Pacific-Basin Finance Journal 86 (2024) 102421

Contents lists available at ScienceDirect

Pacific-Basin Finance Journal

journal homepage: www.elsevier.com/locate/pacfin

Financial geographic density and corporate financial asset holdings: Evidence from China

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ARTICLE INFO

JEL classification:
G20
G31

Keywords:
Financial geographic density
Corporate financial asset holdings
Fintech
Information asymmetry

ABSTRACT

Using data from publicly listed A-share nonfinancial firms in China from 2011 to 2021, we define financial geographic density as the number of financial institutions within a certain radius around the firm, and investigate the impact of financial geographic density on corporate financial asset holdings. Our findings reveal that financial geographic density promotes corporate financial asset holdings by alleviating information asymmetry. The positive impact of financial geographic density on firms' financial asset investments is more pronounced for firms located in regions with a larger number of banking depository financial institutions, as well as those facing greater market competition. Meanwhile, we document that Fintech has little impact on the relationship between financial geographic density and corporate financial asset holdings. Furthermore, the rise of financial geographic density facilitates corporate innovation, thus supporting the precautionary motives of firms to hold financial assets.

1. Introduction

Economic policy uncertainty heightens greater instability in developing countries, diminishing returns on fixed asset investments (Tornell, 1990). Gong et al. (2023) point out that financial assets offer greater liquidity and higher investment returns than fixed assets. As a result, nonfinancial firms actively use financial asset investments to cope with uncertainty (Demir, 2009; Duchin et al., 2017; Huang et al., 2021).

Financial geographic density refers to the distribution and supply of financial resources in a geographic space and is the main determinant of the convenience and availability of financial services (Hombert and Matray, 2017; Petersen and Rajan, 2002). Hollander and Verriest (2016) document that the improvement in financial accessibility, marked by the growth in the number of financial institutions around firms, can effectively reduce transportation costs. Thus, financial service providers can obtain information on operating conditions and soft information through frequent communication with firms (Agarwal and Hauswald, 2010; Petersen and Rajan, 2002), and provide customized financial products to satisfy the needs of firms for financial asset investments.

However, as digital technology develops, the emergence of Fintech has broken the geographic and spatial limitations of traditional financial institutions regarding business models and financial services (Goldstein et al., 2019). As a financial innovation that is driven by digital technology, Fintech may provide firms with access to enormous volumes of financial information at almost zero cost (Zhu, 2019). Fintech also incurs lower costs and risks when processing big data than traditional financial institutions, which have relatively

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https://doi.org/10.1016/j.pacfin.2024.102421
Received 15 September 2023; Received in revised form 4 May 2024; Accepted 30 May 2024
Available online 31 May 2024

stable high costs (Philippon, 2016). Therefore, Fintech expands the availability of financial products for firms (Bollaert et al., 2021; Buchak et al., 2018), and improves the efficiency of financial services (Fuster et al., 2019). The rapid development and application of Fintech have reshaped traditional financial service to a certain extent.

Based on a sample of Chinese publicly listed nonfinancial firms from 2011 to 2021, we investigate the impact of geographic distribution of financial institutions on firms' financial asset investments from the perspective of financial geographic density. We also examine the role of Fintech in the relationship between financial geographic density and corporate financial asset holdings. We find that an increase in the number of financial institutions around firms spurs corporate financial asset holdings. The rise in financial geographic density alleviates information asymmetry between firms and financial institutions, and thus encourage firms to invest more in financial assets. In addition, Fintech has little impact on the positive relationship between financial geographic density and corporate financial asset holdings. Heterogeneity analysis shows that as financial geographic density increases, firms located in regions with a larger number of banking depository financial institutions and those facing greater market competition tend to make greater investments in financial assets. Furthermore, the increase in financial geographic density induces firms to hold more precautionary financial assets in order to smooth their innovation expenditures.

This study contributes to the literature in several ways. First, we provide insights into the determinants of firms' financial asset investments from the perspective of financial geographic density. Previous research has predominantly focused on how a firm's intrinsic characteristics affect its financial asset investments. For example, precautionary motived firms hold financial assets to cope with uncertainty (Duchin et al., 2017; Duong et al., 2020; Han and Wang, 2023; Jayakody et al., 2023), while return-chasing motived firms engage in financial asset investments to achieve high yields (Hugonnier et al., 2015). We examine how the availability of financial services, as indicated by the presence of financial institutions around firms, influences the financial asset investments of nonfinancial firms. We document that an increase in the number of financial institutions around firms mitigates information asymmetry between firms and financial institutions and thus has a positive impact on corporate financial asset holdings.

Second, our work enriches the literature on firms' access to financial services. Previous studies mainly focus on the impact of market competition and relationship loans on firms' credit availability and investment decisions according to the geographic distribution of banks (Amore et al., 2013; Ayyagari et al., 2011; Bai et al., 2018; Berger et al., 2017; Cenni et al., 2015; Hombert and Matray, 2017; Tian et al., 2022). We conduct a comprehensive investigation to assess how increased diversity and quantity of financial institutions surrounding a firm can enhance the accessibility of financial services and alleviate information asymmetry, thereby affecting firm's financial asset investments. Although Kim et al. (2022) state that the geographic distribution of U.S. institution investors plays a crucial role in firm valuation as well as its investment and financing decisions, they use the equity holdings of money management companies to the aggregate market capitalization of public firms in a state to proxy the geographic clustering of institution investors. We define financial geographic density as the number of financial institutions around a firm within a certain radius, thereby provide a more direct insight on the impact of financial service availability on firms' financial asset investments.

Finally, our findings provide more evidence to the ongoing debate regarding the transformative role of Fintech in reshaping traditional financial business models. Existing literature demonstrates that Fintech complements current financial services by enhancing efficiency and inclusivity (Berg et al., 2020; Buchak et al., 2018; Howell et al., 2024; Tang, 2019). However, our findings highlight the enduring importance of physical branches in traditional financial institutions for alleviating information asymmetry and facilitating firms' access to financial services.

The remainder of this paper is organized as follows. Section 2 develop the hypotheses. Section 3 describes the data and defines the key variables. Section 4 presents the empirical results of the baseline model, robustness tests, and mechanism analysis. Section 5 examines the impact of Fintech on the relationship between financial geographic density and corporate financial asset holdings. Section 6 further explores heterogeneity and economic consequence analyses. Section7 concludes.

2. Hypotheses development

The geographic distance between financial institutions and firms is associated with communication costs. Degryse and Ongena (2005) assert that financial institutions may compensate for transportation costs caused by geographic distance through differential pricing, and firms are more inclined to access financial services from closer financial institutions. On the one hand, financial institutions improve the promotion and marketing of financial services as transportation costs between financial institutions and firms decline. They also take the initiative to provide financial products and risk-hedging strategies to cater to firms' financial investment demands. On the other hand, firms tend to preserve assets with high liquidity to cope with uncertainty for precautionary motives (Duchin et al., 2017). An increase in the number of financial institutions around a firm may provide more opportunities for the firm to access financial services (Burgess and Pande, 2005), thereby stimulating it to invest more in financial assets. We propose the following hypothesis:

Hypothesis 1. An increase in financial geographic density has a positive impact on nonfinancial firms' holdings of financial assets.

The distance between financial institutions and firms is the primary factor causing information barrier (Agarwal and Hauswald, 2010; Sufi, 2007). An increase in financial geographic density is conducive to enhancing the frequency and efficiency of communication between financial institutions and firm managers. Tian et al. (2022) find that firms with higher borrowing costs and severer information asymmetry invest more in financial assets as the number of banks around them increases. An increase in the number of financial institutions around firms might mitigate information friction between financial institutions and nonfinancial firms, thereby increasing corporate financial asset holdings. Thus, we hypothesize the following:

Table 1
Definition of variables.

