



Research article

How does digital transformation affect the profitability of rural commercial banks?

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ABSTRACT

Under the impact of the business sinking of large commercial banks and the cross-border competition of fintech companies, digital transformation has become a strategic priority for rural commercial banks. However, can digital transformation improve the profitability of rural commercial banks (PORCB)? This aspect has not been thoroughly examined in academic literature. This study utilizes unbalanced panel data from 54 Chinese rural commercial banks spanning from 2010 to 2021. The Peking University Commercial Bank Digital Transformation Index is employed to gauge the extent of digital transformation, while ordinary least squares estimation is used to examine its effect on the profitability of rural commercial banks and elucidate its underlying mechanisms. The findings show that: (1) Digital transformation can significantly improve the PORCB. (2) Digital transformation improves the PORCB by enhancing asset quality, operating efficiency and risk-taking. (3) The profitability-enhancing effect of digital transformation is more pronounced among rural commercial business banks with larger assets and lower equity concentration, as well as among state-owned rural commercial banks. This paper's findings represent a novel investigation into the correlation between digital transformation and the profitability of rural commercial banks. They offer a theoretical foundation and empirical evidence for future studies examining the economic implications of bank digital transformation, and offer valuable insights for enhancing the digitalisation of rural banks.

1. Introduction

Rural commercial banks, stemming from the ongoing reform of rural financial institutions, constitute over 34 % of Chinese banking institutions. They play a vital role in enhancing the rural financial services ecosystem and supporting the rural economy. However, due to the lack of credit records and pledges coupled with the inherent disadvantages of the agricultural industry, there is a serious information asymmetry between rural financial institutions and agricultural business entities. Adverse selection and moral hazard pose significant challenges for agricultural-related financial services, resulting in heightened risks and costs [1]. This not only diminishes farmers' access to credit but also constrains the profitability of rural commercial banks [2]. Simultaneously, the continued business sinking of large state-owned commercial banks and the cross-border competition of fintech companies have exposed rural commercial banks to the threat of local customer base erosion and the risk of losing stock of customers. Presently, the seamless integration of digital technologies such as big data, cloud computing, artificial intelligence, and blockchain with the financial sector is fundamentally

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reshaping the operational and service paradigms of commercial banks [3]. According to the People's Bank of China, as of March 2024, more than 1000 financial institutions in China have cumulatively launched more than 1100 accessible financial service client apps in large-print and voice versions to promote the release of the vitality of financial digital transformation. Digital banking, as a novel iteration of commercial banking, plays an indispensable role in catering to the digitized real economy of the future. Against the backdrop of historical problems and real challenges, a large number of rural commercial banks have undertaken digital transformation in search of profitability improvement.

Digital transformation is the process through which firms adapt to environmental changes by leveraging digital technologies to innovate new avenues for value creation [4]. Digital transformation can increase corporate strategic investments [5], reduce the risk of firms' share price crashes [6], and improve firms' level of innovation and performance [7]. However, despite the numerous potential benefits, the advantages of digital transformation for enterprises are not always direct or guaranteed [8]. Moreover, the performance of many enterprises has not witnessed significant improvement despite substantial investments in digital transformation [9]. Rural commercial banks encounter various challenges in digital transformation, including the scarcity of multidisciplinary personnel adept in both business and technology, the exorbitant costs associated with partnering with top-tier fintech companies, and the limited integration of financial data [10].

Presently, there is limited research on the economic implications of digital transformation in commercial banks, and the findings are inconclusive. Certain scholars have observed that digital transformation can enhance banks' customer base [11], lower operational expenses, and enhance commercial bank profitability [12]. Conversely, other researchers have noted that excessive technological investment and heightened diversification can compromise banks' stability and lead to increased risk-taking [13]. Additionally, insufficient IT infrastructure resources may compel banks to allocate significant human and financial resources to rectify unforeseen issues during digital transformation, consequently diminishing profitability [14]. In summary, the impact of digital transformation on commercial bank profitability remains inconclusive, and its effects on rural commercial banks have been inadequately explored. However, the theoretical explanations and empirical tests of the impact of digital transformation on the profitability of rural commercial banks and its mechanisms are worthy of in-depth study. Hence, can digital transformation enhance the profitability of rural commercial banks? If so, what are the mechanisms underlying this influence? Moreover, is there heterogeneity in the relationship between digital transformation and rural commercial bank profitability? To address these inquiries, this paper undertakes an exhaustive examination of the association between digital transformation and profitability in rural commercial banks.

This study explores the impact and mechanism of digital transformation on the profitability of rural commercial banks using data from 54 rural commercial banks in China from 2010 to 2021 and finds the following: (1) Digital transformation can enhance the profitability of rural commercial banks. After endogeneity testing using instrumental variables method and difference-in-difference model, the conclusion remains unchanged. Substitution of core variables and replacement of model estimation also do not significantly change the regression results of the benchmark model, indicating that the conclusion is robust. (2) Our findings support the hypothesis that digital transformation improves the profitability of rural commercial banks by enhancing asset quality, operational efficiency, and risk-taking. (3) Digital transformation's effect on rural commercial bank profitability exhibits heterogeneity. Specifically, its impact is more significant in rural banks with lower equity concentration and larger asset sizes. Moreover, digital transformation's influence on profitability is notably stronger in state-owned rural commercial banks compared to their non-state-owned counterparts.

The contributions of this study to the literature are discussed below. Firstly, this study enriches research on factors affecting commercial bank profitability. Prior research has predominantly examined the effects of ESG, green lending, external governance, and regulatory frameworks on commercial bank profitability [15,16]. However, limited empirical studies have investigated the influence of digital transformation. Our study finds that digital transformation is also one of the important determinants of rural commercial banks' profitability. Second, this study further refines the research related to the relationship between digital transformation and the profitability of banks. The existing literature explores the direct influence of digital transformation on bank profitability but lacks investigation into the underlying mechanisms of this relationship [17]. We conduct a comprehensive analysis of the effects of digital transformation on the profitability of rural commercial banks, revealing that enhancements in asset quality, operational efficiency, and proactive risk management resulting from digital transformation can enhance rural bank profitability. These findings support those of Zhu et al. (2023) and Chen et al. (2023) and offer fresh empirical evidence to enhance understanding of the economic ramifications of banks' digital transformation [18,19]. Thirdly, this study offers insights into the digital transformation of small and medium-sized banks at the micro level and furnishes supportive evidence for government initiatives to foster digital financial inclusion in rural areas. This study empirically demonstrates that the profitability gains from digital transformation are particularly significant for agribusiness banks with larger asset sizes and lower equity concentration, as well as state-owned agribusiness banks. These findings hold positive implications for small and medium-sized banks confronting the challenges of digital transformation and underscore the necessity and significance of government support in advancing rural finance development.

