

BANK CREDIT AND FINTECH CREDIT: THE MODERATING ROLE OF INSTITUTIONAL QUALITY

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ABSTRACT

Lending is a primary activity for banks, and the introduction and growth of fintech credit create a new landscape in the competition setting in this field. Previous research focuses on the effect of fintech credit provision on bank credit and bank performance, but not the reverse direction. Meanwhile, theoretically it can be expected that bank credit can affect the growth of fintech credit. This study employs a country-level dataset from 2013 to 2019 to fill the gaps mentioned. We find that bank credit tends to exert a complementary effect on fintech credit. This result implies that the two types of credit suppliers do not aim at the same target customers and tend to cooperate for their mutual benefits, and the growth of bank credit generally facilitates fintech credit. However, when a country has better institutional quality, bank credit negatively affects fintech credit, emphasising on the substitution effect. The study offers some implications for relevant stakeholders based on the research findings.

Keywords: Fintech credit, Bank credit, Institutional quality, GMM

INTRODUCTION

The advent and proliferation of financial technology (fintech) have introduced significant disturbances to the conventional business models of banking institutions (Petrulia et al., 2019). Despite banks continuing to function as the primary reservoir of financial resources for economic units, fintech lending platforms have remarkably evolved in numerous countries and gained much traction recently (Cornelli et al., 2023; Nguyen et al., 2022). In fact, fintech has extensively penetrated various financial domains, including those traditionally dominated by banks, such as credit, deposits and payments. Cornelli et al. (2023) reported that the world has experienced extraordinary growth in the volume of fintech-driven credit, achieving an annual growth rate surpassing 97%. Consequently, fintech firms have emerged as formidable competitors to traditional financial institutions, exerting a discernible influence on the latter's performance and risk-taking behaviour (Phan et al., 2020; Nguyen et al., 2022). Notably, due to the growth of fintech, banks have witnessed a decline in their market share in sectors like residential mortgages (Buchak et al., 2018).

Due to the growth of fintech, prior research has focused on assessing the impact of fintech credit on bank performance/credit. On the one hand, fintech platforms have technological advantages to personalise services (Fuster et al., 2021), risk management (Iyer et al., 2016; Sadhwani et al., 2021; Fuster et al., 2019). Therefore, Hodula (2022) and Nguyen et al. (2022) stated that fintech tends to encroach on the market shares of traditional banks. On the other hand, Hodula (2022) indicated that fintech credit and bank credit can function as complements; in other words, traditional banks and fintech credit platforms do not vie for the same clientele but rather coexist harmoniously as complementary components of the financial ecosystem. Fintech is unlikely to supplant traditional bank credit in the immediate future because banks can also develop their fintech platforms to compete with the fintech firms' expansion (Murinde et al., 2022; Thakor, 2020).

Although there have been several studies on the effect of fintech emergence on bank performance, stability or risk management (Phan et al., 2020; Khan et al., 2024; Nguyen et al., 2022), we find limited empirical studies on the reverse relationship. Lending is traditionally the main activity of banks, so it is less likely that banks stay still and do not demonstrate any response or exert any impact on fintech credit. Banks, as dominant players

in the credit market, shape the financial ecosystem through their lending policies, regulatory compliance and market behaviour. When banks tighten credit supply—due to economic downturns, regulatory changes, or risk aversion—fintech lenders often step in to fill the gap (Buchak et al., 2018). Conversely, when banks expand credit, they may compete directly with fintech platforms, potentially reducing the demand for fintech credit. Furthermore, banks and fintech lenders often rely on overlapping data sources for credit risk assessment, meaning that changes in bank lending practices can influence fintech risk models and lending strategies, though the use of alternative data has increased remarkably recently (Jagtiani & Lemieux, 2019), thus affecting their lending volume. These arguments point to the expectation of an impact of bank credit on fintech credit, which has not been discussed earlier.

Institutional quality has influenced the entities operating in an economy and can moderate the link between bank credit and fintech credit. Higher institutional quality basically protects the rights of creditors, so bank credit might be facilitated by better institutional quality (Chu, 2019; Gani & Rasul, 2020). Gani and Rasul (2020) documented that, the rule of law, regulatory quality and the robustness of legal systems significantly enhance bank credit. Interestingly, even though the same positive effect of institutional quality could be expected for the alternative credit, Chu (2019) indicated that improved institutional quality tends to be associated with increased bank credit, as opposed to informal lending (loans from pawn shops, relatives, etc.).

