverage (LEV)	
	Wage (Wage)	Ratio of total liabilities to total assets
	Enterprise labor intensity (Lintsty)	Cash paid to and for employees
	R&D investment (RDI)	Ratio of salary paid to employees to sales income
	Time of establishment (Age)	Ratio of R&D expenditure to total assets
	Export strength	Establishment date of the enterprise to April 1, 2021 Ratio of overseas business income to assets

*Notes: The time of establishment, R&D investment and the region and industry where the enterprise is located are all taken from the Wind database. In addition, other data, including return on assets, enterprise size and financial leverage, are mainly sourced from Guotai'an database. The Baker index and Davis index in the EPU index are downloaded from the EPU website (<http://www.policyuncertainty.com/index.html>). The index data compiled by Lu Shangqin and Huang Yun are from the website (<https://economicpolicyuncertaintyinchina.weebly.com>). Data are processed according to the following standards: (1) ST and ST * enterprises are excluded; (2) financial insurance industry and real estate industry are excluded; (3) export enterprise samples with missing data in 2010-2019 are excluded; (4) extreme outliers are excluded.*

3.3. Descriptive statistics

The results of descriptive statistics show that the average profitability of export enterprises is only 3.6%, indicating that the profitability of the observed sample is limited, and the profitability gap between companies is

large. The maximum and minimum values are 8.63% and -2.56%, respectively. In addition, the maximum and minimum values of the EPU index of the core explanatory variable are close to their mean values, and it can be seen from the observation images that the changes of this index are relatively stable, without extreme outliers.

Table 2. Descriptive statistics.

variable	Obs.	mean	S.D.	Min	max
roa	6,110	0.0360	0.0809	-2.555	0.863
roe	6,110	0.0463	0.469	-20.74	8.279
epu	6,110	15.02	40.81	1.250	137.4
Baker	6,110	2.250	1.215	0.989	4.605
Davis	6,110	1.458	1.389	0.443	5.128
size	6,110	22.24	1.279	19.06	27.71
lev	6,110	0.423	0.204	0.00752	2.861
wage	6,109	19.43	1.331	15.63	24.88
Lintsty	6,108	0.131	0.0799	0	1.179
RDI	6,110	0.0225	0.0184	0	0.237
age	6,110	22.90	5.161	10	65
export	6,110	0.152	0.197	1.59e-06	3.012

4. Empirical results

4.1. Preliminary results

4.1.1. Benchmark regression

To analyze the impact of EPU on corporate profitability, we use two methods to conduct empirical analysis of benchmark regression. Since there is a specific enterprise feature, individual effect, that does not change with time, this paper mainly adopts fixed effect model (FE) for robust regression. Meanwhile, because of the existence of economic inertia, that is, economic decision-making is not only affected by the current economic situation, but more importantly, it will be affected by the economic situation of the previous period, thus affecting the current performance. Therefore, this paper uses the lagging period of EPU for regression.

Table 3. Regression Results of the Impact of EPU on Enterprise Profitability.

VARIABLES	OLS		FE	
	(1)	(2)	(3)	(4)
lnepu	lnroa -12.205*** (-8.86)	lnroa -14.771*** (-11.14)	lnroa -12.847*** (-11.43)	lnroa -13.700*** (-9.05)
lnsize		-10.728*** (-14.44)		-11.404*** (-9.88)
lnlev		-0.694*** (-26.61)		-0.379*** (-11.51)
lnwage		11.423*** (19.48)		12.357*** (12.20)
lnLintsty		-0.465*** (-16.24)		-0.787*** (-17.76)
lnRDI		0.218*** (13.19)		0.142*** (7.39)

lnexport		-0.034***		-0.052***
		(-3.97)		(-3.39)
Constant	0.172	-1.016	-0.015	-2.816
	(0.45)	(-1.03)	(-0.05)	(-1.52)
Industry FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Observations	5,580	5,567	5,580	5,567
R-squared	0.049	0.265	0.078	0.165

Notes: *** denote the rejection of the null hypotheses at the 1% significance level.

