THE RELATIONSHIP BETWEEN ENVIRONMENTAL UNCERTAINTY AND FIRM PERFORMANCE IN CHINESE LISTED MANUFACTURING COMPANIES: THE MEDIATING ROLE OF COMPETITIVE STRATEGY

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ABSTRACT

Economic globalization has brought great challenges to companies. Faced with uncertainty, appropriate strategic choice is an important means to deal with uncertainty and competitive challenges. The purpose of this research is to investigate the mediating effect of competitive strategy on the relationship between environmental uncertainty and firm performance in Chinese listed manufacturing companies. This research uses OLS regression models to test the mediating role of competitive strategy. The data used in this research are all derived from the public financial statement of listed companies from 2007 to 2019. We found that there is a mediating role of competitive strategy on the relationship between environmental uncertainty and firm performance. In addition, corporate life cycle is introduced as a moderating variable in the relationship between environmental uncertainty and competitive strategy. This study provides strong evidence to help managers in the decision-making process under environmental uncertainty and give managers more accurate advice based on the corporate life cycle of their companies.

Contribution/Originality: This research provides a new method for calculating environmental uncertainty using panel data and expands the research methods for environmental uncertainty. At the same time, a powerful method of text analysis is recommended to help researchers extract relevant information on competitive strategy from the annual reports of listed companies.

1. INTRODUCTION

Economic globalization has brought great challenges to companies, and companies' competitors have undergone tremendous changes from being domestic competitors to global competitors (Rosli, 2012). Whether it is the development trend of economic globalization or the uncontrollable impact of the Covid-19 pandemic, it is difficult for managers to fully understand unfavorable environments and the development of the company. As a result, businesses will face a high degree of environmental uncertainty (Astuty, Pasaribu, Rahayu, & Habibie, 2021; Mufti, Pudjiarti, & Darmanto, 2019). Faced with uncertainty, how to maintain the original profitability and sustainable development is a problem that every company needs to solve. In an environment of uncertainty, the reduction of customer purchases and the price increase imposed by suppliers will lead to a substantial decline in a company's revenue, rising costs and reduced corporate profits (Newkirk & Lederer, 2006). Most previous studies

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believe that in a highly uncertain environment, appropriate strategies can positively affect firm performance (Swamidass & Newell, 1987). Appropriate strategic choice is an important means to deal with uncertainty and competitive challenges (Mosakowski, 1997).

Strategy is a long-term plan formulated by a company (Chandler, 1962), and a reasonable strategic decision is the basis of company competition (Covin, Slevin, & Heeley, 2000). Previous studies on strategy have generally focused on the competitive strategy proposed by Porter (1980) and Porter (1985), or the general competitive strategy proposed by Miles and Snow (1986). This research investigates the choice of competitive strategy of companies under conditions of high uncertainty. An important reason for choosing the competitive strategy proposed by Porter (1980) as the research object is that the sample in this research comprises Chinese manufacturing companies in which Porter's competitive strategy is relatively popular. In addition, in China there is a big difference in thinking between managers and Western executives. Chinese executives often adopt cost leadership strategies without thinking to obtain more stable and predictable benefits (Parnell, Koseoglu, Long, & Spillan, 2012). In order to provide Chinese executives with more accurate advice in the face of a highly uncertain environment, Porter's competitive strategy in indispensable.

Research on environmental uncertainty and competitive strategy is not uncommon (Gupta, 1986; Miller, 1988; Parnell et al., 2012; Qi, Zhao, & Sheu, 2011; Ward & Duray, 2000). This research is concerned with the mediating role of competitive strategy between environmental uncertainty and firm performance. According to previous research, the choice of competitive strategy needs to take into account the suitability of the competitive strategy in each organization and the environment (Barth, 2003), and the most suitable strategy is one that can match the external environment (Hambrick, 1983; Otley, 2016).

However, most of the measurement methods for environmental uncertainty have shortcomings. Since most of the previous research comes from questionnaire survey data, which has the disadvantage of strong subjectivity (Arieftiara, Utama, & Wardhani, 2017; Sekaran, 2003). Based on the research of Arieftiara et al. (2017), this research uses objective data (panel data) to measure environmental uncertainty, and uses the HHI index as a measure of the degree of competition on the basis of previous research. Similarly, to measure competitive strategy, most of the previous research data was obtained from questionnaire surveys (Gomez, Pérez-Aradros, & Salazar, 2021; Lechner & Gudmundsson, 2014; Linton & Kask, 2017; Mohsenzadeh & Ahmadian, 2016). This research is based on the research of Hu, Liang, and Qiu (2020), who used the method of text analysis to measure the competitive strategy selected by companies based on panel data. To avoid uncertainty regarding the measurement data source, the measurement data of the competition strategies are all from the listed Chinese manufacturing companies' financial statements, which ensures the accuracy and objectivity of the results to the greatest extent.

This research also introduces the variable of corporate life cycle to further study the relationship between environmental uncertainty and competitive strategic choices. As companies exhibit different organizational forms, resource constraints, and growth capabilities in each cycle, management also has differences in corporate governance, business decision-making, and financial planning (Jenkins, Kane, & Velury, 2004). Therefore, the internal characteristics of a company change as the life cycle stage changes (Miller & Friesen, 1984). The different characteristics of a company in different life cycle stages will affect the choice of the company's competitive strategy and thus affect the firm's performance (Chen & Hsieh, 2005; Lester, Parnell, & Menefee, 2008). Similarly, the uncertainty of the external environment also will affect the choice of a company's competitive strategy (Parnell et al., 2012). Previous studies have rarely considered the combined effects of corporate life cycle and environmental uncertainty, but this has a certain meaning. The corporate life cycle mainly reflects the internal characteristics of a company, including financing ability, investment ability, cash flow changes (Dickinson, 2011), and product development and changes in the internal structure of the organization (Miller & Friesen, 1984). Comprehensive consideration of the internal and external environments of a company can help managers choose a more appropriate competitive strategy. This research uses the corporate life cycle as a moderating variable to investigate the

relationship between the corporate life cycle, environmental uncertainty and the choice of competitive strategy. In order to enhance its significance, this research selects the growth and maturity stages where the concentration of Chinese manufacturing companies is relatively high.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Environmental Uncertainty