Institutional quality tends to favour bank credit over informal or alternative credit due to several key factors. Strong legal frameworks, effective contract enforcement and robust creditor rights create a secure environment for banks, enabling them to enforce loan agreements and recover collateral, thereby reducing risk and encouraging lending (Cornelli et al., 2023; Gani & Rasul, 2020). Banks also leverage institutional quality through credit bureaus, collateral registries and regulatory compliance mechanisms, which enhance their risk management capabilities (Chu, 2019). Informal lenders, operating outside these systems, lack access to such infrastructure. Fintech credit may not depend as heavily on institutional quality as traditional bank credit does, at least in its current form. Fintech lenders often operate in a less regulated environment, relying on innovative technologies, alternative data (Jagtiani & Lemieux, 2019) and decentralised platforms to assess creditworthiness and disburse loans. This allows them to bypass some of

the formal institutional frameworks that traditional banks depend on, such as legal enforcement of contracts or collateral registries. Finally, institutional quality fosters trust in formal financial systems (North, 1990), encouraging borrowers to shift from informal/alternative to formal credit sources as legal and regulatory frameworks improve. These dynamics highlight why institutional quality could facilitate bank credit more, thus reducing the advantages of fintech credit and underscoring the need to examine its moderating role in the relationship between bank credit and fintech credit.

To sum up, there have been several studies on the effect of fintech emergence on bank performance/stability/risk, but the reverse link has not received adequate attention. The present study extends the literature in many ways. First, examining whether bank credit tends to hamper or induce the growth of fintech credit, the study fills the gap of limited research on the effect of banks' activities on fintech's operations. Second, the moderating effect of institutional quality on the link between bank credit and fintech credit has not been examined. While Chu (2019) focuses on informal borrowing from stores, relatives or friends and underground financing from pawn shops, we examine fintech credit, which has not been dealt with before. As fintech credit tends to not depend as heavily on institutional quality as traditional bank credit does, the enhanced institutional quality may disproportionately promote the growth of traditional and formal lending rather than fintech credit. Evidence on this effect could provide implications for harmonising fintech and bank credit in a country. For these purposes, we use a sample of macro-data level from 2013 to 2019 constructed by Cornelli et al. (2023) and World Bank and the System Generalised Method of Moments (GMM) estimator.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Bank Credit and Fintech Credit

Fintech, defined as the application of technology to provide financial services, has significantly impacted global lending activities. By facilitating interactions between borrowers and lenders through online platforms and applications, fintech lending significantly reduces search costs, accelerates processing times and improves user experience (Thakor, 2020), and mitigating employee errors during the lending process (Buchak et al.,

2018; Fuster et al., 2019). As a result, the rise of fintech poses challenges for traditional banks, largely due to the latter's slower adoption of new technologies (Brandl & Hornuf, 2020).

The impact of fintech lending on bank lending has been widely studied; however, the reverse relationship—how bank credit influences fintech credit—deserves equal attention. The effect of bank credit on fintech credit can be explained through substitution and complementary effects. From a substitution perspective, when banks tighten credit supply due to regulatory changes, economic downturns or risk aversion, fintech lenders may step in to fill the gap, particularly for underserved segments such as small businesses or subprime borrowers (Buchak et al., 2018; Cornelli et al., 2023). Gopal and Schnabl (2022) found that fintech lenders substantially increased their market share, compensating for the reduction in traditional bank lending following the global financial crisis for small business lending, the stakeholder that gets denied by credit rationing by banks. This substitution effect is driven by fintech's ability to leverage alternative data and advanced algorithms to assess creditworthiness, enabling them to serve markets that banks deem too risky or unprofitable (Iyer et al., 2016; Berg et al., 2020). Conversely, when banks expand credit, they may compete directly with fintech platforms, potentially reducing the demand for fintech credit, especially in markets where both entities target similar customer segments.

