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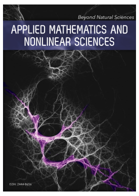

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Mathematical analysis of civil litigation and empirical research of corporate governance

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Abstract

In addition to reducing R&D investment and changing senior managers or corporate name, the significant uncertainty and reputation shock brought by civil litigation may also have a vital impact on corporate governance of the sued company. We use A-share listed companies in Shanghai and Shenzhen stock exchanges from 2011 to 2018 to empirically examine the impact of civil litigation on corporate governance and its mechanism. It is found that, civil litigation is negatively correlated with corporate governance, and financing liabilities (FL) play an intermediary role in the negative correlation. Furthermore, judicial local protectionism weakens the negative correlation between civil litigation and corporate governance. Finally we close with directions for future research.

Keywords: Mathematical analysis, civil litigation, corporate governance, empirical research
AMS 2010 codes: 14Q05, 68W30.

1 Introduction

With the deepening of China's economic reform and steady progress of rule of law, civil litigation has become an important external factor affecting corporate sustainable and healthy development. In 2018, a total of 523 listed companies in China were sued or filed lawsuits, accounting for 14.68% of the total number of listed companies. The number of civil lawsuits reached 2047, of which the amount of money involved in 430 cases was over 100 million Yuan. The potential huge compensation not only directly disrupts normal production and operation activities of the sued company, but also has a significant impact on its corporate governance.

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Recent literature has found that corporate governance is influenced by many factors, such as ownership structure and its nature [1], institutional investors [2], board of directors and independent directors [3], executive characteristics and incentives [4]. Information disclosure [5], product market [6], control market [7], manager market [8], government regulation [9] and other factors exert an influence as well. It is widely known that corporate governance is a process in which investors (including stockholders and creditors), managers, employees and the public constantly "'bargain"' and adjust dynamically. Any sudden shock or external environment change may have a significant impact on corporate governance, which has been overlooked previously. So it is meaningful to identify the casual effects of civil litigation and corporate governance.

As a kind of emergency or external shock, civil litigation not only gives rise to massive cash outflow, but also brings serious reputation shock to the sued company. Civil litigation will not only undermines the position and occupational reputation of senior executives of the sued company, enforce them to adopt risk aversion policies, but also negatively affect its reputation, reduce its credit rating [10] and increase external financing cost [11]. Past literature finds that debt is not only a way of financing and a source of capital, but also a mechanism of corporate governance, which is mainly manifested by restraining the abuse of free cash flow [12], restraining excessive investment [13] and transmitting negative information (bad management, financial distress) to the public [14]. It is expected that, due to civil litigation, debt financing change may affect corporate governance. It is meaningful to empirically examine the mechanism of debt financing on corporate governance.

As an important field of modern corporate finance, theoretical literature has identified casual effect of corporate financing on corporate governance. From the perspective of property right structure, corporate financing is an agreement of control rights and residual claims through a series of explicit or implicit contracts [15]. With a contract of corporate property rights arrangement, corporate financing is closely related to corporate governance, and even determines the mode of corporate governance [16]. At present, corporate financing is dominated by bank credit in China and debt is not only a financing method and sources of fund, but also a corporate governance mechanism. Debt plays its role mainly by restraining senior managers from abusing free cash flow [12], restraining over investment [13] and transmitting negative information [14]. In China, corporate debt financing can be divided into two categories: one is financing liabilities (FL), of which banks are creditors and the other is operating liabilities (OL) (mainly accounts payable, etc.), of which upper and downstream manufacturers are creditors. The two kinds of liabilities have different corporate governance effects. Compared with FL, OL have stronger supervision advantages in creditor governance as a result of their close contractual relationship with other manufacturers and unique information advantages [17]. However, other scholars believe that FL play an important role in corporate governance [18, 19]. We find that, prior studies failed to incorporate the two different kinds of debt in the same framework, and failed to find what kind of debt financing has superior effect. This may be more of a matter of experience. When empirically examining corporate governance effects of the two kinds of liabilities, it is necessary to take causes of action into consideration comprehensively. In reality, there are 424 kinds of causes of action, which can be divided into two categories: one is caused by bank loan, guarantee, pledge, etc., which is related to corporate financing directly, and the other is related to product quality, reputation, sales, etc. Generally Speaking, capital litigation is more closely related to corporate debt financing, while non-capital litigation is more closely related to corporate products or OL. The division of civil litigation into capital and non-capital is helpful to empirically compare corporate governance effects of the two types of debt financing. In addition, considering that existing judicial local protectionism in China may have an impact on civil litigation and corporate governance, we finally broadens the research scope and examines the moderating effect of judicial local protectionism in civil litigation and corporate governance.

