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# Dividend regulation and cost stickiness: evidence from a quasi-natural experiment

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## Abstract

**Purpose** – This paper aims to examine the effect of dividend regulation on cost stickiness (i.e. the asymmetric change in firm expense between sales increase and sales decrease) and explore the underlying mechanism.
**Design/methodology/approach** – Based on the quasi-natural experiment of the Guideline for Dividend Policy of Listed Companies issued by the Shanghai Stock Exchange (SSE) in 2013, the authors employ a difference-in-difference model to investigate the impact of dividend regulation on cost stickiness.
**Findings** – The authors find that the cost stickiness of treatment group firms has decreased significantly when compared with control group firms after the dividend regulation. Moreover, this effect is more pronounced among firms in lower marketization regions, in lower competition industries and those with less analyst coverage and lower cash flow levels. Further analyses show that dividend regulation reduces the cost stickiness of firms by mitigating agency problems. Finally, the conclusion holds after several robust tests, including controlling for firm fixed effect, propensity score matching (PSM), placebo test and reconstruction of expense variable.
**Originality/value** – This paper confirms that dividend regulation serves an important role in corporate governance, which reduces firms' agency costs and thereby decreases cost stickiness. The conclusions shed light on the dividend policies of listed companies and capital market regulation in the future.

**Keywords** Dividend regulation, Cost stickiness, Agency cost, Corporate governance
**Paper type** Research paper

## 1. Introduction

The dividend policy of a listed company is an important financial decision. By paying cash dividends, a company can fulfill its fiduciary duty to shareholders in a timely manner and



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ensure that investors obtain reasonable returns. Simultaneously, it also holds great significance for cultivating investors' long-term investment horizons and promoting the sustainable development of the capital market. However, in reality, the dividend payouts of listed companies in China show significant randomness. Although the number of listed companies that pay cash dividends is increasing compared to the early days of the Chinese capital market establishment, some companies still do not pay cash dividends. Moreover, the frequency and level of cash dividends by some listed companies lack stability and continuity, which is not conducive to investors forming stable return expectations. To guide and promote listed companies toward establishing a sustainable, stable, transparent and scientific dividend payment behavior, the China Securities Regulatory Commission (CSRC) has repeatedly promulgated and revised regulations on the dividend payment of listed companies to improve their dividend payouts.

As a typical country with an emerging market, China is quite different from countries with a mature capital market in terms of its legal environment, market development and corporate governance. Generally, the degree of investor protection in China is weak (Allen, Qian, & Qian, 2005). La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000) develop the dividend agency theory from a legal perspective, arguing that cash dividends are a substitute for the legal protection of shareholders' rights, especially in countries with poor legal investor protection. For an emerging market such as China, where the institution environment is not yet sound, the payment of cash dividends is an important approach to protecting investors' interests. Paying cash dividends prevents the management of companies from using funds to invest in unprofitable projects by reducing their free cash flow (Jensen, 1986). With the increase of a company's level of cash dividends, it will help to restrain companies with excess internal cash flow from overinvestment (Wei & Liu, 2007; Xiao, 2010). These studies indicate that a company's payment of cash dividends has a certain governance role that helps to alleviate agency problems.

Cost stickiness is a very interesting phenomenon; that is, a company's expenses increase more when its business volume rises than they decrease when the business volume falls. Existing studies have discussed the causes of cost stickiness, one of which is the view of agency problem. This view suggests that due to the agency problem between management and shareholders, managers might implement self-interested behavior when making decisions about resource allocation. Notably, this can cause asymmetric changes in company expenses as business volumes rise and fall. Based on the agency problem perspective, when regulators implement dividend policy regulation and encourage or force companies to pay cash dividends, it can help reduce the companies' free cash flow and management's disposable resources, thereby affecting cost stickiness.

To implement the requirements of the CSRC's notice on the Further Implementing Issues Concerning Cash Dividends of Listed Companies, the Shanghai Stock Exchange (SSE) issued the Guidelines for Cash Dividends of Listed Companies in 2013. These guidelines stipulate that if the ratio of the total amount of cash dividends paid by listed companies to the net profit attributable to shareholders in the current year is less than 30%, the boards of directors of those companies should make an announcement to explain in detail how the company will use the profits and funds over the next few years. In doing so, investors and regulators can determine whether the noncompliance behavior of a company is reasonable. This regulation reflects the regulator's desire to increase the level of cash dividends paid by listed companies through dividend policy regulation. Moreover, this regulation only applies to companies listed on the SSE, while companies listed on the Shenzhen Stock Exchange (SZSE) are not subject to this regulation. This allows us to use companies listed on the SZSE as the control group and adopt a difference-in-difference model to examine the relationship between dividend policy regulation and company cost stickiness.

Based on the exogenous event of the Guideline for Dividend Policy of Listed Companies promulgated by the SSE and by using A-share listed companies from 2007 to 2019 as the research sample, our research finds that companies subject to dividend policy regulation have lower cost stickiness. The results of the cross-sectional analysis indicate that the inhibitory effect of dividend policy regulation on company cost stickiness is more significant for companies in lower marketization regions, in lower competition industries and among companies with fewer analyst coverage and lower cash flow levels. The mechanism test result shows that after the promulgation and implementation of the dividend policy regulation, the agency costs of the affected firms significantly decrease, which leads to a decrease in cost stickiness. A battery of robustness tests including controlling for firm fixed effects, using the propensity score matched sample, conducting placebo tests and reconstructing dependent variables confirm the validity of our conclusions.

Compared with the previous literature, the research contributions of this paper are as follows. First, existing studies have empirically tested the relationship between cash dividends and firms' agency costs and found that cash dividends can indeed alleviate firms' agency problems (Lang & Litzenberger, 1989; Yang & Shen, 2004; Liu, Jiao, & Zhang, 2015). However, the existing literature is based on the company-level autonomous cash dividend policy and discusses its impact on company agency costs. Notably, relatively few studies have analyzed agency cost from the perspective of external dividend policy regulation. On the other hand, most previous studies on Chinese dividend policy regulation has focused on the impact of this regulation on corporate dividend payment (An, 2012; Wei, Li, & Li, 2014; Liu, Tan, & Li, 2016), with less attention being paid to its impact on corporate agency cost. Furthermore, to date, no research has directly examined the relationship between external regulation and firm cost stickiness. Therefore, based on the cash dividend policy regulation of the SSE, this study uses agency cost as a mediator variable to directly examine how dividend policy regulation affects cost stickiness by influencing a company's agency cost, thereby contributing to the literature on dividend policy regulation.

Second, there are serious endogeneity problems in the literature related to companies' voluntary cash dividend behavior and dividend policy regulation. A company's dividend payment behavior is endogenous to its characteristics. Thus, it is difficult to rule out the interference of other factors in the research. Taking the Guidelines for Cash Dividends of Listed Companies promulgated and implemented by the SSE in 2013 as an exogenous event, this paper uses a difference-in-difference model to test the relationship between dividend policy regulation and company cost stickiness on the basis of effectively controlling for potential endogenous problems. Our research confirms that the payment of cash dividends can help reduce the agency cost of companies and serves as a corporate governance mechanism, thereby enriching the relevant literature on the governance role of corporate dividends.

Third, existing research on the factors affecting corporate cost stickiness has mainly focused on the company (Liang, 2015; Liang, Chen, & Hu, 2015; Zhou, Zhong, Xu, & Ren, 2016), market (Gong, Liu, & Shen, 2010) and industry levels (Liu, 2006). Our study reveals that dividend policy regulation from regulators also has an effect on firm cost stickiness, which provides evidence of the relationship between external regulation and firm cost stickiness. Moreover, the current theoretical explanations of the causes of corporate cost stickiness are not uniform. Existing theories analyze cost stickiness from the following three perspectives: adjustment costs, management's optimistic expectations and management agency costs. Based on the new perspective of external dividend policy regulation, this paper further supports the agency problem view of cost stickiness, contributing to the literature on cost stickiness.

Finally, the research of this paper shows that the dividend policy regulation has a governance role, providing theoretical support and policy guidance for regulators to formulate dividend rules for listed companies in the future.

The remainder of this paper proceeds as follows. The second section reviews the existing literature on corporate dividends and cost stickiness and then develops the research hypothesis based on theoretical analysis. The third section presents the research design, which introduces the data, model and variable definitions. The fourth section reports the empirical results. The fifth section further explores the underlying mechanism of how dividend policy regulation influences cost stickiness. The sixth section introduces several robustness tests. The final section presents the conclusions.

## 2. Literature review and hypothesis development

### *2.1 Literature review*

*2.1.1 Corporate governance role of dividends.* Miller & Modigliani (1961) proposes the dividend irrelevance theory, which suggests that in a perfect market, a company's market value is irrelevant to its dividend policy. However, there are agency problems between management and shareholders in modern companies. The management may thus use retained earnings to invest in projects that are beneficial to them but detrimental to the company, thereby reducing the company's overall value. The dividend agency theory implies that paying cash dividends has corporate governance effects. First, paying cash dividends reduces a company's free cash flow, restrains management from using free cash flow to make excessive investments and prevents management from wasting company resources on investment projects that destroy the company's value (Jensen, 1986). Empirical tests have shown that the level of corporate overinvestment is affected by the cash available for use by managers. Empirical evidence from US and Chinese capital markets indicates that the more free cash flow controlled by managers, the more serious the overinvestment problem (Griffin, 1988; Richardson, 2006; Liu, 2006; Hu & Gan, 2007; Xu & Zhang, 2009), and cash dividends can effectively restrain management's excessive investment by reducing free cash flow (Vogt, 1994; Lamont, 1997; Tang, Zhou, & Ma, 2007). Meanwhile, the outflow of a company's cash due to the payment of cash dividends renders internal financing alone insufficient to meet a company's financial needs. Naturally, a company's external financing needs will arise, exposing it to the inspection of the capital market. The entry of new investors inflicts even more challenges, and strict external supervision inhibits management's opportunistic behavior (Easterbrook, 1984). Existing scholars have also conducted empirical tests on the dividend agency theory and have verified the theory to a certain extent. They demonstrate that, in the context of both developed capital markets and the Chinese capital market, dividends can reduce the agency cost of companies and improve corporate governance, thereby increasing company value (Lang & Litzenberger, 1989; Yang & Shen, 2004; Liu *et al.*, 2015).