Variable	Definition
FAH	The ratio of financial assets to total assets. The financial assets equal the sum of monetary assets, held-to-maturity investments, financial assets held for trading, investment property, and available-for-sale financial assets before 2017. Since 2018, the financial assets equal the sum of monetary assets, financial assets held for trading, investment property, debt investments, other debt investments, other equity investments, and other non-current financial assets.
Density^{3}	The natural logarithm of the number of financial institutions within the radius of 3 km from the office address at which a firm is located.
Density^{5}	The natural logarithm of the number of financial institutions within the radius of 5 km from the office address at which a firm is located.
Density^{10}	The natural logarithm of the number of financial institutions within the radius of 10 km from the office address at which a firm is located.
Leverage	The ratio of total liabilities to total assets.
Growth	The growth rate of operating income.
Top1	The shareholding ratio of the largest shareholder.
Tangibility	The ratio of tangible assets to total assets.
Size	The natural logarithm of total assets.
SOE	The ownership status, which equals 1 if a firm's ultimate controller is the government or state institutions, and 0 otherwise.

This table presents the definition of key variables used in the paper.

Table 2
Descriptive statistics.

Variable	Obs	Mean	SD	Min	Median	Max
FAH	23,781	0.2421	0.1587	0.0309	0.1989	0.7438
Density3	23,781	3.4983	1.5264	0.0000	3.5264	6.2186
Density5	23,781	4.4450	1.4051	1.0986	4.4543	6.9058
Density10	23,781	5.6546	1.2217	2.4849	5.6204	7.8148
Leverage	23,781	0.3826	0.1900	0.0492	0.3736	0.8201
Growth	23,781	0.1560	0.2846	−0.4621	0.1177	1.3985
Top1	23,781	0.3419	0.1465	0.0877	0.3207	0.7367
Tangibility	23,781	0.1268	0.0936	0.0004	0.1093	0.4723
Size	23,781	12.8207	1.1442	10.8245	12.6615	16.3181
SOE	23,781	0.3010	0.4587	0.0000	0.0000	1.0000

This table reports the descriptive statistics of the key variables used in the main regressions.

Hypothesis 2. An increase in financial geographic density promotes corporate financial asset holdings by alleviating information asymmetry.

Petersen and Rajan (2002) classify information as hard and soft. The transparency of hard information can be improved through public disclosure and third-party auditing. The emergence of information technology, especially Fintech, which facilitates the collection and transmission efficiency of hard information. By processing extensive operational and financial data, Fintech can offer a diverse range of financial products to nonfinancial firms, thereby fulfilling their financial investment needs. However, previous studies document that while Fintech enhances firms' accessibility to financial services, it complements the services of traditional financial institutions rather than substitute them (Buchak et al., 2018; Erel and Liebersohn, 2022; Tang, 2019). Since soft information collected in person and usually recorded in text, it requires greater effort and cost for financial institutions to gather soft information (Liberti and Petersen, 2018). Moreover, Hollander and Verriest (2016) state that the transmission of soft information over long distances may cause a loss of credibility. Hence, the advantage of physical branches enables traditional financial institutions to obtain soft information that is not publicly disclosed, such as statements of management plans, opinions, and economic projections (Berger et al., 2005; Boot and Thakor, 2000). The development of Fintech cannot entirely replace the important function of traditional financial institutions in obtaining soft information through offline communication and interaction. The geographic distribution of financial institutions around firms plays an important role in alleviating information asymmetry and meeting firms' diverse needs for financial investments. Thus, we propose the following hypothesis:

Hypothesis 3. Fintech development has little effect on the relationship between financial geographic density and corporate financial asset holdings.

3. Data and variables

3.1. Data description

We construct our sample of Chinese A-share publicly listed nonfinancial firms for the period from 2011 to 2021. The accounting data and office address information of the firms are obtained from the China Stock Market and Accounting Research Database. The addresses of financial institutions are collected from two sources. The financial license information database of the National Administration of Financial Regulation (formed on the basis of the China Banking and Insurance Regulatory Commission) provides the geographic location of banking depository financial institutions, banking non-depository financial institutions, and insurance

Table 3
The impact of financial geographic density on corporate financial asset holdings.

Dependent Variable:	*FAH*					
	OLS			GMM		
	(1)	(2)	(3)	(4)	(5)	(6)
Density^{3}	0.0063***			0.0154**		
	(4.5049)			(2.0710)		
Density^{5}		0.0068***			0.0140*	
		(4.4954)			(1.7463)	
Density^{10}			0.0094***			0.0156*
			(5.3591)			(1.8729)
Leverage	−0.2696***	−0.2698***	−0.2702***	−0.0204	−0.0299	−0.0276
	(−21.1745)	(−21.1703)	(−21.1951)	(−0.5254)	(−0.7743)	(−0.7101)
Growth	−0.0037	−0.0037	−0.0041	−0.1058***	−0.1067***	−0.1152***
	(−0.9472)	(−0.9444)	(−1.0462)	(−2.6307)	(−2.6450)	(−2.8154)
Top1	0.0599***	0.0600***	0.0610***	−0.0249	−0.0237	−0.0201
	(4.6448)	(4.6553)	(4.7541)	(−0.5442)	(−0.5151)	(−0.4377)
Tangibility	−0.1557***	−0.1550***	−0.1543***	0.1513**	0.1523**	0.1581**
	(−7.8428)	(−7.8090)	(−7.7629)	(2.1442)	(2.1768)	(2.2556)
Size	−0.0041*	−0.0040*	−0.0041*	−0.0058	−0.0048	−0.0058
	(−1.7844)	(−1.7476)	(−1.7680)	(−0.8512)	(−0.7215)	(−0.8498)
SOE	0.0181***	0.0182***	0.0183***	0.0102	0.0118	0.0136
	(3.5617)	(3.5873)	(3.6111)	(0.4357)	(0.5201)	(0.6227)
LagFAH				0.7375***	0.7354***	0.7438***
				(10.7680)	(10.5754)	(10.5516)
Constant	0.3548***	0.3455***	0.3228***	−0.0119	−0.0069	0.0042
	(13.2508)	(12.8482)	(11.7354)	(0.1332)	(0.1338)	(0.1351)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,040	20,040	20,040	20,039	20,039	20,039
Adj.R^2	0.271	0.271	0.272			
AR (1) test				0.087	0.088	0.008
AR (2) test				0.127	0.137	0.175
Hansen test				0.791	0.672	0.773

This table reports the baseline results of the impact of financial geographic density on corporate financial asset holdings. Columns (1)–(3) and (4)–(6) use the OLS and GMM method for regression, respectively. The dependent variable is corporate financial asset holdings (*FAH*), measured by the financial assets to total assets. Financial geographic density is proxied by the number of financial institutions within 3 km (*Density*^{3}), 5 km (*Density*^{5}), and 10 km (*Density*^{10}) radius from the office address at which a firm is located, respectively. The control variables are defined in Table 1. We control year, industry, and province fixed effects in all of the regressions. Standard errors are clustered by firm, and t-statistics for the regression coefficients are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

companies. The membership list of the official website of the Shanghai Stock Exchange provides detailed information on the addresses of the business departments of securities companies. Next, we exploit the coordinate conversion system of the Baidu Map API to convert the office address information of both listed firms and financial institutions into latitude and longitude coordinates, and identify the number of financial institutions within a certain radius around a firm based on the geographic distance between the firm and the financial institution. Then we merge the accounting data of the listed nonfinancial firms with the geographic distribution of financial institutions.

The sample selection process is as follows. (1) We collect the observations listed in the A-share market in Shanghai and Shenzhen before 2021. (2) We exclude firms in the financial, insurance, and real estate industries because their financing and investment decisions differ from those in other industries. (3) We exclude backdoor listed firms and firms with special treatment (such as ST, *ST, suspended, and delisted) as they have different accounting treatments. (4) We exclude observations with missing values for key variables. Our final sample consists of an unbalanced panel of 3140 firms with 23,781 firm-year observations.