We use A-share listed companies in Shanghai and Shenzhen stock exchanges from 2011 to 2018 to empirically examine the impact of civil litigation on corporate governance of the sued companies and its mechanism by constructing corporate governance index [20] and choosing the proportion of the defendant's litigation amount to gross asset as proxy variable of litigation risk. Finally, we explore the moderating effect of judicial local protectionism and make comparison of corporate governance effects of two different types of civil litigation (capital and non-capital).

Compared with past studies, the marginal contribution of this paper lies in: firstly, it broadens the scope of corporate governance research. As far as corporate governance is concerned, there is lots of theoretical and empirical understanding of corporate governance and the impact of external environmental uncertainty on corporate governance has previously been overlooked. We combine civil litigation with corporate governance, explores the impact of civil litigation on corporate governance and its mechanism, and verifies the intermediary effect of debt financing, that is, civil litigation strengthens the negative correlation between civil litigation and corporate governance through FL rather than OL, and OL have less impact on corporate governance, which is consistent with our social financing structure dominated by bank credit at present. Secondly, the moderating effect of judicial local protectionism is examined in the extended analysis, which reveals that judicial local protectionism will weaken the negative correlation between civil litigation and corporate governance. In a word, we empirically examine the influence of civil litigation on corporate governance and its mechanism under the background of rule of law, broaden the research scope of corporate governance, and shed more light on in-depth discussion of judicial local protectionism and civil litigation types.

The structure is as follows: the second part is literature review and hypothesis, the third is sample selection and research design, the fourth and the fifth parts are empirical results and extended analysis and the last part is research conclusion and directions for further discussion.

2 Literature review and hypothesis

2.1 Civil litigation and corporate governance

Well-designed corporate governance is of great significance to reasonably allocate internal rights and obligations, strengthen external supervision, enhance product competitiveness and ensure corporate sustainable development. It is found that, there are many factors affecting corporate governance, including internal factors such as ownership structure and its nature [1], Creditor investors [21], institutional investors [2], board of directors and independent directors [3], executive characteristics and incentives [4], as well as information disclosure [5], product market [6], control market [7], manager market [8], government regulation [9] and other external factors. Corporate governance is a process in which investors (including stockholders and creditors), management, employees and the public and other stakeholders constantly bargain and adjust dynamically. Any sudden shock or environment change may have a profound influence on corporate governance.

From the perspective of law, a company is a collection of a series of contract sets. Under the background of labour division and exchange, a company always comes into a contract with external investors, upstream and downstream manufacturers and social consumers through express or implied terms, and bears a contractual obligation thereof. Due to product flaws or financial distress, any suspension and change of the original contract without any prior consent will give rise to a breach of contract and civil disputes or litigation. For listed companies that are sued for damages, civil litigation often worsens managerial myopia and force major shareholders to seek short-term profits [22], and weaken the supervision and restraint mechanism of major shareholders on senior managers. Senior managers of the sued company will divert part of time and energy originally used for production and operation to litigation activities, which results in weakening corporate resource allocation efficiency; in addition to senior managers, civil litigation will also hinder the disputing parties, such as consumers in product disputes, bank creditors in capital lawsuits and suppliers in product chain from playing a continuous supervisory role. Potential huge compensation caused by civil litigation will result in economic interest outflow from the sued company, and give rise to principal-agent conflict between senior managers and major stakeholders. In accordance with mandatory information disclosure requirement, information disclosure concerning civil litigation will trigger a reputation crisis to the sued company. In order to reduce the impact of litigation disclosure, the sued company will make good use of lengthy and obscure text information to reduce its readability on the basis of meeting the requirement of timely information disclosure [23], and increase information asymmetry and related agency costs between the sued company and external investors. The above shows that huge compensation and reputation shock caused by civil litigation will reduce corporate governance of the sued company. Therefore, we put forward the following hypothesis:

H1: There is a negative correlation between civil litigation and corporate governance, that is, civil litigation may reduce corporate governance of the sued company.

