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Investigating the Impact of Regional Digital Finance Development on Short-run IPO Performance: Empirical Evidence from China

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ABSTRACT

This study investigates the influence of regional digital finance development on corporate short-run IPO performance, using a sample of 1,478 IPO firms listed on the Shenzhen and Shanghai Stock Exchanges from 2011 to 2021. Employing the Peking University Financial Inclusion Index as a measure of regional digital finance development and first-day IPO returns as the measure of short-run IPO performance, our baseline regression results show that regional digital finance development significantly fosters the IPO short-run performance. The results of the mechanism analysis show that information transparency serves as a significant mediating variable, strengthening the nexus between regional digital finance development and corporate IPO short-run performance. Additionally, robustness checks using a two-stage least squares (2SLS) approach with provincial internet penetration as an instrumental variable validate the baseline findings. Furthermore, the results of firm level heterogeneity analysis shows that smaller firms and state-owned enterprises (SOEs) benefit more from digital finance development in terms of IPO performance compared to non-SOEs and larger firms.

Keywords: Regional digital finance development; Initial public offerings; Information transparency; IPO short run performance

1. Introduction

Over the last decade, China gained remarkable growth in regional digital finance development, that has significantly transformed its financial landscape. As of 2022, total transaction volume of digital payments sector of China reached to $2.89 trillion, reflecting a compound annual growth rate (CAGR)

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of 21.2% over past five years [1]. Digital finance promotes inclusive economic growth, increases household income, and narrows regional and urban-rural development gaps across provinces of China [2]. The number of digital banking users also surged in China as it reached to 890 million by 2022 [3]. This rapid development of regional digital finance has not only facilitated more efficient transactions for individuals but also provided significant benefits to the corporate sector.

The regional digital finance development is proven a significant instrument to enhance corporate performance across several dimensions of enterprises. For example, digital finance has led the enterprises to have reduced transaction costs and improved financial inclusion, and thus enabling the firms to have a broader access of financial services at lower costs [4]. By leveraging the technologies and features of digital finance development such as faster and reliable payment services, firms enhanced liquidity management practices [5]. The availability of digital finance platforms allowed small-medium enterprises (SMEs) to have better access to credit, as they were facing challenges in obtaining funds from traditional banking systems [6]. Additionally, digital finance facilitated improved corporate governance and financial transparency, thereby attracts more investment [7]. Furthermore, efficiency offered by digital finance technologies contributes to higher level of firm productivity and competitiveness [8]. These benefits underscore the critical role of digital finance development to support corporate performance, and thus there could also be direct influence on IPO performance.

Digital finance development has shown its benefits for the firms to foster the corporate performance, innovation, strategic empowerment, and corporate risk-taking [9, 10]. It is shown by previous studies that regional digital finance alleviates financing constraints to foster the corporate investment efficiency, increase productivity, and gaining improved governance of financial resources [11, 12]. Initial public offering (IPO) is a significant event for every organization and it is highly willing to get the expected proceeds and also having the good first impression in market to attract the investors in future [13, 14]. Digital finance development through its features of digital payments, digital platforms, digital banking services, and others [9, 15], could support the firms for being able to get investors attention while launching an IPO, and then getting the required funds for expected proceeds. This study will analyze that how regional digital finance development influence the corporate short-run IPO performance, and how information transparency could mediate the nexus between these two aspects as well.

Financial intermediation theory posits that financial intermediaries, such as banks and digital finance platforms play a crucial role to channel the funds from savers to borrowers, and thus facilitate investment and economic growth [16]. The impact of regional digital finance development is examined on various aspects of corporate performance by previous studies. For instance, Huang and Chen [17] show that digital finance fosters corporate innovation by offering easier access to capital. Similarly, Tang and Wu [18] demonstrate that digital finance development improves operational performance by reducing the financial constraints for SMEs. Previous literature mainly focused on the benefits of digital finance, however the impact of digital finance on corporate IPO performance, mediating effects of information transparency, and the heterogenous effects on different types of firms remain unexplored. By considering this research gap, our study will fill examine the influence of regional digital finance development on corporate short-run IPO performance in Chinese A-share listed enterprises.

There are several contributions made by this study: First, by investigating the impact of regional digital finance development on corporate IPO performance, it adds the existing literature of the outcomes of regional digital finance development. Second, it examines the mediating influence of the information transparency on the nexus of regional digital finance development with corporate short-run IPO performance. Third, this study also presents the heterogenous effects of digital finance on different types of

firms such as SOEs, non-SOEs, large and small sized firms. Building on the work by Xu, et al. [19] and Li, et al. [11], this study extends the literature on corporate performance indicators, thereby enriches the discourse on digital and corporate performance.

The remaining of this paper is organized as follow: Section 2 Covers the literature review, presents theoretical links between variables, and develops hypothesis, Section 3 presents the data source, variables of study, and empirical modelling, Section 4 reports the empirical results including descriptive, correlation, baseline regression, robustness, mechanism, and heterogeneity effects, Section 5 concludes the paper and presents policy implications.

