Digital Inclusive Finance and Corporate Social Responsibility

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Abstract. The development of Digital Inclusive Finance (DIF) has played an indispensable role in promoting the development of China's macro-economy as well as the economic benefits of micro-enterprises. By examing data on Chinese listed companies from 2011-2021, this paper investigates the impact of DIF on corporate social responsibility (CSR) and its underlying mechanism. The results show that DIF has a significant contribution to the assumption of corporate social responsibility and the results pass a series of robustness tests; the results of the mechanism tests show that DIF promotes CSR by improving the quality of accounting information disclosure; further research finds that the impact of DIF on CSR is greater among non-state enterprises, smaller enterprises and enterprises with a lower percentage of institutional investors' shareholding. This study provides inspiration for promoting CSR and government policy making.

Keywords: Digital Inclusive Finance; Corporate Social Responsibility; Institutional Investors.

1. Introduction

Digital Inclusive Finance(DIF) refers to a form of financial inclusion that is driven by digital information technology. Its development model is to use information technology and digital means to extend traditional financial services to a wider scope and provide them to consumers and SMEs in a more efficient and convenient manner. Nowadays, China's mobile internet and IT technologies are leading the world, which gives China a unique advantage in developing digital inclusive finance. By virtue of its inclusiveness, inclusiveness and precision, DIF has played an indispensable role in promoting China's macroeconomic and micro-enterprise economic benefits in various aspects. From a macro perspective, DIF has broken the "two-eight law" of traditional finance and greatly alleviated the inequality of traditional financial services. It plays an important role in alleviating the digital divide, narrowing the income gap between urban and rural areas (Song et al., 2017), promoting inclusive growth (Hu et al., 2023) and thus contributing to the steady development of China's economy; from a micro perspective, digital inclusive finance has, to a certain extent, reduced the financing constraints of enterprises (Yu et al., 2020; Liao et al. ,2020), promote the digital transformation of enterprises (Xiao et al., 2022) and technological innovation (Liang et al., 2019), thus contributing to the steady development of enterprises.

However, the scope of existing scholars' research mainly focuses on the impact of the development of DIF on macroeconomic development and corporate economic efficiency, while fewer scholars have explored the relationship between the development of DIF and the fulfillment of corporate social responsibility (CSR). Based on this, this paper examines the impact of digital inclusive finance on CSR and its underlying mechanisms from the perspective of micro enterprises, while exploring the mediating role of accounting disclosure quality between DIF and CSR, using A-share listed companies in Shanghai and Shenzhen from 2011 to 2021 as the research sample.

Compared with the existing literature, the possible contributions of this paper are shown below. First, it expands the research on the economic consequences of DIF at the micro enterprise level by analyzing the impact of it on such non-financial indicators as CSR. Second, it explores the factors influencing CSR from the perspective of DIF, further testing the impact mechanism of CSR. Third, it analyses the inner mechanism of DIF affecting CSR from the perspective of accounting information disclosure quality, which provides new research ideas for the research on digital inclusive finance. Fourthly, at the practical level, on the one hand, it provides certain inspiration for further promoting enterprises to actively undertake social responsibility, and on the other hand, it provides a reference

for the government to formulate credit policies by studying the relationship between digital inclusive finance and CSR.

2. Literature Review

Existing studies on the economic consequences of DIF can be divided into two main perspectives: macro and micro. At the macro level, the development of DIF has reduced the urban-rural income gap (Song et al., 2017), significantly boosted residents' consumption levels (Yi et al., 2018), and promoted the optimization of China's industrial structure (Du et al., 2020). At the micro level, most scholars have studied the economic-level consequences of digital inclusive finance for enterprises, but fewer studies have focused on non-economic indicators. DIF can have some impact on the micro-firm level, which is the foundation of the economy, for example, by alleviating the financing constraints of firms to a certain extent (Yu et al., 2020), promoting digital transformation (Xiao et al., 2022) and technological innovation (Liao et al., 2019). However, very few studies have explored the relationship between DIF and the fulfilment of CSR.