2.2 Corporate governance effect of different civil litigation

In judicial practice, there are many causes for civil action. In accordance with the nature of legal correlation and types of litigants, civil litigation can be divided into capital, product and others three categories.[a] Among them, capital litigation includes loan, guarantee involvement, financial leasing, bill disputes, equity disputes and other cases closely related to corporate financing; product litigation includes product quality disputes, trademark patent infringement disputes, unfair competition and other cases closely related to products; others include fraud, false information liability disputes, real estate and land disputes, bankruptcy litigation, etc. At present, bank credit is the main source for Chinese company to obtain external funds, and most of the capital lawsuits involve bank creditors. Compared with product litigation, most of the capital litigation has simple creditor-debtor correlation, clear legal facts, obvious causal chain and relatively short court trial and execution cycle. The sued company often face higher risk of losing lawsuit which may result in large amount of cash outflow. Facing more and more severe financial constraints and rising debt default risk, senior managers have great possibility or motivation to take short-sighted behaviour or engage in illegal behaviour, such as reducing customer credit rating, increasing the proportion of credit sales, selling at a lower price and so on, which will damage the long-term and overall interests of shareholders. When the sued borrows the new loan to repay the old, it will often face more stringent loan conditions stipulated by the new bank. When the amount of civil compensation is huge and seriously affects the normal production and operation activities of the sued enterprise, bank creditor of stock loans often exercise counterargument right for security and break or withdraw loans, thus weakening the supervision of bank creditors. The above statements show that the negative correlation between capital litigation and corporate governance is more obvious than that of product litigation, or capital litigation strengthens the negative correlation between civil litigation and corporate governance. In this regard, we put forward the following hypothesis:

H2: Compared with product litigation, the negative correlation between capital litigation and corporate governance is stronger.

2.3 The intermediary role of debt financing between civil litigation and corporate governance

Prior studies have found that corporate financing structure is closely related to corporate governance [24], which has an important impact on corporate governance and, to some extent, even determines the mode of corporate governance [25]. In social financing structure dominated by bank credit, debt plays an important role in corporate governance. For example, debt can restrain senior managers from abuse of free cash flow [12], reduce agency costs, and prevent inappropriate corporate investment and financing, dividend distribution and other behaviours through agreements such as protective clauses, so as to improve corporate governance [26]. In order to improve corporate governance, employee stock ownership plan (ESOP) or senior managers incentive contract [27] and mandatory Chief Executive Officer (CEO) change [28] are adopted.

When the company falls into civil disputes, debt financing of the sued company will change greatly. First of all, civil litigation usually leads to debt decline of the sued company. It is found that there is a significant negative correlation between securities litigation and external financing [29], securities litigation will give rise to

[a] According to the provisions on the cause of action of civil cases (Fa[2011]No.41), the notice of the Supreme People's Court on increasing the cause of action of civil cases (Fa[2018]No.344), the cause of action can be divided into 43 categories, including personality disputes, marriage and family inheritance disputes, and property disputes, etc.

a decline of corporate external financing. With the increasing huge compensation, the asset-liability ratio of the sued company decreases significantly [30]. Because of high attorney fees, liquidated damages and other upfront expenses brought by civil litigation, as well as possible subsequent loss compensation and settlement fees, the sued company need to plan for a large amount of preventive cash reserves in the short term [10]. In the short term, the large amount of cash outflow will reduce the financial freedom of the sued company, and even make it into the plight of capital shortage. Under the circumstances, the sued company often falls into adverse situations, due to banks' reluctance to lend and increasing interest rates and guarantees. In extreme cases, banks will reduce credit line and call in a loan before the schedule. Secondly, civil litigation will result in debt structure change of the sued company. The reputation shock brought by civil litigation will reduce the bargaining power of the sued company in front of upstream and downstream manufacturers, resulting in the decrease of the total OL, such as shortening the period of accounts receivable of the sued company by suppliers, requiring much more discount, sales rebate and other preferential measures by sellers (customers), or extending the days of accounts receivable, etc. With the increasing possibility of losing the lawsuit, the probability of opportunistic behaviour of upstream and downstream manufacturers is increasing [31], which may lead to further reduction of total OL. Besides, the uncertainty and potential huge compensation brought by civil litigation will weaken the solvency of the company involved in the lawsuit, which will reduce its ability to obtain credit support in financing activities or bear higher financing costs due to higher risk premium. Prudential banks often take measures, such as tightening risk exposure, reducing credit line and suspending loans. The impact of debt decline on corporate governance is mainly manifested in the following two aspects: First, as far as OL are concerned, the opportunistic behaviours of upstream and downstream manufacturers caused by the potential huge compensation undermine the integrity and continuity of the former original production chain, and affect the normal production and operation activities and financial status of the sued company. In addition, OL decline weakens the information transition and mutual supervision between upstream and downstream manufacturers. Second, in terms of financial liabilities, less financial liabilities caused by civil litigation lead to bank creditors unable to obtain more effective information, which results in increasing information asymmetry; the decline of FL also weakens the supervision and restraint of bank creditors on the abuse of free cash flow and senior managers' risk-taking behaviour. The above analysis shows that civil litigation affects corporate governance of the sued company. In this regard, we put forward the following hypothesis:

H3: Civil litigation affects corporate governance through debt financing. In other words, debt financing plays an intermediary role in the correlation between civil litigation and corporate governance.