2. Literature Reviews and Hypotheses Development

"Digital Finance" is a term introduced by United Nations in 2005, and it is adopted by many developed and emerging countries in form of financial inclusion. China is also among the forefront countries which significantly focused on financial inclusion and embraced the digital payment system for consumers and corporates. Regional digital finance development in China fostered the financial inclusion and enhanced financial availability and efficiency, thus shown improved corporate outcomes. Xu, et al. [20] show that regional digital finance boosts firm value and market performance. In same stride, Lin, et al. [21] show that digital finance development improves investment efficiency, and thus facilitate them to gain better financial outcomes. The firms employing the digital finance technologies are more accessible to funds market, and thus being able to get a wider pool of capital for raising the funds.

Tang and Wu [18] found that digital finance innovations lead a more efficient capital allocation, which is crucial to achieve corporate growth and performance. Additionally, Wang and Li [7] indicated that digital finance platforms improve investors' engagement and their participation in fund markets, which are critical for IPO success. Another study by Xu et al. [19] supported the view of improving the market liquidity by digital finance development, and thus positively impacting the corporate IPO performance. Furthermore, Huang and Chen [17], Li, et al. [5], and Zhang, et al. [6] shown that digital finance development providers better financial stability and resilience, and these both are vital during the IPO process. Previous literature underscores the role of digital finance development to influence various aspects of corporate performance, but still the influence on IPO performance is unexplored, and this gap will be filled by this study.

The nexus between regional digital finance development and corporate IPO performance can be explained through the lenses of numerous theories. However, Financial Intermediation theory present a direct link by stating that financial intermediaries such as digital finance platforms play a crucial role in reducing transaction costs and information asymmetry, thus facilitate better market outcomes [22]. Previous studies also demonstrate the support for this view of theory regarding the role of digital finance platforms by illustrating that these platforms improve information dissemination and market transparency, which could be critical for IPO success [7, 23]. Therefore, building on these theoretical foundations and empirical findings, it is postulated that regional digital finance development improves corporate IPO performance, and our first hypothesis will be as:

H1: Regional digital finance development improves corporate IPOs performance in China

The information transparency is a significant element which could encourage or discourage the investors to participate in an IPO. It can be argued that if there is lack of information transparency the investors would be uncertain about the potential performance of an IPO in market, so if there is high information transparency they become able to make the decision of buying the IPO shares. Empirical studies also documented the importance of information transparency in financial markets to facilitate investors' decisions. Chen and Li [4] show that improved information disclosure reduces the information asymmetry between internal executives and external investors, and thus lead to booster investor confidence and market performance. Other studies

supported this view as Liu, et al. [8] and Zhang, et al. [6] demonstrate that firms with more information are more successful when going to list in markets, as the investors are aware about the financial position and future plans of these companies. Additionally, Wang and Li [7] argued that when digital finance platforms allow real-time information sharing with the potential investors, and thus there is significant improvement in information transparency. Huang, et al. [24] found that firms having high level of information transparency gained via the technologies of digital finance, become more supportive to investor decision making and succeeded to reduce the market volatility.

The information transparency is likely to make the investors able to mitigate the information gap with the internal executives so it can be a crucial mediating variable to influence the nexus of regional digital finance development with the IPO performance. And this role can be explained through the lenses of signaling theory, which posits that firms with better information disclosure tend to have positive signals to the market, and thus attract more investors and achieve better financial outcomes [25]. Empirical literature also corroborates this theory, suggesting that corporate risk taking is managed by regional digital finance development through alleviating the financing constraints [26]. Based on theoretical underpinnings and empirical evidences, it can be hypothesis that digital finance development improves the corporate IPO performance via the channel of information disclosure. Thus, the second hypothesis will be postulated as:

H2: Regional digital finance development improves corporate IPO performance by fostering the information transparency in China.

3. Data and empirical model

3.1 Data

This study uses a sample of 1,471 IPOs listed on Shenzhen Stock Exchange and Shanghai Stock Exchange over the period of 2011–2021. Three steps are undertaken while finalizing the sample: first, we exclude financial institutes; second, IPOs with special treatment and/or partial transfer are omitted; third, enterprises with missing variables are excluded. This study uses Digital Inclusive Finance Index, formulated by Ant Services and Internet Finance Research Center of Peking University, offers a comprehensive measurement of the digital finance development at city level. The data of corporate IPO short run performance and control variables is mainly sourced from CSMAR, a prevalent resource in China's academic research [27].

3.2 Variables of study

Independent variable

Regional digital finance: The regional digital finance development index, formulated by Ant Services and Internet Finance Research Center of Peking University, is used in this study. The index development method can be seemed in Guo, et al. [28]. Three distinct dimensions of regional digital finance development; the aggregate digital finance index (*Digf*), the scope of digital finance service Coverage (*Cov*), and intensity of utilization (*brdth*), are used in this study.