*2.1.2 Semimandatory dividend regulation.* The dividend policies of listed companies have always been the focus of Chinese regulatory agencies. Correspondingly, Chinese scholars have carried out research on the economic consequences of Chinese unique semimandatory dividend policy regulation. This regulation refers to a series of regulatory policies issued by the CSRC that link the refinancing qualifications of listed companies with levels of dividend payment. This regulation aims to solve problem of the dividend payout rates of listed companies in China being relatively low and the number of nonpaid companies increasing year by year (Li, 1999) by imposing soft regulatory constraints. Empirical studies report that the dividend payment of listed companies considerably improve after the implementation of the semimandatory dividend policy regulation (An, 2012). However, the regulation has only improved firms' willingness to pay cash dividends; the overall dividend payment levels of listed companies has not improved but has rather declined to a certain extent (Liu *et al.*, 2016). At a later stage of the implementation of this regulation, the number of companies paying threshold dividend and few dividend has increased significantly (Wei *et al.*, 2014). In addition,

the compulsory intervention of the semimandatory dividend policy regulation on the dividend policy of listed companies has also brought some controversy, triggering the regulatory paradox phenomenon. While promoting the dividend payment of companies with refinancing needs, this regulation also encourages the dividend payment of these companies to cater to its requirements (Wang & Zhang, 2012). Moreover, to take into consideration company refinancing, under the semimandatory dividend policy regulation, listed companies pay more cash dividends during periods of contractionary monetary policy (Quan, Liang, & Fu, 2016), which results in higher level of financing constraints (Chen, Li, & Li, 2015).

*2.1.3 Determinants of cost stickiness.* Anderson, Banker, and Janakiraman (2003) is the first to conduct empirical tests on the phenomenon of firm cost stickiness. They study US public companies and find that when the companies' sales increase by 1%, their expenses will increase by 0.55%; however, when their sales decrease by 1%, the expenses will decrease by only 0.35%. In Chinese research, Sun and Liu (2004), Liu (2006) and Kong, Zhu, and Kong (2007) confirm that the phenomenon of cost stickiness also exists in Chinese listed firms. Subsequent studies have proposed theoretical explanations for the existence of firm cost stickiness from three aspects: adjustment costs, management's optimistic expectations and agency problems (Banker *et al.*, 2011, 2013; Chen, Lu, & Sougiannis, 2012).

The adjustment cost view of cost stickiness states that a company's cost is determined by its management's commitment to resource inputs. When increasing or decreasing committed resources, the company will incur adjustment costs (Anderson *et al.*, 2003). For example, in times of economic downturn, companies may not sell machines or immediately lay off employees because these actions will incur adjustment costs (e.g. machine disposal costs and employee severance pay). Moreover, changes in company costs not only depend on changes in their current business volume but also on their expected changes in future business volumes. Due to the existence of adjustment costs, a company may not immediately reduce resource investment when its business volume declines, resulting in the phenomenon of cost stickiness. From the perspective of the factor market, Gong *et al.* (2010) believe that the development and improvement of the factor market reduce companies' adjustment costs. Their empirical results suggest that the greater the development of the factor market, the lower a company's cost stickiness. From the perspective of human capital, the protection of human capital increases the adjustment cost of human resources (Banker *et al.*, 2013). Based on the Minimum Wage Standards and the Labor Protection Law promulgated in China in 2004 and 2008, respectively, previous empirical studies also find that with an increase in the level of human capital protection, the stickiness of company labor costs increases (Jiang, Yao, & Hu, 2016; Liu & Liu, 2014).

The management's optimistic expectation view of cost stickiness holds that in the long run, the company's business volume and sales volume will show a gradual growth trend that will cause the management to believe that the company's future sales volume will be higher than its current sales volume. Thus, management becomes more optimistic about the company's future sales volume growth and will thus be less willing to reduce committed resources (Anderson *et al.*, 2003; Banker *et al.*, 2011), leading to cost stickiness. When the macroeconomic growth rate is faster and the industry growth is higher, the management's expectations of the future become more optimistic and the company's cost stickiness also increases accordingly (Anderson *et al.*, 2003; Banker *et al.*, 2011). In addition to macroeconomic and industry factors, the optimism level of management themselves will also affect their expectations. Liang (2015) shows that management's overconfidence can improve a company's cost stickiness via the theoretical mechanism of management's optimistic expectations.

The agency problem view of cost stickiness argues that due to agency problems between management and shareholders, management may engage in opportunistic behavior when allocating resources (Chen *et al.*, 2012). For instance, managers may have incentives to engage

in empire building, overinvest to maximize resources under their control and invest more when the company's sales rise, but not reduce investment to the same extent when the company's sales decline. This can result in increased cost stickiness. Empirical evidence has shown that factors such as free cash flow and executive tenure can significantly increase a firm's cost stickiness (Chen *et al.*, 2012). Starting from the macrofinancial system, an international study conducted by Calleja, Steliaros, and Thomas (2006) reports that the cost stickiness of French and German companies is higher than that of US and British companies. This can be attributed to the US and British financial systems being capital market-centered, paying more attention to shareholder interests and having a better governance structure. Since the external governance mechanism can reduce a company's agency costs, it will have an inhibitory effect on the company's cost stickiness. Additionally, existing empirical studies have carried out research on external audits, media coverage, institutional investor shareholding, etc. The results found that for a company audited by the international Big Four accounting firms, with more media coverage and a higher institutional investor shareholding ratio, the degree of asymmetric changes in company expenses decreases as business volume rises and falls (Liang *et al.*, 2015; Liang, 2017, 2018).

Based on the above literature review, the existing literature on dividend policy regulation is mostly based on semimandatory dividend policy regulation, with few literature examining the dividend policy regulation implemented by the SSE in 2013 to realize the constraints on companies' dividend policies through information disclosure channels. Moreover, the current dividend policy regulation literature has also failed to explore the relationship between dividend policy regulation and firm cost stickiness. Based on dividend agency theory and starting from the agency cost view of cost stickiness, dividend policy regulation can influence the free cash flow of companies by affecting their dividend behaviors, thereby having an effect on management's disposable resources and company cost stickiness. Moreover, since the Chinese capital market attaches great importance to giving investors a reasonable return on investment and cultivating a long-term investment horizon, it is also of great practical significance to explore the impact of dividend policy regulation on company cost stickiness.

### *2.2 Hypothesis development*

Banker *et al.* (2011) believe that management's opportunistic behavior is an important factor affecting firm cost stickiness. Due to the separation of ownership and management in modern companies, management with information advantages and actual control of their company's decision-making may take advantage of the information asymmetry between the company and its investors to engage in self-interested behaviors, such as not reducing the company's related expenses when business volume decreases, which results in cost stickiness. Chen *et al.* (2012) find that management's motivation to conduct empire building can significantly increase a firm's cost stickiness. When a company's business volume increases, managers motivated to build a personal empire will deliberately invest additional resources, such as by updating office equipment, building office space and hiring more employees. Because the management can obtain potential monetary and nonmonetary benefits from a company with a larger size, they may not reduce the amount of previously invested resources to the same extent or delay cost-cutting when the company's business volume declines, which leads to a significant increase in costs and expenses when the company's business volume increases but a lower decrease in the costs and expenses when the business volumes decrease, resulting in the phenomenon of cost stickiness. Construction of personal empires requires sufficient funds available for use; hence, the management of companies with poor corporate governance tend to retain cash surpluses and pay less or no dividends (La Porta *et al.*, 2000). Therefore, an excessively low level of cash dividends may exacerbate agency conflicts between a company's management and external shareholders.

Dividend agency theory holds that companies paying cash dividends can restrain managers from abusing free cash flow (Easterbrook, 1984; Jensen, 1986; Xiao, 2010). Moreover, after paying cash dividends, a company may need to raise funds through the capital market in the future, leading to stronger external monitoring and restrictions on management's opportunistic behavior. The Guidelines for Cash Dividends of Listed Companies promulgated by the SSE in 2013 stipulate that if the ratio of the total amount of cash dividends to be paid by a listed company to the net profit attributable to the listed company for the year is less than 30%, the company should make a detailed statement in the announcement of its board of directors to explain this situation. Existing research has found that this regulation significantly increases the dividend payout ratio of listed companies (He & Li, 2018). Accordingly, we believe that this dividend policy regulation can first reduce the resources available to management to engage in opportunistic behavior by increasing a company's dividend payment, which weakens management's ability to abuse cash flow for empire building, thereby inhibiting management's tendency to blindly increase resource investment when business volume increases and reduces the asymmetry of a company's expense level adjustment when the business volume rises and falls (Jensen, 1986). Meanwhile, the dividend policy regulation stipulates that when the company's dividend payout ratio is less than 30%, the company should explain this matter in detail. This additional information disclosure requirement limits management's ability to gloss over its nonpayment of dividends (Berle & Means, 1932), further encouraging management to increase the payment of cash dividends and enhancing the governance role of corporate dividends. Additionally, as a company's dividend payment increases, a financing need is created. In terms of a company's internal financing, when cash flow is tight, management is forced to cut expenses and recover funds when the business volume declines, thereby reducing the cash flow wasted on nonprofit projects. This will narrow the gap between the degree of cost reduction when business volume decreases and the degree of cost increase when business volume increases. From the perspective of external financing, when a company needs to finance through external channels, it implies that the company will be subject to stronger external monitoring, which will largely limit the opportunistic behavior of management (Easterbrook, 1984) and restrain it from blindly expanding when the business volume is rising and delaying or not cutting corresponding costs when the business volume is declining, resulting in a lower level of cost stickiness. Based on the aforementioned analysis, we propose research Hypothesis 1.