Focusing on the intermediary role of debt financing between civil litigation and corporate governance, this paper further analyses and compares the difference between OL and FL. Usually, an company and its upstream and downstream manufacturers form an informal contract based on reputation in the frequent supply of raw materials, intermediate products and product sales activities [32]. With the increase of transaction frequency and gradual decrease of information asymmetry, there is often a kind of mutual trust between the two parties, and the OL represented by accounts payable, bill payable and other payables will be increasing. When an company falls into civil disputes, creditors of OL usually do not participate in corporate governance of the sued company due to short-debt period and high adjustment cost [33]; only when the litigation is likely to lead to bankruptcy, reorganisation, takeover of the enterprise, or ineffective internal supervision led by shareholders, can creditors of OL actively participate in corporate governance [34] and claim residual property, which is the same as other ordinary creditors (such as banks). Compared with OL, most of the FL has longer term and larger amount, and bank creditor have higher supervision and incentive and more strict risk control measures. When a company is involved in litigation disputes, compared with the creditor of OL such as suppliers, bank creditors often actively take measures, such as reducing credit line, terminating the loan, requiring prepayment, etc., to reduce credit risk loss of the company involved in the lawsuit. The reduction of FL weakens the supervision and restraint of bank creditors, which is not conducive to corporate governance of the sued company. Therefore, this paper puts forward the following hypothesis:

H4: Compared with OL, FL play a stronger intermediary role in civil litigation and corporate governance.

3 Research design

3.1 Sample selection and Data sources

We choose A-share listed companies (excluding financial insurance companies) from 2011 to 2018 as research sample, and at the same time, the samples are eliminated based on the following criteria: (1) companies listed for <1 year and (2) companies with missing data. Finally 982 samples were collected. Lawsuits data is sorted out manually, legal environment data is from «Marketization Index of China's Provinces: National Economic Research Institute (NERI) Report», the data of other main variables and control variables are from China Stock Market Accounting Research (CSMAR) database and Wind database. Further, we winsorize 1% data of all continuous variables in order to control the influence of extreme values on the regression results.

3.2 Variable definition

(1) Dependent variable: corporate governance index. In accordance with Bai Chongen et al. [20], this paper constructs corporate governance index (G), which covers internal and external mechanism of corporate governance and its Chinese characteristics. The data comes from CSMAR database.

(2) Independent variable: litigation risk. This paper chooses the ratio of defendant's litigation amount to the total assets to measure litigation risk of listed companies [35], and this part of data is sorted out from Wind database.

(3) Intermediary variable: Debt financing. In order to distinguish liabilities and eliminate the influence of company scale, this paper uses Yang Yong et al. [36] for reference, and uses (accounts payable + notes payable + other accounts payable)/shareholder's equity, (short-term loan + long-term loan)/shareholder's equity to measure operating liability and financing liability (FL), respectively, of the company involved in the lawsuit.

(4) Control variable. Referring to previous literature on civil litigation and corporate governance, this paper controls the variables that may affect corporate governance, such as external legal environment (law), internal strategy (strat) and variables that characterise corporate characteristics, such as profit, growth, solvency and size. In addition, this paper controls the year and industry dummy variables. The definition and calculation method of specific variables are shown in Table 1.

3.3 Research design

This paper uses the data of listed companies sued from 2011 to 2018, and uses multiple regression to conduct empirical analysis. In order to test the hypothesis, the following model is constructed

$$G_{i,t} = \alpha + \alpha_1 LRisk_{i,t-1} + \alpha_2 CVs_{i,t} + \sum Industry_i + \sum Year_t + \varepsilon_{i,t} \tag{1}$$

$$Mdebt_{i,t} = C + \alpha_1 LRisk_{i,t-1} + \alpha_2 CVs_{i,t} + \sum Industry_i + \sum Year_t + \varepsilon_{i,t} \tag{2}$$

$$\begin{aligned} G_{i,t} = {} & C + \alpha_1 LRisk_{i,t-1} + \alpha_2 Mdebt_{i,t} + \alpha_3 LRisk_{i,t-1} * Mdebt_{i,t} + \alpha_4 CVs_{i,t} \\ & + \sum Industry_t + \sum Year_t + \varepsilon_{i,t} \end{aligned} \tag{3}$$