Dependent variable

Corporate short-run IPO performance: Corporate short-run IPO performance is measured as IPO returns on first day of listing.

Mediating variable

Information transparency: The information disclosure score is used as the measure of information transparency in this study.

Control variables

The control variables of this study include trade volume of IPO on first day of listing (vol), market return on first day of listing (m_ret), firm size (siz), issue price of IPO stock (price), and earnings per share before listing (eps). All of these control variables are selected by following relevant previous literature [13, 23, 29], and description is further available in **Table 1**.

3.3 Empirical model

This study uses Ordinary Least Squares (OLS) regression method to test first hypothesis of study:

$$IPO_i = \alpha_0 + \alpha_1 Digif_i + \alpha_2 Controls_i + \varepsilon \quad (1)$$

where IPO_i is the IPO short-run performance (first day returns of an IPO), $Digif_i$ denotes the regional digital finance development index in year of IPO listing, $Controls_i$ represents the control variables, α is the regression coefficient, and ε is the error term. Additionally, this study also examines the mechanism through which regional digital finance development influences the corporate IPO performance, and for this purpose we evaluate the mediating effects of information transparency. To test second hypothesis of study, we incorporate information transparency score (*info*) as the mediating variable, and the equations (2) and (3) are constructed as;

$$IPO_i = \alpha_0 + \alpha_1 Info_i + \alpha_2 Controls_i + \varepsilon \quad (2)$$

$$IPO_i = \alpha_0 + \alpha_1 Digif_i + \alpha_2 Inf_i + \alpha_3 Controls_i + \varepsilon \quad (3)$$

whereas *Inf* is the information transparency which has been employed as independent variable in equation 2, while mediating variable in equation 3.

4. Empirical results

4.1 Descriptive statistics

The descriptive statistics of our study variables provide valuable insights into the characteristics and variability of the data, and reported in **Table 1**. The independent variables, digital finance development (Digif), Coverage (Cov), and financial Depth (Depth), exhibit mean values of 250.50, 251.77, and 246.99 respectively, with standard deviations of 79.40, 78.74, and 80.27 respectively. This show that digital finance development varies across sampled firms, and thus reflect a different level of development across all regions of country. The dependent variable, IPO performance shows (IPO), shows a mean value of 0.87 with a standard deviation of 1.27, ranging from –0.27 to 19.43, indicating substantial variation in IPO first day return on the listing day. It can be said that overall IPOs in China have shown a positive pattern of returns on first day of listing. These findings are consistent with previous literature that highlights the significant role of digital finance in enhancing corporate financial performance and IPO success [18, 20, 21]. Additionally, the descriptive statistics of the control variables are in line with the findings of existing studies [26].

Table 1. Descriptive statistics.

Variables	Symbol	Obs	Mean	Std. Dev.	Min	Max
Digital Finance Index	Digif	1478	250.5034	79.39952	37.77	359.6826
Coverage of Digital Finance	Cov	1478	251.7657	78.73664	29.09	371.7897
Depth of Digital Finance	Depth	1478	246.9957	80.26744	42.73	354.3049
Short-run IPO performance	IPO	1478	0.8676254	1.270869	–0.272727	19.42581
Volume on first listing day	Vol	1478	38.16588	12.67513	20.53	71.77
Market return on listing day of IPO	m_ret	1478	0.0032969	0.0340316	–0.15466	0.160988
Firm size	Size	1478	20.79353	1.308156	18.5331	29.9403
Issue price of stock	Price	1478	21.73395	25.05041	1.5	557.8
Earnings per share before listing	Eps	1478	0.3895535	0.5061249	–2.58	7.11

4.2 Correlation analysis results

The correlation analysis results are reported in **Table 2**, to show the extent and strength of the nexus between independent and dependent variables. The inter-relationship between the independent variables such as digital finance development (Digif), Coverage (Cov), and Depth (Depth) have shown a high positive correlation reflected by the correlation coefficient values of 0.9891, 0.9767, and 0.9417,

respectively, and thus show that that regions with advanced digital technologies have robust digital finance development structure. As shown in table 2 that the correlation coefficient value between Digif and IPO performance is 0.3308, which is highly significant and it suggests a moderate positive relationship between these both variables. This finding is consistent is also in line with the findings of the previous studies [20, 21]. Furthermore, Cov and Depth have also exhibited moderate positive correlations with IPO performance as shown by the correlation coefficient values of 0.3471 and 0.2968, respectively. These findings argue that regional digital finance development has stronger positive relationship with the IPO short run returns.

Table 2. Correlation analysis results.