Environmental uncertainty reflects the continuous changes and the complexity of the environment (Astuty et al., 2021; Mufti et al., 2019; Wheelen, Hunger, Hoffman, & Bamford, 2017). Environmental changes generally include technological development, changes in market supply and demand, and intensified market competition, including intensified competition in the domestic market and intensified international competition brought about by globalization (Parnell et al., 2012). When the environment changes drastically, managers often pay attention to the company's competitive environment, customer environment, and economic sectors (Ebrahimi, 2000). Therefore, more studies believe that there are three aspects of environmental uncertainty: competition uncertainty, market uncertainty, and technological uncertainty (Arieftiara et al., 2017; Davies & Walters, 2004; DeSarbo, Anthony, Song, & Sinha, 2005). The uncertainty of competition mainly comes from the intensification of market competition caused by the increase of competitors, the increase of external competitors brought about by economic globalization (Kim, Nam, & Stimpert, 2004; Rosli, 2012), the new products of domestic competitors joining, and the rapid occupation of market share forcing the rapid improvement of the overall quality and performance of the product. Market uncertainty mainly comes from constant changes in customer needs (Arieftiara et al., 2017). It is difficult for a product to be accepted by customers immediately, and it requires continuous development and innovation to meet changing customer needs. Technological uncertainty comes from the continuous innovation of companies, which leads to technological changes within the industry (Arieftiara et al., 2017). Not only that, some innovative services will also bring technological innovations in the industry, although service improvements or innovations cannot be aggravated, but the derivative technology of innovative services has greatly promoted the uncertainty of technology in the industry (Salunke, Weerawardena, & McColl-Kennedy, 2011). The advantages generated by this service innovation are sustainable (Kandampully & Duddy, 1999), so it is easy to become the main driver of technological uncertainty at this stage.

Huge uncertainty will bring great pressure to executives' decision-making. In the traditional dualistic approach, the environment is either certain or uncertain. It is difficult to formulate appropriate strategies when considering uncertainty (Courtney, Kirkland, & Viguerie, 1997). Therefore, there are comparatively effective judgments on the degree of environmental uncertainty. According to previous research, environmental uncertainty is divided into four levels, from a completely clear future to a completely unpredictable future (Courtney et al., 1997). After clarifying the rapid changes in the corporate environment and the emergence of new organizational structures, managers can try to match the strategy with the organization (Dent, 1990; Elmassri, Harris, & Carter, 2016).

2.2. Competitive Strategy

Competitive strategy is a series of strategies or decisions that a company uses to gain a competitive advantage in its industry in order to achieve its goals (Hambrick, 1983; Porter, 1980). Competitive strategy attempts to solve the problem of how companies compete with competitors in specific industries (Schendel & Hofer, 1979).

For a company to achieve effective competition, it must gain a competitive advantage. There are three strategies to obtain competitive advantage, namely differentiation, cost leadership, and centralization (Porter, 1980; Porter., 1985). Previous research has paid more attention to the differentiation and cost leadership strategies (Dess & Davis, 1984; Nayyar, 1993) because the centralization strategy is actually a decision-making method for

companies in a narrow market by using a differentiation or a cost leadership strategy (Amoako-Gyampah & Acquaah, 2008).

The differentiation strategy focuses on whether a company has characteristics that distinguish it from its competitors, thereby attracting buyers' attention (Porter, 1985). Previous research believed that the differentiation strategy is generally through brand recognition, product innovation and promotion, higher product quality than competitors, providing additional services to customers, and distribution channel control (Dess & Davis, 1984; Li & Calantone, 1998). Compared with the cost leadership strategy, the differentiation strategy pays more attention to customer-related needs and enhances the company's market competitiveness with the unique attributes of its own products (Cadez & Guilding, 2012). The differentiation strategy needs to establish its own position in the market to make up for its differentiation, resulting in a cost premium (Ortega, 2010). The cost leadership strategy focuses on whether a company's product costs are lower than its competitors, thus obtaining a cost advantage (Coeurderoy & Durand, 2004). The pursuit of high efficiency and low cost, the pursuit of economies of scale, and the improvement of the bargaining power of their own companies with raw material suppliers are the goals of the cost leadership strategy (Li & Calantone, 1998; Morgan, Kaleka, & Katsikeas, 2004; Panwar, Nybakk, Hansen, & Pinkse, 2016). Due to the large differences in the characteristics of differentiation strategy and cost leadership strategy, companies need to consider more factors when choosing a competitive strategy. Environmental uncertainty is what business managers must consider before choosing a strategy (Courtney et al., 1997).

2.3. The Influence of the Choice of Competitive Strategy on Performance under Environmental Uncertainty

The relationship between competitive strategy and performance is an enduring topic and has attracted a lot of attention in recent years (Abubakar, Khalifa, Elbasset, & Alkharusi, 2022; Castillo-Apraiz, Richter, de Antonio, & Gudergan, 2020; Hermawan, 2021; Hu et al., 2020; Kharub, Mor, & Sharma, 2019; Linton & Kask, 2017; Odiri & Ideh, 2021; Sabihaini & Prasetio, 2020). Sabihaini and Prasetio (2020) proved the positive impact of competitive strategy on firm performance, and they believe that the two competitive strategies that are commonly used cannot significantly improve firm performance, which is similar to the view of Porter (1980). The combination of the cost leadership strategy and the differentiation strategy may lead to the company being "stuck in the middle". Other studies used competitive strategy as a mediating variable to study the mediating effect of competitive strategy. For example, Linton and Kask (2017) discussed the impact of matching entrepreneurial orientation and competitive strategy with firm performance. Most previous research proved that a company's competitive strategy can largely affect its operating efficiency and financial performance (Giroud & Mueller, 2010, 2011; Ko, Tong, Zhang, & Zheng, 2016; Mubeen, Han, Abbas, & Hussain, 2020).