3.2. Variable definitions

3.2.1. Corporate financial asset holdings

Referring to Demir (2009), we define corporate financial asset holdings (*FAH*) as financial assets scaled by total assets. Financial assets include the balance sheet accounts “monetary assets,” “held-to-maturity investments,” “financial assets held for trading,” “investment property,” and “available-for-sale financial assets.” In 2017, the China Accounting Standards Committee issued Chinese Accounting Standards for Business Enterprises No. 22: Recognition and Measurement of Financial Instruments. The new accounting standards no longer use “held-to-maturity investments” and “available-for-sale financial assets,” but add “debt investments,” “other debt investments,” “other equity investments,” and “other non-current financial assets” to the balance sheet accounts. Therefore, financial assets contain the balance sheet accounts “monetary assets,” “financial assets held for trading,” “investment property,” “debt investments,” “other debt investments,” “other equity investments,” and “other non-current financial assets” since 2018.

Table 4
Robustness tests: Alternative measure for corporate financial asset holdings.

Dependent Variable:	*NoncashFAH*		
	(1)	(2)	(3)
Density^{3}	0.0026***		
	(2.9198)		
Density^{5}		0.0029***	
		(2.9947)	
Density^{10}			0.0033***
			(2.8586)
Leverage	−0.1010***	−0.1011***	−0.1012***
	(−13.3452)	(−13.3609)	(−13.3865)
Growth	−0.0123***	−0.0123***	−0.0125***
	(−5.0027)	(−5.0085)	(−5.0881)
Top1	0.0093	0.0094	0.0095
	(1.1562)	(1.1644)	(1.1803)
Tangibility	−0.0392***	−0.0388***	−0.0388***
	(−2.9392)	(−2.9076)	(−2.8986)
Size	−0.0012	−0.0012	−0.0012
	(−0.9760)	(−0.9686)	(−0.9345)
SOE	0.0009	0.0009	0.0012
	(0.2965)	(0.2874)	(0.3663)
Constant	0.1062***	0.1021***	0.0957***
	(7.1530)	(6.7931)	(6.0719)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Province FE	Yes	Yes	Yes
Observations	16,055	16,055	16,055
Adj.R^2	0.187	0.187	0.187

This table reports the results of the impact of financial geographic density on corporate noncash financial asset holdings. The dependent variable is corporate noncash financial asset holdings (*NoncashFAH*), measured by the noncash financial assets to total assets. Financial geographic density is proxied by the number of financial institutions within 3 km (*Density*^{3}), 5 km (*Density*^{5}), and 10 km (*Density*^{10}) radius from the office address at which a firm is located, respectively. The control variables are defined in Table 1. We control year, industry, and province fixed effects in all of the regressions. Standard errors are clustered by firm, and t-statistics for the regression coefficients are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

3.2.2. Financial geographic density

Financial geographic density (*Density*) is the natural logarithm of the number of financial institutions around a firm's office. Financial institutions are comprised various types, including banking depository financial institutions, banking non-depository financial institutions, insurance companies, and securities companies. Therefore, financial geographic density represents the regional financial development and availability of financial services. Specifically, we use the Baidu Map API to obtain the latitude and longitude coordinates of nonfinancial firms and the geographic location of financial institutions. We then calculate the number of financial institutions within a certain radius of the office address at which a firm is located. The radius thresholds for the geographic distance between nonfinancial firms and financial institutions are 3 km, 5 km, and 10 km. The greater the number of financial institutions around a firm within a given radius threshold, the higher the availability of financial services for the firm and the lower the communication costs between the firm and financial institutions.

3.2.3. Control variables

Inspired by the literature on corporate financial asset holdings (Duchin et al., 2017; Zhang and Zheng, 2020; Favara et al., 2021; Huang et al., 2021; Tian et al., 2022), we include the following control variables: the ratio of total liabilities to total assets (*Leverage*), the growth rate of operating income (*Growth*), the shareholding ratio of the largest shareholder (*Top1*), the ratio of tangible assets to total assets (*Tangibility*), the natural logarithm of total assets (*Size*), and the state-owned property (*SOE*). The definitions of the key variables are presented in Table 1.

3.3. Descriptive statistics

Table 2 tabulates the descriptive statistics of the key variables. To exclude potential spurious effects caused by outliers, all firm-level continuous variables are winsorized at the top and bottom 1% levels so that the observed values outside the 1% and 99% quantiles are replaced with observed values at the 1% and 99% quantiles, respectively. The average financial asset holdings of listed Chinese nonfinancial firms are 24.21% of total assets, and the median of financial assets to total assets is 19.89%, which means that more than half of the firms in our sample hold financial assets. The natural logarithm of the number of financial institutions within the radius thresholds of 3 km, 5 km, and 10 km around the firm are 3.4983, 4.4450, and 5.6546, respectively. This indicates that, on average, 33, 85, and 285 financial institutions are distributed within 3 km, 5 km, and 10 km from a firm, respectively. Moreover, the mean value of the leverage ratio is 38.26%, the average growth rate of operating income is 15.60%, the average shareholding of the

Table 5
Robustness tests: The dynamic impact of financial geographic density.

Dependent Variable:	*FAHGrowth*		
	(1)	(2)	(3)
DensityGrowth^{3}	0.2203***		
	(3.3484)		
DensityGrowth^{5}		0.3074***	
		(3.3287)	
DensityGrowth^{10}			0.3180**
			(2.2753)
Leverage	−0.4731***	−0.4734***	−0.4723***
	(−17.7390)	(−17.7597)	(−17.7061)
Growth	0.1653***	0.1654***	0.1656***
	(12.8025)	(12.8075)	(12.8177)
Top1	0.0542**	0.0548**	0.0543**
	(2.0230)	(2.0441)	(2.0240)
Tangibility	−0.3731***	−0.3729***	−0.3729***
	(−8.2258)	(−8.2144)	(−8.2176)
Size	0.3928***	0.3930***	0.3927***
	(45.2027)	(45.2321)	(45.1711)
SOE	0.0309***	0.0310***	0.0311***
	(3.0601)	(3.0707)	(3.0692)
Constant	−0.6827***	−0.6858***	−0.6847***
	(−13.9169)	(−13.9502)	(−13.9192)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Province FE	Yes	Yes	Yes
Observations	20,039	20,039	20,039
Adj.R^2	0.285	0.285	0.285

This table reports the results of the dynamic impact of financial geographic density on corporate financial asset holdings. The dependent variable is the growth rate of corporate financial asset holdings (*FAHGrowth*). The growth of financial geographic density is proxied by the growth number of financial institutions within 3 km (*DensityGrowth*^{3}), 5 km (*DensityGrowth*^{5}), and 10 km (*DensityGrowth*^{10}) radius from the office address at which a firm is located, respectively. The control variables are defined in Table 1. We control year, industry, and province fixed effects in all of the regressions. Standard errors are clustered by firm, and t-statistics for the regression coefficients are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

largest shareholder is 34.19%, the mean asset tangibility is 12.68%, the average firm assets are 3.7 billion, and 30.10% of firms in the sample are state-owned enterprises.