*H1*. After the promulgation and implementation of the Guidelines for Cash Dividends of Listed Companies, the cost stickiness of listed companies subject to the dividend policy regulation will decrease.

The effect of dividend policy regulation on the cost stickiness of listed companies may be affected by other factors. First, the degree of regional marketization is an important element of a company's external environment, which has a great impact on its business development. With continuous advancements in the marketization process in China, the level of marketization in various regions has shown an obvious imbalance. Differences in the level of marketization will lead to large differences in the governance environments of listed companies located in different regions. Due to the more complete legal systems, governance systems and monitoring mechanisms in regions with a higher degree of marketization, the degree of investor protection is higher, the role of restraint and monitoring of companies' management is stronger and companies' free cash flow problems are less serious, limiting the governance effect of dividend policy regulation. In regions with a lower degree of marketization, the external legal environment is worse, the regulatory system is more imperfect and the corporate governance mechanism is less sound. Due to the lack of effective monitoring on the company's management, the opportunistic motivation of management is enhanced and companies have more serious free cash flow problems. In this situation,

dividend policy regulation can suppress the opportunistic behavior of management to a greater extent by increasing the dividend payment levels of listed companies, which results in decreased company cost stickiness. Based on the above analysis, we propose Hypothesis 2.

*H2*. For firms in lower marketization regions, the effect of dividend policy regulation on the reduction of cost stickiness is more significant.

Second, the degree of competition in the industry within which a company operates also affects the relationship between dividend policy regulation and company cost stickiness. Alchian (1950) notes that industry competition can serve a role in corporate governance to restrain and motivate management. Intense industry competition means a higher risk of bankruptcy and, for company executives, a higher risk of dismissal. Simultaneously, fiercer competition in the industry means that the behavior of other enterprises can be observed more closely, and the economic behavior of other enterprises can also be used as a benchmark for evaluating the performance of a particular company's management, which makes the opportunistic behavior of a company's management more likely to be discovered by external investors and regulators (Fee & Hadlock, 2004). Therefore, when the level of industry competition is higher, management faces a higher risk of dismissal and stronger external monitoring, which will reduce the abuse of free cash flow (Harford, 1999). Accordingly, we believe that industry competition has replaced the governance role of dividend payment to a certain extent, and the governance effect of dividend policy regulation is weaker in companies operating in industries with stronger competition. In contrast, when a company is operating in an industry with weaker competition, its management faces less external competition pressure and monitoring. Under such circumstances, the governance role of dividends is more critical such that it significantly reduces cost stickiness. Based on the above analysis, we propose the research hypothesis 3.

*H3*. For firms in lower competition industries, the effect of dividend policy regulation on the reduction of cost stickiness is more significant.

Meanwhile, as an information intermediary, security analysts will also affect the relationship between dividend policy regulation and company cost stickiness. On the one hand, securities analysts can use their professional knowledge to process and translate information to make it easier for investors to understand, thereby enhancing the effectiveness of information usage; on the other hand, they can help reduce the information asymmetry between firms and investors by conveying private information that they obtain from other channels (Bowen, Chen, & Cheng, 2008). In addition, security analysts can also exert influence on management by publishing research reports to effectively monitor them (Jung, Sun, & Yang, 2012). For companies with higher analyst coverage, their management are faced with stronger external monitoring from securities analysts. Therefore, the information and monitoring effect of security analysts reduce the agency problem between company management and shareholders, which weakens the governance role of dividend. On the contrary, for companies with lower analyst coverage, the degree of information asymmetry between the company and investors is higher, the external monitoring is weaker and the management is more likely to use the company's free cash flow to obtain private benefits. In that case, by increasing the dividends of listed companies and reducing management's abuse of free cash flow, dividend policy regulation helps to reduce company cost stickiness. Based on this, we propose Hypothesis 4.

*H4*. For firms with lower analyst coverage, the effect of dividend policy regulation on the reduction of cost stickiness is more significant.

Finally, the relationship between dividend policy regulation and company cost stickiness will also be influenced by the company's own cash flow level. When a company's cash flow is relatively sufficient, an increase in the level of dividend payment caused by the dividend

policy regulation has relatively little impact on the cash flow resources that the management controls, and it is difficult to form an effective constraint on the management's empire building behavior. On the contrary, when the company's cash flow level is relatively low, an increase in the level of dividend payment brought about by dividend policy regulation can largely limit management's ability to abuse cash flow. This inhibits management's tendency to blindly increase resource input when the business volume increases, thereby reducing cost stickiness more effectively. Simultaneously, when a company's cash flow is tighter, the additional cash expenditures caused by dividend regulation will further force management to cut down their expenses when the company's business volume declines, thereby improving the symmetry of changes in costs and expenses when the business volume rise and fall, which further reduces company cost stickiness. Moreover, for those companies with tighter cash flow, dividend policy regulation can significantly increase the company's demand for external financing, make management face stronger external monitoring and then better limit management's opportunistic behavior and inhibit company cost stickiness. Based on this, we propose Hypothesis 5.

*H5.* For firms with lower cash flow levels, the effect of dividend policy regulation on the reduction of cost stickiness is more significant.

## 3. Research design

### *3.1 Empirical model and variable definition*

To test Hypothesis 1, this paper draws on the research of Anderson *et al.* (2003), Sun and Liu (2004) and Liang (2018) to construct the following multivariate regression model:

$$\begin{aligned} LnSGA = {} & \beta_0 + \beta_1 LnIncome + \beta_2 LnIncome \times D + \beta_3 LnIncome \times D \times Treat \\ & + \beta_4 LnIncome \times D \times Post + \beta_5 LnIncome \times D \times Treat \times Post + \beta_6 Treat \\ & + \beta_7 Post + \beta_8 Treat \times Post + \Sigma LnIncome \times D \times Economic\_Var \\ & + \Sigma Economic\_Var + \Sigma Control\_Var + \varepsilon \end{aligned} \quad (1)$$

Model (1) specifically includes the following variables: the dependent variable *LnSGA* represents the change in company expenses, which is equal to the natural logarithm of the ratio of the company's current year to the previous year's selling, general and administrative expenses. The independent variable *LnIncome* represents the change in revenue, which is equal to the natural logarithm of the ratio of the company's current year to the previous year's revenue. *D* is a dummy variable that stands for whether the company's revenue has decreased. If the company's revenue in the current year has decreased compared to the previous year, it takes the value of 1, and 0 otherwise. *Treat* is a dummy variable for the company in the treatment group. If the company is listed on the SSE, it takes the value of 1 and 0 otherwise. *Post* is a dummy variable for the affected year, which takes the value 1 if the observation year is in 2013 and beyond, and 0 otherwise.

In Model (1), if the coefficient $\beta_2$ of *LnIncome*×*D* is significantly negative, this implies that the absolute value of the company's expenses decreases when the business income decline is lower than the absolute value of the company's expense increase when business income rises (i.e. the company has the phenomenon of cost stickiness). In this model, we mainly focus on the interaction term *LnIncome*×*D*×*Treat*×*Post*. If the coefficient $\beta_5$ of *LnIncome*×*D*×*Treat*×*Post* is significantly positive, it implies that after the SSE promulgated and implemented the Guidelines for Cash Dividends of Listed Companies, the cost stickiness of the companies in the treatment group significantly reduces. Furthermore, we split the sample into subsamples based

on regional marketization, industry competition, analyst coverage and cash flow level to test Hypothesis 2 to Hypothesis 5.

Following the research of Anderson *et al.* (2003), Model (1) controls for the economic characteristic variables that drive a company's cost stickiness, including the following variables: Dummy variable (*D_Twoyear*) which takes the value of 1 if the company's revenue has declined for two consecutive years and 0 otherwise; the economic growth variable (*Eco_Growth*) that is equal to the national gross domestic product (GDP) growth rate of the current year relative to the previous year; the human capital intensity variable (*Employ_Inten*) that is equal to the ratio of the total number of employees to revenue (in million yuan) at the end of the year and the fixed capital intensity variable (*Asset_Inten*) that is equal to the ratio of the company's total assets at the end of the year to the year's revenue. To be consistent with Anderson *et al.* (2003), this study includes these four variables and their interaction term with $LnIncome \times D$ in the model. Additionally, the regression model also incorporates other control variables as follows: profitability (*ROA*), which is equal to the firm's net income divided by total assets at the year end; financial leverage (*Lev*), which is equal to the firm's total liabilities divided by total assets at the year end; regional marketization (*MKI*), which is derived from the China Marketization Index compiled by Wang, Gao, and Zhang (2019); the shareholding ratio of the largest shareholder (*Firsthold*), which is equal to the proportion of shares held by the firm's largest shareholder at the year end; the ratio of independent directors (*Ind*), which is equal to the number of a firm's independent directors divided by the total number of board directors at the year end; duality of chairman and chief executive officer (CEO) dummy variable (*Dual*), which is equal to 1 if the chairman and CEO of a firm are the same person, and 0 otherwise; and the management shareholding ratio (*Mshare*), which is equal to the proportion of shares held by the firm's management at the year end. Table 1 details the definitions of the main variables in this paper.

### *3.2 Sample and data*

This paper selects A-share listed companies from 2007 to 2019 as the preliminary research sample. On this basis, we screen the sample according to the following criteria: (1) excluding samples in the financial industry; (2) excluding initial public offering (IPO) and special treatment (ST) samples and (3) excluding samples with missing data. Ultimately, we obtain a total of 29240 firm-year observations. Financial data of listed companies are obtained from the China Stock Market and Accounting Research Database (CSMAR) and WIND databases. To mitigate the effect of potential outliers, we winsorize all continuous variables at both the upper and lower 1 percentile, and the standard errors are clustered at the firm level.