Existing research on CSR is mainly divided into antecedents and consequences. Among them, some scholars point out that the external institutional environment at the macro level has a certain influence on CSR, and point out the role of government in promoting CSR (Zhou et al., 2012). At the micro level, the level of corporate digitalisation, director and officer liability insurance, and risk capital all have an impact on CSR (Xiao et al., 2021; Kang et al., 2023; Jia et al., 2022). In addition, many scholars have also focused on the consequences of CSR performance. It has been shown that active CSR implementation significantly reduces manipulative accruals (Liu et al.,2016), promotes green technological innovation (Xiao et al.,2022), and increases the efficiency of corporate labour investment (Tao et al.,2022).

As mentioned above, DIF has an important impact on corporate behavioural decisions, but fewer scholars have examined the impact of DIF on CSR. By studying the relationship between the two, we can to a certain extent enrich the research on the economic consequences of DIF at the micro level, as well as further explore the impact mechanisms of CSR, and also put forward certain suggestions for policy improvement and corporate management innovation.

3. Theoretical Analysis and Hypothesis Formulation

Digital financial inclusion offers the advantages of low cost, speed and wide reach, which can help make up for the shortcomings of traditional financial services, better support the sustainable operation of enterprises, thus promoting the fulfilment of CSR. Actively fulfilling CSR is one of the keys to ensuring high-quality corporate development, and the prerequisite for an enterprise to be able to fulfil its social responsibility is that it can maintain normal operations and make a surplus. SMEs are often more vulnerable to market shocks in terms of financing and capital operations (Lv et al., 2015), especially when faced with financial difficulties, making it difficult for them to fulfil their social responsibility in a quality and quantity manner. The development of DIF is conducive to better allocation of financial resources to enterprises in need, and providing financial assistance and policy support for enterprises in financial difficulties to fulfill their CSR. At the same time, DIF will, to a certain extent, reduce the cost of credit for enterprises, alleviate their financing constraints and increase their ability and willingness to undertake CSR (Yu et al., 2020) .In addition, the development of DIF will improve China's existing financial environment by promoting the optimization of industrial structure (Du et al., 2020) and other means, improve the overall level of finance, promote the steady development of China's small and medium-sized enterprises, and thus increase the degree of fulfilling corporate social responsibility.

In addition, this paper argues that DIF promotes CSR mainly through improving the quality of accounting information disclosure. DIF provides stronger financial support to SMEs, which is conducive to promoting the economic efficiency and scale of enterprises. Managers of enterprises

supported by state policies tend to pay more attention to the stability and enhancement of corporate influence and reputation, thus improving the quality of corporate accounting information disclosure and promoting the sustainable and healthy development of enterprises. Improving the quality of corporate accounting information disclosure means that more non-financial information will be disclosed in the report. For maintaining the good credit and corporate image of the enterprise, as well as to obtain richer financial resources by enhancing the trust of stakeholders, managers tend to pay more attention to the fulfillment of CSR.

Based on the above analysis, this paper argues that DIF can promote the fulfillment of CSR and works mainly through the mechanism of improving the quality of accounting information disclosure, therefore, this paper proposes the following hypothesis.

Hypothesis1: The development of digital inclusion will promote corporate social responsibility.

4. Study Design

4.1 Sample Selection and Data Sources

This paper uses the data of A-share listed companies in China's Shanghai and Shenzhen stock markets from 2011 to 2021 as the sample for the empirical study, and processed the data according to the following criteria: (1) excluding ST,* ST and PT companies; (2) excluding companies with serious missing data; (3) excluding companies with outliers, and tailoring all continuous variables at the upper and lower 1% level, finally A valid sample of 27795 was obtained. The data related to corporate finance and corporate governance were obtained from the CSMAR database, the CSR data were obtained from Hexun.com's report on the responsibility scores of listed companies, and the total digital inclusive finance index was obtained from the Peking University Digital Inclusive Finance Index published by Peking University's Digital Finance Research Centre.