On the other hand, the complementary view suggests that bank credit and fintech credit can coexist and even reinforce each other. Firstly, fintech platforms often rely on banks for funding or liquidity, particularly in peer-to-peer (P2P) lending models, where banks act as institutional investors (Papanikolaou, 2018). Papanikolaou (2018) argued that banks typically originate loans for fintech credit platforms, thus supporting the activities of the fintech lenders. In this way, bank credit can facilitate the growth of fintech credit by providing the necessary financial infrastructure and stability. Secondly, Cornelli et al. (2023) find that, in areas with a higher unmet demand for financial services (few bank branches per capita), fintech credit tends to be provided more, consistent with Navaretti et al. (2017). This supports the notion that fintech credit reaches clients in underbanked regions, functioning as a complementary service to traditional banking. Thirdly, traditional banking institutions might serve to expand the production, while fintech lenders focus more on consumer credit (due to their uncollateralised nature). Fintech credit tends to thrive more in the

consumer segment, but not the business segment, at least in low-income countries (Bazarbash & Beaton, 2020). When bank credit increases, more credit can be channelled through production and more outputs are generated. This increased supply might be consumed with increased fintech credit supply that targets consumer finance. Finally, when bank credit is higher, this might reflect stronger overall credit demand which fintech credit providers can also enjoy.

To sum up, we might expect both negative (substitution view) and positive associations (complementary view) between bank credit and fintech credit. Therefore, our first testable hypothesis is:

H1: Bank credit is related to fintech credit.

Bank Credit, Fintech Credit and Institutional Quality

The institutional environment has many dimensions (Kaufmann et al., 2000). Government effectiveness measures the quality of public and civil service, as well as policy formulation and implementation, which is a pre-determinant for accessing and using financial services. Regulatory quality captures the ability of the government to conduct policies and regulations that promote private sector development. The rule of law quantifies the extent to which agents have confidence in and abide by the rules of society. This indicator strongly affects financial access as it reflects the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence.

Good governance facilitates the functioning of intermediation processes (Gani & Rasul, 2020). Traditional banks rely heavily on formal credit scoring, using data whose quality depends heavily on regulations and institutions, as well as collaterals. These systems are deeply embedded in institutional infrastructure, such as credit bureaus and collateral registries, which requires strong legal frameworks to function effectively. In contrast, fintech platforms use alternative data—such as social media activity, mobile phone usage, online transaction history and even psychometric testing—to assess creditworthiness (Berg et al., 2020; Jagtiani & Lemieux, 2019). This allows them to evaluate borrowers who may lack formal credit histories or collateral, reducing their dependence on the quality of traditional institutional systems. Furthermore, traditional banks depend on formal legal

systems to enforce loan contracts, recover collateral and resolve disputes. Fintech platforms, however, often use innovative mechanisms to mitigate risk, such as dynamic pricing, peer pressure or reputation-based systems. For instance, some P2P platforms use social networks or community-based lending models, where borrowers are incentivised to repay loans to maintain their reputation within the platform (Iyer et al., 2016). While legal systems still play a role, fintech lenders are less reliant on them compared to traditional banks.

Empirically, Gani and Rasul (2020) examined the effect of institutional quality on bank credit in emerging countries from 2004 to 2017. The findings show that the rule of law, regulatory quality and the strength of legal systems are significant determinants of credit provided by banks. Albaity et al. (2022) show that the increased quality of governance helps increase the credit growth of ASEAN banks, except for indicators of voice, accountability and political stability. Importantly, borrowers tend to pay for bank loans before fintech loans (Bao & Huang, 2021), which might suggest that improved institutional quality makes bank lending safer.

To sum up, institutional quality should facilitate lending activities, since it improves informational quality, law enforcement and lender protection. Even though this could benefit both bank credit and fintech credit, due to the business models of fintech firms it is less likely that fintech enjoys the same benefit from higher institutional quality. Therefore, we propose that, as institutional quality increases, the impact of bank credit on fintech credit is more of a substitution.

H2: Institutional quality has a moderating role in the relationship between bank credit and fintech credit.