4. Empirical results

Considering the potential endogeneity problem caused by the location problem of financial institutions (Ellison et al., 2010), an increase in firms' financial asset investments simultaneously drives up the number of financial institutions around them. Therefore, to mitigate the reverse causality issue and investigate the impact of financial geographic density on corporate financial asset holdings, we estimate the following baseline model (1):

$$FAH_{i,t} = \alpha + \beta Density^{k}_{i,t-1} + \gamma' Controls_{i,t-1} + Year + Industry + Province + \varepsilon_{i,t} \quad (1)$$

where the subscripts i and t denote the firm and year, respectively. The dependent variable $FAH_{i,t}$, is measured as the ratio of financial assets to total assets of firm i in year t. The independent variable, $Density^{k}_{i,t-1}$, is the lagged financial geographic density proxied by the natural logarithm of the number of financial institutions within the radius threshold of k kilometers around firm i in year t (k takes the value of 3, 5 and 10, respectively). $Controls_{i,t-1}$ denotes a vector of the lagged control variables that are potential factors affecting corporate financial asset holdings. *Year*, *Industry* and *Province* are the year, industry, and province fixed effects, respectively. $\varepsilon_{i,t}$ is the error term. We include year fixed effects to capture unobservable time-varying common shocks in corporate financial investments, industry fixed effects to control for all unobservable time-invariant determinants of corporate financial asset holdings within industries, and province fixed effects to capture economic development differences across regions. Standard errors are adjusted for clustering at the firm level to eliminate disturbances in heteroscedasticity.

4.1. Baseline results

Table 3 reports the empirical results of the baseline model. We estimate the baseline model by using the ordinary least squares (OLS) method in Columns (1)–(3). The coefficients of *Density*^{3}, *Density*^{5}, and *Density*^{10} are all significantly positive, indicating that the financial asset holdings of firms are increasing with the number of financial institutions around them. To address the potential endogeneity problem, we use the generalized method of moments (GMM) to estimate the baseline model in Columns (4)–(6). The

Table 6
Robustness tests: Sample concerns.

Dependent Variable:	*FAH*					
	Tobit model			Unchanged office address subsample		
	(1)	(2)	(3)	(4)	(5)	(6)
Density^3	0.0087***			0.0059**		
	(6.0992)			(2.0138)		
Density^5		0.0094***			0.0074**	
		(6.0332)			(2.5155)	
Density^{10}			0.0131***			0.0094***
			(7.1553)			(2.8572)
Leverage	−0.2043***	−0.2044***	−0.2047***	−0.2305***	−0.2312***	−0.2315***
	(−27.6425)	(−27.6570)	(−27.7137)	(−9.3806)	(−9.4127)	(−9.4205)
Growth	0.0064**	0.0065**	0.0064**	−0.0073	−0.0069	−0.0070
	(2.5310)	(2.5364)	(2.5059)	(−0.9463)	(−0.9032)	(−0.9122)
Top1	0.0657***	0.0657***	0.0663***	0.0834***	0.0849***	0.0873***
	(6.6425)	(6.6446)	(6.7092)	(2.9279)	(2.9846)	(3.0742)
Tangibility	−0.1884***	−0.1881***	−0.1880***	−0.1613***	−0.1589***	−0.1565***
	(−13.7668)	(−13.7495)	(−13.7483)	(−4.1105)	(−4.0656)	(−4.0133)
Size	−0.0119***	−0.0119***	−0.0118***	−0.0030	−0.0029	−0.0031
	(−7.3647)	(−7.3433)	(−7.3470)	(−0.6199)	(−0.5975)	(−0.6232)
SOE	−0.0050	−0.0048	−0.0047	0.0228**	0.0222**	0.0228**
	(−1.2028)	(−1.1509)	(−1.1433)	(2.4287)	(2.3688)	(2.4517)
Constant	0.4225***	0.4124***	0.3824***	0.3174***	0.3036***	0.2847***
	(15.4712)	(15.0019)	(13.5762)	(5.4433)	(5.1976)	(4.8483)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,040	20,040	20,040	5645	5645	5645
Adj.R^2				0.285	0.286	0.287

This table reports the results of the impact of financial geographic density on corporate financial asset holdings after considering sample concerns. Columns (1)–(3) use the Tobit model for estimations, Columns (4)–(6) use a subsample of firms with unchanged office addresses for regressions. The dependent variable is corporate financial asset holdings (*FAH*), measured by the financial assets to total assets. Financial geographic density is proxied by the number of financial institutions within 3 km (*Density*^{3}), 5 km (*Density*^{5}), and 10 km (*Density*^{10}) radius from the office address at which a firm is located, respectively. The control variables are defined in Table 1. We control year, industry, and province fixed effects in all of the regressions. Standard errors are clustered by firm, and t-statistics for the regression coefficients are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

coefficients of *Density*^{3}, *Density*^{5}, and *Density*^{10} are still positive and statistically significant, implying that a rise in financial geographic density significantly promotes firms to invest more in financial assets. Regarding economic significance, the coefficient of *Density*^{3} in Column (1) is 0.0063, which suggests that *ceteris paribus*, a one standard deviation increase in the natural logarithm of the number of financial institutions distributed within the radius threshold of 3 km around the firm, the corresponding increase in financial asset holdings of the firm is about 0.96% (0.0063*1.5264), which accounts for 3.97% of the sample mean. Similarly, a one standard deviation increase in the financial geographic density within the radius threshold of 5 km and 10 km around the firm will spur corporate financial asset holdings by 0.95% (0.0068*1.4051) and 1.15% (0.0094*1.2217), which represent 3.95%, and 4.74% of the sample mean, respectively. Therefore, the baseline empirical results support Hypothesis 1.

The coefficients of the control variables show that total financial asset holdings are higher for firms with a higher ownership concentration and those controlled by the government. Moreover, firms with higher leverage, higher profitability, greater tangible assets, and larger size tend to hold fewer financial assets, while the coefficients of profitability are statistically insignificant.

4.2. Robustness tests

4.2.1. Alternative measure for corporate financial asset holdings

Previous studies on corporate financial asset holdings regards cash and cash equivalents as operating assets and excludes cash and cash equivalents from financial assets (Duchin et al., 2017; Tian et al., 2022). Thus, we use the noncash financial assets scaled by total assets as a proxy for corporate financial asset holdings. Specifically, the noncash financial assets are measured by excluding the balance sheet account "monetary assets" from total financial assets, and the corporate noncash financial asset holdings (*NoncashFAH*) is the ratio of the noncash financial assets to total assets. Table 4 presents the empirical results of using an alternative measure for corporate financial asset holdings. The coefficients of *Density* are all significantly positive, which means that the increase in the number of surrounding financial institutions has a positive impact on firms' investments in noncash financial assets. These findings are consistent with the baseline results.

4.2.2. The dynamic impact of financial geographic density

To illustrate the dynamic impact of financial geographic density on corporate financial asset holdings, we regress the increase in the

Table 7
Robustness tests: The impact of China's regulatory guidelines in 2012.

Dependent Variable:	*FAH*		
	(1)	(2)	(3)
Density^3	0.0026***		
	(4.6429)		
Density^3*Post2012	0.0095***		
	(4.3699)		
Density^5		0.0009***	
		(4.6530)	
Density^5*Post2012		0.0083***	
		(3.4926)	
Density^{10}			0.0052*
			(1.7191)
Density^{10}*Post2012			0.0046*
			(1.6547)
Leverage	−0.2691***	−0.2694***	−0.2701***
	(−21.1352)	(−21.1376)	(−21.1792)
Growth	−0.0035	−0.0036	−0.0040
	(−0.9087)	(−0.9228)	(−1.0345)
Top1	0.0598	0.0599	0.0610
	(1.0825)	(0.3582)	(0.7532)
Tangibility	−0.1559***	−0.1551***	−0.1543***
	(−7.8533)	(−7.8169)	(−7.7650)
Size	−0.0042*	−0.0041*	−0.0041*
	(−1.8123)	(−1.7703)	(−1.7784)
SOE	0.0182***	0.0183***	0.0183***
	(3.5785)	(3.6022)	(3.6186)
Constant	0.3556***	0.3462***	0.3231***
	(13.2738)	(12.8667)	(11.7438)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Province FE	Yes	Yes	Yes
Observations	20,040	20,040	20,040
Adj.R^2	0.271	0.271	0.272

This table reports the results of the impact of financial geographic density on corporate financial asset holdings after considering the implementation of the regulatory guidelines in 2012. The dependent variable is corporate financial asset holdings (*FAH*), measured by the financial assets to total assets. Financial geographic density is proxied by the number of financial institutions within 3 km (*Density*^{3}), 5 km (*Density*^{5}), and 10 km (*Density*^{10}) radius from the office address at which a firm is located, respectively. *Post2012* is a dummy that equals one for the years after 2012 and zero otherwise. The control variables are defined in Table 1. We control year, industry, and province fixed effects in all of the regressions. Standard errors are clustered by firm, and t-statistics for the regression coefficients are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

number of financial institutions within a certain threshold radius around the firm (*DensityGrowth*) on the growth rate of firm's holdings of financial assets (*FAHGrowth*). Table 5 shows the impact of the increase in financial geographic density on the growth of firms' financial asset investments. The coefficients of *DensityGrowth* are statistically significant, which shows that an increase in the number of financial institutions around firms positively affects the growth of corporate financial asset holdings. These results are robust to our baseline results.