2. Theoretical literature review and research hypotheses

2.1. Digital transformation and rural commercial bank profitability

Schumpeter's (1942) theory of creative destruction posits that dynamic imbalance is typical in a thriving economy [20]. Economic growth stems from an evolving economic structure, constantly shifting from the old equilibrium to establish a new one and reallocating resources to foster new growth engines. From the perspective of creation, digital transformation is conducive to rural commercial banks' business processes and product innovation [21]. It has the effect of reducing information asymmetry [22], lowering financial

transaction costs and risks, broadening the coverage of financial services, and enhancing profit margins. The optimisation of a lending business process can help to improve the efficiency of lending and increase the bank's loan scale in terms of both size and value. The innovation of financial products can help attract different types of customers, which further contributes to the overall interest income. The increase in loan interest income will thus enhance the profitability of rural commercial banks. Digital technology aids rural commercial banks in screening quality customers and swiftly identifying specific needs for precision marketing [23]. From a disruptive standpoint, digital transformation has shifted rural commercial banks' focus from product-centered value to customer- and market-oriented business models [24]. New technologies and talents introduced by digital transformation expedite the transition of rural commercial banks into agile organizations. This capability aids banks in promptly recognizing and responding to shifts in market demand [25], thereby enhancing profitability [26]. Ionaşcu et al. (2023) also argue that there is a good correlation between digital progress and higher profitability within the banking sector [27]. Based on the arguments above, this study proposes the following hypothesis.

H1. Digital transformation can improve the profitability of rural commercial banks.

2.2. Mechanisms for the impact of digital transformation

2.2.1. Digital transformation affects rural commercial bank profitability through improved asset quality

Digital transformation enhances the asset quality of rural commercial banks through two primary avenues. Initially, digital transformation mitigates information asymmetry between rural commercial banks and lenders, curbing adverse selection and moral hazard, thereby enhancing asset quality. Chen et al. (2023) utilize panel data from 36 listed banks in China spanning from 2011 to 2021 to demonstrate that digital transformation substantially decreases banks' risk-taking [19]. Prior to lending, rural commercial banks leverage digital tools such as big data and cloud computing to dismantle the traditional single assessment framework. They cross-validate data across various external platforms to ascertain borrowers' true creditworthiness, aiding in fraud detection and risk mitigation [28]. Subsequently, during the post-loan phase, intelligent risk control systems autonomously track customers' repayment patterns and financial standing in real-time. This capability enables rural commercial banks to promptly address post-loan risks, thereby mitigating moral hazard [29]. Secondly, digital transformation can improve asset quality by reducing the loan concentration of rural commercial banks. Advancements in digital technology broaden the outreach of rural commercial banks and extend the scope of their customer base [30]. Simultaneously, product and service innovation enable rural commercial banks to address the diverse financial requirements of niche segments. Consequently, digital transformation optimizes the customer composition of rural commercial banks and diminishes loan concentration, thereby mitigating asset risk. Decline in asset quality introduces credit risk, posing a threat to banks' profitability [31]. Almaqtari et al. (2019) using the data of 69 Indian commercial banks for the period 2008–2017, found that the improvement in asset quality has a significant positive impact on the return on a bank's net worth [32]. Based on the arguments above, this study proposes the following hypothesis.

H2. Digital transformation improves the profitability of rural commercial banks by improving asset quality.

2.2.2. Digital transformation impacts rural commercial bank profitability by improving operational efficiency

Digital transformation can improve the operational capabilities of rural commercial banks (Zhu & Jin, 2023) [18]. Digital transformation enhances the operational efficiency of rural commercial banks in two primary ways. On the one hand, digital transformation improves the credit allocation efficiency of rural commercial banks. The introduction of big data technology can broaden the information channels of rural commercial banks and obtain customer information that cannot be accessed in traditional ways. Cloud computing enables rapid integration and refinement of extensive information, facilitating profound market analysis and precise marketing for rural commercial banks, thereby expediting credit approval and issuance [33]. On the other hand, digital transformation improves the human resource allocation efficiency of rural commercial banks. Technological advancements and the widespread adoption of intelligent equipment resulting from the digital transformation of rural commercial banks directly replace a significant portion of routine and repetitive tasks. This shift is reflected in the increase in high-skilled labor, the transformation and enhancement of the human capital structure [34], and the improvement in human resource allocation efficiency. Investment in intelligent teller machines frees up tellers to transition to marketing roles, reducing labor costs and enhancing bank performance [35]. While the allocation of limited resources to various regions, sectors, and businesses is pivotal for the profitability of commercial banks [36], human resources also significantly contribute to the factor mix. Based on the arguments above, this study proposes the following hypothesis.

H3. Digital transformation enhances the profitability of rural commercial banks by improving operational efficiency.

2.2.3. Digital transformation affects the profitability of rural commercial banks through increased risk-taking

The digital transformation of rural commercial banks primarily enhances their risk-taking capacity by mitigating external competitive pressures and improving their risk mitigation capabilities. On the one hand, digital transformation can mitigate competitive pressure arising from the ongoing decline of large commercial banks, thereby boosting risk-taking among rural commercial banks. Leveraging digital technology, rural commercial banks can monitor public sentiment on social media platforms and online forums to gauge customer feedback, particularly regarding financial products and services. This enables banks to promptly adjust their marketing strategies and enhance the competitiveness of their offerings [37]. On the other hand, enhanced asset quality, operational efficiency, and capital adequacy resulting from digital transformation can bolster rural commercial banks' capacity to

manage and mitigate risk. Consequently, this may lead to a relaxation of lending standards and an uptick in the proportion of risky assets in their portfolios [38,39]. The effect of risk-taking on the profitability of rural commercial banks remains uncertain. While an increase in bank risk appetite may elevate profitability expectations, it also introduces greater uncertainty regarding profitability. Based on the arguments above, this study proposes the following hypothesis.