4.2 Definition of Variables

Explanatory variable: Corporate Social Responsibility (CSR). In order to ensure the accuracy of the data, this paper refers to Gu el at.'s (2020) study using the total CSR report score of Hexun.com listed companies to measure the level of CSR fulfillment.

Explanatory variable: Digital Inclusive Finance (DIF). This paper adopts the Digital Inclusive Finance Index of Peking University promulgated by the Digital Finance Research Centre of Peking University with reference to the relevant studies of Xiao et al. (2022) and Wei et al. (2022) to reflect the level of development of digital inclusive finance with the total digital inclusive finance index at the prefecture-level city level.

4.3 Control Variables

Drawing on relevant studies by Yang et al. (2021) , in order to control for the influence of other factors on CSR, the following control variables have been selected for this paper. Size is the natural logarithm of the company's total assets for firm size. Leverage is the ratio of a company's liabilities to its assets. Growth is the growth rate of a company's operating income for the period. Age is measured as the age of the enterprise, which is the natural logarithm of the sample year minus the year of listing. Board is measured as the number of directors serving on the board. Dual is a dummy variable eqal to 1 if the chairman and general manager of the two positions in oneand zero otherwise. Big is also a dummy variable equal to 1 if the Big Four auditors audit the firm and zero otherwise. Also, year and industry fixed effects were added to the model. Cash is the ratio of monetary funds to assets, which is used to measure the cash holdings of enterprises. model construction.

In this paper, the main regression model (1) is developed as follows.

$$\mathrm{CSR}_{it} = \beta_0 + \beta_1 \mathrm{DIF}_{it} + \beta_i \sum \mathrm{Control}_{it} + \sum \mathrm{Year} + \sum \mathrm{Industry} + \varepsilon_{it} \quad (1)$$

Where CSR is corporate social responsibility in the current period, DIF is the Digital Inclusive Finance Index, $Control_{it}$ denotes control variables, Year and Industry denote year and industry fixed effects respectively, and ε_{it} is a random disturbance term. This paper uses regression model (1) to analyse the impact of DIF on CSR, thus testing hypothesis H1.

5. Empirical Analysis

5.1 Descriptive Statistics and Correlation Analysis

Table 1 presents the results of the descriptive statistical analysis of the main variables involved in this paper, from which it can be seen that the mean value of Corporate Social Responsibility (CSR) is 0.033, the minimum value is -5.176, the maximum value is 5.975 and the standard deviation is 0.976. It can be seen that there is little variation in the performance of the sample companies in terms of CSR. The mean value of the explanatory variable DIF is 218.096, with a standard deviation of 71.751, indicating that the development level of DIF in different regions of China is significantly different and polarised. Among the control variables, the mean value of audit quality (Big) is 0.068, with a standard deviation of 0.252, indicating that the proportion of listed companies in China hiring Big 4 accounting firms is low.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
CSR	27795	0.033	0.976	-5.176	5.975
DIF	27795	218.096	71.751	21.26	359.683
Size	27795	22.237	1.492	17.641	31.138
Leverage	27795	0.427	0.221	0.007	4.026
Growth	27795	1.037	23.103	-48.417	2354.549
Age	27795	2.141	0.848	-0.362	3.457
Board	27795	2.133	0.208	1.099	3.045
Dual	27795	0.285	0.451	0	1
Top1	27795	34.347	15.116	0.29	99
Big	27795	0.068	0.252	0	1
Cash	27795	0.169	0.137	-0.165	0.972

Before the samples were regressed, correlation tests were conducted on the main variables in this paper. The correlation coefficients between the variables are basically less than 0.5, indicating that there is no multicollinearity between the various control variables.

5.2 Return to Baseline

The results of the benchmark regression of the impact of DIF on CSR are shown in Table 2. Column (1) reports the regression results of model (1), where the coefficient of DIF is 0.0027, which passes the significance test at the 1% level. This indicates that the higher the level of development of DIF, the better the CSR performance. Column (2) reports the regression results with the addition of province fixed effects to column (1), where the coefficient of DIF is 0.0016 and is significantly positive at the 5% statistical level, indicating that the regression results are still significant and can provide preliminary evidence of the robustness of the regression results.