The regression results in columns (1) and (3) are the results of OLS regression and fixed effect regression using the EPU index compiled by Huang and Luk (2020) when the return on assets is used as the index to measure the profitability of the enterprise. Columns (2) and (4) are OLS regression and fixed effect regression after adding various control variables. From the regression results, whether the least squares method or the fixed effect regression is used, whether the control variable is added or not, the coefficient of the EPU index is always negative and significant at the 1% level. It can be seen that EPU has a negative effect on the profitability of export enterprises. In other words, the increase of EPU is not conducive to the better economic performance of enterprises. In addition, as far as other control variables are concerned, they are consistent with the conclusions of most literature and theories, with a high level of significance.

4.1.2. Regulation effect

To analyze the factors that affect the relationship between EPU and corporate profitability, this paper analyzes whether there is a regulatory effect between RDI and export strength by reference to the assumption that H2a and H2b use ordinary OLS regression and fixed effect regression models.

Table 4. Regulation Effect.

Variables	(1)	(2)	(4)	(1)
	lnroa	lnroa	lnroa	lnroa
lnepu	-14.207***	-13.640***	-0.059***	-13.726***
	(-10.67)	(-5.96)	(-4.90)	(-5.99)
lnsize1	-10.580***	-11.282***	-11.711***	-11.348***
	(-14.42)	(-6.33)	(-16.15)	(-6.36)
lnlev1	-0.690***	-0.377***	-0.700***	-0.380***
	(-26.63)	(-7.05)	(-26.68)	(-7.09)
lnwage1	11.160***	12.253***	11.432***	12.330***
	(19.39)	(6.99)	(19.81)	(7.01)
lnLintsty1	-0.468***	-0.782***	-0.529***	-0.785***
	(-16.49)	(-10.03)	(-18.75)	(-10.08)
lnRDI1	0.199***	0.136***	0.173***	0.142***
	(11.58)	(3.84)	(10.61)	(4.01)
lnexport1	-0.038***	-0.052**	-0.043***	-0.053**
	(-4.47)	(-2.31)	(-4.85)	(-2.36)
lninteract1	0.001*	0.001***	0.004***	0.002**
	(1.70)	(2.74)	(3.01)	(2.41)
Constant	-1.029	-2.908	-2.315**	-2.904
	(-1.07)	(-0.89)	(-2.44)	(-0.89)

Observations	5,567	5,567	5,567	5,567
Number of code		610		610
R-squared	0.252	0.166	0.225	0.166

Notes: *** denote the rejection of the null hypotheses at the 1% significance level.

The explanatory variable interaction in columns (1) and column (2) is the interaction item between EPU and RDI; The interaction items in columns (3) and (4) are the interaction items between EPU and export. It can be seen from the regression results that the interaction terms of both ordinary OLS regression and fixed effect regression are positive. The results are relatively significant, indicating that R&D investment and export efforts have weakened the negative impact of EPU on profitability. When R&D and export are weak, the impact of EPU on profitability is obvious. However, with the improvement of R&D and export, the impact of EPU gradually decreases.

5. Conclusion

Based on the empirical data of 6110 listed export companies in China from 2010 to 2019, this paper empirically examines the impact of EPU on corporate profitability, as well as other factors that affect the relationship between the two, and deeply examines the heterogeneity effect of this impact. The empirical results show that the increase in EPU will have a negative impact on the profitability of enterprises. Besides, R&D investment and export efforts have weakened the negative impact of EPU on profitability. In other words, when R&D and export are weak, the impact of EPU on profitability is obvious. However, with the improvement of R&D and export, the impact of EPU gradually decreases.

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Declaration of Competing Interest

All the authors claim that the manuscript is completely original. The authors also declare no conflict of interest.

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