H4. Digital transformation affects the profitability of rural commercial banks through increased risk-taking.

3. Data and model design

3.1. Sample

Since the trend of rapid development and widespread application of digital technology mainly appeared after 2010, this paper takes the initial sample of Chinese rural commercial banks from 2010 to 2021. The micro characteristic variables of rural commercial banks are mainly from the China Stock Market and Accounting Research Database (CSMAR). Missing data were filled in using the Corporate Alert Link website to ensure data integrity.¹ Data are collected from banks' financial statements, including balance sheets, income statements, and financial notes. The authors calculated the liquidity creation level and business diversification indicators. The data on digital transformation are obtained from the Digital Transformation Index of Commercial Banks of Peking University.² Macro data are from the National Bureau of Statistics of China (NBS) and the statistical bureaus of prefecture-level cities, and some results are measured by the authors. Banks with fewer than three consecutive years of variables in the benchmark model are excluded from the study. In order to avoid the extreme endpoints biasing the results of the study, all continuous variables in this paper are subjected to winsorize shrinkage tailing below 1 % and above 99 processing. The final dataset comprises 443 observations from 54 rural commercial banks spanning 2010 to 2021.

3.2. Variables

3.2.1. Dependent variable: profitability

Based on Saunders et al. (2020), this study adopts return on assets (ROA) as a metric for bank profitability [40]. ROA is the prevalent metric for assessing overall bank performance, with a higher value indicating greater profitability for rural commercial banks. In the robustness test, the profitability of rural commercial banks is reassessed using the cost-income ratio. The cost-income ratio indicates the bank's expenses per unit of income, with lower values suggesting stronger profitability for the bank.

3.2.2. Independent variable: digital transformation (DT)

Building on the research by Xie and Wang (2022), this study utilizes Peking University's Digital Transformation Index for Chinese Commercial Banks as a proxy measure for the level of digital transformation in rural commercial banks [41]. The index, grounded in three dimensions—strategic, business, and management digitalisation—offers a comprehensive and objective assessment of the digital transformation status and trajectory of commercial banks. Appendix A outlines the methodology for constructing the Digital Transformation Index for commercial banks at Peking University.

3.2.3. Mediation variables

Based on the preceding theoretical analysis, digital transformation impacts the profitability of rural commercial banks by influencing asset quality, operational efficiency, and risk-taking behavior. Loans are the main assets of commercial banks, therefore we use the non-performing loan ratio to measure the asset quality of rural commercial banks [42], where a higher non-performing loan ratio indicates a lower level of asset quality in rural commercial banks. Operational efficiency is assessed through the total asset turnover ratio of rural commercial banks. This ratio, delineated as the quotient of the commercial bank's main business income and total assets, captures the extent to which rural commercial banks utilize their total assets, thereby reflecting their operational capacity [43]. Drawing on Delis and Kouretas (2011), we use the risk-weighted asset ratio to measure the risk-taking level of rural commercial banks [38]. This ratio primarily signifies the proportion of high-risk-rated assets held by the bank, with a higher proportion indicating a greater inclination of the bank to acquire high-risk assets.

3.2.4. Control variables

With reference to existing studies, bank size (lnsize), capital adequacy ratio (CAR), business diversification (HHI), and liquidity creation (LC) are selected in this paper to control for the effect of bank characteristics [44–47]. Bank liquidity creation level (LC) is measured by “bank overall liquidity creation/total assets”. The overall bank liquidity creation measure refers to the study of Berger & Bouwman (2009), which is able to comprehensively measure bank assets and liabilities [48]. The specific construction method is as follows: in the first step, according to the ease of realization, transaction costs and maturity time, the items of bank balance sheets are classified into liquid, semi-liquid and illiquid categories. When categorizing specific items, due to the differences in financial systems,

¹ CSMAR database: China Stock Market and Accounting Research Database. Official website of Enterprise Alert Pass platform: www.qyyjt.cn.

² The index is available free of charge from the Digital Transformation Index for Chinese Commercial Banks group at Peking University: xxl@nsd.pku.edu.cn (Xuanli Xie).

structures and environments between China and developed economies, we draw on the categorization approach of Chinese scholars and assign categorization values to each type of item based on the setting of the accounts in China’s annual reports of the banking industry (see Appendix B) [49]. In the second step, a weighted summation is performed based on the classification results in the previous step to construct an indicator of banks’ overall liquidity creation, which is given by the following formula: overall liquidity creation = $0.5 \times \sum (\text{illiquid assets} + \text{liquid liabilities}) + 0 \times \sum (\text{semi-liquid assets} + \text{semi-liquid liabilities}) - 0.5 \times \sum (\text{liquid assets} + \text{illiquid liabilities and equity})$. The Herfindahl Index (HHI) was used to measure the level of business diversification in rural commercial banks and the formula is shown in equation (1):

$$HHI_{it} = 1 - \left(II_{it}^2 + NII_{it}^2 \right) \tag{1}$$

Where II is the share of net interest income of the bank in the operating income of the bank, NII is the share of non-interest income of the bank in the operating income, and the larger the HHI the higher the level of diversification of the bank’s business. Meanwhile, GDP growth rate (GDP), inflation rate (CPI) and share of primary sector (SPS) are added as macro influences. Table 1 provides more detailed information on the definitions of the variables.

3.3. Model design

We constructed the following model (2) to test the relationship between digital transformation and the profitability of rural commercial banks:

$$ROA_{it} = \alpha_0 + \alpha_1 DT_{it} + \alpha_2 X_{it} + \mu_i + \theta_t + \varepsilon_{it} \tag{2}$$

Where ROA_{it} represents the profitability of rural commercial bank i in year t . DT_{it} is the digital transformation of rural commercial bank i in year t . X_{it} is a vector of a set of control variables. μ_i and θ_t are bank and time-fixed effects, respectively. ε_{it} is a random disturbance term.