Among them, G is dependent variable, LRisk is independent variable, Mdebt is intermediary variable and CVs are control variables. Considering that it takes a certain time for civil litigation to have an impact on corporate governance, litigation risk (LRisk) lags a period of time. Model (1) tests the impact of civil litigation on corporate governance, Model (2) tests the impact of civil litigation on debt financing and Model (3) adds intermediary variable (Mdebt) and its cross term with litigation risk (LRisk*Mdebt) on the basis of Model (1). The intermediary variable is measured by FL and OL, Model (1), (2) and (3) test the mediating role of debt financing.

Table 1 Main variable definition and its calculation.

	Variable	Symbol	Definition and its calculation
Dependent variable	Corporate governance index	G	Construct as Bai Chongen et al. [20]
Independent variable	Proportion of sued amount	LRisk	(Amount involved in the case/total assets)*100
Intermediary variable	OL	OL	(Accounts payable + notes payable + other accounts payable)/shareholder's equity
	FL	FL	(Short-term loan + long-term loan)/shareholder's equity
Control variable	Legal environment	Law	Measured by "'market intermediary organisation and legal environment"' in Fan Gang index
	Internal strategy	Strat	In Wang Huacheng et al. [37], it is expressed by the arithmetic mean of six indicators, namely, the tendency to find new products, the efficiency of production and distribution, historical growth, the concentration of new products and services, organizational stability, and the commitment of technical efficiency.
	Corporate culture	Resp	If social responsibility report is provided externally, the value is 1, otherwise it is 0.
	Profitability	ROA	Net profit/total asset
	Corporate growth	Grow	Sale proceeds at the end of the year/sales proceeds at the end of last year-1
	Asset-liability ratio	Lev	Total liability/total asset
	Corporate scale	Size	Natural logarithm of total assets
	Year dummy	Year	If listed from t−8 to t, Year dummy = 0, otherwise, Year dummy = 1
	Industry dummy	Industry	According to industry classification guide of China Securities Regulatory Commission, Category C is classified by two digits, and the rest is classified by one digit, with a total of 21 industry variables

FL, financing liability; OL, operating liability; ROA, return on assets.

4 Empirical analysis

4.1 Data description

Table 2 is the descriptive statistical results of the main variables. As shown in Table 2, in terms of dependent variable (G), the mean of corporate governance index of listed company is 0.0314, the maximum is 2.1878 and the minimum is −1.0274, indicating that there are great differences in corporate governance indexes of different listed companies. The mean of LRisk is 2.6402, the large gap between the maximum and the minimum indicates that litigation risk faced by listed companies is quite different. Compared with OL, FL of listed companies are quite different. From other variables, listed companies are not the same considering the legal environment, internal strategy and growth.

Table 3 shows the statistics of civil lawsuits in which listed companies participated as defendants from 2011 to 2018. During this period, a total of 3305 cases involving 83.967 billion yuan were filed against listed

Table 2 Variable description.

Variable	Sample size	Mean	Standard deviation	Minimum	Maximum
G	982	0.0314	0.5384	−1.0274	2.1878
LRisk	982	2.6402	7.7834	0.0001	106.6978
OL	982	0.6708	3.5338	−76.6759	56.4142
FL	982	1.0515	6.7368	−73.9349	162.8783
Law	982	8.9192	4.6887	−0.2	16.94
Strate	982	215.6843	303.1892	1.1966	2479.183
Resp	982	0.0478	0.2135	0	1
Growth	982	0.054	0.8408	−1	15.8560
ROA	982	−7.6465	136.6108	−2474.181	0.3127
Lev	982	0.8465	3.5150	0.0702	63.9712
Size	982	22.2609	1.3118	17.2770	26.2169

FL, financing liability; OL, operating liabilities.

Table 3 Lawsuits description (times/billion yuan).