## 4. Empirical results

### *4.1 Summary statistics*

Table 2 provides summary statistics for the main variables. The average value of change in company expenses (*LnSGA*) is 0.136, the average value of change in revenue *LnIncome* is 0.121 and the number of firms with a decline in revenue account for 28.4% of the sample. In our sample, companies in the treatment group accounted for 41.9%, and 66.3% of the observations are made during the implementation of the dividend policy regulation. Additionally, the proportion of companies in the sample whose revenue has declined for two consecutive years is 11.8%, the average GDP growth rate is 11.4%, the average human capital density is 1.574 and the average fixed capital density is 2.613. The average return on total assets of the sample companies is 3.6%, while companies' financial leverage ratios reach an average of 45.3% and the average marketization index is 7.872. Moreover, the average shareholding of the largest shareholder accounts for 34.5% of the company's total shares. The average ratio of independent directors is 37.3%. Furthermore, companies with the

| Variable | Definition |
|---|---|
| *Dependent variables* | |
| *LnSGA* | Change in company expenses, which is equal to the natural logarithm of the ratio of the company's current year to the previous year's selling, general and administrative expenses |
| *Independent variables* | |
| *LnIncome* | Change in revenue, which is equal to the natural logarithm of the ratio of the company's current year to the previous year's revenue |
| *D* | Dummy variable that indicates whether the company's revenue has decreased. If the company's revenue in the current year has decreased compared to the previous year, it takes the value of 1, and 0 otherwise |
| *Treat* | Dummy variable for the company in the treatment group, which takes the value of 1 if the company is listed on the SSE, and 0 otherwise |
| *Post* | Dummy variable for the affected year, which takes the value 1 if the observation year is in 2013 and beyond, and 0 otherwise |
| *Moderator variables* | |
| *MKI* | Marketization index, which is derived from the China Marketization Index compiled by Wang *et al.* (2019) |
| *HHI* | Herfindahl Index, which is calculated by summing the squares of the market shares of all firms in an industry |
| *Follow* | Analyst follow, which is the natural logarithm of the total number of analyst reports published on the company plus one at year end |
| *CF* | Cash flow level, which is the net cash flow from operations divided by total assets |
| *Control variables* | |
| *D_Twoyear* | Dummy variable indicating whether the company's revenue has declined for two consecutive years. If it has, then the value is 1, and 0 otherwise |
| *Eco_Growth* | Economic growth variable, which is equal to the national GDP growth rate of the current year relative to the previous year |
| *Employ_Inten* | Human capital intensity variable (*Employ_Inten*), which is equal to the ratio of the total number of employees to the revenue (in million yuan) at the end of the year |
| *Asset_Inten* | Fixed capital intensity variable (*Asset_Inten*), which is equal to the ratio of the company's total assets at the end of the year to the same year's revenue |
| *ROA* | Profitability, which is defined as the firm's net income divided by its total assets at year end |
| *Lev* | Financial leverage, which is defined as a firm's total liabilities divided by total assets at year end |
| *Firsthold* | Shareholding ratio of the largest shareholder, which is the proportion of shares held by the firm's largest shareholder at year end |
| *Ind* | Ratio of independent directors, which is equal to a firm's number of independent directors divided by the total number of board directors at year end |
| *Dual* | Duality of chairman and CEO dummy variable, which is equal to 1 if the chairman and CEO of a firm are the same person, and 0 otherwise |
| *Mshare* | Management shareholding ratio, which is equal to the proportion of shares held by the firm's management at year end |
| *Industry* | Industry dummy variable, industries are based on the CSRC's one-digit industry code for nonmanufacturing firms and two-digit industry code for manufacturing firms |
| *Year* | Year dummy variable, which sets dummy variable for the year corresponding to the observation |

**Table 1.**
Variable definition

duality of chairman and CEO account for 24.3% of sample firms. Also, the average shareholding ratio of management is 5.6%.

### *4.2 Regression results*

*4.2.1 Dividend policy regulation and cost stickiness.* Table 3 presents the test results of Hypothesis 1. Column (1) reports the regression result, which only includes the change in

| Variable | Obs | Mean | SD | Min | P5 | Median | P95 | Max |
|---|---|---|---|---|---|---|---|---|
| *LnSGA* | 29240 | 0.136 | 0.26 | −0.789 | −0.227 | 0.119 | 0.553 | 1.242 |
| *LnIncome* | 29240 | 0.121 | 0.335 | −1.047 | −0.357 | 0.107 | 0.637 | 1.53 |
| *D* | 29240 | 0.284 | 0.451 | 0 | 0 | 0 | 1 | 1 |
| *Treat* | 29240 | 0.419 | 0.493 | 0 | 0 | 0 | 1 | 1 |
| *Post* | 29240 | 0.663 | 0.473 | 0 | 0 | 1 | 1 | 1 |
| *D_Twoyear* | 29240 | 0.118 | 0.322 | 0 | 0 | 0 | 1 | 1 |
| *Eco_Growth* | 29240 | 0.114 | 0.043 | 0.07 | 0.07 | 0.097 | 0.184 | 0.231 |
| *Employ_Inten* | 29240 | 1.574 | 1.531 | 0.055 | 0.187 | 1.173 | 4.223 | 11.29 |
| *Asset_Inten* | 29240 | 2.613 | 2.553 | 0.383 | 0.659 | 1.897 | 6.738 | 18.49 |
| *ROA* | 29240 | 0.036 | 0.076 | −0.34 | −0.082 | 0.037 | 0.144 | 0.224 |
| *Lev* | 29240 | 0.453 | 0.219 | 0.057 | 0.114 | 0.446 | 0.815 | 1.107 |
| *MKI* | 29240 | 7.872 | 1.785 | 2.98 | 4.54 | 7.94 | 9.97 | 10.8 |
| *Firsthold* | 29240 | 0.345 | 0.149 | 0.089 | 0.134 | 0.323 | 0.618 | 0.749 |
| *Ind* | 29240 | 0.373 | 0.053 | 0.273 | 0.333 | 0.333 | 0.462 | 0.571 |
| *Dual* | 29240 | 0.243 | 0.429 | 0 | 0 | 0 | 1 | 1 |
| *Mshare* | 29240 | 0.056 | 0.124 | 0 | 0 | 0 | 0.374 | 0.569 |

**Table 2.** Summary statistics

revenue (*LnIncome*), the interaction term between the change in revenue and the decline in revenue (*LnIncome* × *D*) and the industry-fixed effects and year-fixed effects. The results show that the coefficient of the change in revenue (*LnIncome*) is 0.493, which is significant at the 1% level and indicates that a company's expenses generally move in the same direction as the change in income. The coefficient of the interaction term *LnIncome*×*D*, which is significant at the 1% level, indicates that when a company's revenue declines, the degree of cost decline is lower than the degree of cost increase when revenue rises (i.e. cost stickiness exists in Chinese companies), which is consistent with existing research findings. Column (2) adds the dummy variable *Treat* of the treatment group, the dummy variable *Post* of the affected years, interaction term *Treat*×*Post* and the interaction terms of these variables and *LnIncome* × *D*. The results show that the coefficient of the interaction term (*LnIncome*×*D*×*Treat*×*Post*) is 0.134 and significant at the 5% level. The regression results indicate that after the SSE implements the dividend policy regulation, the cost stickiness of companies in the treatment group significantly decreases when compared with the control group. Column (3) further incorporates other control variables, and it is evident that the coefficient of the interaction term (*LnIncome*×*D*×*Treat*×*Post*) remains significantly positive. The aforementioned results suggest that dividend policy regulation alleviates the agency problem by reducing the resources available to management to engage in opportunistic behavior, thereby leading to a decrease in firm cost stickiness. This finding supports Hypothesis 1 of this paper.

*4.2.2 Moderator effect of regional marketization.* Research Hypothesis 2 explores the impact of regional marketization on the relationship between dividend policy regulation and firm cost stickiness. Based on the marketization index of the company's location, this paper divides the sample into a high marketization group and a low marketization group according to the median value of the market index and then repeats the main regression in Model (1) for the respective subsamples. Regional marketization (*MKI*) is derived from the China Marketization Index compiled by Wang, Fan, and Hu (2019).

Table 4 presents the regression results. Column (1) reports the results for companies in the high marketization group. Notably, the coefficient of the interaction term (*LnIncome*×*D*×*Treat*×*Post*) is not significant, which indicates that for companies in high marketization regions, dividend policy regulation has little inhibitory effect on the stickiness of company expenses. For companies in the low marketization group, Column (2) shows the

| Variables | (1) *LnSGA* | (2) *LnSGA* | (3) *LnSGA* |
|---|---|---|---|
| *LnIncome* | 0.493*** | 0.491*** | 0.483*** |
| | (43.27) | (42.97) | (40.81) |
| *LnIncome×D* | −0.234*** | −0.133*** | −0.166** |
| | (−13.42) | (−3.99) | (−2.04) |
| *LnIncome×D×Treat* | | −0.135*** | −0.108** |
| | | (−2.85) | (−2.37) |
| *LnIncome×D×Post* | | −0.113*** | −0.099** |
| | | (−2.90) | (−2.05) |
| *LnIncome×D×Treat×Post* | | 0.134** | 0.119** |
| | | (2.31) | (2.10) |
| *Treat* | | −0.038*** | −0.031*** |
| | | (−7.15) | (−5.91) |
| *Post* | | 0.086*** | 0.084*** |
| | | (8.22) | (8.09) |
| *Treat×Post* | | 0.018*** | 0.017*** |
| | | (2.80) | (2.78) |
| *LnIncome×D×D_Twoyear* | | | 0.153*** |
| | | | (5.09) |
| *LnIncome×D×Eco_Growth* | | | 0.653 |
| | | | (1.34) |
| *LnIncome×D×Employ_Inten* | | | −0.007 |
| | | | (−1.23) |
| *LnIncome×D×Asset_Inten* | | | −0.019*** |
| | | | (−6.55) |
| *D_Twoyear* | | | −0.013** |
| | | | (−2.21) |
| *Employ_Inten* | | | 0.001 |
| | | | (0.45) |
| *Asset_Inten* | | | −0.003** |
| | | | (−2.57) |
| *ROA* | | | 0.001 |
| | | | (0.04) |
| *Lev* | | | −0.009 |
| | | | (−1.00) |
| *MKI* | | | 0.004*** |
| | | | (4.58) |
| *Firsthold* | | | 0.058*** |
| | | | (6.45) |
| *Ind* | | | −0.038 |
| | | | (−1.59) |
| *Dual* | | | −0.001 |
| | | | (−0.27) |
| *Mshare* | | | 0.132*** |
| | | | (11.75) |
| *Constant* | −0.051*** | −0.027* | −0.050** |
| | (−3.64) | (−1.90) | (−2.55) |
| *Industry* | Yes | Yes | Yes |
| *Year* | Yes | Yes | Yes |
| *Observations* | 29,240 | 29,240 | 29,240 |
| *Adjusted R-squared* | 0.310 | 0.313 | 0.327 |