In order to test the mechanism by which digital transformation affects the profitability of rural commercial banks, we constructed models (3)–(8) based on Chen and Kim (2023) as follows [50]:

$$NPL_{it} = \beta_0 + \beta_1 DT_{it} + \beta_2 X_{it} + \mu_i + \theta_t + \varepsilon_{it} \tag{3}$$

$$ROA_{it} = \nu_0 + \nu_1 DT_{it} + \nu NPL_{it} + \nu_3 X_{it} + \mu_i + \theta_t + \varepsilon_{it} \tag{4}$$

$$OE_{it} = \delta_0 + \delta_1 DT_{it} + \delta_2 X_{it} + \mu_i + \theta_t + \varepsilon_{it} \tag{5}$$

$$ROA_{it} = \zeta_0 + \zeta_1 DT_{it} + \zeta_2 OE_{it} + \zeta_3 X_{it} + \mu_i + \theta_t + \varepsilon_{it} \tag{6}$$

$$RWAR_{it} = \eta_0 + \eta_1 DT_{it} + \eta_2 X_{it} + \mu_i + \theta_t + \varepsilon_{it} \tag{7}$$

$$ROA_{it} = \theta_0 + \theta_1 DT_{it} + \theta_2 RWAR_{it} + \theta_3 X_{it} + \mu_i + \theta_t + \varepsilon_{it} \tag{8}$$

Where NPL_{it} represents the asset quality of rural commercial bank i in year t . OE_{it} represents the operational efficiency of rural commercial bank i in year t . $RWAR_{it}$ represents the risk-taking of rural commercial bank i in year t .

Table 1
Definitions of the main variables.

Variable	Definition
Dependent variable	
ROA	Bank profits, measured by return on assets (Saunders et al., 2020).
Independent variable	
DT	The digital transformation level of rural commercial banks, measured by the Peking University China Commercial Bank Digital Transformation Index (Xie and Wang, 2023).
Control variable	
Lnszize	Bank size, measured by the number of banks’ total annual assets.
CAR	Bank capital adequacy Ratio, measured by net capital/risk assets.
HHI	Bank diversification, measured by Herfindahl-Hirschman Index.
LC	Bank liquidity creation level, measured by bank liquidity creation/total assets.
GDP	GDP growth rate
CPI	Consumer price index
SPS	Share of primary sector value added in GDP
Intermediate variable	
NPL	Bank asset quality, measured by NPL ratio (Ding & He, 2023).
OE	Bank operating capacity, measured by total asset turnover ratio (Wang et al., 2021).
RWAR	Bank risk-taking, measured by Risk-weighted asset ratio (Delis & Kouretas, 2011).
Instrument variable	
IV	Number of mobile phone subscribers in prefecture-level cities

4. Results and discussion

4.1. Descriptive analysis

Table 2 reports the descriptive statistics of the main variables in this study. The mean value of return on total assets is 0.98 per cent and the maximum value is 1.80 per cent, and all 54 rural commercial banks have positive returns in the last twelve years, but there are large differences in return on total assets among different rural commercial banks. The mean value of digital transformation is 51.09, the maximum value is 135.15, the minimum value is 0, and the standard deviation is 31.67, indicating that the level of digital transformation of Chinese rural commercial banks varies greatly.

4.2. Baseline results

Table 3 presents the results of the baseline regression, all regressions control for individual bank fixed effects and time fixed effects. Column (1) is a univariate regression and the coefficient of DT is 0.0024 which is significantly positive at 1 % level. In columns (2) to (3), this study gradually adds individual control variables and macro control variables of rural commercial banks, and the results show that the coefficient of DT is still significantly positive at the 1 % level. This aligns with the results reported by Do et al. (2022) [12]. According to the results of fitting the normal distribution of the residuals in Fig. 1, the empirical findings of this paper are valid. This indicates that digital transformation can contribute to the profitability of rural commercial banks and hypothesis 1 is valid.

4.3. Endogeneity check

To address potential reverse causation, we employ the number of regional cell phone subscribers as an instrumental variable. This choice is justified as the number of cell phone subscribers directly influences the prevalence of mobile banking users and, consequently, the extent of digital transformation in rural commercial banks [51], without directly impacting profitability. The results are shown in Table 4, columns (1) to (2), the instrumental variable passes the unidentifiable and weak instrumental variable tests. The coefficient of DT is significantly positive, consistent with the previous findings.

Employing the double-difference approach to mitigate unobservable time trends could result in a concurrent increase in both the level of digital transformation and the profitability of rural commercial banks. In 2017, the People’s Bank of China (PBOC) established the Financial Technology Committee and introduced the “13th Five-Year Plan for the Development of Information Technology in China’s Financial Industry”. The plan explicitly advocated for the continual promotion of innovative development in the financial industry through advanced information technology and the effective integration and application of digital technology in financial operations. This provided significant guidance for financial institutions seeking to leverage emerging technologies for rapid development. Considering that the policy was formulated by the People’s Bank of China (PBOC), it can be seen as a relatively exogenous shock for rural commercial banks that is conducive to advancing their digital transformation process. At the same time, different banks are subject to different policy shocks due to the large differences in asset size, talent reserve and strategic layout, which creates an opportunity for this study to construct a double-difference model to verify the validity of the previous findings. We use the median of the digital transformation index of rural commercial banks in 2017 as the basis for classification, set the lower digital transformation level group as the treatment group and the higher group as the control group. Based on this we constructed the following double difference model:

$$ROA_{it} = \gamma_0 + \gamma_1 Treat_{it} \times Post_{it} + \gamma_2 X_{it} + \mu_i + \theta_t + \varepsilon_{it} \tag{9}$$

In model (9), $Treat_{it}$ represents the grouping variable, which indicates the treatment group when taking the value of 1 and the control group when taking the value of 0. $Post_{it}$ is a dummy variable for the time of the policy, which takes the value of 1 in the year 2017 and after, and 0 otherwise. γ_1 reflects the true impact of the implementation of the development plan on the profitability of rural com-

Table 2
Descriptive statistics.

Variables	Mean	SD	Min	Max	N
ROA	0.9843	0.3238	0.1000	1.8000	443
DT	51.0901	31.6660	0	135.1465	443
Lnsize	25.2897	1.1069	23.0916	27.7035	443
CAR	14.2260	1.9835	9.6200	22.4400	443
HHI	0.2773	0.1456	-0.0023	0.4997	443
LC	0.5450	0.1313	0.0936	0.8163	411
GDP	9.3810	4.7539	-7.0644	23.6852	443
CPI	102.3284	0.7956	101.1000	105.3297	443
SPS	3.3385	2.3763	0.2910	11.7421	443
NPL	1.7941	1.0148	0.4800	6.8400	443
OE	0.0232	0.0068	0.0086	0.0403	436
RWAR	0.6333	0.0897	0.2878	0.8540	408
IV	422.3290	176.5830	106.3406	703.8871	338

Table 3
Baseline results.