RESEARCH METHODOLOGY

Empirical Models

To test the hypotheses H1, this study proposes the following baseline model:

$$\begin{aligned} Fincred_{it} = & \beta_0 + \beta_1 Fincred_{it-1} + \beta_2 Bankcred_{it} + \beta_3 String_{it} + \beta_4 Bankdiv_{it} \\ & + \beta_5 Bankeff_{it} + \beta_6 NPL_{it} + \beta_7 Concen_{it} + \beta_{it} \end{aligned} \quad (1)$$

To test the hypothesis H2, this study expands Equation (1) to the following empirical model:

$$\begin{aligned} Fincred_{it} = & \beta_0 + \beta_1 Fincred_{it-1} + \beta_2 Bankcred_{it} + \beta_3 INSQ_{it} + \\ & \beta_4 INSQ * Bankcred_{it} + \beta_5 String_{it} + \beta_6 BankDiv_{it} + \\ & \beta_7 Bankeff_{it} + \beta_8 NPL_{it} + \beta_9 Concen_{it} + \beta_{it} \end{aligned} \quad (2)$$

Where *Fincred* is the ratio of the volume of fintech credit to GDP of a country (Cornelli et al., 2020; 2023; Nguyen et al., 2022). This is a standardised proxy to account for the size of economy when comparing different countries. *Fincred_{it-1}* is the variable included to control for the dynamism in fintech credit provision, consistent with Cornelli et al. (2023). *Bankcred* is the ratio of credit granted by the banking sector to GDP. *String* is the index indicating the stringency or strictness of the banking regulations. *BankDiv* is the indicator of income diversification, measured as the ratio of banks' non-interest income to total income. *Bankeff* indicates bank efficiency, measured as the ratio of overhead cost to total assets. *NPL* represents the credit risk encountered with credit activities, measured as the ratio of non-performing loans to total loans. *Concen* is the concentration level of the banking sector, measured as the ratio of total assets of five largest banks to total assets of the whole banking industry in a country. In line with Chu (2019), Gani and Rasul (2020) and Albaity et al. (2022), for *INSQ* we select three indicators, which are “government effectiveness”, “regulatory quality” and “rule of law”. Albaity et al. (2022) showed that the increased quality of governance was found to increase credit growth, except for indicators of voice and accountability and political stability. In addition, we examine the factor of “control of corruption” because we believe more efficient handling of corruption reduces barriers and improves access to credit, especially official credit.

Estimation Method

We rely on a dynamic model that includes the dependent variable's one-period lagged value as an explanatory variable. By construction, this leads to the endogeneity issue caused by the correlation of the lagged dependent variable and the error term (Roodman, 2009). In this study, we employ the System GMM estimator, as in Cornelli et al. (2023), for some reasons.

This estimator consists of one equation in differences and another in levels. This approach offers two primary econometric benefits (Eugster, 2020; Roodman, 2009). First, differencing helps remove any potential firm fixed effects, which is a source of endogeneity. Second, utilising past values of the explanatory variables as instruments for the current explanatory variables helps to reduce potential biases arising from reverse causality and simultaneity (Eugster, 2020). One big advantage of System GMM is the availability of instrumental variables created from the original variables in the model. Third, System GMM is capable of handling the other defects including heteroskedasticity and autocorrelation, thanks to its two-step estimator (Roodman, 2009).

Research Sample

The research dataset is obtained from several sources. First, we collect data on fintech credit from the source of Cornelli et al. (2020). The data is available on a yearly basis from 2013 to 2019 for 79 developed and developing countries. The data is at country level, built from an annual industry survey data and web-scraping from Cambridge Centre for Alternative Finance and other websites (Cornelli et al., 2020). Bank credit is obtained from the Global Financial Development Database. Bank diversification, bank efficiency, concentration are collected from the World Bank's Global Financial Development Database. Non-performing loans data is retrieved from International Monetary Funds. The choice of the research period is driven by the data availability. Furthermore, with the COVID-19 outbreak starting from 2020, there are different patterns as to how consumers and financial firms interact as well as the tendency to prefer more online interactions (thus favouring fintech credit), which can bias the result if we include data from 2020. We take on all available data, but there are variables that have missing values in some specific years. We derived the final sample with 305 observations with full data for all the variables. Variable description is provided in the Appendix.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1 presents the descriptive values of the variables in the model. *Fincred* has a rather low mean value (0.037%) compared to 63.8% of *Bankcred*, indicating that the digital alternative credit is still modest. *BankDiv* is on average circa 40%, implying that income from activities has become more significant for banks. The ratio of overhead cost to total assets (*Bankeff*) is about 3% on average. The mean value of non-performing loans to total loans is quite high, at approximately 5%, which might harm the stability of the banking system. Finally, the level of banking concentration is quite high, approximately 76%, or the assets of the five largest banks account for three quarters of the total industry.