**Note(s):** ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively; robust *t*-statistics are in parentheses; standard errors clustered at the firm level

**Table 3.**
Dividend policy regulation and cost stickiness

| Variables | (1) High marketization *LnSGA* | (2) Low marketization *LnSGA* |
|---|---|---|
| *LnIncome* | 0.520*** | 0.454*** |
| | (32.36) | (27.92) |
| *LnIncome×D* | −0.200* | −0.173 |
| | (−1.76) | (−1.55) |
| *LnIncome×D×Treat* | −0.030 | −0.171*** |
| | (−0.48) | (−2.67) |
| *LnIncome×D×Post* | −0.028 | −0.131* |
| | (−0.41) | (−1.92) |
| *LnIncome×D×Treat×Post* | 0.015 | 0.200** |
| | (0.19) | (2.56) |
| *Treat* | −0.031*** | −0.029*** |
| | (−4.49) | (−3.74) |
| *Post* | 0.078*** | 0.096*** |
| | (5.33) | (6.20) |
| *Treat×Post* | 0.020** | 0.015 |
| | (2.42) | (1.64) |
| *LnIncome×D×D_Twoyear* | 0.153*** | 0.161*** |
| | (3.52) | (3.91) |
| *LnIncome×D×Eco_Growth* | −0.006 | 1.232* |
| | (−0.01) | (1.81) |
| *LnIncome×D×Employ_Inten* | 0.003 | −0.011 |
| | (0.29) | (−1.59) |
| *LnIncome×D×Asset_Inten* | −0.017*** | −0.020*** |
| | (−3.89) | (−5.27) |
| *D_Twoyear* | −0.015* | −0.008 |
| | (−1.95) | (−0.90) |
| *Employ_Inten* | 0.008*** | −0.004* |
| | (3.77) | (−1.94) |
| *Asset_Inten* | −0.001 | −0.004*** |
| | (−0.45) | (−2.73) |
| *ROA* | 0.038 | −0.042 |
| | (0.95) | (−1.00) |
| *Lev* | 0.005 | −0.020 |
| | (0.45) | (−1.55) |
| *MKI* | 0.003 | 0.004*** |
| | (0.66) | (2.77) |
| *Firsthold* | 0.067*** | 0.054*** |
| | (5.47) | (4.10) |
| *Ind* | −0.012 | −0.064* |
| | (−0.37) | (−1.80) |
| *Dual* | −0.003 | 0.001 |
| | (−0.74) | (0.10) |
| *Mshare* | 0.098*** | 0.194*** |
| | (7.87) | (8.88) |
| *Constant* | −0.068 | −0.028 |
| | (−1.43) | (−0.99) |
| *Industry* | Yes | Yes |
| *Year* | Yes | Yes |
| *Observations* | 14,611 | 14,629 |
| *Adjusted R-squared* | 0.366 | 0.299 |

**Note(s):** ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively; robust *t*-statistics are in parentheses; standard errors clustered at the firm level

**Table 4.**
Dividend policy regulation and cost stickiness: grouped by marketization

coefficient of the interaction term (*LnIncome*×*D*×*Treat*×*Post*) is 0.2, which is significant at the 5% level. This suggests that for companies located in low marketization regions, dividend policy regulation significantly reduces company cost stickiness. The *F*-test results for the coefficient difference of *LnIncome*×*D*×*Treat*×*Post* between the two subsamples are significant, with a *p*-value of 0.044. These results suggest that for companies located in regions with low marketization levels, their cost stickiness is more significantly affected by dividend policy regulation, which supports Hypothesis 2 of this paper.

*4.2.3 Moderator effect of industry competition.* Research Hypothesis 3 focuses on the impact of industry competition on the relationship between dividend policy regulation and firm cost stickiness. We divide the sample into a high industry competition group and a low industry competition group according to the median value of industry competition. We then repeat the main regression in Model (1) for the respective subsamples, where industry competition is measured by the Herfindahl index, which is equal to the sum of the squares of the market shares of all firms in an industry.

Table 5 reports the regression results. The regression of Column (1) for the high industry competition group shows that the coefficient of the interaction term (*LnIncome*×*D*×*Treat*×*Post*) is not significant, which indicates that for companies in high competition industries, dividend policy regulation does not have a significant effect on cost stickiness. The test in Column (2) for the low industry competition group shows that the coefficient of the interaction term (*LnIncome*×*D*×*Treat*×*Post*) is significantly positive at the 5% level. This indicates that for companies in low competition industries, dividend policy regulation has a significant inhibitory effect on their cost stickiness. The *p*-value of the coefficient difference test between the two groups is 0.083, indicating that the coefficients of *LnIncome*×*D*×*Treat*×*Post* are significantly different in the two subsamples. These results suggest that industry competition has played a moderating role in the relationship between dividend policy regulation and company cost stickiness. For companies in low competition industries, dividend policy regulation reduces their cost stickiness more significantly. This verifies the research Hypothesis 3 of this paper.

*4.2.4 Moderator effect of analyst coverage.* Research Hypothesis 4 examines the impact of securities analysts' attention on the relationship between dividend policy regulation and firm cost stickiness. We divide the sample into a high analyst attention group and a low analyst attention group according to the median value of analyst attention. We then repeat the main regression in Model (1) for the respective subsamples, in which analyst attention is measured as the natural logarithm of the total number of analyst reports published on a company plus one by year end.

Table 6 reports the regression results. The regression of Column (1) for the high analyst attention group shows that the coefficient of the interaction term (*LnIncome*×*D*×*Treat*×*Post*) is not significant, which indicates that for companies with high analyst attention, the dividend policy regulation doesn't have a significant impact on cost stickiness. Column (2) reports the results for the low analyst attention group and shows that the coefficient of the interaction term (*LnIncome*×*D*×*Treat*×*Post*) is 0.131, which is significant at the 5% level. This indicates that for companies with low analyst attention, dividend policy regulation has a more significant inhibitory effect on cost stickiness. The *p*-value of the coefficient difference test between groups is 0.062, which indicates that the regression coefficients of *LnIncome*×*D*×*Treat*×*Post* are significantly different in the two subsamples. These results suggest that the relationship between dividend policy regulation and company cost stickiness is affected by securities analysts' attention. For companies with low analyst attention, their cost stickiness is more significantly affected by dividend policy regulation. This result supports the research hypothesis 4 of this paper.

| Variables | (1) High industry competition *LnSGA* | (2) Low industry competition *LnSGA* |
|---|---|---|
| *LnIncome* | 0.555*** | 0.433*** |
| | (32.60) | (27.68) |
| *LnIncome×D* | −0.343*** | −0.034 |
| | (−3.36) | (−0.29) |
| *LnIncome×D×Treat* | 0.038 | −0.189*** |
| | (0.55) | (−3.13) |
| *LnIncome×D×Post* | −0.030 | −0.147** |
| | (−0.45) | (−2.20) |
| *LnIncome×D×Treat×Post* | 0.014 | 0.175** |
| | (0.16) | (2.37) |
| *Treat* | −0.018*** | −0.039*** |
| | (−2.73) | (−4.86) |
| *Post* | 0.069*** | 0.080*** |
| | (5.09) | (4.95) |
| *Treat×Post* | 0.007 | 0.024** |
| | (0.96) | (2.52) |
| *LnIncome×D×D_Twoyear* | 0.091* | 0.187*** |
| | (1.90) | (4.90) |
| *LnIncome×D×Eco_Growth* | 1.315* | 0.197 |
| | (1.82) | (0.31) |
| *LnIncome×D×Employ_Inten* | −0.011 | −0.007 |
| | (−0.94) | (−0.99) |
| *LnIncome×D×Asset_Inten* | −0.021*** | −0.017*** |
| | (−2.66) | (−5.28) |
| *D_Twoyear* | −0.013 | −0.013 |
| | (−1.64) | (−1.40) |
| *Employ_Inten* | −0.002 | 0.004** |
| | (−1.03) | (2.04) |
| *Asset_Inten* | −0.006** | −0.001 |
| | (−2.39) | (−0.78) |
| *ROA* | −0.090** | 0.048 |
| | (−2.16) | (1.19) |
| *Lev* | −0.056*** | 0.035** |
| | (−4.71) | (2.45) |
| *MKI* | 0.003*** | 0.004*** |
| | (3.48) | (2.70) |
| *Firsthold* | 0.046*** | 0.064*** |
| | (4.24) | (4.46) |
| *Ind* | −0.026 | −0.049 |
| | (−0.88) | (−1.30) |
| *Dual* | 0.006 | −0.009 |
| | (1.40) | (−1.61) |
| *Mshare* | 0.086*** | 0.192*** |
| | (6.77) | (9.45) |
| *Constant* | 0.015 | −0.072*** |
| | (0.39) | (−2.63) |
| *Industry* | Yes | Yes |
| *Year* | Yes | Yes |
| *Observations* | 15,576 | 13,664 |
| *Adjusted R-squared* | 0.354 | 0.314 |