However, before choosing a competitive strategy, business managers need to analyze the changes in the business environment, that is to say, managers need to discuss different future results and make predictions to choose a suitable strategy (Courtney et al., 1997). Environmental uncertainty affects a company's strategy and performance at the same time (Swamidass & Newell, 1987). The choice of company strategy can be seen as a means to deal with uncertainty and competitive challenges (Parnell, Long, & Lester, 2015). The result is often reflected in the improvement of firm performance. Dent (1990) believes that changes in the environment will cause organizational renewal, and new organizations need to be matched with new strategies to develop soundly. Previous studies have also continuously emphasized the suitability of competitive strategies in various organizations and environmental structures (Barth, 2003; Parnell et al., 2012). In addition, environmental uncertainty will limit individuals' ability to assess the environment within a certain period of time (Beal, 2000; Buchko, 1994). Therefore, the analysis of environmental uncertainty is the basis of strategic choices (Chong & Chong, 1997), and the prediction of the environment is the most critical issue for managers before making strategic choices (Mosakowski, 1997). It is not uncommon to study the impact of the choice of competitive strategy on firm performance under environmental uncertainty. For example, Tanrıverdi and Lezki (2021) studied the relationship

between competitive pressure in the external environment of the air transportation industry and corporate strategic choices. Arieftiara et al. (2017) explored the relationship between environmental uncertainty and company strategy; they selected the competitive strategy model of Courtney et al. (1997) and believed that companies implementing prospecting strategies can often perform better in a highly uncertain environment. It is also believed that companies that implement analytical strategies tend to perform better in a stable environment. These conclusions are consistent with previous studies (Freel, 2005). Research on the relationship between Porter's competitive strategy model Porter (1980) and environmental uncertainty is also uncommon. Differentiation strategies are more likely to be used in unstable environments, while cost leadership strategies are more suitable for lower environmental uncertainty (Miller, 1988; Ward & Duray, 2000). In addition, there have been previous studies investigating the relationship between uncertainty in the Chinese market environment and competitive strategy. Chinese companies rarely consider environmental uncertainty in the process of formulating competitive strategies, and most Chinese companies prefer to use cost leadership strategy, even under high environmental uncertainty (Parnell et al., 2012; Parnell et al., 2015). Unlike previous studies, Chinese companies have faced huge uncertainties in recent years, including changes in Chinese policies, changes in world trade status, and the impact of the Covid-19 pandemic on the Chinese economy. This research focuses on the strategic decisions made by the Chinese market in response to environmental uncertainties in recent years, and the coping strategies of listed companies, rather than small and medium-sized companies (Parnell et al., 2012; Parnell et al., 2015), because external environmental changes are reflected more in the decision-making changes of listed companies. Using text analysis instead of questionnaire surveys, the textual information of listed companies' statements is used as the basis for listed companies' strategic choices to more objectively investigate the relationship between environmental uncertainty and competitive strategy.

Therefore, based on previous research, the following hypothesis is proposed:

H1: Competitive strategy mediates the relationship between environmental uncertainty and firm performance.

3. RESEARCH METHODS

3.1. Sample and Data Collection

The primary sources of data were the China Stock Market and Accounting Research (CSMAR) database and the Wingo database, consisting of the A-share listed manufacturing companies from 2007 to 2019. Any companies with missing information were removed from the dataset, and a final total of 12,790 samples were obtained (as shown in Table 1). In order to eliminate the influence of extreme values, this research carried out a 1% tailing of all continuous variables.

Table 1. Sample selection process.

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Total listed manufacturing companies	802	853	906	1,149	1,347	1,446	1,443	1,535	1,687	1,831	2,157	2,227	2,288	19,671
Unavailable companies	224	234	232	470	617	640	603	597	503	479	721	762	799	6,881
Total sample (companies per year)	578	619	674	679	730	806	840	938	1,184	1,352	1,436	1,465	1,489	12,790

3.2. Measurement of Variables

3.2.1. Dependent Variable

As the goal pursued by a company, firm performance is the result of company development, progress, and continuous pursuit of benefits and efficiency (Taouab & Issor, 2019). Firm performance can be divided into financial performance and non-financial performance (Alamri, 2019). Financial performance focuses more on the objective factors of firm performance, which generally comes from information disclosure in accounting reports. Because financial performance is more objective and accurate, it is now a common performance evaluation method in many studies (Jusoh & Parnell, 2008). Non-financial performance is more subjective. The data used in this research comes from panel data, so objective financial performance is more suitable.

Most research focuses on financial performance, including ROA and ROE. ROA mainly emphasizes shareholder wealth by using the efficiency of a company's assets (Mubeen et al., 2020), which is more common than other financial performance measurements. This research mainly focuses on a company's ROA as a measurement of firm performance.

3.2.2. Environment Uncertainty

Environmental uncertainty can be divided into three dimensions, market environment uncertainty, competitive environment uncertainty, and technological environment uncertainty (Arieftiara et al., 2017; DeSarbo et al., 2005; Ebrahimi, 2000). The previous study provided a scale for evaluating environmental uncertainty (DeSarbo et al., 2005), but this scale measures environmental uncertainty from a subjective point of view. According to the research of Arieftiara et al. (2017), the evaluation results of the three dimensions are ranked by the average percentage to obtain an objective EU Index.

3.2.2.1. Market Uncertainty

Market uncertainty reflects changes in consumer demand, therefore, previous studies used the standard deviation of sales to measure the market uncertainty (Arieftiara et al., 2017; Ghosh & Olsen, 2009; Parnell et al., 2012). This research uses the following formula from Arieftiara et al. (2017) to measure the standard deviation of sales in the study:

$$CV(Z_i) = \frac{\sqrt{\sum_{k=1}^{5} \frac{(z_1 - \bar{z})^2}{5}}}{\bar{z}}$$

CV is the coefficient of variation, Z_i is the annual sales of the company, and Z is the average sales of the company in the past five years. A higher standard deviation of sales indicates a greater degree of market uncertainty faced by the company.

3.2.2.2. Uncertainty of Competition

Competitive uncertainty reflects the degree of competition in the market in which a company is located. A high degree of competition will lead to a high degree of competition uncertainty, which will greatly affect a company's performance level (Parnell et al., 2015). The best measure of the degree of market competition is the Herfindahl–Hirschman Index (HHI) (Mubeen et al., 2020). The advantage of the HHI is that it can measure market competition through the square sum of the market share of each company in the industry. The data can be derived from objective financial statements of listed companies (Jain, Li, & Shao, 2013). This research uses the HHI index as a measure of competition uncertainty.

Since the indicators of the three dimensions need to be ranked by the average percentage, the results of competition uncertainty and market uncertainty need to be ranked by percentage within the industry.