TABLE 1
Descriptive statistics

Variable	Obs.	Mean	SD	Min	Max
<i>Fincred</i>	305	0.0368	0.2138	0.0000	2.8922
<i>String</i>	305	0.7195	0.1006	0.4091	0.9565
<i>Bankdiv</i>	305	37.7101	12.8591	10.5410	79.5165
<i>Bankcred</i>	305	71.4927	44.4500	10.4668	223.3909
<i>Bankeff</i>	305	2.9475	2.6715	0.3705	28.0114
<i>NPL</i>	305	4.6702	4.3748	0.3524	25.7086
<i>Concen</i>	305	73.1934	15.9524	33.7946	100.0000

Table 2 presents the correlation coefficients between pairs of variables in the model. *String* has a negative correlation with *Bankcred*, or the more stringent the banking regulation can stifle bank credit growth, which is understandable. However, bank stringency can also reduce fintech credit, implying that stricter banking regulations can hamper access to fintech credit, consistent with Claessens et al. (2018). The most important thing is the positive association between bank credit and fintech credit, indicating that they are supplemental to each other, rather than substitutive. Nonetheless, the coefficients in the correlation matrix only provide tentative assessment of the association between the two factors, without considering the existence of other covariates. This weakness might generate bias in the estimation of the

coefficients. Therefore, we further conduct multiple regression to ascertain the determinants of fintech credit.

TABLE 2

Correlation matrix

Variable	<i>Fincred</i>	<i>String</i>	<i>Bankdiv</i>	<i>Bankcred</i>	<i>Bankeff</i>	<i>NPL</i>	<i>Concen</i>
<i>Fincred</i>	1.0000						
<i>String</i>	−0.1250	1.0000					
<i>Bankdiv</i>	−0.0759	−0.0282	1.0000				
<i>Bankcred</i>	0.1844	−0.1259	0.1812	1.0000			
<i>Bankeff</i>	−0.0908	0.0292	0.1148	−0.4830	1.0000		
<i>NPL</i>	−0.0995	0.1691	0.1860	−0.3108	0.1212	1.0000	
<i>Concen</i>	−0.0976	−0.1070	0.2417	0.2108	−0.1246	−0.0877	1.0000

Regression Results and Discussions

Table 3 presents the model (1)'s estimation results using System GMM. The *p*-values of the test for autocorrelation of order two (AR2) and overidentification (Hansen test) are all larger than 5%, indicating that the instruments used are valid. In addition, the coefficients of the lagged dependent variables are significant at 1%, indicating the validity of using dynamic models. In Column (1), we estimate the baseline model (1). In Column (2), we further account for a country's institutional quality, adding variables of regulatory quality, government effectiveness and rule of law. In Column (3), we control for GDP per capita (the level of development of an economy) and GDP growth rate (business cycle effect). Finally, in Column (4), we control for regional effects with regional dummies.

The estimation results revealing a positive association between bank credit and fintech credit suggest a complementary relationship between the two, aligning with the complementary theory discussed in the literature. One possibility for the complementary effect of bank credit is that the two sectors might not share the same set of target customers (Buchak et al., 2018; Tantri, 2021; Bartlett et al., 2021; Chen et al., 2023). Additionally, fintech lenders often rely on banks for funding or liquidity, so banks act as funders for fintech firms to extend loans (Papanikolaou, 2018). This symbiotic relationship suggests that an increase in bank credit can facilitate the growth

of fintech credit by providing the necessary financial support and regulatory legitimacy. Thirdly, when bank credit is higher, this might reflect stronger overall credit demand which fintech credit providers can also enjoy.

However, the positive association does not entirely rule out the possibility of substitution effects in certain contexts. This substitution effect is more likely to occur in markets where fintech lenders can leverage alternative data and advanced algorithms to assess creditworthiness, enabling them to serve markets that banks deem too risky or unprofitable (Iyer et al., 2016; Berg et al., 2020). Nevertheless, the overall positive relationship observed in the results suggests that, on a broader scale, the complementary dynamics dominate, with bank credit and fintech credit working together to expand the overall availability of credit and reach a more diverse customer base. This finding underscores the importance of fostering collaboration between traditional banks and fintech platforms to promote financial inclusion and innovation in the credit market.