**Note(s):** ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively; robust *t*-statistics are in parentheses; standard errors clustered at the firm level

**Table 5.** Dividend policy regulation and cost stickiness: grouped by industry competition

| Variables | (1) High analyst coverage *LnSGA* | (2) Low analyst coverage *LnSGA* |
|---|---|---|
| *LnIncome* | 0.600*** | 0.408*** |
| | (42.30) | (25.24) |
| *LnIncome×D* | −0.263** | −0.118 |
| | (−2.03) | (−1.21) |
| *LnIncome×D×Treat* | 0.034 | −0.134** |
| | (0.40) | (−2.53) |
| *LnIncome×D×Post* | −0.042 | −0.080 |
| | (−0.50) | (−1.40) |
| *LnIncome×D×Treat×Post* | −0.049 | 0.131** |
| | (−0.48) | (1.98) |
| *Treat* | −0.020*** | −0.035*** |
| | (−3.31) | (−4.44) |
| *Post* | 0.047*** | 0.089*** |
| | (3.56) | (5.98) |
| *Treat×Post* | 0.021*** | 0.014 |
| | (3.07) | (1.45) |
| *LnIncome×D×D_Twoyear* | 0.225*** | 0.152*** |
| | (3.91) | (4.41) |
| *LnIncome×D×Eco_Growth* | 0.144 | 0.782 |
| | (0.19) | (1.36) |
| *LnIncome×D×Employ_Inten* | 0.008 | −0.008 |
| | (0.51) | (−1.21) |
| *LnIncome×D×Asset_Inten* | −0.034*** | −0.017*** |
| | (−4.72) | (−5.45) |
| *D_Twoyear* | 0.014 | −0.016** |
| | (1.40) | (−2.27) |
| *Employ_Inten* | 0.008*** | 0.000 |
| | (4.29) | (0.12) |
| *Asset_Inten* | 0.002 | −0.003** |
| | (0.93) | (−2.35) |
| *ROA* | −0.011 | −0.177*** |
| | (−0.26) | (−4.31) |
| *Lev* | −0.004 | −0.028** |
| | (−0.32) | (−2.31) |
| *MKI* | 0.002* | 0.004*** |
| | (1.88) | (3.15) |
| *Firsthold* | 0.004 | 0.094*** |
| | (0.34) | (7.04) |
| *Ind* | 0.031 | −0.085** |
| | (1.15) | (−2.27) |
| *Dual* | 0.002 | −0.002 |
| | (0.58) | (−0.48) |
| *Mshare* | 0.080*** | 0.143*** |
| | (6.09) | (8.65) |
| *Constant* | −0.050* | −0.060** |
| | (−1.92) | (−2.16) |
| *Industry* | Yes | Yes |
| *Year* | Yes | Yes |
| *Observations* | 13,971 | 15,269 |
| *Adjusted R-squared* | 0.425 | 0.263 |

**Note(s):** ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively; robust *t*-statistics are in parentheses; standard errors clustered at the firm level

**Table 6.**
Dividend policy regulation and cost stickiness: grouped by analyst coverage

*4.2.5 Moderator effect of cash flow levels.* Research Hypothesis 5 examines the effect of cash flow level on the relationship between dividend policy regulation and firm cost stickiness. This paper divides the sample into a high cash flow group and a low cash flow group according to the median value of cash flow. Then, we repeat the main regression in Model (1) for the respective subsamples, in which cash flow is equal to the net cash flow generated by operating activities divided by total assets.

Table 7 reports the regression results. The regression of Column (1) for the high cash flow level group shows that the coefficient of the interaction term ($LnIncome \times D \times Treat \times Post$) is not significant, which indicates that the impact of dividend policy regulation on the company's cost stickiness is not significant for the companies with high cash flow level. The test results shown in Column (2) for the low cash flow level group show that the coefficient of the interaction term ($LnIncome \times D \times Treat \times Post$) is 0.148, which is significant at the 5% level. This suggests that for companies with low cash flow levels, dividend policy regulation has a stronger inhibitory effect on cost stickiness. The $p$-value of the coefficient difference test between the two groups is 0.091, which indicates that the regression coefficients of $LnIncome \times D \times Treat \times Post$ are significantly different in the two subsamples. These results indicate that the level of cash flow will affect the relationship between dividend policy regulation and company cost stickiness. In companies with low cash flow levels, dividend policy regulation has a stronger inhibitory effect on cost stickiness. This result supports research Hypothesis 5 of this paper.

## 5. Further analysis: the mechanism test

The empirical results presented in the previous section indicate that the dividend policy regulation reduces firms' cost stickiness. The theoretical analysis of this paper suggests that the dividend policy regulation reduces the agency cost of a company by exerting the governance function of corporate dividends, which leads to a decrease in the company's cost stickiness. Here, we examine this mechanism in detail.

Following Ye and Liu (2014), this paper uses excess perquisites to measure company agency costs. Excess perquisites are taken from general and administrative expenses after deducting the remuneration of directors, senior management and supervisors, the provision for bad debts, the provision for obsolete inventories and the amortization of intangible assets for the year, which are obviously not part of excess perquisite items (Luo, Zhang, & Zhu, 2011; Quan, Wu, & Wen, 2010). Furthermore, based on Wang, Fan, and Hu (2019), this paper uses the following model to calculate excess perquisites:

$$\frac{Perk_t}{Asset_{t-1}} = \beta_0 + \beta_1 \frac{1}{Asset_{t-1}} + \beta_2 \frac{\Delta Sale_t}{Asset_{t-1}} + \beta_3 \frac{PPE_t}{Asset_{t-1}} + \beta_4 \frac{Inventory_t}{Asset_{t-1}} + \beta_5 LnEmployee_t + \varepsilon \quad (2)$$

Among these, $Perk_t$ represents the total perquisites of managers, $Asset_{t-1}$ is the total assets of a company in the previous year, $\Delta Sale_t$ is the change in operating revenue, $PPE_t$ is the net value of fixed assets in the current year, $Inventory_t$ is the total inventory in the current year and $LnEmployee_t$ is the natural logarithm of the number of employees in the current year. We perform regressions on the sample by year and industry. The obtained predicted value of the dependent variable represents the normal level of manager perquisites, while the difference between the actual total perquisites of managers and the expected normal level of perquisites represents excess perquisites, which is the measure of agency cost ($AC$) in this study.

On this basis—and following the research of Wen, Zhang, Hou, and Liu (2004)—we construct the following mediation effect models.

| Variables | (1) High cash flow level *LnSGA* | (2) Low cash flow level *LnSGA* |
|---|---|---|
| *LnIncome* | 0.598*** | 0.381*** |
| | (41.59) | (22.84) |
| *LnIncome×D* | −0.365*** | −0.009 |
| | (−2.71) | (−0.09) |
| *LnIncome×D×Treat* | 0.032 | −0.164*** |
| | (0.32) | (−3.08) |
| *LnIncome×D×Post* | −0.007 | −0.125** |
| | (−0.08) | (−2.15) |
| *LnIncome×D×Treat×Post* | 0.004 | 0.148** |
| | (0.04) | (2.14) |
| *Treat* | −0.002 | −0.060*** |
| | (−0.27) | (−7.61) |
| *Post* | 0.091*** | 0.061*** |
| | (6.25) | (3.96) |
| *Treat×Post* | −0.002 | 0.034*** |
| | (−0.28) | (3.46) |
| *LnIncome×D×D_Twoyear* | 0.121** | 0.160*** |
| | (2.32) | (4.34) |
| *LnIncome×D×Eco_Growth* | 0.514 | 0.696 |
| | (0.56) | (1.21) |
| *LnIncome×D×Employ_Inten* | −0.008 | −0.010 |
| | (−0.50) | (−1.54) |
| *LnIncome×D×Asset_Inten* | −0.024*** | −0.019*** |
| | (−4.06) | (−5.40) |
| *D_Twoyear* | −0.010 | −0.019** |
| | (−1.21) | (−2.32) |
| *Employ_Inten* | 0.006*** | −0.001 |
| | (2.97) | (−0.71) |
| *Asset_Inten* | 0.001 | −0.003** |
| | (0.82) | (−2.50) |
| *ROA* | 0.061 | −0.108** |
| | (1.51) | (−2.46) |
| *Lev* | 0.000 | −0.019 |
| | (0.01) | (−1.53) |
| *MKI* | 0.003*** | 0.004*** |
| | (3.35) | (3.40) |
| *Firsthold* | 0.030*** | 0.071*** |
| | (2.75) | (4.97) |
| *Ind* | −0.006 | −0.062* |
| | (−0.19) | (−1.71) |
| *Dual* | 0.006 | −0.006 |
| | (1.42) | (−1.21) |
| *Mshare* | 0.079*** | 0.164*** |
| | (5.12) | (10.64) |
| *Constant* | −0.113*** | −0.005 |
| | (−4.28) | (−0.18) |
| *Industry* | Yes | Yes |
| *Year* | Yes | Yes |
| *Observations* | 14,620 | 14,620 |
| *Adjusted R-squared* | 0.420 | 0.272 |

**Note(s):** ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively; robust *t*-statistics are in parentheses; standard errors clustered at the firm level

**Table 7.**
Dividend policy regulation and cost stickiness: grouped by cash flow levels

$$LnSGA = \beta_0 + \beta_1 LnIncome + \beta_2 LnIncome \times D + \beta_3 LnIncome \times D \times Treat + \beta_4 LnIncome \times D \times Post + \beta_5 LnIncome \times D \times Treat \times Post + \beta_6 Treat + \beta_7 Post + \beta_8 Treat \times Post + \Sigma LnIncome \times D \times Economic\_Var + \Sigma Economic\_Var + \Sigma Control\_Var + \varepsilon \quad (3)$$

$$AC = \beta_0 + \beta_1 Treat + \beta_2 Post + \beta_3 Treat \times Post + \Sigma Control\_Var + \varepsilon \quad (4)$$

$$LnSGA = \beta_0 + \beta_1 LnIncome + \beta_2 LnIncome \times D + \beta_3 LnIncome \times D \times Treat + \beta_4 LnIncome \times D \times Post + \beta_5 LnIncome \times D \times Treat \times Post + \beta_6 Treat + \beta_7 Post + \beta_8 Treat \times Post + \beta_9 LnIncome \times D \times AC + \beta_{10} AC + \Sigma LnIncome \times D \times Economic\_Var + \Sigma Economic\_Var + \Sigma Control\_Var + \varepsilon \quad (5)$$

Among these models, Model (3) is the same as Model (1) in this paper. The dependent variable of Model (4) is firm agency cost (*AC*). The main explanatory variables are the treatment group dummy variable *Treat*, the affected year dummy variable *Post* and the interaction term *Treat*×*Post*. Additionally, Model (4) also adds the natural logarithm of the company's total assets (*Size*), the growth rate of the company's sales revenue (*Growth*), return on assets (*ROA*), financial leverage (*Lev*), market index (*MKI*), the largest shareholder's shareholding ratio (*Firsthold*), the independent director ratio (*Ind*), the duality of chairman and CEO dummy (*Dual*) and the management shareholding ratio (*Mshare*). Model (5) adds the company agency cost variable *AC* and the interaction term *LnIncome*×*D*×*AC* on the basis of Model (3).