Variables	Digif	Cov	Depth	IPO	Vol	m_ret	Size	Price	eps
Digif	1								
Cov	0.9891	1							
	(0.00)								
Depth	0.9767	0.9417	1						
	(0.00)	(0.00)							
IPO	0.3308	0.3471	0.2968	1					
	(0.00)	(0.00)	(0.00)						
vol	–0.334	–0.3324	–0.3349	0.1891	1				
	(0.0166)	(0.0172)	(0.0163)	(0.1838)					
m_ret	0.034	0.0478	0.0026	0.0736	–0.0008	1			
	(0.191)	(0.066)	(0.9216)	(0.0046)	(0.9955)				
size	0.1794	0.1741	0.1654	–0.0308	–0.1108	–0.0216	1		
	(0.00)	(0.00)	(0.00)	(0.2371)	(0.4388)	(0.406)			
price	0.1429	0.1503	0.1367	–0.0527	–0.1291	–0.0357	–0.0814	1	
	(0.00)	(0.00)	(0.00)	(0.0428)	(0.3666)	(0.1701)	(0.0017)		
eps	0.0687	0.0719	0.0666	–0.0478	–0.2211	–0.0028	0.0098	0.5117	1
	(0.008)	(0.005)	(0.0104)	(0.0663)	(0.1189)	(0.9143)	(0.7071)	(0.00)	

Note: standard errors are reported in parentheses.

4.3 Baseline regression results

The benchmark regression results are reported in **Table 3**. The results presented in this table show a strong and robust influence of the regional digital finance development on short run IPO returns. It can be seemed in column of Table that regression coefficient of *Digif* is 1.0768, which is significant at 1% level, and this value reflects that with one unit increase in regional digital finance development there will be 1.08 units increase in IPO short run returns. These findings are in line with the previous literature, which underscores the importance of robust digital infrastructure to improve the market efficiency, facilitate batter financial decision, and reduce the overall transaction costs [20]. The influence of other variables of regional digital finance development such as *Cov* and *Depth* also exhibit significant positive coefficients of 1.1021 and 1.0392, respectively, and they support the main finding of the positive impact of regional digital finance development on IPO short-run returns.

The significant positive influence of *Digif*, *Cov*, and *Depth* on IPO short-run performance underscore the critical role of digital finance development in shaping a conducive environment for firms to go for IPOs. Digital finance's feature to reduce information asymmetry, and improve access to financial resources is particularly beneficial for firms during the IPO process, and thereby they generate positive returns

on first day of listing. These findings also validate the economic theory having the well-developed financial systems contribute to higher corporate performance as they offer better financing opportunities and fostering investor confidence. Moreover, results for the control variables are in line with previous literature, reinforcing the validity of the model and the robustness of the findings [21, 26].

Table 3. Benchmark regression results.

	(1)	(2)	(3)
Variables	IPO	IPO	IPO
Digif	1.0768***		
	(16.67)		
Cov		1.1021***	
		(16.23)	
Depth			1.0392***
			(16.13)
Vol	0.1739***	0.1663***	0.1756***
	(20.12)	(19.31)	(20.16)
m_ret	2.9975***	2.8394***	3.4601***
	(3.64)	(3.43)	(4.18)
Size	–0.1783***	–0.1710***	–0.1742***
	(–8.00)	(–7.67)	(–7.79)
Price	–0.0105***	–0.0104***	–0.0105***
	(–7.78)	(–7.64)	(–7.70)
Eps	0.0755	0.0719	0.0722
	(1.17)	(1.11)	(1.11)
_cons	–3.4347***	–3.6366***	–3.3196***
	(–6.56)	(–6.79)	(–6.30)
Adj R-squared	0.2895	0.2836	0.2823
N	1,478	1,478	1,478

Note: *, **, *** denotes the significance level 1%, 5%, and 10%, and t-statistics are reported in brackets.

4.4 Checking the robustness of baseline regression results with 2SLS

This study employs two-stages least squares (2SLS) regression approach by using the provincial internet penetration as the instrumental variable. Provincial internet penetration serves as solid instrumental variable as it isis highly correlated with digital finance development measures such as Digif, Cov, and Depth, as access to the internet is a prerequisite for digital financial services. However, it is plausibly exogenous to IPO performance, making it a valid instrument. Additionally, previous studies also employed similar instrument to address endogeneity concerns in the context of digital finance and corporate performance [17, 23].

The results of 2SLS are reported in columns (1) to (6) of **Table 4**. It can be seemed in columns (1), (3) and (5) that in the first stage, internet penetration significantly predicts Digif, Cov, and Depth, as indicated by the coefficients of 0.0203, 0.0198, and 0.0207 respectively, all significant at the 1% level. This shows a strong correlation between internet penetration and our digital finance variables. In the second stage, the coefficients for Digif, Cov, and

Depth on IPO performance is reported as 1.0388, 1.0640, and 1.0206, respectively, all highly significant and comparable to the baseline OLS results. Thus, these findings accept hypothesis 1 which state that regional digital finance development positively impacts IPO performance, even when accounting for potential endogeneity.

Table 4. Robustness results.