	(1)	(2)	(3)
DT	0.0024*** (0.0007)	0.0022*** (0.0007)	0.0022*** (0.0007)
Insize		0.0316 (0.0656)	0.0389 (0.0663)
CAR		0.0315*** (0.0066)	0.0348*** (0.0070)
HHI		-0.0533 (0.0919)	-0.0955 (0.0946)
LC		0.0405 (0.1097)	0.0449 (0.1089)
GDP			0.0049 (0.0039)
CPI			0.0701** (0.0348)
SPS			0.0146 (0.0343)
Cons	1.1213*** (0.0571)	-0.0721 (1.6057)	-7.6791 (4.0055)
Bank	Y	Y	Y
Year	Y	Y	Y
R ²	0.5492	0.5785	0.5884
adj. R ²	0.473	0.5050	0.5090
N	443	411	411

Note: Clustered standard errors at the bank level are in parentheses. *, **, and *** indicate significance at the 10 %, 5 %, and 1 % levels, respectively. The tables below are the same.

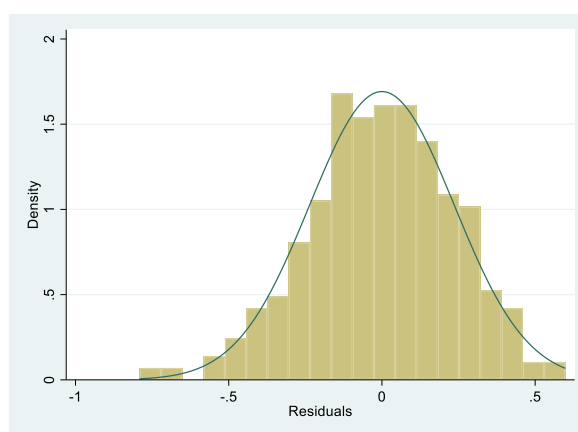


Fig. 1. Residual normal distribution fitting plot.

Table 4
Endogeneity check.

	(1)	(2)	(3)
	IV Reg Phase I	IV Reg Phase II	DID
IV	0.0195*** (0.0042)		
DT		0.1206*** (0.0042)	
Treat*Post			0.0705* (0.0372)
Insize	1.6156 (3.5681)	3.4278*** (1.2038)	0.0412 (0.0667)
CAR	1.6677** (0.6620)	-0.2594* (0.1396)	0.0379*** (0.0070)
HHI	1.1222 (7.6190)	-2.5104 (1.9331)	-0.1133 (0.0954)
LC	0.7896 (8.3404)	-1.0992 (1.8043)	0.0255 (0.1098)
GDP	-0.3509 (0.2682)	0.0535 (0.3960)	0.0051 (0.0039)
CPI	3.7863 (3.4467)	1.1355* (0.6823)	0.0749*** (0.0350)
SPS	8.3296*** (2.8111)	-0.1699 (0.7089)	0.0273 (0.0341)
Bank	Y	Y	Y
Year	Y	Y	Y
N	306	306	411
Kleibergen-Paap rk Wald F	21.031		
Kleibergen-Paap rk LM	9.927***		

Note: The Kleibergen-Paap rk Wald F statistic in column (1) is 21.031, which rejects the original hypothesis of a weak instrumental variable at the 10 per cent level. The p-value of Kleibergen-Paap rk LM test was less than 0.01 and the original hypothesis of non-identifiability was rejected.

mercial banks with low levels of digital transformation after eliminating the time trend that affects both the treatment and the control groups. As shown in column (3) of Table 4, development planning significantly improves the profitability performance of rural commercial banks with low levels of digital transformation. Based on Fig. 2, it can be seen that there is no significant difference between the profitability of the treatment and control groups before the exogenous policy shock, which is consistent with the parallel trend assumption. The empirical results still support the research hypothesis of this paper.

4.4. Robustness check

Firstly, the dependent variable is re-measured using the cost-income ratio (CIR). The results, as shown in column (1) of Table 5, show that DT can significantly reduce the CIR of rural commercial banks, i.e. digital transformation is beneficial to the profitability of rural commercial banks. Secondly, we re-run the regressions after excluding samples from 2020 and later years, taking into account new crown epidemic events that may affect the results of the study. The results are shown in column (2) of Table 5, where the DT coefficient remains significantly positive. Thirdly, considering that the crowding-out effect and technology spillover effect of digital financial inclusion on commercial banks may affect the level of digital transformation and profitability of rural commercial banks [52], we further validate the robustness of the findings by using the Peking University Index of Digital Financial Inclusion for Prefecture-Level Cities. Column (3) of Table 5 shows that digital transformation can still significantly contribute to the profitability of rural commercial banks after considering the impact of digital financial inclusion. Finally, the system GMM model is used for further robustness tests. Column (4) of Table 5 shows that AR (2) is greater than 0.1 and there is no second-order serial correlation in the model. The p-value of Hansen’s test is greater than 0.1 and the instrumental variables are valid. The coefficient of DT is significantly positive, consistent with the findings of the previous study.