4.2.3. Sample concerns

Considering that our dependent variable, corporate financial asset holdings, has the feature of left censoring at zero. The estimation results of linear regressions may be biased. Therefore, we exploit the Tobit model to estimate the baseline model. In addition, firms may move their offices to regions with greater financial development, resulting in a self-selection problem. To alleviate the endogeneity issue arising from sample selection bias, we exclude firms that relocated their office addresses during the sample period. Table 6 reports the impact of financial geographic density on corporate financial asset holdings after considering sample concerns. Columns (1)–(3) use the Tobit model for estimations, and Columns (4)–(6) use a subsample of firms with unchanged office addresses for regressions. The coefficients of *Density* are all significantly positive, meaning that the rise of financial geographic density has a positive impact on firms' financial asset investments after considering the sample concerns. Our baseline results are robust.

4.2.4. The impact of China's regulatory guidelines of 2012

In 2012, China's Security Regulatory Commission promulgated the Regulatory Guidelines for Listed Companies No. 2: Regulatory Requirement in Respect of the Management and Use of Proceeds of Listed Companies. The regulatory guidelines indicate that to improve the efficiency of the use of proceeds, listed firms can use idle proceeds to purchase safe and capital-protected investment products with high liquidity, such as fixed-return treasury bonds, wealth management products, and other investment products offered by banks. Hence, the positive effect of financial geographic density on corporate financial asset holdings may be correlated with the

Table 8
Mechanism analysis: Information asymmetry.

Dependent Variable:	*FAH*		
	(1)	(2)	(3)
Density^3	0.0036**		
	(2.1415)		
Density^3*Asymmetry*	0.0060**		
	(2.3394)		
Density^5		0.0038**	
		(2.0302)	
Density^5*Asymmetry*		0.0066**	
		(2.3949)	
Density^{10}			0.0063***
			(2.9309)
Density^{10}*Asymmetry*			0.0066**
			(2.1078)
Asymmetry	−0.0198**	−0.0278**	−0.0349**
	(−2.1182)	(−2.2762)	(−1.9990)
Leverage	−0.2708***	−0.2712***	−0.2719***
	(−21.2791)	(−21.3097)	(−21.3777)
Growth	−0.0036	−0.0035	−0.0037
	(−0.9140)	(−0.9091)	(−0.9512)
Top1	0.0583***	0.0580***	0.0583***
	(4.4831)	(4.4679)	(4.4996)
Tangibility	−0.1507***	−0.1500***	−0.1494***
	(−7.6012)	(−7.5615)	(−7.5154)
Size	−0.0032	−0.0030	−0.0030
	(−1.2672)	(−1.2031)	(−1.1865)
SOE	0.0173***	0.0174***	0.0175***
	(3.3689)	(3.3962)	(3.4117)
Constant	0.3523***	0.3461***	0.3263***
	(11.6638)	(11.3538)	(10.3525)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Province FE	Yes	Yes	Yes
Observations	19,801	19,801	19,801
Adj.R^2	0.271	0.271	0.272

This table reports the results of the mechanism of the impact of financial geographic density on corporate financial asset holdings. The dependent variable is corporate financial asset holdings (*FAH*). Financial geographic density is proxied by the number of financial institutions within 3 km (*Density*^{3}), 5 km (*Density*^{5}), and 10 km (*Density*^{10}) radius from the office address at which a firm is located, respectively. *Asymmetry* is a dummy to capture information asymmetry, which equals one if the number of analysts who have tracked the firm is below the median, and zero otherwise. The control variables are defined in Table 1. We control year, industry, and province fixed effects in all of the regressions. Standard errors are clustered by firm, and t-statistics for the regression coefficients are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

implementation of the regulatory guidelines in 2012. To investigate the impact of the regulatory guidelines on listed firms' financial asset investments, we define a year dummy variable *Post2012*, which takes the value of one for the years after 2012 and zero otherwise. Then we add the interaction term of financial geographic density and the year dummy variable, *Density*Post2012*, to the baseline model. Table7 presents the impact of financial geographic density on corporate financial asset holdings after considering the implementation of regulatory guidelines. The coefficients of *Density* remain significantly positive, and the coefficients of the interaction term *Density*Post2012* are also significantly positive. These results imply that although the regulatory guidelines have a positive impact on corporate financial asset holdings, an increase in the number of financial institutions around firms still significantly promotes firms' financial asset investments. The baseline results are robust to the implementation of the regulatory guidelines.

4.3. Mechanism analysis

The increase in the number of financial institutions around firms improves the availability of financial services and fosters greater face-to-face communication frequency between firms and these financial institutions (Hollander and Verriest, 2016). This, in turn, significantly reduces information costs between financial institutions and firms, thereby substantially facilitating the efficient allocation of financial assets among firms. Consequently, the rise in financial geographic density promotes corporate financial asset holdings by reducing information asymmetry. Firms with a higher degree of information asymmetry have more opportunities to engage in financial investments as financial accessibility improves. To explore the mechanism of the impact of financial geographic density on corporate financial assets holdings, we estimate the following model (2):

$$FAH_{i,t} = \alpha + \beta_1 Density^{k}_{i,t-1} + \beta_2 Density^{k}_{i,t-1} * Asymmetry_{t-1} + \beta_3 Asymmetry_{t-1} +$$

Table 9
Fintech, financial geographic density and corporate financial asset holdings.

Dependent Variable:	*FAH*			*FAH*		
	(1)	(2)	(3)	(4)	(5)	(6)
Density^{3}	0.0053***			0.0084***		
	(3.7459)			(5.7336)		
Density^{5}		0.0055***			0.0087***	
		(3.5896)			(5.4676)	
Density^{10}			0.0073***			0.0110***
			(4.0046)			(5.9766)
Fintech	0.0619***	0.0607***	0.0530***			
	(4.7496)	(4.6115)	(3.9424)			
FinInfoNum				0.0109***	0.0108***	0.0108***
				(2.8217)	(2.8121)	(2.8109)
Leverage	−0.2729***	−0.2730***	−0.2731***	−0.2643***	−0.2645***	−0.2651***
	(−21.3078)	(−21.2965)	(−21.2960)	(−19.8543)	(−19.8102)	(−19.8223)
Growth	−0.0045	−0.0044	−0.0047	0.0032	0.0032	0.0027
	(−1.1494)	(−1.1500)	(−1.2114)	(0.7043)	(0.6861)	(0.5790)
Top1	0.0573***	0.0574***	0.0584***	0.0742***	0.0740***	0.0748***
	(4.4454)	(4.4520)	(4.5389)	(5.3523)	(5.3394)	(5.4110)
Tangibility	−0.1542***	−0.1537***	−0.1534***	−0.1434***	−0.1425***	−0.1422***
	(−7.7785)	(−7.7524)	(−7.7246)	(−6.7795)	(−6.7274)	(−6.6984)
Size	−0.0039*	−0.0038*	−0.0038*	−0.0039*	−0.0038*	−0.0038*
	(−1.6961)	(−1.6559)	(−1.6609)	(−1.7306)	(−1.6756)	(−1.6682)
SOE	0.0194***	0.0195***	0.0196***	0.0192***	0.0196***	0.0201***
	(3.8225)	(3.8544)	(3.8703)	(3.5668)	(3.6515)	(3.7591)
Constant	0.2195***	0.2151***	0.2152***	0.3023***	0.2914***	0.2672***
	(5.6619)	(5.5532)	(5.5580)	(10.1899)	(9.7760)	(8.8041)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,009	20,009	20,009	11,643	11,643	11,643
Adj.R^2	0.274	0.274	0.274	0.270	0.269	0.270