In the above equations, $\beta_5$ in Model (3) is the total effect of dividend policy regulation on firm cost stickiness, and the interaction of $\beta_3$ in Model (4) and $\beta_9$ in Model (5) is the indirect effect (i.e. the mediation effect) through the mediator variable *AC*, and $\beta_5$ in Model (5) is the direct effect. In the case of only one mediator variable, if the following two conditions hold, the mediation effect is significant: (1) the independent variable significantly affects the dependent variable (i.e. $\beta_5$ in Model (3) is significant); (2) after controlling for its preceding variables (including independent variables), any one variable of the causal chains significantly affects its subsequent variables (i.e. $\beta_3$ of Model (4) and $\beta_9$ of Model (5) are both significant).

According to the above hypothesis, we expect dividend policy regulation to suppress firm cost stickiness by reducing the company's agency cost. Therefore, it is expected that the coefficient $\beta_5$ of the interaction term *LnIncome*×*D*×*Treat*×*Post* in Model (3) will be significantly positive and the coefficient $\beta_3$ of the interaction term *Treat*×*Post* of Model (4) will be significantly negative, while $\beta_5$ of Model (5) will be significantly positive and $\beta_9$ of Model (5) will be significantly negative.

Table 8 reports the regression results of the aforementioned models. Among them, the regression results of Model (3) are shown in Column (3) of Table 3. The regression results of Model (4) are shown in Column (1) of Table 8. The coefficient of the interaction term *Treat*×*Post* is −0.003, which is significant at the 1% level. This result indicates that after the implementation of the dividend policy regulation, the company's agency cost has significantly decreased. Finally, the regression results of Model (5) are shown in Column (2) of Table 8. After adding the variable *AC* and the interaction term *LnIncome*×*D*×*AC*, the coefficient of the interaction term *LnIncome*×*D*×*Treat*×*Post* remains significantly positive and the coefficient of *LnIncome*×*D*×*AC* is significantly negative. These results verify the existence of a mediator effect (i.e. the dividend policy regulation reduces companies' cost stickiness by reducing their agency costs).

| Variables | (1) *AC* | (2) *LnSGA* |
|---|---|---|
| *LnIncome* | | 0.464*** |
| | | (42.37) |
| *LnIncome×D* | | −0.092 |
| | | (−1.30) |
| *LnIncome×D×Treat* | | −0.086** |
| | | (−2.14) |
| *LnIncome×D×Post* | | −0.091** |
| | | (−2.21) |
| *LnIncome×D×Treat×Post* | | 0.091* |
| | | (1.83) |
| *Treat* | 0.003** | −0.034*** |
| | (2.32) | (−6.50) |
| *Post* | 0.005*** | 0.072*** |
| | (5.28) | (7.37) |
| *Treat×Post* | −0.003*** | 0.020*** |
| | (−3.62) | (3.44) |
| *AC* | | 1.207*** |
| | | (17.64) |
| *LnIncome×D×AC* | | −2.445*** |
| | | (−3.96) |
| *LnIncome×D×D_Twoyear* | | 0.132*** |
| | | (4.79) |
| *LnIncome×D×Eco_Growth* | | 0.366 |
| | | (0.87) |
| *LnIncome×D×Employ_Inten* | | −0.009 |
| | | (−1.42) |
| *LnIncome×D×Asset_Inten* | | −0.021*** |
| | | (−7.18) |
| *D_Twoyear* | | −0.016*** |
| | | (−2.76) |
| *Employ_Inten* | | −0.002 |
| | | (−1.60) |
| *Asset_Inten* | | 0.001 |
| | | (0.56) |
| *Size* | −0.002*** | |
| | (−7.18) | |
| *Growth* | −0.000 | |
| | (−0.72) | |
| *ROA* | 0.016*** | 0.014 |
| | (3.54) | (0.50) |
| *Lev* | 0.004** | −0.002 |
| | (2.08) | (−0.22) |
| *MKI* | 0.001*** | 0.002** |
| | (6.24) | (2.39) |
| *Firsthold* | 0.001 | 0.057*** |
| | (0.42) | (6.25) |
| *Ind* | −0.007 | −0.030 |
| | (−1.24) | (−1.26) |
| *Dual* | 0.000 | −0.001 |
| | (0.35) | (−0.31) |
| *Mshare* | −0.005 | 0.135*** |
| | (−1.61) | (11.82) |
| *Constant* | 0.036*** | −0.030 |
| | (4.91) | (−1.52) |
| *Industry* | Yes | Yes |
| *Year* | Yes | Yes |
| *Observations* | 29,240 | 29,240 |
| *Adjusted R-squared* | 0.019 | 0.346 |

**Table 8.**
Mechanism test: reduce agency cost

**Note(s):** ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively; robust *t*-statistics are in parentheses; standard errors clustered at the firm level

## 6. Robustness tests

To further verify the reliability of the conclusions of this paper, we conduct the following robustness tests: (1) controlling for firm fixed effect; (2) regression using propensity score matched samples; (3) placebo test changing experiment period and (4) reconstructing the dependent variable by deducting the management compensation from expenses.

### *6.1 Controlling for firm fixed effect*

The above analysis uses OLS regression for estimation. To further control for the impact of variables that may be omitted at the firm level that do not vary with time, this paper uses the firm fixed-effect model to retest the regression in Model (1). The relevant test results are shown in Table 9. It shows that the coefficient of the interaction term *LnIncome*×*D*×*Treat*×*Post* is significantly positive at the 5% level, which implies that the conclusions of this paper remain robust after controlling for firm-fixed effect.

### *6.2 Propensity score matching method*

In this study, the characteristics of the companies in the treatment group and the companies in the control group may be systematically different. Although the regression model controls for the common company characteristic variables, it could be unable to rule out endogeneity problems caused by omitted variables. To alleviate this concern, we use the propensity score matching (PSM) method for regression. The matching variables include the control variables in Model (1), and the one-to-one nearest neighbor matching method is used. Table 10 reports the regression results using propensity score-matched samples. The coefficient of the interaction term *LnIncome*×*D*×*Treat*×*Post* is 0.156, which is significant at the 5% level. This result indicates that after the companies in the treatment group and the control group are matched, the conclusions of this paper remain unchanged. As such, this result further supports the inhibitory effect of the dividend policy regulation on cost stickiness.

### *6.3 Placebo test*

To further verify the conclusions of this paper, we conduct a placebo test. A placebo test essentially acts as a counterfactual test by inferring the effects of a policy or event by making assumptions that are contrary to the facts. If the reduction in the cost stickiness of the companies in the treatment group is indeed caused by dividend policy regulation, then similar conclusions should not be found in the placebo test.

Specifically, this paper manually moves the implementation year of the dividend policy regulation of the SSE forward and backward by two years. In the former scenario, the variable *Post* has a value of 1 when a company's observation year is in 2011 and beyond, and 0 in other years. In the latter scenario, the variable *Post* has a value of 1 when a company's observation year is in 2015 and beyond, and 0 in other years. Table 11 reports the results of the placebo test, which show that the coefficients of the interaction term *LnIncome*×*D*×*Treat*×*Post* are not significant. This result further verifies the research conclusion of this paper, which is that the dividend policy regulation reduces company cost stickiness.