	(1)	(2)	(3)	(4)	(5)	(6)
Stage:	**First**	**Second**	**First**	**Second**	**First**	**Second**
Variables:	**Digif**	**IPO**	**Cov**	**IPO**	**Depth**	**IPO**
Digif		1.0388***				
		(9.75)				
Cov				1.0640***		
				(9.71)		
Depth						1.0206***
						(9.71)
Vol	–0.0239***	0.1730***	–0.0165***	0.1658***	–0.0263***	0.1751***
	(–8.73)	(19.61)	(–6.39)	(19.08)	(–9.59)	(19.62)
m_ret	0.7064***	3.0263***	0.8337***	2.8730***	0.2878	3.4664***
	(2.67)	(3.67)	(3.34)	(3.46)	(1.09)	(4.20)
Size	0.0582***	–0.1754***	0.0503***	–0.1685***	0.0568***	–0.1729***
	(8.30)	(–7.60)	(7.60)	(–7.34)	(8.07)	(–7.48)
Price	0.0014***	–0.0104***	0.0012***	-0.0103***	0.0014***	–0.0104***
	(3.25)	(–7.59)	(3.01)	(–7.47)	(3.29)	(–7.55)
Eps	0.0162	0.0744	0.0190	0.0710	0.0192	0.0717
	(0.78)	(1.15)	(0.97)	(1.10)	(0.92)	(1.11)
Internet	0.0203***		0.0198***		0.0207***	
	(29.16)		(30.18)		(29.60)	
_cons	3.1778***	–3.2764***	3.2889***	–3.4747***	3.2003***	–3.2417***
	(21.43)	(–5.20)	(23.51)	(–5.37)	(21.53)	(–5.14)
Adj R-squared	0.4104	0.2922	0.4178	0.2864	0.4168	0.2852
N	1,478	1,478	1,478	1,478	1,478	1,478

Note: *, **, *** denotes the significance level 1%, 5%, and 10%, and t-statistics are reported in brackets.

4.5 Mechanism analysis

Information transparency (*info*) is a significant factor allowing the investors to trust or not on a firm going to list on stock market, so its inclusion as a mediating variable in our regression analysis reveals significant insights into the relationship between regional digital finance development and IPO short-run performance. The coefficient for information transparency is positive and significant across all models as reported in columns (2) to (4) of table 6, and ranging from 0.0138 to 0.0207, showing that higher information transparency enhances IPO performance. This finding aligns with the theoretical view that better information disclosure reduces information asymmetry, and making the investors to be more confident and gaining better market outcomes [30].

Additionally, when included as the mediating variable into equation (1), it is found that there is increase in regression coefficients of Digif, Cov, and Depth such as they reach at 1.083, 1.118, and 1.046 respectively, showing that when *Info* is incorporated as the mediating variable, the impact of regional digital finance development on corporate IPO performance improved. This suggests that regional digital finance development improves to provide stronger positive impact on IPO performance when accounting for the mediating role of information transparency. These results also validate the robustness of our baseline findings and are consistent with the literature, which highlights the role of digital finance in enhancing market efficiency and corporate financial performance [31].

Table 5. Mechanism analysis results.

	(1)	(2)	(3)	(4)
Variables	**IPO**	**IPO**	**IPO**	**IPO**
Info	0.007***	0.0138***	0.0144***	0.0147***
	(3.66)	(2.64)	(2.76)	(2.81)
Digif		1.0831***		
		(16.43)		
Cov			1.1181***	
			(16.02)	
Depth				1.0463***
				(15.93)
Vol	0.1529***	0.1755***	0.1681***	0.1772***
	(16.47)	(20.30)	(19.50)	(20.35)
m_ret	3.6114***	2.8735***	2.7110***	3.3210***
	(4.04)	(3.49)	(3.28)	(4.02)
Size	–0.0684***	–0.1568***	–0.1487***	–0.1515***
	(–2.73)	(–6.62)	(–6.28)	(–6.38)
Price	–0.0085***	–0.0113***	–0.0111***	–0.0113***
	(–5.75)	(–8.17)	(–8.06)	(–8.13)
Eps	0.0412	0.0723	0.0686	0.0688
	(0.59)	(1.12)	(1.06)	(1.06)
_cons	0.2787	–3.8866***	–4.1100***	–3.8089***
	(0.53)	(–7.07)	(–7.32)	(–6.88)
Adj R-squared	0.1629	0.2924	0.2868	0.2857
N	1,478	1,478	1,478	1,478

Note: *, **, *** denotes the significance level 1%, 5%, and 10%, and t-statistics are reported in brackets.

4.6 Heterogeneity analysis

Firm-ownership structure

Firm ownership plays a significant role in influencing the benefits gained from regional digital finance development on firm performance aspects because state-owned enterprises (SOEs) and non-SOE firms operate under different regulatory and market environments, which could have the direct affect on how they leverage digital finance technologies. SOEs could benefit less from digital finance development compared to the non-SOEs because of having larger size, more rigid structures, and a broader access to traditional financial resources. While non-SOEs, often being more flexible and facing greater financial constraints, and they could derive more significant benefits from the efficiencies and accessibility offered by the regional digital finance development [32, 33]. In addition to this, non-SOEs are also more innovative and quicker to adopt new technologies, which would lead to enhance their financial performance via the channels of digital finance development [34].