3.2.2.3. *Technical Uncertainty*

Technological uncertainty reflects changes in the technological environment (Parnell et al., 2012) and is measured by an industry's rate of technological change. Hambrick (1983) provides a measure of the innovation intensity of the three largest competitors in an industry over a three-year period. Innovation intensity includes the introduction of new products and services, and the opening of new branches, factories, or departments to support production and distribution systems (Ittner, Larcker, & Rajan, 1997). This research is based on the innovation intensity measurement method provided by Arieftiara et al. (2017) based on Hambrick (1983). If a company has no innovation in its annual report, it will get 0 points, and if there is an innovation, it will get 1 point. If there is more than one innovation, the company gets 2 points. The technological uncertainty of the entire industry is determined by the innovation scores of the three largest competitors in the industry. The higher the score, the greater the technological uncertainty.

The choice of the three biggest competitors in this research is based on the comprehensive consideration of the stage of the company's life cycle, the size of the company's assets, the year of the company's business and the year of listing. Among them, mature companies are the main targets because mature companies generally have strong competitiveness and are often the biggest competitors in the industry.

Finally, after obtaining the index percentage rankings of the three dimensions, the percentage rankings of the three dimensions are averaged, and the result is used as an indicator of corporate environmental uncertainty (Arieftiara et al., 2017).

3.3.3. *Competitive Strategy*

The competitive strategy classification method Porter (1980) has always been one of the most popular classification methods (Gomez et al., 2021). Competitive strategies include focused strategy, differentiation strategy and cost leadership strategy. A company needs to be able to clearly select and execute one of these three strategies, but it is clear that the focused strategy can be used within a company at the same time as the differentiation and cost leadership strategies (Porter, 1985). Cost leadership strategy requires companies to produce their products at a lower cost, while differentiation strategy pays more attention to technological innovation. Porter (1985) believed that differentiation strategy and cost leadership strategy cannot be used at the same time, but there are studies that show that the differentiation strategy can be built on the basis of cost leadership (Dess & Davis, 1984). In order to reflect the accuracy of this research, the companies that adopt a cost leadership strategy and a differentiation strategy together are included.

Subjective judgment methods are not suitable for this research. At the same time, the methods proposed by previous studies that use financial indicators as the basis for strategic judgment can also accurately distinguish which strategy companies are more inclined to adopt (Arieftiara et al., 2017). Therefore, this research adopts the method of text analysis to measure the company's attention to a certain competitive strategy by the proportion of words related to competition strategy in the total number of words in the annual report (Hu et al., 2020). The previous research is based on the competitive strategy theories and concepts of Porter (1980) and Dess and Davis (1984) by extracting the seed words of competitive strategy and using the method of "seed words + Word2Vec similar words expansion" to measure competitive strategy (Hu et al., 2020).

This research extracts the text analysis results of the competitive strategy of listed Chinese manufacturing companies from 2007 to 2019 from the Wingo database. It is undeniable that the company will mention both the differentiation strategy and the cost leadership strategy in the annual report. This research uses the difference in the word frequency between the cost leadership strategy and the differentiated strategy to clarify the competitive strategy that the company has adopted. The number of word frequencies shows the company's degree of attention to the competitive strategy. This research introduces "strategy" as a dummy variable. When strategy = 1, the word frequency difference between cost leadership strategy and differentiated strategy is greater than or equal to 0,

indicating that companies tend to adopt the cost leading strategy. Conversely, when strategy = 0, it means that the company tends to adopt a differentiated strategy, and the word frequency difference is less than 0.

3.3.4. Control Variables

This research introduces eight control variables to ensure the accuracy of the research results, including corporate growth, corporate size, debt-to-asset ratio, proportion of state-owned shareholders, proportion of senior management shareholders, size of the company, time to market, whether to observe the annual loss, and the quality of the company's auditors for that year. All control variables are presented in Table 2 along with the independent and dependent variables used in this research.

As this research focuses on Chinese manufacturing companies, due to the particularity of the Chinese system, it is necessary to consider the impact of state-owned shares on companies (Lin, Cai, & Li, 1998; Lin & Tan, 1999; Lin., Lu, Zhang, & Zheng, 2020). At the same time, the quality of auditors can also ensure the authenticity and completeness of a company's annual reports. Compared with small audit firms, large audit firms carry out stricter and higher quality audits of listed companies (Behn, Choi, & Kang, 2008; Khurana & Raman, 2004).

Table 2. Variable definitions and descriptions.

Classification of Variables	Variables	Variable Names	Definition
DV	ROA	Return on assets	(Net profit/average value of assets at the end of the period and beginning of the period) × 100%
IV	EU	Environmental uncertainty index	The average percentile rank of technology, market and competitive uncertainty
	STRA	Competitive strategy type	The word frequency difference between the company's cost leadership strategy and its differentiated strategy in the current year, which is greater than 0 and the value is 1; otherwise, it is 0
Control Variables	Growth	Company growth	(The difference between the main business income of the current period and the previous period/the main business income of the previous period) × 100%
	SIZE	Company size	Natural logarithm of total assets
	SS	State-owned shareholders	The number of shares held by state-owned shareholders as a percentage of the total number of shares
	ES	Executive shareholding	The number of shares held by executives as a percentage of the total number of shares
	AGE	The company's listing years	The time elapsed from the company's listing to the observation point
	RAR	Assets and liabilities	(Operating income/average value of assets at the end of the period and beginning of the period) × 100%
	BIG4	Auditor quality	If it is audited by one of the "Big Four" auditors, it has a value of 1, and 0 otherwise
	LOSS	Loss	If the net profit in the observation year is negative, it is 1, and 0 otherwise

4. RESULT

4.1. Descriptive Statistics

Table 3 shows the basic characteristics of the variables in this research, including the mean, standard deviation, minimum, median and maximum. Judging from the mean and median values of the Environmental Uncertainty Index (EU), most of the samples are at a moderate degree of uncertainty, which is consistent with previous studies (Arieftiara et al., 2017). There are also companies with a high degree of uncertainty. The maximum value of EU reaches 0.96, indicating that the company's external environment has undergone tremendous changes, which has led to a high degree of uncertainty. The median value of STRA that companies tend to adopt is 1, indicating that

most Chinese manufacturing companies still tend to adopt cost leadership strategy, which are more likely to be influenced by Chinese culture and lead to managers' preference for risk aversion (Parnell et al., 2012).

Table 3. Descriptive statistics of variables.