### *6.4 Reconstructing the dependent variable after removing management compensation*

According to previous research, the protection clauses in labor protection laws raise the adjustment cost of compensation, which makes the stickiness of compensation higher than that of other expenses (Banker *et al.*, 2013). Therefore, this paper draws on the research of Liang (2018) and recalculates the variable of expenses after removing management compensation. The results of the regression are shown in Table 12 and the coefficient of the interaction term *LnIncome*×*D*×*Treat*×*Post* is significantly positive at the 5% level. This

| Variables | (1)<br>*LnSGA* |
|---|---|
| *LnIncome* | 0.489*** |
| | (39.58) |
| *LnIncome×D* | −0.252*** |
| | (−2.83) |
| *LnIncome×D×Treat* | −0.146*** |
| | (−2.83) |
| *LnIncome×D×Post* | −0.103* |
| | (−1.94) |
| *LnIncome×D×Treat×Post* | 0.123** |
| | (2.00) |
| *Post* | 0.232*** |
| | (3.94) |
| *Treat×Post* | 0.023*** |
| | (3.30) |
| *LnIncome×D×D_Twoyear* | 0.194*** |
| | (5.93) |
| *LnIncome×D×Eco_Growth* | 0.975* |
| | (1.80) |
| *LnIncome×D×Employ_Inten* | −0.005 |
| | (−0.71) |
| *LnIncome×D×Asset_Inten* | −0.019*** |
| | (−5.61) |
| *D_Twoyear* | 0.001 |
| | (0.11) |
| *Employ_Inten* | 1.522*** |
| | (3.38) |
| *Asset_Inten* | 0.006** |
| | (2.13) |
| *ROA* | 0.002 |
| | (1.20) |
| *Lev* | −0.159*** |
| | (−3.99) |
| *MKI* | −0.022 |
| | (−1.22) |
| *Firsthold* | 0.009** |
| | (2.19) |
| *Ind* | 0.153*** |
| | (5.59) |
| *Dual* | −0.132*** |
| | (−3.10) |
| *Mshare* | −0.000 |
| | (−0.06) |
| *Constant* | 0.139*** |
| | (5.08) |
| *Firm* | Yes |
| *Year* | Yes |
| *Observations* | 29,240 |
| *Adjusted R-squared* | 0.298 |

**Note(s):** ***, ** and * denote statistical significance at the 1, 5 and 10 levels, respectively; robust *t*-statistics are in parentheses; standard errors clustered at the firm level

**Table 9.**
Controlling for firm-fixed effect

| Variables | (1) *LnSGA* |
|---|---|
| *LnIncome* | 0.457*** |
| | (25.53) |
| *LnIncome×D* | −0.062 |
| | (−0.52) |
| *LnIncome×D×Treat* | −0.176*** |
| | (−2.86) |
| *LnIncome×D×Post* | −0.115* |
| | (−1.66) |
| *LnIncome×D×Treat×Post* | 0.156** |
| | (2.03) |
| *Treat* | −0.028*** |
| | (−3.74) |
| *Post* | 0.098*** |
| | (6.35) |
| *Treat×Post* | 0.009 |
| | (0.98) |
| *LnIncome×D×D_Twoyear* | 0.133*** |
| | (2.94) |
| *LnIncome×D×Eco_Growth* | 0.413 |
| | (0.59) |
| *LnIncome×D×Employ_Inten* | −0.003 |
| | (−0.38) |
| *LnIncome×D×Asset_Inten* | −0.023*** |
| | (−5.30) |
| *D_Twoyear* | −0.013 |
| | (−1.46) |
| *Employ_Inten* | 0.001 |
| | (0.32) |
| *Asset_Inten* | −0.005*** |
| | (−3.57) |
| *ROA* | 0.022 |
| | (0.47) |
| *Lev* | −0.006 |
| | (−0.40) |
| *MKI* | 0.002* |
| | (1.71) |
| *Firsthold* | 0.072*** |
| | (5.59) |
| *Ind* | −0.033 |
| | (−0.96) |
| *Dual* | −0.005 |
| | (−0.93) |
| *Mshare* | 0.149*** |
| | (7.56) |
| *Constant* | −0.035 |
| | (−1.25) |
| *Industry* | Yes |
| *Year* | Yes |
| *Observations* | 13,789 |
| *Adjusted R-squared* | 0.305 |

**Note(s):** ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively; robust *t*-statistics are in parentheses; standard errors clustered at the firm level

**Table 10.** Propensity score matching method

| Variables | (1) *LnSGA* | (2) *LnSGA* |
|---|---|---|
| *LnIncome* | 0.460*** | 0.500*** |
| | (33.89) | (38.81) |
| *LnIncome×D* | −0.199** | −0.340*** |
| | (−2.21) | (−4.15) |
| *LnIncome×D×Treat* | −0.066 | 0.027 |
| | (−1.06) | (0.56) |
| *LnIncome×D×Post* | −0.023 | 0.058 |
| | (−0.37) | (1.44) |
| *LnIncome×D×Treat×Post* | 0.063 | −0.044 |
| | (0.86) | (−0.74) |
| *Treat* | −0.020*** | −0.022*** |
| | (−3.20) | (−4.36) |
| *Post* | 0.005 | −0.024*** |
| | (0.42) | (−3.37) |
| *Treat×Post* | −0.003 | 0.009 |
| | (−0.39) | (1.56) |
| *LnIncome×D×D_Twoyear* | 0.121*** | 0.151*** |
| | (3.36) | (4.52) |
| *LnIncome×D×Eco_Growth* | 0.744* | 0.967 |
| | (1.75) | (1.60) |
| *LnIncome×D×Employ_Inten* | −0.015** | −0.009 |
| | (−2.40) | (−1.25) |
| *LnIncome×D×Asset_Inten* | −0.017*** | −0.019*** |
| | (−5.08) | (−5.57) |
| *D_Twoyear* | −0.017** | −0.015** |
| | (−2.36) | (−2.39) |
| *Employ_Inten* | −0.001 | 0.002 |
| | (−0.53) | (1.20) |
| *Asset_Inten* | −0.002 | −0.002* |
| | (−1.58) | (−1.94) |
| *ROA* | −0.077** | −0.019 |
| | (−2.04) | (−0.58) |
| *Lev* | −0.017 | 0.002 |
| | (−1.48) | (0.19) |
| *MKI* | 0.004*** | 0.004*** |
| | (4.28) | (5.09) |
| *Firsthold* | 0.054*** | 0.051*** |
| | (5.25) | (5.29) |
| *Ind* | −0.073** | −0.008 |
| | (−2.53) | (−0.30) |
| *Dual* | −0.003 | 0.001 |
| | (−0.70) | (0.33) |
| *Mshare* | 0.156*** | 0.122*** |
| | (11.44) | (10.38) |
| *Constant* | 0.078*** | 0.042** |
| | (3.43) | (2.22) |
| *Industry* | Yes | Yes |
| *Year* | Yes | Yes |
| *Observations* | 25,124 | 23,540 |
| *Adjusted R-squared* | 0.275 | 0.350 |

**Table 11.**
Placebo test

**Note(s):** ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively; robust *t*-statistics are in parentheses; standard errors clustered at the firm level

| Variables | (1) *LnSGA* |
|---|---|
| *LnIncome* | 0.482*** |
| | (40.76) |
| *LnIncome×D* | −0.158* |
| | (−1.93) |
| *LnIncome×D×Treat* | −0.111** |
| | (−2.41) |
| *LnIncome×D×Post* | −0.101** |
| | (−2.09) |
| *LnIncome×D×Treat×Post* | 0.120** |
| | (2.12) |
| *Treat* | −0.031*** |
| | (−5.92) |
| *Post* | 0.085*** |
| | (8.15) |
| *Treat×Post* | 0.017*** |
| | (2.81) |
| *LnIncome×D×D_Twoyear* | 0.153*** |
| | (5.10) |
| *LnIncome×D×Eco_Growth* | 0.625 |
| | (1.28) |
| *LnIncome×D×Employ_Inten* | −0.007 |
| | (−1.27) |
| *LnIncome×D×Asset_Inten* | −0.019*** |
| | (−6.48) |
| *D_Twoyear* | −0.013** |
| | (−2.20) |
| *Employ_Inten* | 0.001 |
| | (0.39) |
| *Asset_Inten* | −0.003** |
| | (−2.50) |
| *ROA* | 0.001 |
| | (0.02) |
| *Lev* | −0.009 |
| | (−1.00) |
| *MKI* | 0.004*** |
| | (4.62) |
| *Firsthold* | 0.057*** |
| | (6.30) |
| *Ind* | −0.038 |
| | (−1.57) |
| *Dual* | −0.001 |
| | (−0.35) |
| *Mshare* | 0.135*** |
| | (11.93) |
| *Constant* | −0.050** |
| | (−2.55) |
| *Industry* | Yes |
| *Year* | Yes |
| *Observations* | 29,240 |
| *Adjusted R-squared* | 0.324 |

**Note(s):** ***, ** and * denote statistical significance at the 1, 5 and 10% levels, respectively; robust *t*-statistics are in parentheses; standard errors clustered at the firm level

**Table 12.** Reconstruct the dependent variable after removing management compensation

result indicates that after changing the calculation method of the dependent variable, there remains evidence that the dividend policy regulation reduces firm cost stickiness, which confirms the robustness of our conclusions in this paper.

## 7. Conclusions

By taking A-share listed companies from 2007 to 2019 as the research sample, this study investigates the impact of dividend policy regulation on cost stickiness by constructing a difference-in-difference model based on the exogenous event of the Guideline for Dividend Policy of Listed Companies promulgated by the SSE. The results indicate that after the implementation of the Guideline for Dividend Policy of Listed Companies, the cost stickiness of firms subject to dividend policy regulation significantly decreases. Furthermore, this effect is more pronounced for companies in lower marketization regions, lower competition industries, with lower analyst attention and lower cash flow levels. Moreover, the mechanism test results suggest that dividend policy regulation mainly restrains firms' cost stickiness by reducing their agency costs. This paper conducts a battery of robustness tests, such as controlling for firm fixed effects, using the propensity score matched sample, conducting placebo tests and reconstructing dependent variables, which confirm the validity of our conclusions.

Our research has implications for further improving the front-line regulation of Chinese stock exchanges and promoting the establishment of reasonable and scientific dividend policies for listed companies. First, this paper finds that dividend policy regulation is an important governance mechanism that reduces the agency problem of corporate management and can significantly inhibit corporate cost stickiness. This shows that under the background that Chinese legal system is not perfect and that the internal governance of listed companies is not yet sound, the front-line regulation functions of stock exchanges should be strengthened to make up for the regulatory voids caused by weak legal systems and the imperfect internal governance of companies. Second, the CSRC has taken various measures to guide listed companies to improve their cash dividends from the perspective of protecting the legitimate rights and interests of investors and cultivating long-term investment horizons in the market. The implementation of dividend policy regulation provides policy guidance, which is conducive to promoting listed companies to establish a reasonable and scientific dividend policy. Finally, with the increase in macroeconomic environment complexity and industry competition, cost management represents an important aspect of listed companies' operations management. Therefore, listed companies should actively address the stickiness of expenses caused by the management agency problem, alleviate their free cash flow problems and effectively and reasonably control costs to succeed in the fierce market competition and achieve sustainable and healthy development.

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