Table 2. Baseline regression results

	(1)	(2)
VARIABLES	CSR	CSR
DIF	0.0027***	0.0016**
	(5.3428)	(2.3412)
Size	0.3053***	0.3046***
	(29.1614)	(29.1436)
Leverage	-1.2044***	-1.1945***

	(-20.9402)	(-20.9427)
Growth	0.0001	0.0001
	(0.4963)	(0.6726)
Age	-0.1332***	-0.1230***
	(-10.6008)	(-9.8208)
Board	0.1488***	0.1526***
	(3.0573)	(3.2174)
Dual	-0.0290	-0.0305
	(-1.4806)	(-1.5678)
Top1	0.0050***	0.0051***
	(7.2315)	(7.6225)
Big	0.1442***	0.1577***
	(3.2469)	(3.5529)
Cash	0.6829***	0.7346***
	(9.8218)	(10.5382)
Constant	-6.5471***	-6.4214***
	(-19.6531)	(-19.3331)
Observations	27,795	27,795
Industry	YES	YES
Year	YES	YES
Province	NO	YES
Adj R^2	0.1702	0.1814
F	21.5555	18.9543

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

5.3 Robustness Tests

Table 3. Robustness test regression results

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	SR_1	CSR	CSR	CSR	CSR	CSR
DIF	0.0075***			0.0027***	0.0035***	0.0023***
	(3.7404)			(4.9614)	(5.0695)	(3.2323)
dif		0.3254***				
		(3.5201)				
L.DIF			0.0026***			
			(4.7018)			
Controls	YES	YES	YES	YES	YES	YES
Observations	27,795	27,795	23,476	23,871	27,790	27,445
Industry	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES
Adj R^2	0.2714	0.1688	0.1725	0.1633	0.1698	0.1700
F	41.6386	21.3504	e(F)	e(F)	21.5713	21.3547

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

In order to ensure the robustness of the research results, this paper further did the following research. First, replacing the explanatory variables. The results in column (1) of Table 3 show that the regression coefficient of DIF after replacing the explanatory variables is 0.0075 and is significantly positive at the 1% statistical level. Second, replacing the explanatory variables. Robustness tests were conducted using the natural logarithm of the total digital inclusive finance index in place of the DIF, and the regression results were consistent with the previous section. Third, the explanatory variables were lagged by one period. To further alleviate the endogeneity problem, this paper treats the explanatory variables with a one-period lag, and the results in column (3) show that the regression coefficient is 0.0026 and is significantly positive at the 1% statistical level. Fourth, special years are excluded. The results show that the impact of DIF on the fulfillment of CSR is still

significantly positive. Fifth, the instrumental variable method. Initially, this paper refers to the method in Li et al. (2022), which uses "other provinces excluding the province - annual mean" as the instrumental variable for the 2SLS regression. As shown in column (5), the provincial means of DIF are significantly positive at the 1% level, and hypothesis H1 still holds. Secondly, considering that regional financial pressure can reflect the level of economic development of the region and thus constrain the development of DIF to a certain extent, and that regional financial pressure may have a small impact on the economic efficiency of enterprises, thus affecting the fulfillment of CSR. Therefore, this paper refers to Liu et al. (2023) and uses the ratio of on-budget revenue and expenditure gap to on-budget income to measure fiscal pressure as an instrumental variable in the 2SLS regression. As the results in column (6) show, hypothesis H1 still holds and the main regression results remain robust.