	Total sample		Different cause of action				The incorporation and jurisdiction			
			Capital		Product		In the same prefecture		Not in the same prefecture	
Year	Sued times	Amount involved	Sued times	Amount involved	Sued times	Amount involved	Sued times	Amount involved	Sued times	Amount involved
2011	49	4.359	12	0.514	5	3.418	13	0.561	36	3.798
2012	84	1.817	13	0.63	10	0.802	14	0.886	70	0.931
2013	175	3.631	20	1.9	26	0.808	58	2.216	117	1.415
2014	322	6.452	50	2.092	24	2.586	60	4.35	262	2.102
2015	325	3.165	27	1.398	23	0.642	52	1.988	273	1.177
2016	1484	8.935	50	3.291	28	1.532	872	3.885	612	5.05
2017	237	19.285	56	7.908	48	3.082	148	13.924	89	5.361
2018	629	36.323	378	28.095	126	5.149	495	27.767	134	8.556
Total	3305	83.967	606	45.828	290	18.019	1712	55.577	1593	28.39

companies. Among them, there were 606 capital cases involving 45.828 billion yuan, accounting for 54.58% of the total amount involved in the period, and 290 product cases, involving 18.019 billion yuan, accounting for 21.46% of the total amount in the period. From the perspective of judicial local protectionism, a total of 1712 cases of listed companies were tried by People's Courts in the prefecture where the sued listed companies were incorporated, involving 55.577 billion yuan, accounting for 66.19% of the total amount involved in the period, while the remaining 1593 cases were tried by People's Court outside the prefecture where the sued listed companies were incorporated.

4.2 Regression results

(1) Basic regression. Table 4 shows the regression result of civil litigation on corporate governance of the sued enterprise. Column (1) is the regression of dependent variable to control variable, and column (2) adds the regression of litigation risk expressed by the proportion of litigation amount. Dependent variable (G) is the index of listed companies, which comprehensively reflects internal and external governance mechanism and Chinese characteristics of the sued company. Table 4 shows that after controlling other factors, the litigation risk coefficient is significantly negative at 5% level, which verifies the negative

Table 4 Civil litigation and corporate governance.

	(1)	(2)
	G	**G**
LRisk		-0.007^{**} (-2.29)
Law	-0.006 (-1.56)	-0.006 (-1.58)
Strate	0.016^{***} (2.30)	0.014^{***} (2.20)
Resp	0.111 (1.51)	0.110 (1.51)
Growth	-0.061^{**} (-1.96)	-0.061^{**} (-1.99)
ROA	-0.112^{**} (-2.15)	-0.094^{*} (-1.80)
Lev	-0.118^{**} (-2.10)	-0.122^{**} (-2.17)
Size	0.058^{***} (3.56)	0.068^{***} (4.05)
Year	Control	Control
Industry	Control	Control
Constant	-1.085^{***} (-2.85)	-1.341^{***} (-3.39)
N	982	982
Adj. R^2	0.231	0.234

***, ** and * represent significance at the 1%, 5% and 10% level, respectively; *t*-statistics are reported in parentheses.

Table 5 The moderating role of civil litigation types and judicial local protectionism.

	(1)	(2)
	G	**G**
LRisk	-0.013^{***} (-2.74)	-0.007^{*} (-1.91)
LP		0.029 (0.80)
LRisk*LP		0.004^{*} (0.38)
ToC	-0.005 (-0.13)	
LRisk*ToC	-0.010^{**} (-1.49)	
Year	Control	Control
Industry	Control	Control
Constant	-1.363^{***} (-3.44)	-1.435^{***} (-3.55)
N	982	982
Adj. R^2	0.235	0.233

***, ** and * represent significance at the 1%, 5% and 10% level, respectively; *t*-statistics are reported in parentheses. LP, local protection; ToC, type of cause of action.

correlation between litigation risk and corporate governance of the sued enterprise, and so Hypothesis 1 holds.

(2) In order to test Hypothesis 2, we construct a dummy variable (type of cause of action [ToC]) to join the regression. If the company is sued for loan, guarantee or other capital reasons, the dummy variable is 1. If the company is sued for product quality, infringement and other reasons, otherwise it is 0. The regression result is shown in column (1) of Table 5. The coefficient of litigation risk is significantly negative at the level of 1%, and the coefficient of the cross item with the ToC is also significantly negative. This shows that, compared with non-capital litigation, the negative correlation between capital litigation and corporate governance is more obvious, that is, capital litigation strengthens the negative correlation between civil litigation and corporate governance.

Table 6 A test of intermediary role of debt financing.