Variables	N	Mean	S.D.	Min.	Median	Max.
ROA	12790	0.026	0.078	−0.381	0.028	0.213
EU	12790	0.408	0.172	0.000	0.400	0.960
STRA	12790	0.710	0.454	0.000	1.000	1.000
Growth	12790	0.272	0.798	−0.753	0.105	5.689
SIZE	12790	22.054	1.235	13.191	21.942	27.386
SS	12790	0.054	0.136	0.000	0.000	0.971
ES	12790	0.044	0.099	0.000	0.000	0.636
AGE	12790	12.718	5.437	4.610	11.960	29.050
RAR	12790	0.511	1.454	−0.087	0.463	98.963
BIG4	12790	0.055	0.229	0.000	0.000	1.000
LOSS	12790	0.860	0.347	0.000	1.000	1.000

Since the mean value of GROWTH is positive, and the median value is also positive, it shows that most companies are developing well. The values for SIZE are greater than 10, and the average value is 22, indicating that the scale of listed companies is close, and all have a certain scale; there are no small or medium-sized companies, and the same can be seen from the listing period of most manufacturing companies that have been developed for some time, and have passed the initial stage. It is worth noting that most manufacturing companies do not have state-owned shares (SS), indicating that listed companies are less affected by state-owned shares. In the total sample, loss-making companies (LOSS) accounted for the majority, and annual reports not audited by BIG4 auditors also accounted for the majority.

4.2. Correlation Analysis

Table 4 presents the correlation between independent variables, intermediate variables, dependent variables and control variables in this research. From the correlation results, it can be initially observed that the uncertainty of the external environment of the company and the performance of the company change in the same direction, that is, the stronger the uncertainty of the external environment, the better the performance of the company. This relationship is similar to previous studies (Swamidass & Newell, 1987). In addition, when the company is more inclined to adopt a differentiated strategy, the better the performance of the company (strategy is a positive sign that the company tends to adopt a cost leadership strategy). It is also observed that when companies face higher uncertainty, they are more inclined to adopt a differentiation strategy.

Table 4. Correlation analysis.

Variables	ROA	EU	STRA	Growth	SIZE	SS	ES	AGE	RAR	BIG4	LOSS
ROA	1.000										
EU	0.003 (0.774)	1.000									
STRA	-0.094 (0.000)***	-0.033 (0.000)***	1.000								
Growth	0.004 (0.667)	0.074 (0.000)***	-0.012 (0.182)	1.000							
SIZE	0.084 (0.000)***	0.097 (0.000)***	-0.091 (0.000)***	-0.087 (0.000)***	1.000						
SS	-0.006 (0.516)	0.024 (0.006)***	0.147 (0.000)***	0.008 (0.393)	0.054 (0.000)***	1.000					
ES	0.043 (0.000)***	0.026 (0.003)***	-0.220 (0.000)***	0.011 (0.199)	-0.113 (0.000)***	-0.163 (0.000)***	1.000				
AGE	-0.054 (0.000)***	-0.045 (0.000)***	0.069 (0.000)***	0.027 (0.003)***	0.200 (0.000)***	-0.015 (0.093)*	-0.412 (0.000)***	1.000			
RAR	-0.067 (0.000)***	0.037 (0.000)***	0.049 (0.000)***	0.003 (0.727)	-0.073 (0.000)***	0.024 (0.007)***	-0.051 (0.000)***	0.051 (0.000)***	1.000		
BIG4	0.079 (0.000)***	0.012 (0.182)	-0.018 (0.039)**	-0.039 (0.000)***	0.321 (0.000)***	0.036 (0.000)***	-0.082 (0.000)***	0.078 (0.000)***	0.001 (0.818	1.000	
LOSS	0.682 (0.000)***	0.012 (0.174)	-0.087 (0.000)***	0.024 (0.006)***	0.080 (0.000)***	0.003 (0.711)	0.052 (0.000)***	-0.063 (0.000)***	-0.049 (0.000)***	0.040 (0.000)***	1.000

Note: p-values are in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.3. Multiple Regression Results

Hypothesis 1 (H1) of this research is to test the mediating effect of competitive strategy between environmental uncertainty and firm performance. The test of mediation is divided into three steps. First, the relationship between the independent variable and the dependent variable is predicted, and the correlation coefficient needs to be significant. Second, we predict whether the relationship between the independent variable and the intermediary variable is significant, if not, the intermediary analysis is terminated. Finally, the independent variable and the intermediate variable are used to predict the dependent variable at the same time to test whether the coefficient of the independent variable to the dependent variable is significant. If it is significant and less than the coefficient of the relationship between the independent variable and the dependent variable in the first step, it means that some of the mediating effects are significant. If the independent variable and the intermediate variable predict the dependent variable at the same time, the independent variable is not significant to the coefficient of the dependent variable, indicating that the intermediate variable has a completely mediating effect on the relationship between the independent variable and the dependent variable (Baron & Kenny, 1986; Bollen, 1989).

Table 5. Multiple regression results.

Variable	(1) STRA	(2) STRA	(3) ROA	(4) ROA	(5) ROA	(6) ROA
EU	-0.106*** (-3.961)	-0.064** (-2.422)	0.024*** (4.681)	0.015*** (3.895)	0.022*** (4.315)	0.014*** (3.796)
STRA					-0.018*** (-10.990)	-0.006*** (-4.747)
Growth		0.006 (1.241)		-0.001 (-0.895)		-0.001 (-0.843)
SIZE		-0.035*** (-10.302)		0.003*** (5.357)		0.002*** (4.907)
ES		-0.474*** (-11.093)		0.018*** (2.946)		0.015** (2.470)
AGE		0.022 (0.708)		-0.000* (-1.843)		-0.000 (-1.557)
RAR		0.005*** (6.765)		-0.002*** (-4.464)		-0.002*** (-4.455)
BIG4		0.001 (0.291)		0.015*** (6.241)		0.014*** (6.142)
LOSS		-0.041** (-2.456)		0.150*** (102.917)		0.150*** (102.490)
SS		-0.075*** (-7.230)		-0.009** (-1.989)		-0.009** (-1.961)
Cons		1.530*** (20.400)	0.016*** (7.477)	-0.163*** (-15.523)	0.030*** (12.005)	-0.154*** (-14.444)
R^2	0.195	0.224	0.040	0.490	0.049	0.491
N	12790	12790	12790	12790	12790	12790
IndusFE	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes

Note: p-values are in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01.