This table reports the results of the impact of Fintech on the relationship between financial geographic density and corporate financial asset holdings. The dependent variable is corporate financial asset holdings (*FAH*), measured by the financial assets to total assets. Financial geographic density is proxied by the number of financial institutions within 3 km (*Density*^{3}), 5 km (*Density*^{5}), and 10 km (*Density*^{10}) radius from the office address at which a firm is located, respectively. The development of Fintech is proxied by the Digital Financial Inclusion Index of China (*Fintech*) in Columns (1)–(3) and the numbers of financial information service enterprises (*FinInfoNum*) in Columns (4)–(6), respectively. The control variables are defined in Table 1. We control year, industry, and province fixed effects in all of the regressions. Standard errors are clustered by firm, and t-statistics for the regression coefficients are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

$$\gamma' Controls_{i,t-1} + Year + Industry + Province + \varepsilon_{i,t} \quad (2)$$

where $FAH_{i,t}$ and $Density^{k}_{i,t-1}$ are corporate financial assets holdings and financial geographic density, respectively, which are defined in Table 1. $Asymmetry_{t-1}$ is a dummy to capture the information asymmetry. Financial institutions across the financial market can leverage the professional reports issued by analysts to gain insights into the financial investment needs of nonfinancial firms and subsequently offer tailored financial services. Following Hong et al. (2000), we proxy the information asymmetry (*Asymmetry*) by analyst coverage, firms with fewer analysts have higher information asymmetry. The dummy variable *Asymmetry* takes the value of one if the average number of analysts who have tracked the firm is below the median, and zero otherwise. Table 8 reports the results of the impact of financial geographic density on firms' financial asset holdings through information asymmetry. The coefficients of *Density* remain significantly positive in all the regressions, indicating that an increase in the number of financial institutions around the firm promotes firm's holding of financial assets. Moreover, the coefficients of the interaction term *Density*Asymmetry* are positive and statistically significant, implying that firms with higher information asymmetry have a greater incentive to hold more financial assets as the number of financial institutions around them increases. Therefore, Hypothesis 2 holds.[1]

5. Fintech, financial geographic density, and corporate financial assets holdings

Fintech has expanded the coverage of financial services and enriched the supply of high-quality financial products, owing to its advantages in data collection, integration, and processing (Duarte et al., 2012). Fintech provides comprehensive information by

[1] We only report the results with analyst coverage as the proxy for information asymmetry due to space limitations. In the untabulated results, we also adopt institutional ownership, as proposed by Barry et al. (1990), as an alternative measure for information asymmetry and obtain consistent results. We thank the anonymous reviewer for the relevant comment.

Table 10
The impact of Fintech related policies.

Dependent Variable:	*FAH*					
	Subsample from 2011 to 2015			Subsample from 2016 to 2019		
	(1)	(2)	(3)	(4)	(5)	(6)
Density^{3}	0.0011***			0.0091***		
	(9.4659)			(5.8517)		
Density^{5}		0.0027***			0.0090***	
		(9.2246)			(5.3323)	
Density^{10}			0.0065***			0.0110***
			(9.6106)			(5.6047)
Leverage	−0.2541***	−0.2544***	−0.2550***	−0.1927***	−0.1930***	−0.1937***
	(−14.0331)	(−14.0707)	(−14.1021)	(−12.6099)	(−12.5914)	(−12.6103)
Growth	−0.0169**	−0.0167**	−0.0169**	−0.0150***	−0.0147***	−0.0151***
	(−2.2258)	(−2.2017)	(−2.2185)	(−2.9337)	(−2.8849)	(−2.9441)
Top1	0.0275	0.0281	0.0299	0.0648***	0.0646***	0.0656***
	(1.4772)	(1.5103)	(1.6093)	(4.3795)	(4.3722)	(4.4496)
Tangibility	−0.1594***	−0.1590***	−0.1577***	−0.1500***	−0.1490***	−0.1482***
	(−5.6598)	(−5.6527)	(−5.6193)	(−6.4362)	(−6.3962)	(−6.3514)
Size	−0.0038	−0.0040	−0.0042	−0.0073***	−0.0071***	−0.0070***
	(−1.1264)	(−1.1709)	(−1.2399)	(−2.8684)	(−2.7842)	(−2.7566)
SOE	0.0134**	0.0127*	0.0120*	0.0267***	0.0273***	0.0280***
	(2.0324)	(1.9340)	(1.8214)	(4.5832)	(4.6820)	(4.8140)
Constant	0.3721	0.3659	0.3446	0.3350***	0.3240***	0.3004***
	(0.5606)	(1.2800)	(1.1923)	(11.3038)	(10.8965)	(9.8846)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5888	5888	5888	8584	8584	8584
Adj.R^2	0.285	0.285	0.286	0.223	0.222	0.222

This table reports the results of the impact of Fintech on the relationship between financial geographic density and corporate financial asset holdings considering related policies. Columns (1)–(3) use the subsample from 2011 to 2015 to exclude the impact of the release of Advancing Inclusive Finance Development in 2015. Columns (4)–(6) use the subsample from 2016 to 2019 to exclude the impact of the issuance of Fintech Development Plan in 2019. The dependent variable is corporate financial asset holdings (*FAH*), measured by the financial assets to total assets. Financial geographic density is proxied by the number of financial institutions within 3 km (*Density*^{3}), 5 km (*Density*^{5}), and 10 km (*Density*^{10}) radius from the office address at which a firm is located, respectively. The control variables are defined in Table 1. We control year, industry, and province fixed effects in all of the regressions. Standard errors are clustered by firm, and t-statistics for the regression coefficients are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

processing massive transaction data on firms (Berg et al., 2020; Cenni et al., 2015), thus breaks geographic boundaries and offers more convenient financial services for firms through online transactions, which strikes the business models of traditional financial institutions.

To investigate whether Fintech development crowds out the positive effects of financial geographic density on corporate financial asset holdings, we introduce the development of Fintech to the baseline model to control the potential impact of Fintech on corporate financial asset holdings. Inspired by Ding et al. (2022) and Nie et al. (2023), we employ the Digital Financial Inclusion Index of China (*Fintech*) compiled by the Institute of Digital Finance at Peking University and the numbers of financial information service enterprises (*FinInfoNum*) in each region to capture the development of Fintech. We match the *Fintech* and *FinInfoNum* with cities where firms' offices are located. Table 9 shows the impact of financial geographic density on corporate financial asset holdings after controlling for the development of Fintech. Columns (1)–(3) use *Fintech* as the control variable to capture the potential impact of Fintech on corporate financial asset holdings. The coefficients of *Density* are positive and statistically significant in all regressions, and the coefficients of *Fintech* are significantly positive, which means that though there is a positive relationship between Fintech and corporate financial holdings, the increase in the number of financial institutions around the firm still has a significantly positive impact on firm's financial asset investments. Columns (4)–(6) use *FinInfoNum* as the control variable to capture the potential impact of Fintech on corporate financial asset holdings. The coefficients of *Density* remain significantly positive and the coefficients of *FinInfoNum* are significantly positive, indicating that Fintech cannot replace traditional financial institutions regarding face-to-face communication and the collection of soft information. Therefore, the development of Fintech has little impact on the relationship between financial geographic density and corporate financial asset holdings, supporting Hypothesis 3.