Financing liability as intermediary variable				**OL as intermediary variable**			
	(1)	**(2)**	**(3)**		**(4)**	**(5)**	**(6)**
	G	**FL**	**G**		**G**	**OL**	**G**
LRisk	-0.007^{**}	-0.051^{**}	-0.009^{**}	LRisk	-0.007^{**}	0.001	-0.009^{**}
	(−2.31)	(−2.32)	(−2.61)		(−2.31)	(0.14)	(−2.55)
FL			0.041^{***}	OL			0.044^{***}
			(8.63)				(3.37)
LRisk*FL			-0.003^{*}	LRisk*OL			−0.005
			(0.67)				(−1.11)
Controls	Control	Control	Control	Controls	Control	Control	Control
Year	Control	Control	Control	Year	Control	Control	Control
Industry	Control	Control	Control	Industry	Control	Control	Control
Constant	-1.338^{***}	-13.989^{***}	-0.848^{**}	Constant	-1.338^{***}	0.610	-1.293^{***}
	(−3.38)	(−5.23)	(−2.21)		(−3.38)	(0.49)	(−3.25)
N	982	982	982	N	982	982	982
Adj. R^2	0.234	0.174	0.300	Adj. R^2	0.234	0.083	0.243

***, ** and * represent significance at the 1%, 5% and 10% level, respectively; t-statistics are reported in parentheses. FL, financing liability; OL, operating liability.

(3) Mechanism test. In order to verify the mediating role of debt financing, this paper uses the method of adjustment path analysis by referring to Xu Ning et al. [38]. The first step is to verify the correlation between independent variable and dependent variable. The second step is to verify the correlation between independent variable and intermediary variable. The third step is to add dependent variable and the interaction term between independent variable and intermediary variable into the independent variable and dependent variable model. As a full effect regulation model, this method can analyse the influence mechanism of civil litigation on corporate governance.

Taking litigation risk as the independent variable, corporate governance of the sued company as dependent variable, and debt financing as the intermediary variable, the regression results are shown in Table 6. Considering the differences between OL and FL in terms of debt maturity, financing amount and risk control, this paper tests the mediating role of FL and OL. Column (1) of Table 6 verifies the negative correlation between litigation risk and corporate governance of the sued enterprise; taking into account of both columns (2) and (5), we find that there is a significant negative correlation between litigation risk and FL, but no significant correlation between litigation risk and OL. Column (3) shows that after adding the interactivity of litigation risk and FL, the litigation risk coefficient is still negative at the level of 5%, and the negative correlation between litigation risk and corporate governance still holds. The coefficient of FL is significantly positive at the level of 1%, and the coefficient of interaction between litigation risk and FL is significantly negative at the level of 10%. This proves that debt financing, especially FL, plays an intermediary role, that is, litigation risk affects corporate governance of the sued company through FL, which verifies Hypotheses 3 and 4.

5 Further discussion and robust test

5.1 The moderating role of judicial local protectionism

In order to further explore the influence factors of civil action on corporate governance, we investigate the influence of judicial local protectionism on the correlation between civil litigation and corporate governance from the perspective of judicial justice.

At present, China's economy and society are in a transitional period, and judicial local protectionism still exists [39]. Taking civil cases as an example, People's court can exercise its discretion within the scope permitted by laws and regulations. If the case involves local company, it can actively compete with other courts for jurisdiction; timely control the process and rhythm of case acceptance, trial and execution; selectively adopt or exclude the evidence involved in the case; and interpreted the cited or applicable laws, regulations, rules expansively or contractible; select execution time, mode and strength of the case judgment or ruling. The People's court will try its best to favour its local company and protect local interests in the whole litigation activities, so as to achieve the same effect as the local government's "'selective law enforcement"' [40]. When the case involves local state-owned company or is inextricably linked with the government, it is often difficult for the court to remain neutral, and the judicial local protectionism is more serious. In this regard, this paper constructs a dummy variable (LP) to join the regression. If the domicile of the sued listed company or its main place of business and the jurisdiction of the court belong to the same prefecture, the dummy variable is 1, otherwise it is 0, so as to explore the influence of judicial local protectionism. The regression results are shown in column (2) of Table 5.

It can be seen from Table 5 that the negative correlation between litigation risk and corporate governance still holds. Compared with the prefecture where justice is much more fairer, judicial local protectionism weakens the negative correlation between civil litigation and corporate governance. The reason behind this lies in that if civil disputes are submitted to the court where the company is located for trial, local court is likely to exercise its discretion within the scope permitted by laws and regulations, or favour local company and protect local interests by controlling the process or rhythm of case acceptance, trial and execution. Under the protection of the local court, the possibility of the sued company to win is increased [41], the compensation liability is reduced or even exempted, and the impact on corporate reputation is also lighter. Thus, the cash outflow pressure faced by the sued company is reduced, which reduces the bank creditors' worry about the solvency of the sued enterprise, and reduces the possibility of early loan withdrawal and loan break. In addition to less impact on financial liabilities, the bias of local courts also alleviates the impact of civil disputes on the supply and marketing correlation between the sued company and its upstream and downstream manufacturers, resulting in insignificant changes in OL. Therefore, judicial local protectionism reduces the fluctuation of debt financing and reputation impact of the sued company, and weakens the negative correlation between civil litigation and corporate governance.