4.5. Mechanism analysis

In order to examine the channels through which digital transformation acts on the profitability of rural commercial banks, this paper tests the mechanisms proposed by the theoretical analyses using mediation effects models. Table 6 reports the regression results of the mediated effects model for the mechanism test. Column (1) shows the empirical results of the benchmark regression of digital transformation affecting the profitability of rural commercial banks. The empirical results in columns (2) to (7) validate Hypotheses 2–4 on the impact mechanisms. First, the negative significant coefficient of DT in column (2) indicates that digital transformation reduces the NPL ratio of rural commercial banks and improves their asset quality. This is in line with the findings of Chen et al. (2023) [19]. The negative significant coefficient of NPL in Column (3) indicates that the decline in asset quality inhibits the improvement of rural commercial banks’ profitability. Meanwhile, the DT coefficient in column (3) is smaller than the DT coefficient in column (1), which suggests that asset quality plays a partially mediating role in digital transformation and rural commercial bank profitability. Therefore, hypothesis 2 is verified. Second, the positive and significant coefficient of DT in Column (4) indicates that digital transformation can enhance the resource allocation efficiency of rural commercial banks. The significant positive coefficient of OE in column (5) indicates that resource allocation efficiency enhances the profitability of rural commercial banks. Meanwhile, the DT coefficient in column (5) is smaller than the DT coefficient in column (1), which suggests that asset allocation efficiency plays a partially mediating role in digital transformation and rural commercial bank profitability. Therefore, hypothesis 3 is verified. Finally, the positive and significant coefficient of DT in column (6) indicates that digital transformation can enhance the risk-taking of rural commercial banks. The significant positive coefficient of RWAR in column (7) indicates that risk-taking can increase the profitability of rural commercial banks, which may be due to the fact that the increase of risk-taking implies the reduction of the “loan shyness” behavior of rural commercial banks and the increase of the loan size helps to increase the profitability of rural commercial banks. Meanwhile, the DT coefficient in column (7) is smaller than the DT coefficient in column (1), which suggests that risk-taking plays a partially mediating role in digital transformation and rural commercial bank profitability. Therefore, hypothesis 4 is verified.

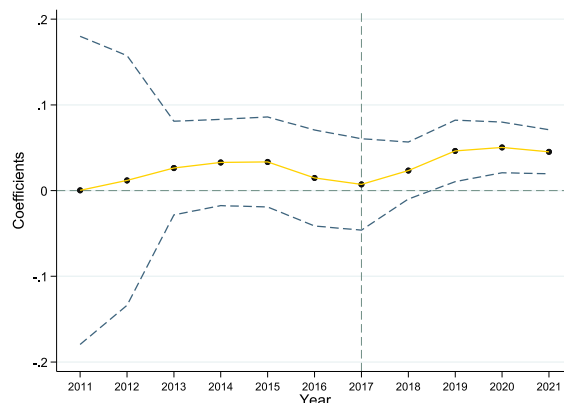


Fig. 2. Parallel trend test.

Table 5
Robustness check.

	(1)	(2)	(3)	(4)
	CIR	ROA	ROA	ROA
L.ROA				0.7094*** (0.0948)
DT	-0.0269* (0.0138)	0.0018** (0.0009)	0.0022*** (0.0008)	0.0014** (0.0007)
lnsize	-3.0357** (1.2273)	0.0775 (0.0733)	0.0709 (0.0716)	-0.0159 (0.0284)
CAR	-0.2153 (0.1313)	0.0179** (0.0080)	0.0244*** (0.0079)	0.0197 (0.0177)
HHI	0.2864 (1.749)	-0.3118*** (0.1139)	-0.1885* (0.1085)	-0.1729 (0.1929)
LC	-2.2853 (2.0140)	-0.0992 (0.1296)	-0.0043 (0.1177)	-0.0321 (0.2406)
GDP	-0.0463 (0.0743)	0.0018 (0.0041)	0.0067* (0.0040)	0.0022 (0.0061)
CPI	-0.6356 (0.6474)	0.0994** (0.0399)	0.0591 (0.0385)	0.0286 (0.0687)
SPS	-0.7885 (0.6352)	0.0800* (0.0438)	0.0285 (0.0397)	0.0184 (0.0281)
Index			0.0020 (0.0018)	
Bank	Y	Y	Y	Y
Year	Y	Y	Y	Y
AR(1)-p				0.015
AR(2)-P				0.160
Hansen-P				0.228
R ²	0.1246	0.5537	0.5862	
adj. R ²	0.0240	0.4260	0.4930	
N	403	318	354	354

Note: Index is the Peking University Digital Inclusive Finance Index.³ Since our research object is rural commercial banks, we choose the Peking University Digital Inclusive Finance Index for prefecture-level cities.

³ The index is available at the Digital Finance Research Centre of Peking University. <https://idf.pku.edu.cn/zsbz/515313.htm>.

Table 6
Mechanism test.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ROA	NPL	ROA	OE	ROA	RWAR	ROA
DT	0.0022*** (0.0007)	-0.0045** (0.0022)	0.0014** (0.0007)	0.0035** (0.0016)	0.0017** (0.0007)	0.0007*** (0.0002)	0.0020*** (0.0007)
NPL			-0.1554*** (0.0159)				
OE					0.1334*** (0.0247)		
RWAR							0.3901** (0.1646)
lnsize	0.0389 (0.0663)	-0.7563*** (0.1987)	-0.0786 (0.0600)	-0.6558*** (0.1392)	0.1263* (0.0658)	-0.1796*** (0.0002)	0.0662 (0.0716)
CAR	0.0348*** (0.0070)	-0.0045 (0.0211)	0.0341*** (0.0062)	0.0134 (0.0148)	0.0330*** (0.0068)	-0.0103*** (0.0025)	0.0374*** (0.0076)
HHI	-0.0955 (0.0946)	0.5078* (0.2836)	-0.0166 (0.0843)	-2.0850*** (0.1987)	0.1826* (0.1045)	0.0266 (0.0323)	-0.0044 (0.0948)
LC	0.0449 (0.1089)	-0.6028* (0.3263)	-0.0487 (0.0970)	0.7406*** (0.2287)	-0.0538 (0.1063)	0.0694* (0.0364)	-0.0615 (0.1076)
GDP	0.0049 (0.0039)	-0.0179 (0.0115)	0.0021 (0.0034)	0.0030 (0.0081)	0.0045 (0.0037)	-0.0020 (0.0013)	0.0060 (0.0038)
CPI	0.0701** (0.0348)	-0.2628** (0.1042)	0.0293 (0.0311)	-0.0139 (0.0730)	0.0720** (0.0334)	-0.0025 (0.0122)	0.0415 (0.0359)
SPS	0.0146 (0.0343)	0.0291 (0.1027)	0.0191 (0.0304)	-0.0343 (0.0720)	0.0191 (0.0330)	0.0013 (0.0117)	0.0103 (0.0344)
Cons	-7.6791 (4.0055)	47.9980*** (12.0021)	-0.2209 (3.6316)	19.7650** (8.4119)	-10.3151*** (3.8816)	5.3413*** (1.4007)	-5.6732 (4.2046)
Bank	Y	Y	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y	Y	Y
R ²	0.5884	0.1587	0.6776	0.5617	0.6207	0.3711	0.5754
adj. R ²	0.5090	0.0340	0.6150	0.4780	0.5470	0.2450	0.4880
N	411	411	411	411	411	383	383