The results of multiple regression are shown in Table 5. The whole process has a fixed effect on industry and year. According to the test steps of the mediation effect, first column (3) shows the relationship between the independent variable EU and the dependent variable performance (ROA). It is found that the higher the uncertainty of the external environment of the company, the better the performance of the company (β = 0.024, p < 0.01). This finding is quite different from the results of previous studies (Hoque, 2004), but it is consistent with the results of the correlation test. This shows that when managers of Chinese manufacturing companies face greater uncertainty, they can better predict environmental uncertainty and make correct decisions to improve firm performance (Chong

& Chong, 1997). When the control variable is introduced, R² increases from 0.04 in column (3) to 0.49 in column (4), which means that when the control variable is introduced, the degree of interpretation of the dependent variable ROA by the independent variable EU is greatly improved, and it can be found that the independent variable, the relationship between EU and the dependent variable ROA, is still positive and significant (β = 0.015, P < 0.01), which further proves that when the external environment is more uncertain, the company's performance will be better.

Second, the relationship between the independent variable and the intermediate variable is shown in column (1). The relationship between EU and STRA is negative and significant (β = -0.106, p < 0.01), indicating that the greater the uncertainty of the external environment, the more inclined a firm is to adopt a differentiated strategy, and when the external environment is less uncertain, companies are more inclined to adopt a cost leadership strategy. This conclusion is similar to the results of previous studies (Miller, 1988; Qi et al., 2011; Ward & Duray, 2000). When the external environment is highly uncertain, market demand will change constantly, and technological innovation will also continuously promote the development of products, and the competitive environment will also become increasingly fierce in the wave of economic globalization. So, if a company wants to maintain an existing competitive advantage or competitive position in the ever-changing market, it should conform to the development of the times, adapt to the changes in the external environment, and continue to innovate in products and services. In other words, companies are more inclined to adopt differentiation strategies when environmental uncertainty is strong (Porter, 1980). In addition, when the study introduces control variables, as shown in column (2), the relationship between the independent variable EU and the intermediate variable STRA is negative and significant (β = -0.064, p < 0.05), indicating that, under the control of other influencing factors, the greater the uncertainty of the external environment, the more inclined companies are to adopt differentiated strategies. This result is consistent with the absence of other factors.

Finally, EU and STRA are used together to predict ROA. As shown in column (5), the relationship between EU and ROA is significant and positive, and there is no insignificant situation. Therefore, STRA may only play a part of the mediating role between EU and ROA. In the relationship between EU and ROA, as shown in (3), the coefficient β decreased from 0.024 in (3) to 0.022 in (5), and the value of t in (3) of 4.681 dropped to 4.315 in (5), indicating that STRA has a partial mediating role. Similarly, after the introduction of control variables, R² increased from 0.049 in (5) to 0.491 in (6), which can better explain most of the samples. And when the control variables are introduced, STRA still shows a partial mediating effect, because in column (4), the control variables are also introduced. When EU is used to predict ROA, the coefficient β is 0.015. However, when EU and STRA are used to jointly predict ROA in (6), the coefficient of EU drops to 0.014, which can explain the partial mediation effect of STRA on the relationship between EU and ROA. Therefore, the hypothesis H1 is proved.

4.4. Robustness Check

Since the independent variable EU and the intermediary variable STRA are calculated, when the mediating effect is analyzed for robustness, this research uses ROE as a measurement of firm performance to replace ROA for analysis based on previous research (Yin, Wei, Chen, & Wei, 2020). The results are the same as in previous research, which improves the robustness of this study. The results are listed in the Appendix 1 robustness check.

5. ADDITIONAL ANALYSIS

5.1 Moderating Effect of Corporate Life Cycle

From the results in Chapter 4, we can find part of the mediating effect of STRA on EU and performance. However, the strategic decision of a company not only needs to consider changes in the external environment, but the internal environment of the company is also a factor worth considering. The internal environment of a company is affected by many factors, and it is difficult to evaluate the changes in the internal environment of a company by

comprehensive indicators. Therefore, this research introduces the corporate life cycle to comprehensively consider the relationship between the different life cycle stages, the uncertainty of the external environment, and the choice of competitive strategy. The main reason is that the corporate life cycle is an integration of the internal environmental characteristics of the company at different stages of development. In other words, the switching of corporate life cycle stages is a manifestation of the changes in the internal environment of the company, especially in the organizational structure (Miller & Friesen, 1984). It is a prerequisite for managers to make strategic choices to clarify the life cycle stage of a company (Lester et al., 2008; Pasch, 2019).

In the process of corporate decision-making, companies will face different tests in different life cycle stages (Adizes, 1979). Often companies have different characteristics in different life cycles, and these characteristics mostly reflect the different internal environments of the company. For example, companies in the start-up stage have relatively high capital costs, high levels of internal management opportunism (Hasan, Hossain, & Habib, 2015), are owner-dominated, and have simple and informal organizational structures (Miller & Friesen, 1984). When a company enters the growth stage, its main goal is the rapid growth of sales and the accumulation of resources. The organizational structure is still simple, but some powers are delegated to middle managers (Miller & Friesen, 1984), paying more attention to innovation and market development (Xie, Firch, Zhang, & Liu, 2019). However, when a company reaches the maturity stage, the sales volume of the company will drop, the level of innovation will drop, and a more bureaucratic organizational structure will appear (Quinn & Cameron, 1983). At this stage, the company will begin to become conservative (Young & Huang, 2004) and begin to economize on production and operating efficiency (Xie et al., 2019). When a company enters a period of recession, it begins to significantly save resources and stop innovating to extend its survival time (Dickinson, 2011). In addition, the organizational structure is complex (Miller & Friesen, 1984) and the efficiency is low.

For the stages of the corporate life cycle, the above shows the form of the four stages. According to previous research, there is also a five-stage model, which includes a recovery stage (Miller & Friesen, 1984; Quinn & Cameron, 1983) or a shock stage (Dickinson, 2011), and the main purpose of companies at this stage is to prevent it from entering a recession period and to re-enter the company into the growth stage or the mature stage through measures such as product diversification (Quinn & Cameron, 1983). However, the life cycle of a company does not necessarily follow the process from the start-up period to the recession period. It can jump at various stages at any time (Dickinson, 2011). Therefore, companies need to judge their life cycle stage based on their current company characteristics instead of making predictions based on previous rules.