5.2 Endogeneity and robustness test

(1) Reduce sample size. The conclusion of this paper may be affected by the sample selection error, so this paper selects manufacturing listed companies as the research object to retest. The regression results are shown in column (1) of Table 7, and the conclusion is still valid.

(2) Variable substitution. For independent variable (LRisk), taking the logarithm of the number of lawsuits of listed companies in the previous period plus 1 as the substitution variable, the regression results are shown in column (2) of Table 7; for dependent variable (G), the dummy variable of the integration of chairman and general manager is used as the substitution variable, and the regression results are shown in column (3) of Table 7; considering industrial difference between governance index and litigation risk, this paper retests corporate governance index and litigation risk by subtracting the industrial mean. The regression results are shown in column (4) of Table 7. Regression results show that the conclusion is still valid.

(3) Heckman two-stage method. In order to solve sample self-selection problem, this paper uses Heckman two stage method to test. Referring Pan Yue et al. [35], in the first stage, two dummy variables namely capital litigation and non-capital litigation are selected as the dependent variable to construct probit model, and the factors whether the sued company violate the rules and whether the accounting firms issue standard unqualified opinions are added to calculate IMR, and then the original model is brought into the second

Table 7 Endogeneity and robustness test.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
	G	**G**	**G-Dual**	**G**	**G**
LRisk	-0.010^{***}	-0.008^{**}	-0.001^{*}	-0.023^{*}	-0.007^{**}
	(-1.56)	(-0.30)	(-0.01)	(-1.98)	(-0.45)
IMR					0.0574
					(0.38)
Controls	Control	Control	Control	Control	Control
Year	Control	Control	Control	Control	Control
Industry		Control	Control	Control	Control
Constant	-2.469^{***}	-1.077^{***}	-1.853^{***}	-1.323^{***}	-1.006^{***}
	(-5.66)	(-2.83)	(-5.36)	(-3.36)	(-2.68)
N	618	982	982	982	982
Adj. R^2	0.205	0.230	0.173	0.256	0.152

***, ** and * represent significance at the 1%, 5% and 10% level, respectively; *t*-statistics are reported in parentheses. IMR, inverse mills ratio.

stage of regression. Column (5) of Table 7 shows that IMR coefficient is not significant, indicating that there is no obvious self-selection problem in the sample.

6 Conclusion and directions for future research

With steady progress of rule of law in China, civil litigation has increasingly become an important external factor that affects corporate sustainable and healthy development. We examine the impact of civil litigation on corporate governance and its mechanism using A-share listed companies in Shanghai and Shenzhen stock exchanges from 2011 to 2018 and draw the following conclusions: First, there is a significant negative correlation between civil litigation and corporate governance, that is, huge compensation risk and reputation shock brought by civil litigation reduce corporate governance of the sued company. Second, as to the mechanism, debt financing, or other, FL rather than OL, plays an intermediary role as channel between civil litigation and corporate governance. Third, judicial local protectionism weakens the negative correlation between civil litigation and corporate governance. When the domicile of the sued is in the same prefecture as the court, civil litigation has less negative correlation with corporate governance. In a word, this paper not only expands the research on corporate governance under the circumstances of rule of law, but also further reveals the mechanism and influencing factors of civil litigation on corporate governance.

There are several potential avenues for future research. As to corporate governance, there are many measurements and a widely accepted corporate governance index has not been constructed. Although we construct corporate governance index in accordance with Bai Chongen et al. [20], the index fails to take CEO equity incentive into consideration due to missing of data. Gathering finer data will help us get a comprehensive index. Second, the debt mechanism implies a new way of thinking about corporate governance. Corporate financing, such as off-sheet-financing, equity pledge and related transactions, gives rise to a number of new research directions linking corporate financing to corporate governance. Further theories could incorporate more complex features of corporate financing. Third, the recent financial crisis has led to a number of regulatory changes that affect civil litigation. Securities laws are revised and came into effect in March 2020, and the provisions on several issues of representative action in securities disputes, issued by Supreme Court, make class action feasible. With increasing class action, it would be fruitful to study how class action impacts corporate governance. We hope that it will help stimulate this research to going forward and look forward to learning from it.

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