4.6. Heterogeneity analysis

4.6.1. Concentration of equity

In transition economies characterized by weak formal institutions, instances of “misappropriation” by large shareholders occasionally arise, and collusive behavior between controlling shareholders and executives significantly diminishes the incentives for executives to foster long-term competitive advantages such as digital transformation [53]. This paper divides the sample into high and

low equity concentration groups based on the median shareholding of the first largest shareholder. The empirical results, as shown in columns (1) and (2) of Table 7, show that the DT coefficients are significantly positive only for rural commercial banks with lower equity concentration. This indicates that the contribution of digital transformation to profitability is limited to rural commercial banks with low equity concentration. This may be due to the fact that the small asset size of rural commercial banks makes it more difficult to control management through effective competition in the event of a “one-share dominance” situation. In this case, the management may not aim to improve the profitability of the bank through digital transformation, but may have more incentives to harm the bank’s interests through misappropriation of funds and insider lending.

4.6.2. Nature of property rights

Due to the implicit government guarantees and political connections, state-owned rural commercial banks may have a more significant competitive advantage in the process of digital transformation compared to non-state-owned rural commercial banks [54], and thus the economic consequences of digital transformation may differ depending on the ownership of the rural commercial bank [55]. This paper divides the sample into state-owned rural commercial banks (OS1) and non-state-owned rural commercial banks (OS0). The empirical results, as shown in columns (3) and (4) of Table 7, indicate that the coefficient of digital transformation of state-owned rural commercial banks is larger than the coefficient of digital transformation of non-state-owned rural commercial banks and passes the test of difference in coefficients between groups. This suggests that the impact of digital transformation on improving profitability is more pronounced in state-owned rural commercial banks compared to non-state-owned rural commercial banks. It’s noteworthy that although the coefficient for digital transformation in non-state rural commercial banks is smaller, it remains significant, implying that digital transformation in these banks also positively influences their profitability.

4.6.3. Asset size

The digital transformation of commercial banks requires significant financial support, and thus the size of rural commercial banks’ assets may influence the profitability-enhancing effect of digital transformation. To investigate the variations in the profitability enhancement resulting from digital transformation across different asset size levels, this study categorizes the sample rural commercial banks into small, medium, and large groups based on their asset size. As shown in column (5) of Table 7, the coefficient of DT is -0.0017 and insignificant, which suggests that digital transformation of rural commercial banks with small asset size may be detrimental to profitability. This could be attributed to the substantial capital and time required for digital transformation, which smaller rural commercial banks may lack, leading to unsuccessful implementation and potential capital loss. As shown in column (6) of Table 7, the DT coefficient is 0.0010 but not significant, which suggests that digital transformation of rural commercial banks with moderate asset size may be beneficial to their profitability. Column (7) of Table 7 reveals a significant coefficient of DT at 0.0025 , significant at the 10 % level, suggesting that digital transformation in rural commercial banks with larger assets positively affects profitability.

4.7. Discussion

Below is a comparison with prior research. Firstly, unlike previous literature examining the relationship between digital transformation and bank performance [11,27], this study is conducted in the regional context of China and identifies a linear relationship between digital transformation and rural commercial bank profitability. Although studies in different regional contexts lack direct empirical evidence for this study, some indirect support exists. For example, Ionaşcu et al. (2023) find that Romanian banks have improved operational efficiency, enhanced customer experience and competitive advantage through digital innovations and artificial technologies [27]. At the same time, the financial soundness of the banks was significantly improved with deeper digital integration. Shaikh and Anwar (2023) examined the influence of digital banking transactions on Indian banks’ performance, finding that the adoption of digital transaction modes like Real-Time Gross Settlement (RTGS) and National Electronic Funds Transfer (NEFT) improves financial and operational performance while reducing transaction costs. In this sense, digital transformation can bring positive economic benefits to commercial banks [11]. Additionally, this study elucidates the underlying mechanism by which digital transformation influences the profitability of rural commercial banks, drawing on validation from prior research. Do et al. (2022) using data from 13 Vietnamese joint-stock commercial banks from 2011 to 2019 found that digital transformation helps to improve the performance of commercial banks, but they did not further analyse the mechanism of action by which digital transformation affects bank performance [12]. Our study finds that asset quality, risk taking and operational efficiency are important ways in which digital transformation affects the profitability of rural commercial banks. Notably, Chen et al. (2023) found that digital transformation significantly reduces banks’ NPL ratios, and this effect is more pronounced among small and medium-sized banks [19]. Our study supports this finding and brings digital transformation, risk-taking and profitability into the same theoretical framework, which helps to improve the theory of digital transformation in banks. Finally, this study enriches the heterogeneity of research on the relationship between digital transformation and bank performance. On the one hand, this study corroborates Do et al.’s (2022) observation that the positive effect of digital transformation on bank performance is more significant among larger banks [12]. On the other hand, this study also finds that the promotional effect of digital transformation on the profitability of rural commercial banks is more pronounced among rural commercial banks with lower equity concentration and state-owned rural commercial banks, which has not yet been investigated in the existing literature.