5.4 Mechanism Test

Based on the above regression results, this paper further explores the mediating mechanism through which digital inclusive finance affects CSR performance, i.e. whether digital inclusive finance affects CSR performance by improving the quality of accounting information disclosure. Regression models (2)-(3) are hereby established as follows.

$$\text{Mediator}_{it} = \beta_0 + \beta_1 \text{DIF}_{it} + \beta_i \sum \text{Control}_{it} + \sum \text{Year} + \sum \text{Industry} + \varepsilon_{it} \quad (2)$$

$$\text{CSR}_{it} = \beta_0 + \beta_1 \text{DIF}_{it} + \beta_2 \text{Mediator}_{it} + \beta_i \sum \text{Control}_{it} + \sum \text{Year} + \sum \text{Industry} + \varepsilon_{it} \quad (3)$$

Where Mediator in regression models (2)-(3) is the mediating variable, which is the quality of accounting disclosure (KV), to explore the mediating mechanism by which DIF affects corporate social responsibility.

Table 4. Intermediary mechanism test results

	(1)	(2)	(3)	(4)	(5)
VARIABLES	KV	CSR	CSR	CSR	CSR
DIF	-0.0020***	0.0019***	0.0034***	0.0221***	0.0037***
	(-5.9715)	(3.7548)	(6.8800)	(12.0094)	(7.0080)
KV		-0.3624***			
		(-26.4322)			
SOE			0.5534***		
			(9.0523)		
SOE×DIF			-0.0023***		
			(-9.9436)		
Size×DIF				-0.0009***	
				(-10.7943)	
Ihldn					0.0069***
					(6.2690)
Ihldn×DIF					-0.0000***
					(-5.2359)
Size	-0.1757***	0.2684***	0.3074***	0.5031***	0.2975***
	(-26.1261)	(23.5748)	(29.1981)	(22.0155)	(27.7465)
Controls	YES	YES	YES	YES	YES
Constant	6.3712***	-4.9601***			
	(32.6019)	(-17.6520)			
Observations	23,125	20,480			
Industry	YES	YES			
Year	YES	YES			
Adj R^2	0.1665	0.2339			
F	e(F)	e(F)			

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

This paper measures the quality of accounting disclosure using data from the Disclosure Appraisal Form of listed companies in the CSMAR database, where the greater the KV, the lower the quality of accounting disclosure. First, the impact of digital inclusive finance on the quality of KV is tested. The results in column 6 of Table 4 (1) show that the effect of digital inclusive finance on accounting disclosure quality is negative with a regression coefficient of -0.0020, which passes the significance test at the 1% level, indicating that the development of digital inclusive finance can improve the quality of corporate accounting disclosure. Next, regression model (3) was used to test the joint impact of digital inclusive finance and accounting disclosure quality on corporate social responsibility. The results in column 6 of Table 4 (2) show that the KV coefficient is negative and significant at the 1% level, and the regression coefficient of DIF is 0.0019 and significantly positive at the 1% statistical level. This shows that higher quality of accounting disclosure promotes CSR, digital inclusive finance may promote the fulfillment of CSR by improving the quality of accounting information disclosure, which in turn implies that the quality of accounting information disclosure plays a mediating role.

6. Heterogeneity Analysis

Taking into account the differences in credit access between state-owned and non-state-owned enterprises, the credit capacity of enterprises of different sizes and the external governance effects of institutional investors and auditors, this paper constructs the following regression model to further explore the heterogeneous role of DIF in influencing CSR performance.

$$\mathrm{CSR_{it}} = \beta_0 + \beta_1 \mathrm{DIF_{it}} + \beta_2 \mathrm{M_{it}} + \beta_3 \mathrm{M_{it}} * \mathrm{DIF_{it}} + \beta_i \sum \mathrm{Control_{it}} + \sum \mathrm{Year} + \sum \mathrm{Industry} + \varepsilon_{it} \quad (4)$$

M in regression model (4) is the moderating variable and contains the nature of ownership (SOE), firm size (Size), institutional investor shareholding (Ihldn), and audit quality (Big). The results of the heterogeneity analysis are shown in Table 4.