Table 6 reports the results of heterogeneity analysis and shows that the coefficients for Digif, Cov, and Depth are positive and significant for both SOEs and non-SOEs but they have been reported higher for the SOEs. It can be explained as that the coefficient for Digif is 1.0903 for SOEs (in column 1) compared to 0.8706 for non-SOEs (in column 2), suggesting that SOEs would have a stronger positive impact from digital finance development on their IPO performance comparative to Non-SOEs. Similarly, Cov and Depth have also shown higher coefficients for SOEs 1.1092 and 1.0630, respectively than for non-SOEs (0.9409 and 0.7672, respectively. This indicates that while both types of firms benefit from the regional digital finance development in China, however the SOEs gain more substantial advantages. These findings are consistent with the literature that shows the differing impacts of digital finance based on firm ownership structures [34].

Table 6. Firm ownership heterogeneity effects.

	(1)	(2)	(3)	(4)	(5)	(6)
	SOE	**Non-SOE**	**SOE**	**Non-SOE**	**SOE**	**Non-SOE**
Variables	**IPO**	**IPO**	**IPO**	**IPO**	**IPO**	**IPO**
Digif	1.0903***	0.8706***				
	(15.49)	(5.94)				
Cov			1.1092***	0.9409***		
			(15.06)	(5.98)		
Depth					1.0630***	0.7672***
					(15.07)	(5.50)
Vol	0.1789***	0.1409***	0.1713***	0.1348***	0.1809***	0.1399***
	(19.08)	(7.36)	(18.32)	(7.11)	(19.16)	(7.20)
m_ret	3.3390***	–0.2982	3.1705***	–0.3589	3.8046***	–0.0002
	(3.72)	(–0.17)	(3.52)	(–0.21)	(4.23)	(–0.00)
Size	–0.1521***	–0.1964***	–0.1391***	–0.1933***	–0.1483***	–0.1964***
	(–4.73)	(–6.48)	(–4.33)	(–6.41)	(–4.60)	(–6.37)
Price	–0.0103***	–0.0220***	–0.0102***	–0.0222***	–0.0103***	–0.0213***
	(–7.30)	(–3.97)	(–7.17)	(–4.00)	(–7.24)	(–3.81)
Eps	0.0519	0.3768*	0.0474	0.3748	0.0494	0.3543*
	(0.76)	(1.94)	(0.69)	(1.94)	(0.72)	(1.81)
_cons	–4.1016***	–1.4329	–4.3841***	–1.8166	–4.0455***	–0.8251
	(–5.99)	(–1.53)	(–6.30)	(–1.85)	(–5.88)	(–0.91)
Adj R-squared	0.2888	0.3398	0.2827	0.3415	0.2828	0.3210
N	1,321	157	1,321	157	1,321	157

Note: *, **, *** denotes the significance level 1%, 5%, and 10%, and t-statistics are reported in brackets.

Firm size

Firm size is also a significant factor to influence the benefits firms could garner from the regional digital finance development on corporate performance aspects such as IPO. Larger firms have relatively a more robust and established financial structure and they also own wider volume of resources to leverage digital finance technologies more effectively, while smaller firms could also benefit from the increased financial inclusion and accessibility that digital finance provides. Previous studies show that smaller firms often face higher financial constraints and therefore stand to gain more from improved access to financial services facilitated by digital finance development [35, 36]. On the other hand, larger firms would have a broader and better access to traditional financial services and may thus experience relatively smaller incremental benefits from digital finance [29].

As shown in **Table 7** that the coefficients for Digif, Cov, and Depth on IPO performance are consistently positive and significant for both sized firms including small and large, but the magnitude of these effects is relatively higher for small firms. It is shown in column (1) of **Table 7** that the coefficient for Digif is 1.1009 for small firms compared to 0.8896 for large firms (shown in column 2), reflecting that small sized firms experience a greater positive impact from digital finance development on their IPO short run performance. In same stride, Cov and Depth also present higher coefficients for small firms such as 1.1512 and 1.0521, respectively (shown in columns 3 and 5), than for large firms 0.8794 and 0.8603, respectively, (shown in columns 4 and 6). These findings demonstrate that regional digital finance development could benefit all firms, but smaller firms gain more substantial advantages due to their initial financial constraints and the relative improvement in financial inclusion and accessibility

provided by digital finance to achieve better IPO returns. These results are consistent with the literature, which shows that digital finance development provides a crucial role to alleviate the financing constraints and enhance performance, particularly for smaller firms [36, 37].

Table 7. Firm size heterogeneity analysis results.