According to previous research, taking into account the different characteristics of different companies in different life cycle stages, the choice of competitive strategy is also different in each life cycle stage (Chen & Hsieh, 2005; Hu et al., 2020). What can reach a consensus is that companies in the mature and recession phases are more inclined to adopt cost leadership strategies, and companies in the start-up phase are more inclined to adopt differentiated strategies. For companies in the growth stage, previous studies have not reached a consensus (Chen & Hsieh, 2005). Taking into account the joint effect of external environment uncertainty, this research focuses on investigating the relationship between external environment uncertainty and the choice of competitive strategy at different stages of the corporate life cycle.

Taking the research content into account, this study selected companies in the growth stage and the mature stage with the largest number of manufacturing companies as the research objects, as most previous studies have done (Auzair & Langfield-Smith, 2005; Shaheen, Nazir, Mehar, & Adil, 2020). This research investigates the choice of competitive strategy under the environmental uncertainty of the firm during the growth and maturity stages. Taking into account the characteristics of environmental uncertainty and previous research on the matching of competitive strategies and corporate life cycles (Chen & Hsieh, 2005), this research proposes the following hypotheses:

H2: For companies in the growth stage, the greater the environmental uncertainty, the more inclined companies are to adopt differentiated strategies.

H3: For companies in the maturity stage, the greater the environmental uncertainty, the more inclined companies are to adopt cost leadership strategies.

5.2. Corporate Life Cycle Measurement

The earliest methods of judging the life cycle of a company are questionnaires based on the characteristics of each life cycle stage (Miller & Friesen, 1984) and the self-test model of the corporate life cycle (Kazanjian & Drazin, 1990). Recent research comprehensively considers all life cycle characteristics to conduct a questionnaire survey (Su, Baird, & Schoch, 2017), which is highly subjective. However, because this research uses panel data, it is not possible to obtain corporate life cycle data via questionnaire surveys.

Therefore, this research adopts a more objective cash flow pattern based on panel data to determine the stage of a company's life cycle (Dickinson, 2011). The cash flow pattern judges the life cycle stage of a company by analyzing its operating cash flow (OANCF), investing cash flow (IVNCF) and financing cash flow (FINCF).This pattern is widely used in the panel data-based corporate life cycle research (Ahmed et al., 2020; Hasan & Habib, 2017; Shahzad, Lu, & Fareed, 2019; Xie et al., 2019). The specific cash flow model to judge the stage of a company's life cycle is:

(1) Introduction: if OANCF < 0, IVNCF <0 and FINCF > 0.

(2) Growth: if OANCF > 0, IVNCF < 0 and FINCF > 0.

(3) Maturity: if OANCF > 0, IVNCF < 0 and FINCF <0.

(4) Decline: if OANCF < 0, IVNCF > 0 and FINCF $\leq$ or $\geq$ 0.

(5) Shake-out: the remaining firm years are classified into the shake-out stage.

5.3. Results of the Moderating Effect

In the first part of the research, the mediating effect of competitive strategy on the relationship between environmental uncertainty and firm performance is proved. This section further studies the matching relationship between competitive strategy and environmental uncertainty and introduces the corporate life cycle as a moderating variable.

Table 6 shows the total number of companies in each life cycle stage in the sample total. It can be found that 30% of the sample companies are in the growth stage and 35% of the sample companies are the mature stage. The number of companies in these two stages is much higher than the number of companies in other stages.

Table 6. Distribution of sample companies.

Corporate Life Cycle Stage	Number of Companies
Introduction	1747
Growth	3961
Maturity	4513
Shake-out	748
Decline	1821
Total	12790

Companies in the growth and mature stages were selected as the research objects because these have more practical significance than other stages and can provide effective suggestions for most business managers.

This research divides the sample into two groups, namely the group of companies in the growth stage (3961 in total) and the group of companies in the mature stage (4513 in total). Since the number of companies in the growth stage is close to the number of companies in the mature stage, the data was not filtered further.

Table 7 shows the relationship between the uncertainty of the external environment and the choice of competitive strategy for companies in the growth stage and the maturity stage. Columns (1) and (2) show the relationship between the corporate environmental uncertainty and the competitive strategy relation. From (1), it can be seen that the choice of corporate competitive strategy has nothing to do with environmental uncertainty, and the same result is obtained when the control variables are introduced (β = -0.018, p > 0.1). Therefore, companies in the growth stage need to choose a competitive strategy according to their own development needs rather than just focusing on the uncertainty of the company's external environment to choose a suitable competitive strategy. Some companies already have a certain position in the market of the same industry, so they may not need to increase advertising investment and product innovation to obtain more customers, but they should control costs and improve the supply chain to maintain a competitive advantage. In contrast, some companies are still in the stage of rapid development or have just stabilized their position in the market. Therefore, such companies need to adopt a differentiated strategy to enhance their competitiveness. This also explains why previous studies achieved different results on the competitive strategic choices of companies in the growth stage (Chen & Hsieh, 2005; Hu et al., 2020; Lester et al., 2008); therefore, Hypothesis 2 is rejected.

Table 7. Moderating effect of corporate life cycle.

Variables	Growth Stage		Maturity Stage	
	(1)	(2)	(3)	(4)
	STRA	STRA	STRA	STRA
EU	-0.080	-0.018	-0.172***	-0.133***
	(-1.589)	(-0.357)	(-3.758)	(-2.939)
GROWTH		-0.001		0.005
		(-0.050)		(0.682)
SIZE		-0.029***		-0.038***
		(-4.591)		(-6.548)
SS		0.116*		0.047
		(1.924)		(0.906)
AGE		0.007***		0.007***
		(4.497)		(5.160)
BIG4		-0.086***		-0.034
		(-3.003)		(-1.321)
LOSS		-0.067***		-0.058***
		(-3.347)		(-3.166)
ES		-0.528***		-0.477***
		(-7.149)		(-6.270)
RAR		0.063***		0.056***
		(2.672)		(3.185)
Cons	0.741***	1.337***	0.771***	1.554***
	(34.490)	(9.731)	(39.682)	(12.206)
R^2	0.199	0.236	0.223	0.254
N	3961	3961	4513	4513
Indus FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Note: p-values are in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01.