TABLE 3

The association between bank credit and fintech credit

Variable	<i>Fincred</i> Model (1)	<i>Fincred</i> Institutional quality	<i>Fincred</i> GDP/capita and GDP growth rate	<i>Fincred</i> Regional effects and dummies
<i>L.fincred</i>	1.4876*** (244.92)	1.4518*** (229.560)	1.4299*** (196.75)	1.4877*** (199.02)
<i>String</i>	-0.0744*** (-5.99)	-0.0802*** (-6.16)	-0.0616*** (-4.80)	-0.0547*** (-3.29)
<i>Bankdiv</i>	-0.0008*** (-3.03)	-0.0003** (-2.57)	0.0000 (0.22)	-0.0008*** (2.87)
<i>Bankcred</i>	0.0002*** (3.54)	0.0011*** (13.03)	0.0013*** (11.70)	0.0002** (2.27)
<i>Bankeff</i>	-0.0001 (-0.23)	-0.0046*** (-4.94)	-0.0022*** (-4.00)	-0.0011 (-0.85)
<i>NPL</i>	-0.0009** (-2.26)	-0.0009* (-1.84)	-0.0013** (-2.07)	-0.0019*** (-2.74)
<i>Concen</i>	-0.0001 (-0.99)	0.0004** (2.64)	0.0001 (1.16)	-0.0002 (-1.36)

(Continued on next page)

TABLE 3 (Continued)

Variable	<i>Fincred</i> Model (1)	<i>Fincred</i> Institutional quality	<i>Fincred</i> GDP/capita and GDP growth rate	<i>Fincred</i> Regional effects and dummies
<i>GOVEFF</i>		−0.0071 (−0.93)		
<i>REGQUAL</i>		−0.0377*** (−3.75)		
<i>ROL</i>		−0.0103 (−0.98)		
<i>CCI</i>		0.0090 (1.20)		
<i>GDPCAP</i>			−0.0023*** (−9.80)	
<i>GDP</i>			0.0040*** (7.07)	
Reg dummies				Yes
cons	0.0865*** (6.20)	0.0176 (1.23)	0.0015 (0.11)	0.0573* (1.94)
No. of obs.	247	247	247	247
AR1	0.109	0.100	0.094	0.102
AR2	0.381	0.391	0.392	0.376
Hansen	0.894	0.268	0.354	0.908

Notes: In Column (1), we estimate the baseline Model (1). In Column (2), we control for the country's institutional quality. In Column (3), we control for the GDP per capita and GDP growth rate. In Column (4), we control for regional effects with regional dummies. *, ** and *** indicate significant at 10%, 5% and 1%, respectively. The numbers in brackets are *t*-statistics.

Table 4 presents the estimation results of Model (2) to evaluate the hypothesis about the moderating effect of institutional quality on the relationship between bank credit and fintech credit. We employ four institutional quality proxies: government effectiveness, regulatory quality, rule of law and control of corruption. Again, the *p*-values of all the autocorrelation of order two and overidentification tests show satisfactory results. Furthermore, the coefficients of the one-period lagged value of the dependent variables are all significant, supporting the use of the dynamic model in our study.

Most of the institutional quality indicators have a positive association with fintech credit individually, except for government effectiveness (*GOVEFF*). This aligns with the argument that better institutional quality should

support lending activities (Gani & Rasul, 2020). This is different from the findings of Chu (2019) who finds better institutional quality reduces the informal lending (from pawnshops, relatives), since the alternative credit in this study, fintech credit, is different. However, its interactions with bank credit (*Bankcred*Rol*, *Bankcred*Goveff*, *Bankcred*Regqual*, *Bankcred*CCI*) are all negatively and significantly impacts fintech lending, supporting H2 hypothesis.