To further examine the impact of Fintech on the relationship between financial geographic density and corporate financial asset holdings, we conduct subsample analyses to exclude the effect of policy interventions. At the end of 2015, the State Council launched the Plan for Advancing Inclusive Finance Development (2016–2020), which aims to promote the optimization and upgrading of financial institutions using digital technology to provide customers with full coverage of financial services. Subsequently, in 2019, the People's Bank of China released the Fintech Development Plan (2019–2021) to boost the Fintech industry and spur a digital economy with an improved modern financial system. Therefore, we explore the impact of Fintech development by estimating the baseline model using two subsamples from 2011 to 2015 and 2016 to 2019, respectively. Table 10 reports the results of considering the impact of the

Table 11
Heterogeneity of financial institutions.

Dependent Variable:	*FAH*					
	Bank-surrounded firms			Non-bank-surrounded firms		
	(1)	(2)	(3)	(4)	(5)	(6)
Density^{3}	0.0052***			0.0001**		
	(3.4403)			(2.1700)		
Density^{5}		0.0065***			0.0010**	
		(3.0533)			(2.1081)	
Density^{10}			0.0094***			0.0053***
			(3.5455)			(2.9206)
Leverage	−0.2744***	−0.2746***	−0.2751***	−0.2624***	−0.2624***	−0.2624***
	(−14.4023)	(−14.4168)	(−14.4428)	(−17.0318)	(−17.0363)	(−17.0059)
Growth	−0.0070	−0.0069	−0.0071	0.0002	0.0002	0.0000
	(−1.2558)	(−1.2378)	(−1.2769)	(0.0440)	(0.0330)	(0.0057)
Top1	0.0714***	0.0713***	0.0719***	0.0506***	0.0504***	0.0511***
	(3.8106)	(3.8061)	(3.8372)	(2.8710)	(2.8595)	(2.9157)
Tangibility	−0.1798***	−0.1799***	−0.1802***	−0.1460***	−0.1457***	−0.1443***
	(−6.3331)	(−6.3466)	(−6.3585)	(−5.2810)	(−5.2634)	(−5.2010)
Size	−0.0062*	−0.0061*	−0.0058*	−0.0012	−0.0011	−0.0014
	(−1.8742)	(−1.8474)	(−1.7744)	(−0.4190)	(−0.3879)	(−0.4947)
SOE	0.0211***	0.0207***	0.0213***	0.0105	0.0108	0.0107
	(3.0252)	(2.9696)	(3.0527)	(1.4537)	(1.4944)	(1.4754)
Constant	0.3978***	0.3848***	0.3551***	0.3197***	0.3205***	0.3001***
	(10.3567)	(9.6644)	(6.9186)	(9.1165)	(9.0752)	(8.0388)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,342	10,342	10,342	9697	9697	9697
Adj.R^2	0.299	0.299	0.299	0.242	0.242	0.243

This table reports the results of the heterogeneous effects of financial geographic density on corporate financial asset holdings among different types of financial institutions. Columns (1)–(3) use bank-surrounded firms as samples, Columns (4)–(6) use non-bank-surrounded firms as samples. The dependent variable is corporate financial asset holdings (*FAH*), measured by the financial assets to total assets. Financial geographic density is proxied by the number of financial institutions within 3 km (*Density*^{3}), 5 km (*Density*^{5}), and 10 km (*Density*^{10}) radius from the office address at which a firm is located, respectively. The control variables are defined in Table 1. We control year, industry, and province fixed effects in all of the regressions. Standard errors are clustered by firm, and t-statistics for the regression coefficients are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The empirical *p*-values for the coefficient differences between bank-surrounded firms and non-bank-surrounded firms with respect to *Density*^{3}, *Density*^{5}, and *Density*^{10}are 0.000, 0.000, and 0.000, respectively.

Fintech related policies on corporate financial asset holdings. Columns (1)–(3) use the subsample from 2011 to 2015, and Columns (4)–(6) use the subsample from 2016 to 2019. The coefficients of *Density* are all significantly positive, indicating that the implementation of Fintech related policies does not affect the positive impact of financial geographic density on corporate financial asset holdings. Fintech expands access to financial products and the supply of financial services rather than crowding out traditional finance institutions. Our findings are consistent with those of Tang (2019) and Erel and Liebersohn (2022).

6. Further analyses

6.1. Cross-sectional heterogeneity

6.1.1. Heterogeneity of financial institutions

The geographic distribution of different types of financial institutions around firms may have heterogeneous effects on corporate financial asset holdings. Firms mainly purchase financial products from banking depository financial institutions but have relatively few financial investment transactions with other financial institutions. We classify financial institutions into banking depository financial institutions and other financial institutions. If the number of banking depository financial institutions around a firm is above the median, then we define the firm as bank-surrounded firm. Otherwise, the firm is considered as non-bank-surrounded firm. Table 11 presents the results of the heterogeneity effects of different types of financial institutions on the relationship between financial geographic density and corporate financial asset holdings. Columns (1)–(3) use bank-surrounded firms as samples, Columns (4)–(6) use non-bank-surrounded firms as samples. The coefficients of *Density* are significantly positive in all regressions, and the coefficient estimates of *Density* are statistically significantly larger for bank-surrounded firms than those for non-bank-surrounded firms. These results imply that compared to the increasing in other financial institutions around firms, an increase in the number of surrounding banking depository financial institutions significantly stimulates firms to make more financial asset investments.

6.1.2. Heterogeneity of market competition

The financial asset investments of firms facing different market competitions may be heterogeneous. Firms in a competitive market

Table 12
Heterogeneity of market competition.

Dependent Variable:	*FAH*					
	Higher market competition			Lower market competition		
	(1)	(2)	(3)	(4)	(5)	(6)
Density^{3}	0.0084***			0.0034*		
	(4.4228)			(1.6860)		
Density^{5}		0.0087***			0.0045**	
		(4.2348)			(2.0006)	
Density^{10}			0.0108***			0.0079***
			(4.5669)			(3.0588)
Leverage	−0.2663***	−0.2667***	−0.2675***	−0.2666***	−0.2665***	−0.2663***
	(−14.5367)	(−14.4960)	(−14.5022)	(−15.7732)	(−15.7883)	(−15.8240)
Growth	−0.0085	−0.0086*	−0.0091*	0.0038	0.0040	0.0040
	(−1.6367)	(−1.6510)	(−1.7393)	(0.6843)	(0.7159)	(0.7125)
Top1	0.0729***	0.0728***	0.0744***	0.0509***	0.0510***	0.0516***
	(4.1247)	(4.1224)	(4.2146)	(2.7118)	(2.7163)	(2.7586)
Tangibility	−0.1287***	−0.1267***	−0.1244***	−0.2073***	−0.2074***	−0.2095***
	(−5.0204)	(−4.9459)	(−4.8573)	(−6.4839)	(−6.5086)	(−6.5980)
Size	−0.0057*	−0.0055*	−0.0053	−0.0028	−0.0029	−0.0033
	(−1.7316)	(−1.6527)	(−1.5987)	(−0.8937)	(−0.9344)	(−1.0527)
SOE	0.0202***	0.0207***	0.0213***	0.0136*	0.0133*	0.0127*
	(2.8233)	(2.9062)	(2.9729)	(1.9027)	(1.8641)	(1.7941)
Constant	0.3560***	0.3436***	0.3183***	0.3596***	0.3535***	0.3333***
	(9.2472)	(8.9182)	(8.1201)	(9.7353)	(9.4845)	(8.7519)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,689	10,689	10,689	9338	9338	9338
Adj.R^2	0.266	0.265	0.266	0.291	0.292	0.293