Columns (3) and (4) show the competitive strategy choices of companies in the mature stage when faced with environmental uncertainty. From (3), it can be seen that when the competition uncertainty a company faces is stronger, it is more inclined to adopt the differentiation strategy (β = -0.172, p < 0.01). When the control variables were introduced, the results remained unchanged. Most of the companies in the mature stage are relatively competitive companies in the same industry market, and in many cases even leading companies in the industry. Therefore, what companies in the mature stage need to consider is how to maintain their existing competitive advantages while creating barriers to entry into the industry to extend the length of time before the company

enters the recession period as much as possible. Therefore, most companies will adopt cost leadership strategies to maintain their existing competitive advantages and, at the same time, maximize the barriers to the entry of new products through cost control and economies of scale. However, because this research focuses on the relationship between the uncertainty of the external environment and the choice of competitive strategy, when the external environment is highly uncertain, the technological level will change drastically. Therefore, some companies in the mature stage may have maintained their status. If the capital advantage cannot be invested in the development of technology to obtain technological advantage, these mature stage companies may lose their competitive advantage and quickly enter the recession stage. Similarly, when the external environment is highly uncertain, the needs of customers are often accompanied by drastic changes. If companies only focus on product costs and give up product development according to customer needs, the company may lose existing customers in order to reduce the competitiveness of companies in the industry. In addition, environmental uncertainty is often accompanied by increased competition, which greatly increases the difficulty for companies to choose competitive strategies. Therefore, companies in the mature stage often need to change their previous cost leadership strategy and adopt a differentiated strategy to respond to changing external customer needs and technological innovations. Therefore, Hypothesis 3 is proved.

6. CONCLUSION

The relationship between uncertainty in the external environment and competitive strategy has always been a concern of researchers. This research examines the mediating role of competitive strategy between the uncertainty of the external environment and firm performance. We collected data on China's listed manufacturing companies for a total of 12 years, from 2007 to 2019, to demonstrate the mediating role of competitive strategies. Since the data was taken from the reports of listed companies, this research uses the environmental uncertainty (EU) index as a method of evaluating EU, and text analysis to determine the competitive strategy that companies tend to adopt based on previous research.

The results show that when a company's external environment is highly uncertain, the use of a differentiated strategy can help improve company performance. When the uncertainty of the external environment of the company and the differentiation strategy jointly predicts the performance (ROA), the coefficient of EU is smaller than the coefficient of EU when the ROA is predicted by EU alone. Also, the relationship between EU and competitive strategy is significant. Therefore, it can be proved that the competitive strategy has a mediating effect on the uncertainty of the external environment of the company and the performance of the company. This means that when companies are faced with high external environmental uncertainties, the use of differentiated strategies can often improve their performance.

This research further introduces the corporate life cycle as a moderating variable to study the relationship between the uncertainty of the corporate external environment and competitive strategy. By selecting the companies in the growth stage and the companies in the maturity stage, it was found that when the company is in the growth stage, due to the different development directions of the companies in different growth stages, some companies hope to stabilize their market positions in a short period of time, and some companies hope to go further and develop products to gain a higher market share. Correspondingly, companies in the growth stage may have different choices of competitive strategies, which can be cost leadership strategies, and there may also be companies that adopt differentiated strategies (Hu et al., 2020). Therefore, even if companies are under varying degrees of environmental uncertainty, there may still be situations in which growth-stage companies choose different competitive strategies. Therefore, the study found that there is no matching relationship between the uncertainty of the external environment of the company in the growth stage and the choice of competitive strategy.

Compared with companies in the growth stage, companies in the mature stage have a matching relationship between environmental uncertainty and competitive strategy. The study found that companies in the mature stage

are more inclined to adopt differentiated strategies when the environmental uncertainty is relatively high. Because of a higher degree of environmental uncertainty, the market's supply–demand relationship may undergo drastic changes, competitors may also increase, and industry technology will also develop substantially. Therefore, in order to maintain existing competitive advantages, companies adopt differentiated strategies to increase product promotion investment, develop new products, invest in new technology research and development and advertising investment to maintain the current market level and meet the needs of existing customers, and at the same time provide for future customers. The demand is forecasted in response to the entry of new competitors. This is different from previous research on the relationship between competitive strategy and corporate life cycle (Chen & Hsieh, 2005; Hu et al., 2020; Lester et al., 2008). Under the uncertainty of the environment, companies no longer tend to adopt cost leadership strategies but adopt differentiation strategies in order to maintain their current market position in response to the entry of new competitors and the emergence of new technologies.

This research provides a new method for calculating environmental uncertainty using panel data, and it expands the research method for environmental uncertainty research because most of the previous studies on environmental uncertainty use questionnaires. At the same time, a powerful method of text analysis is recommended to help researchers extract relevant information on competitive strategy from the annual reports of listed companies to reflect the use of competitive strategy by companies. The single method of the questionnaire has been transformed into a method that can use text analysis to extract information from panel data, which improves the feasibility of management accounting using panel data for research.

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Appendix 1. Robustness check.

	(1)	(2)	(3)	(4)	(5)	(6)
	STRA	STRA	ROE	ROE	ROE	ROE
EU	-0.106***	-0.064**	0.072***	0.047***	0.068***	0.047***
	(-3.961)	(-2.422)	(4.96)	(4.10)	(4.69)	(4.05)
STRA					-0.038***	-0.008**
					(-7.98)	(-2.11)
Growth		0.006		0.004*		0.004*
		(1.241)		(1.87)		(1.89)
Size		-0.035***		0.006***		0.006***
		(-10.302)		(3.98)		(3.78)
ES		-0.474***		0.017		0.013
		(-11.093)		(0.90)		(0.69)
Age		0.022		-0.000		-0.000
		(0.708)		(-0.45)		(-0.32)
RAR		0.005***		0.003***		0.003***
		(6.765)		(3.04)		(3.05)
BIG4		0.001		0.032***		0.032***
		(0.291)		(4.51)		(4.47)
LOSS		-0.041**		0.386***		0.385***
		(-2.456)		(85.85)		(85.55)
SS		-0.075***		-0.047***		-0.047***
		(-7.230)		(-3.51)		(-3.49)
Cons		1.530***	0.029**	-0.420***	0.070***	-0.405***
		(20.400)	(1.78)	(-12.63)	(4.09)	(-11.94)
R^2	0.195	0.224	0.020	0.390	0.024	0.389
N	12790	12790	12790	12790	12790	12790
Indus FE	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes

Note: p-values are in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.