	(1)	(2)	(3)	(4)	(5)	(6)
	Small	**Large**	**Small**	**Large**	**Small**	**Large**
Variables	**IPO**	**IPO**	**IPO**	**IPO**	**IPO**	**IPO**
Digif	1.1009***	0.8896***				
	(11.72)	(9.34)				
Cov			1.1512***	0.8794***		
			(11.58)	(8.97)		
Depth					1.0521***	0.8603***
					(11.33)	(9.02)
Vol	0.1722***	0.1792***	0.1648***	0.1734***	0.1730***	0.1813***
	(13.87)	(14.98)	(13.38)	(14.48)	(13.83)	(15.08)
m_ret	2.8330**	3.0923***	2.6779**	2.9287**	3.3403**	3.4395**
	(2.42)	(2.69)	(2.28)	(2.53)	(2.85)	(2.98)
Size	0.1401	–0.2180***	0.1655	–0.2161***	0.1716	–0.2169***
	(1.27)	(–7.64)	(1.51)	(–7.55)	(1.56)	(–7.58)
Price	–0.0089***	–0.0126***	–0.0089***	–0.0124***	–0.0087***	–0.0127***
	(–4.69)	(–6.21)	(–4.67)	(–6.08)	(–4.57)	(–6.21)
Eps	–0.0637	0.1264*	–0.0632	0.1203*	–0.0810	0.1271*
	(–0.44)	(1.75)	(–0.44)	(1.66)	(–0.56)	(1.75)
_cons	–9.8873***	–1.5840**	–10.5916***	–1.4940	–10.2494***	–1.4621
	(–4.77)	(–2.03)	(–5.12)	(–1.89)	(–4.93)	(–1.86)
Adj R-squared	0.2967	0.2944	0.2941	0.2885	0.2893	0.2894
N	739	739	739	739	739	739

Note: *, **, *** denotes the significance level 1%, 5%, and 10%, and t-statistics are reported in brackets.

5. Conclusion and policy implications

5.1 Conclusion

This study aims to investigate the influence of regional digital finance development on corporate short-run IPO performance by using the sample of 1,478 IPO firms listed on Shenzhen and Shanghai Stock Exchanges over the period of 2011–2021. This study employed the Peking University Financial Inclusion Index as a measure of regional digital finance development, first day IPO returns as the measure of short run IPO performance. Our baseline regression results show that digital finance development, Coverage, and financial Depth significantly foster the IPO short run performance. The inclusion of information transparency as a mediating variable further confirmed that better information disclosure could lead to positively impact the IPO outcomes. Furthermore, the robustness of these findings is confirmed using a two-stage least squares (2SLS) approach with provincial internet penetration as an instrumental variable, and our baseline results remain consistent. Additionally, our analysis of firm size and ownership heterogeneity revealed that smaller firms and state-owned enterprises (SOEs) benefit more from digital finance development in terms of IPO performance compared to the non-SOEs and large size firms.

5.2 Policy implications

The findings of this study present significant

policy implications for policymakers and regulators aiming to achieve positive returns through using the features and technologies of digital finance development. Given the positive impact of regional digital finance development on IPO performance, it is suggested that efforts must be made for expanding the digital financial services, particularly in less developed regions. It is suggested that policymakers should develop the policies that could promote internet penetration and digital financial inclusion, as they both can substantially benefit smaller firms and SOEs, which are shown to gain more from such advancements. The regional governments are encouraged to improve the transparency and information disclosure practices through pushing the corporations to utilize digital finance development technologies. Implementing supportive regulations for digital finance platforms and fostering an environment that facilitates financial innovation can lead to more robust and inclusive financial markets.

References

[1] Statista, 2024. Digital Banks – China. *Market Insights.* Available from: https://www.statista.com/outlook/fmo/banking/digital-banks/china (cited 10 July 2024).

[2] Z. Xun, W. Guanghua, Z. Jiajia, and H. Zongyue, 2020. Digital economy, financial inclusion and inclusive growth. *China Economist.* 15(3), 92–105.

[3] C. M. Group, 2023. About the China Internet User Data Report. *Internet Users in China*. Available from: https://www.chinamarketing-corp.com/blog/2023-china-internet-user-data/ (10 May 2024).

[4] Y. Chen, Z. Li, 2019. Information disclosure and market performance. *Journal of Financial Economics*. 132(2), 455–471.

[5] X. Li, Y. Liu, W. Zhang, 2020. Information disclosure and market performance: Evidence from Chinese listed firms. *Journal of Corporate Finance.* 64, 101622.

[6] J. Zhang, H. Li, D. Wu, 2021. The effect of information transparency on IPO performance: Evidence from China. *Journal of Financial Markets.* 54, 100876.

[7] H. Wang, J. Li, 2020. Digital finance platforms and investor engagement. *Journal of Financial Markets.* 50, 100602.

[8] G. Liu, Y. Huang, X. Chen, 2019. Digital finance and corporate capital costs. *Journal of Corporate Finance.* 60, 101541.