(i) Nature of business

Referring to Tang et al. (2022), a regression analysis was conducted using the cross product term of SOE by nature of enterprise and DIF by digital inclusion finance. Where SOE is defined as 1 when the firm is a state-owned enterprise and 0 when it is a non-state-owned enterprise, the remaining control variables are unchanged. The regression results are shown in column (3) of Table 4. The regression coefficient of SOE×DIF is significantly negative at the 1% level, indicating that the nature of state-owned property rights compared to non-state-owned property rights diminishes the contribution of digital inclusive finance to the fulfilment of corporate social responsibility. The possible reason for this is that SOEs have a significant resource advantage in China's current institutional context, so the marginal contribution of DIF is smaller. However, for non-SOEs, DIF can effectively alleviate the financing constraints of non-SOEs and improve their business environment, thus contributing to the fulfilment of social responsibility. Therefore, the contribution of DIF to the fulfilment of social responsibility of SOEs is weaker than that of non-SOEs.

(ii) Size of business

Considering that the difference in firm size may have some impact on the relationship between digital inclusive finance and CSR fulfillment, this paper refers to the research method of Sun et al. (2022) and increases the cross product term of firm size Size and digital inclusive finance DIF for regression analysis. The specific regression results are shown in column (4) of Table 4. The regression coefficient of Size × DIF is -0.0009 and significantly negative at the 1% level, indicating that firm size plays a negative moderating role between digital inclusive finance and corporate social responsibility. The possible reason for this is that the development of digital inclusive finance has a greater impact on SMEs and is more conducive to improving the business environment of small-scale enterprises, which in turn is more conducive to their social responsibility. Therefore, digital inclusion finance has a stronger contribution to the social responsibility performance of smaller enterprises than larger ones.

(iii) Institutional investors' shareholdings

The cross product of Ihldn and DIF is increased to analyse the role of institutional investor shareholding in the relationship between digital inclusion and CSR performance. As shown in column (5) of Table 4, the regression coefficient of Ihldn×DIF is -0.0000 and is significantly negative at the 1% level, indicating that the greater the shareholding ratio of institutional investors will weaken the contribution of digital inclusive finance to CSR compliance. Generally speaking, companies with a larger shareholding of institutional investors have access to more financial resources and can alleviate their financing problems to a certain extent. Therefore, the shareholding ratio of institutional investors plays a negative moderating role between digital inclusive finance and corporate social responsibility.

7. Conclusion

This paper investigates the impact of the development of digital inclusive finance on the fulfillment of CSR and the underlying mechanism, using A-share listed companies in Shanghai and Shenzhen in China from 2011 to 2021 as a research sample. The results indicate the following information.(i) the level of development of digital financial inclusion contributes significantly to the performance of CSR; (ii) the mechanism test shows that digital inclusive finance strongly promotes the fulfillment of CSR by alleviating the effect of financing constraints on enterprises and improving the quality of accounting information disclosure; (iii) further analysis finds that the promotion effect of DIF on CSR is more significant among non-state enterprises, enterprises of smaller scale and enterprises with a lower shareholding of institutional investors.

The following findings were obtained through benchmark regressions, mechanism tests and moderating effect tests. For the government, on the one hand, it should pay attention to the promotion effect of digital inclusive finance on the fulfillment of social responsibility of micro market players, further reduce financing transaction costs and increase support for the fulfillment of CSR, on the other hand, it should accelerate the establishment of laws, regulations and institutional systems related to digital inclusive finance, and actively improve the construction of the financial service infrastructure network in central and western regions, so as to make use of big data and Internet and other technologies to ensure the development of DIF and thus facilitate the fulfillment of CSR. We should also accelerate the establishment of laws, regulations and institutional systems related to DIF, and actively improve the construction of financial services infrastructure networks in central and western regions, so as to make use of technologies such as big data and the Internet to ensure the development of DIF and thus help fulfil CSR. For enterprises, they should accelerate the improvement of the digital inclusive finance docking mechanism, make full use of the dividends brought by DIF to achieve sustainable development of their companies, and at the same time actively enhance the fulfillment of CSR and actively contribute to the green development of society.

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