The estimation results showing a negative and significant interaction between bank credit and institutional quality on fintech credit underscore the substitution effect that arises when institutional quality improves. This finding aligns with the literature, which suggests that higher institutional quality disproportionately benefits traditional banks over fintech platforms or alternative credit providers (Cornelli et al., 2023; Chu, 2019). Strong institutional frameworks, characterised by effective rule of law, regulatory quality and the rule of law, enhance the functioning of formal financial systems, enabling banks to expand their lending activities more efficiently (Gani & Rasul, 2020; Kaufmann et al., 2000). For instance, robust legal systems and creditor protections reduce the risks associated with lending, allowing banks to offer credit at lower costs and with greater confidence. Additionally, institutional infrastructure such as credit bureaus and collateral registries, which are critical for traditional banks, become more effective in high-quality institutional environments, further strengthening banks' competitive advantage (Albaity et al., 2022). As a result, fintech platforms, which rely less on formal institutional systems and more on alternative data and innovative risk management techniques (Berg et al., 2020; Jagtiani & Lemieux, 2019), may find it harder to compete with banks in such environments. This creates a substitution effect, where the growth of bank credit, facilitated by strong institutions, crowds out fintech credit.

The negative interaction also highlights the asymmetric impact of institutional quality on bank credit and fintech credit. While banks thrive in environments with high institutional quality due to their reliance on formal legal and regulatory frameworks, fintech platforms often operate in less regulated spaces and rely on decentralised mechanisms such as peer pressure, reputation-based systems, and alternative data (Iyer et al., 2016). This allows fintech lenders to serve markets that banks typically overlook, such as underserved or unbanked populations. However, as institutional quality improves, the advantages of fintech lending—such as flexibility

and accessibility—diminish relative to the benefits of bank credit, such as lower costs and greater stability (Bao & Huang, 2021). Furthermore, borrowers in high-quality institutional environments may prioritise bank credit over fintech credit due to the perceived reliability and lower risk associated with traditional banking (Bao & Huang, 2021). This dynamic reinforces the substitution effect, as improved institutional quality shifts borrower preferences towards banks, reducing the demand for fintech credit. Overall, the results suggest that institutional quality acts as a moderating factor, amplifying the substitution effect between bank credit and fintech credit, particularly in environments where formal financial systems are well-developed and trusted.

TABLE 4

The moderating effect of institutional quality on the link between bank credit and fintech credit

Variable	<i>Fincred</i> Model (1)	<i>Fincred</i> Institutional quality	<i>Fincred</i> GDP/capita and GDP growth rate	<i>Fincred</i> Regional effects and dummies
<i>L.fincred</i>	1.3259*** (123.86)	1.4066*** (191.68)	1.3481*** (161.64)	1.3667*** (154.80)
<i>String</i>	-0.0983*** (-6.50)	-0.0677*** (-4.37)	-0.0724*** (-4.75)	-0.0961*** (-6.48)
<i>Bankdiv</i>	-0.0001 (-0.52)	-0.0001 (-0.57)	0.0000 (0.22)	-0.0002 (-1.23)
<i>Bankcredit</i>	0.0029*** (18.98)	0.0022*** (11.36)	0.0028*** (20.36)	0.0023*** (14.96)
<i>ROL</i>	0.0881*** (5.96)			
<i>Bankcred*ROL</i>	-0.0016*** (-12.87)			
<i>GOVEFF</i>		0.0121 (0.95)		
<i>Bankcred*GOVEFF</i>		-0.0009*** (-7.05)		
<i>REGQUAL</i>			0.0460*** (3.57)	
<i>Bankcred*REGQUAL</i>			-0.0014*** (-9.79)	

(Continued on next page)

TABLE 4 (Continued)

Variable	<i>Fincred</i> Model (1)	<i>Fincred</i> Institutional quality	<i>Fincred</i> GDP/capita and GDP growth rate	<i>Fincred</i> Regional effects and dummies
<i>CCI</i>				0.0597*** (6.09)
<i>Bankcred*CCI</i>				−0.0011*** (−10.90)
<i>Bankeff</i>	0.0030*** (5.05)	0.0016*** (2.82)	0.0030*** (4.65)	0.0014 (1.34)
<i>NPL</i>	0.0012* (1.78)	0.0001 (0.12)	0.0001 (0.19)	0.0007 (1.46)
<i>Concen</i>	0.0008*** (2.73)	0.0004* (1.82)	0.0007** (2.60)	0.0006** (2.33)
<i>GDPCAP</i>	−0.0015*** (−4.42)	−0.0004 (−1.36)	−0.0005* (−1.86)	−0.0018*** (−4.55)
<i>GDP</i>	0.0001 (0.32)	0.0019*** (3.52)	0.0010** (2.15)	0.0014*** (3.59)
_cons	−0.1015*** (−4.76)	−0.0738*** (−2.69)	−0.1226*** (−4.76)	−0.0488** (−2.00)
No. of obs.	247	247	247	247
AR1 test p_value	0.101	0.093	0.097	0.100
AR2 test p_value	0.423	0.393	0.412	0.391
Hansen test p_value	0.397	0.46	0.329	0.327

Notes: *, **, and *** indicate significant at 10%, 5% and 1%, respectively. The numbers in brackets are *t*-statistics.