[9] X. Wu, Y. Liu, B. Xia, 2024. Industrial technology progress, digital finance development and corporate risk-taking: Evidence from China's listed firms. *Plos one.* 19(3), e0298734.

[10] Y. Ji, L. Shi,S. Zhang, 2022. Digital finance and corporate bankruptcy risk: Evidence from China. *Pacific-Basin Finance Journal.* 72, 101731.

[11] Q. Li, H. Chen, Y. Chen, et al., 2023. Digital economy, financing constraints, and corporate innovation. *Pacific-Basin Finance Journal.* 80, 102081.

[12] A. Rai, R. Patnayakuni, N. Seth, 2006. Firm performance impacts of digitally enabled supply chain integration capabilities. *MIS quarterly.* 225–246.

[13] I. Krinsky, W. Rotenberg, 1989. The valuation of initial public offerings. *Contemporary Accounting Research.* 5(2), 501–515.

[14] S. Benninga, M. Helmantel, O. Sarig, 2005. The timing of initial public offerings. *Journal of financial economics.* 75(1), 115–132.

[15] A. Salvi, F. Vitolla, M. Rubino, et al., 2021. Online information on digitalisation processes and its impact on firm value. *Journal of Business Research.* 124, 437–444.

[16] D.W. Diamond, 1984. Financial intermediation and delegated monitoring. *Review of Economic Studies.* 51(3), 393–414.

[17] J. Huang, R. Chen, 2020. Financial stability and digital finance: Insights from China. *Journal of Banking and Finance.* 113, 105746.

[18] Y. Tang, Q. Wu, 2021. Digital finance and capital allocation efficiency: Evidence from China. *Journal of Financial Economics.* 142(2), 579–602.

[19] L. Xu, D. Li, P. Wang, 2021. The role of digital finance in market liquidity: Evidence from

China. *Emerging Markets Review.* 47, 100736.

[20] Y. Xu, Y. Wang, F. Lu, D. Sheng, 2024. A study of the impact of digital inclusive finance on firm value from the perspective of financing constraints. Applied Economics. 56(33), 4033–4047.

[21] Y. Lin, X. Yan,X. Yang, 2023. Digital finance and enterprise investment efficiency in China. International Review of Financial Analysis. 90, 102929.

[22] D.W. Diamond, 1984. Financial intermediation and delegated monitoring. The review of economic studies. 51(3), 393–414.

[23] Y. Chen, R. Zhang, 2020. The impact of digital finance on firm valuation: Evidence from China. Financial Management. 49(3), 783–804.

[24] X. Huang, J. Li, H. Xu, 2021. The impact of internet penetration on digital finance development: Evidence from China. *Journal of Financial Economics.* 142(3), 679–701.

[25] M. Spence, 1973. Job market signaling. *Quarterly Journal of Economics.* 87(3), 355–374.

[26] Z. Wang, 2022. Digital finance, financing constraint and enterprise financial risk. *Journal of Mathematics.* 2022(1), 2882113.

[27] D. Kong, B. Liu, 2023. Digital technology and corporate social responsibility: evidence from China. *Emerging Markets Finance and Trade.* 1–27.

[28] H. Guo, F. Gu, Y. Peng, et al., 2022. Does digital inclusive finance effectively promote agricultural green development?—A case study of China. *International Journal of Environmental Research and Public Health.* 19(12), 6982.

[29] R.E. Carpenter, B.C. Petersen, 2002. Is the Growth of Small Firms Constrained by Internal Finance?. *Review of Economics and Statistics.* 84(2), 298–309.

[30] P.M. Healy, K.G. Palepu, 2001. Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics.* 31(1–3), 405–440.

[31] C. Li, Y. Wang, Z. Zhou, Z. Wang, and A. Mardani, "Digital finance and enterprise financing constraints: Structural characteristics and mechanism identification," *Journal of Business Research,* vol. 165, p. 114074, 2023.

[32] F. Allen, J. Qian, M. Qian, 2005. Law, finance, and economic growth in China. *Journal of Financial Economics.* 77(1), 57–116.

[33] M. Ayyagari, A. Demirguc-Kunt, V. Maksimovic, 2010. Formal versus informal finance: Evidence from China. *Review of Financial Studies.* 23(8), 3048–3097.

[34] R. Cull, L.C. Xu, T. Zhu, 2009. Formal finance and trade credit during China's transition. *Journal of Financial Intermediation.* 18(2), 173–192.

[35] T. Beck, A. Demirguc-Kunt, V. Maksimovic, 2005. Financial and Legal Constraints to Growth: Does Firm Size Matter?. *The Journal of Finance.* 60(1), 137–177.

[36] A.N. Berger, G.F. Udell, 2006. A more complete conceptual framework for SME finance. *Journal of Banking and Finance.* 30(11), 2945–2966.

[37] T. Beck, A. Demirgüç-Kunt, V. Maksimovic, 2005. Financial and legal constraints to growth: does firm size matter? *The journal of finance.* 60(1), 137–177.