This table reports the results of heterogeneous effects of financial geographic density on corporate financial asset holdings under varying degrees of market competition. Columns (1)–(3) use firms facing relatively higher market competition as samples. Columns (4)–(6) use firms facing lower market competition as samples. The dependent variable is corporate financial asset holdings (*FAH*), measured by the financial assets to total assets. Financial geographic density is proxied by the number of financial institutions within 3 km (*Density*^{3}), 5 km (*Density*^{5}), and 10 km (*Density*^{10}) radius from the office address at which a firm is located, respectively. The control variables are defined in Table 1. We control year, industry, and province fixed effects in all of the regressions. Standard errors are clustered by firm, and t-statistics for the regression coefficients are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The empirical p-values for the coefficient differences between firms facing higher market competition and firms facing lower market competition with respect to *Density*^{3}, *Density*^{5}, and *Density*^{10}are 0.000, 0.000, and 0.000, respectively.

are under greater operating pressure and therefore have a greater incentive to invest in financial assets to cope with uncertainty. Following Hou and Robinson (2006) and Gu (2016), we measure market competition using the Herfindahl-Hirschman index (HHI). If the HHI of a firm is higher than the median, then the firm is in an industry with a high degree of market concentration and faces lower market competition and *vice versa*. Table 12 shows the heterogeneity effects of market competition on the relationship between financial geographic density and corporate financial asset holdings. Columns (1)–(3) use firms facing relatively high market competition as samples, Columns (4)–(6) use firms facing lower market competition as samples. The coefficients of *Density* are significantly positive in all regressions, and the coefficient estimates of *Density* are statistically significantly larger for firms facing higher competition than those for firms facing lower competition. The heterogeneity of market competition implies that firms make more financial asset investments with an increase in financial geographic density when they face higher market competition.

6.2. *Financial geographic density and corporate innovation*

Corporate innovation is an inherently risky process with asymmetric information and uncertain outcomes, thereby firms' future investment projects are mainly financed from internal cash flow (Almeida et al., 2004; Arrow, 1962; Brown et al., 2009). Brown and Petersen (2011) document that firms utilize precautionary cash holdings to smooth research and development (R&D) spending, resulting from the high adjustment costs of innovation and the volatility of external funding. Therefore, for firms with precautionary motives, financial assets have relatively high liquidity and can mitigate external financing constraints, which further promotes corporate innovation (Duchin et al., 2017; Gong et al., 2023). Conversely, for firms with return-chasing motives, innovation activities will shrink when firms invest excessively in financial assets to achieve high yields (Demir, 2009; Leng et al., 2023). We further investigate how the positive impact of financial geographic density on corporate financial asset holdings influences firms' innovation activities. Corporate innovation (*Innovation*) is measured as R&D expenses scaled by total assets (Aghion et al., 2013). Table 13 reports the results of the economic consequence of the impact of financial geographic density on corporate financial asset holdings. The coefficients of *Density* are significantly positive, implying that the rise in financial geographic density stimulates firms to engage in more innovation activities. As the increase in the number of financial institutions around firms, firms with precautionary motive will

Table 13
Financial geographic density and corporate innovation.

Dependent Variable:	*Innovation*		
	(1)	(2)	(3)
Density^{3}	0.0015***		
	(3.1797)		
Density^{5}		0.0020***	
		(3.7447)	
Density^{10}			0.0040***
			(6.1194)
Leverage	−0.0483***	−0.0482***	−0.0481***
	(−11.2732)	(−11.2856)	(−11.3026)
Growth	0.0012	0.0012	0.0011
	(0.7789)	(0.8112)	(0.7369)
Top1	−0.0265***	−0.0265***	−0.0259***
	(−5.7805)	(−5.7795)	(−5.6979)
Tangibility	−0.0410***	−0.0408***	−0.0407***
	(−5.9251)	(−5.9092)	(−5.8957)
Size	−0.0032***	−0.0032***	−0.0034***
	(−4.3854)	(−4.4411)	(−4.6771)
SOE	−0.0032*	−0.0033*	−0.0037**
	(−1.7982)	(−1.8517)	(−2.0856)
Constant	0.1189***	0.1157***	0.1040***
	(14.0955)	(13.6543)	(12.0046)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Province FE	Yes	Yes	Yes
Observations	18,072	18,072	18,072
Adj.R^2	0.300	0.300	0.306

This table reports the results of the economic consequence of the impact of financial geographic density on corporate financial asset holdings. The dependent variable is corporate innovation (*Innovation*), measured by the research and development (R&D) expenses scaled by total assets. Financial geographic density is proxied by the number of financial institutions within 3 km (*Density*^{3}), 5 km (*Density*^{5}), and 10 km (*Density*^{10}) radius from the office address at which a firm is located, respectively. The control variables are defined in Table 1. We control year, industry, and province fixed effects in all of the regressions. Standard errors are clustered by firm, and t-statistics for the regression coefficients are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

hold more financial assets to hoard liquidity in response to potential financing fluctuations, which contributes to corporate innovation. Our results are consistent with those of Deng et al. (2021), who find that the geographic diversification of banking depository financial institutions encourages corporate innovation.

7. Conclusion

We explore the impact of access to financial services on corporate financial asset holdings from the perspective of financial geographic density. Existing literature on the determinants of corporate financial asset holdings mainly focuses on economic uncertainty (Duong et al., 2020; Han and Wang, 2023; Huang et al., 2021; Jayakody et al., 2023) and firms' motives (Demir, 2009; Duchin et al., 2017). However, the important role of the availability of financial services in nonfinancial firms' financial asset investments has been overlooked, especially in transitional economies.

We exploit the number of financial institutions within a certain radius of the office address at which a firm is located as a proxy for financial geographic density, empirically investigate the impact of financial geographic density on the financial asset holdings of Chinese listed nonfinancial firms, and further examine the impact of Fintech on the relationship between financial geographic density and corporate financial asset holdings. We document that an increase in the number of financial institutions around a firm has a significant positive impact on corporate financial asset holdings. An increase in financial geographic density spurs the financial asset investments of firms by alleviating information asymmetry. Moreover, the positive impact of financial geographic density on corporate financial asset holdings is more pronounced for firms located in regions with a larger number of banking depository financial institutions, as well as those facing greater market competition. Notably, our findings indicate that Fintech has little impact on the relationship between financial geographic density and corporate financial asset holdings. Additionally, an increase in the number of financial institutions around firms promotes corporate innovation, which supports the precautionary motive behind firms' holdings of financial assets.

Overall, our findings provide insights into how financial geographic density affects firm's investments in financial assets. Our study had several implications. First, the geographic distribution of traditional financial institutions is conducive to enhancing their communication with firms and mitigating information asymmetry, thereby encouraging firms to invest more in financial assets. We emphasize that Fintech cannot substitute for traditional financial institutions in providing financial services to firms. Hence, policymakers should recognize the importance of the geographic distribution of traditional financial institutions in improving the efficiency

of financial services, and provide direction and guidance for the location of financial institutions. Second, an increase in financial geographic density promotes corporate innovation, which means that firms will hold more precautionary financial assets to smooth their innovation expenditures as the availability of financial services increases. Therefore, policymakers need to pay more attention to the impact of uncertainty on corporate investment behavior and provide liquidity support to firms to avoid excessive financial investments.

CRediT authorship contribution statement

Ting Wang: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Validation, Writing – original draft, Writing – review & editing. **Jiani Xu:** Data curation, Writing – original draft. **Liuyong Yang:** Conceptualization, Supervision.

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