CONCLUSIONS AND IMPLICATIONS

Lending is a major traditional activity of banks, so the introduction and growth of fintech in the field of credit extension can disrupt the sustainability of traditional banking. This is why mainstream research tends to focus on the effect of fintech on bank performance/stability/efficiency. Limited studies have been conducted on the reverse relationship, i.e., how the banking sector can affect fintech, particularly the impact of bank credit on fintech

credit. Another limitation is, to the best of our knowledge, that there are no studies investigating the moderating effect of institutional quality on the link between bank credit and fintech credit.

For theoretical contributions, this study extends existing research by addressing the gap regarding the impact of bank credit on fintech credit. Most previous discussions have focused on how fintech affects bank performance, stability, and efficiency while ignoring the influence of the banking sector on fintech. Using the macro dataset from Cornelli et al. (2023) and World Bank, the study finds that bank credit complements fintech credit according to the complementary theory, which assumes that both fintech credit and bank credit can develop together. Furthermore, the study adds a new exploration to the debate by considering the moderating role of institutional quality. Extending the study, we find that banks tend to dominate in environments with better institutional frameworks, reducing the volume of fintech credit. This sheds light on how market forces and the institutional context may shape the development of fintech credit, thus enriching the theoretical understanding of how financial systems adapt to technological disruption.

This study, therefore, provides some practical suggestions for policymakers and bank managers. First, policymakers should support fintech development, but they should aim for a balance, ensuring that both banks and fintech can coexist and develop. Second, fintech managers should pay attention to market needs and the institutional environment in which they operate to make appropriate adaptations. Fintechs should leverage their technological and regulatory advantages to mitigate negative impacts while increasing their credit market share. Additionally, for banks, understanding this complementary relationship can guide strategic partnerships with fintech to better serve broader customer segments while remaining competitive in the changing financial landscape.

This study also has some limitations, such as the limited time of data collection and the number of observations. Examining the unidirectional influence of bank credit on fintech credit may shed some light on theoretical arguments, but simultaneously examining the correlation and causality between them is worth considering. Moreover, considering them in other contexts is also helpful for researchers and managers. Therefore, future

studies might examine the link between bank credit and fintech credit in more settings, such as different levels of uncertainty or diverse demographic characteristics. In addition, it can benefit to examine the relationship between the two types of credit in a national setting, with changing economic conditions. These directions will enhance our understanding of how stakeholders respond towards the existence of fintech.

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APPENDIX

Variable's construction

Variable	Definition	Source
<i>Bankdiv</i>	Bank non-interest income to total income (%)	Global Financial Development – GFDD.EI.03
<i>Bankeff</i>	Bank cost to income ratio (%)	Global Financial Development – GFDD.EI.07
<i>Fincred</i>	Volume of fintech credit to GDP of a country	Cornelli et al. (2020)
<i>Bankcred</i>	Private credit by deposit money banks to GDP (%)	Global Financial Development – GFDD.DI.01
<i>NPL</i>	Bank non-performing loans to total gross loans (%)	IMF – FB.AST.NPER.ZS
<i>String</i>	Regulatory Stringency Index (Cornelli et al., 2020)	World Bank's Bank Regulation and Supervision Survey
<i>Concen</i>	5-bank asset concentration	Global Financial Development – GFDD.OI.06
<i>GDPCAP</i>	GDP per capita (current USD)	World Bank
<i>GDP</i>	GDP growth rate (annual %)	World Bank
<i>CCI</i>	Corruption Control Index	Worldwide Governance Indicators
<i>GOVEFF</i>	Government Effectiveness Index	Worldwide Governance Indicators
<i>REGQUAL</i>	Regulatory Quality Index	Worldwide Governance Indicators
<i>ROL</i>	Rule of Law Index	Worldwide Governance Indicators