Table 7
Heterogeneity test.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ROA (Low CG)	ROA (High CG)	ROA (OS1)	ROA (OS0)	ROA (Small)	ROA (Medium)	ROA (Large)
DT	0.0029*** (0.0010)	0.0015 (0.0011)	0.0040*** (0.0014)	0.0019** (0.0009)	-0.0017 (0.0020)	0.0010 (0.0010)	0.0025* (0.0015)
Insize	0.1105 (0.0797)	0.0478 (0.1301)	-0.1272 (0.1853)	0.0940 (0.0740)			
CAR	0.0544*** (0.0106)	0.0307*** (0.0098)	0.0403*** (0.0129)	0.0276*** (0.0088)	0.0106 (0.0122)	0.0369*** (0.0129)	0.0502*** (0.0139)
HHI	0.0070 (0.1317)	-0.1298 (0.1415)	-0.0368 (0.1662)	-0.0227 (0.1225)	0.0166 (0.2161)	-0.0547 (0.1277)	0.0709 (0.1556)
LC	0.2712** (0.1467)	0.2748 (0.1876)	0.1513 (0.2071)	0.1061 (0.1385)	0.1008 (0.2181)	0.6112*** (0.1760)	0.1065 (0.1806)
GDP	0.0181*** (0.0071)	0.0008 (0.0046)	0.0018 (0.0051)	0.0072 (0.0062)	0.0086 (0.0087)	0.0028 (0.0044)	0.0026 (0.0056)
CPI	0.1264* (0.0735)	0.0456 (0.0380)	-0.0458 (0.0558)	0.1380*** (0.0472)	0.1279 (0.0787)	-0.0301 (0.0420)	0.0813 (0.0616)
SPS	0.0224 (0.0449)	-0.1058 (0.0558)	0.1532* (0.0827)	-0.0450 (0.0406)	-0.1552** (0.0681)	0.1594** (0.0660)	0.0466 (0.0790)
Cons	-15.7279** (7.7841)	-4.7750 (5.4054)	7.7926 (7.2311)	-15.5623*** (5.3043)	-11.1720 (8.1725)	2.8295 (4.3443)	-8.1348 (6.2757)
Bank	Y	Y	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y	Y	Y
R ²	0.6424	0.6090	0.6317	0.5326	0.5206	0.6694	0.6516
adj. R ²	0.5350	0.4980	0.5220	0.4160	0.3940	0.5510	0.4610
N	213	198	166	245	138	145	131
Coefficient difference test			P = 0.022				

Note: Columns (1) to (2) present the estimation results for the lower and higher concentration groups. Columns (3) to (4) present the estimation results for state-owned rural commercial banks and non-state-owned rural commercial banks. Columns (5) to (7) present the estimation results for rural commercial banks of different asset sizes.

5. Conclusions, suggestions and limitations

5.1. Conclusions

This study utilizes data from Chinese rural commercial banks spanning 2010 to 2021 to explore the impact of digital transformation on their profitability and operational mechanisms. The findings are as follows: (1) Utilizing Peking University's digital transformation index for commercial banks, we assess the level of digital transformation in rural commercial banks, finding that it positively impacts their profitability. (2) Digital transformation enhances the profitability of rural commercial banks by optimizing asset quality, operational efficiency, and risk-taking capabilities. (3) Rural commercial banks with larger scale and lower ownership concentration and state-owned rural commercial banks are more significantly affected by digital transformation on profitability. The findings of this paper theoretically enrich the theory of rural finance and the theory of digital transformation of banks, practically alleviate the concerns of rural banks in developing countries about digital transformation, and provide experience and evidence for sustainable profitability improvement of rural commercial banks.

5.2. Suggestions

The following suggestions are offered based on the study's findings. Firstly, managers of rural commercial banks should recognize the crucial role of digital transformation in enhancing risk management, operational efficiency, and profitability. On one hand, they should adhere to the internal and external linkage between external business digitalisation and internal management digitalisation, pay attention to the investment efforts in the introduction and cultivation of digital talents. They should also try to forward the upgrading and transformation of smart outlets, in order to promote the improvement of the operational efficiency of rural commercial banks. On the other hand, leveraging digital technology to empower the development of a comprehensive intelligent risk control system, managers should bolster data governance capabilities and enhance information acquisition and processing capabilities. Additionally, rural commercial banks should not overlook the significance of offline operations during digital transformation. They should consider customer segments preferring in-person transactions and elderly individuals less adept at using smart devices.

Secondly, rural commercial banks should develop a tailored and flexible digital transformation strategy considering both regional economic characteristics and their internal resources to prevent a one-size-fits-all approach to digitalisation. Rural commercial banks with higher equity concentration should prioritize long-term growth over short-term gains when making digital transformation decisions. This approach enables efficient decision-making and investment to enhance profitability over time through digitalisation. State-owned rural commercial banks should implement a proactive digital transformation strategy leveraging their political

connections and negotiation strengths. They should actively recruit fintech experts and foster long-term partnerships with reputable fintech firms to maximize the profitability benefits of digital transformation.

Finally, government departments should enhance top-level design and policy guidelines for digital transformation in the banking industry. Additionally, they should implement supportive complementary policies to ensure its effectiveness. During the digital transformation of rural commercial banks, the government should offer policy support, financial assistance, and facilitate the recruitment of fintech experts. Moreover, it should promote collaboration between rural banks and third-party fintech firms. Additionally, there is a need to enhance fintech supervision and set higher standards for accessing fintech products to prevent the circulation of subpar products in the market, which could lead to systemic financial risks.

5.3. Limitations

This paper still has some limitations. Firstly, the study sample is constrained by the lack of public disclosure of information in annual reports by rural commercial banks. Consequently, factors like innovation performance and R&D investment, which could impact digital transformation and profitability, are challenging to precisely measure. Subsequent research endeavors could enhance sample data acquisition through extensive questionnaire surveys or with support from provincial rural credit unions in China. Secondly, this paper does not address how digital transformation may be influenced by factors such as bank competition, cross-border competition from fintech firms, and government intervention. Future studies could explore the effects of these factors on the economic outcomes of banks' digital transformation. Lastly, the focus of this study on rural commercial banks in China may restrict its applicability to rural banks beyond the Chinese borders. In future research, the applicability of this study can be extended by examining the impact of regional context on digital transformation.

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Data availability statement

The authors do not have permission to share data.

CRedit authorship contribution statement

Nan Chao: Writing – review & editing, Writing – original draft, Software, Methodology, Formal analysis, Data curation, Conceptualization. **Yu Zhou:** Writing – review & editing, Software, Methodology, Data curation, Conceptualization. **Haifen Yang:** Writing – review & editing, Funding acquisition, Data curation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A

The Peking University Digital Transformation Index for Commercial Banks comprehensively and objectively measures the digital transformation and development trends of commercial banks from three dimensions: strategic digitalisation, business digitalisation and management digitalisation. [Table A1](#) shows the index system of Peking University's digital transformation index for Chinese commercial banks.

Table A1
Peking University Digital Transformation Index Indicator System for Chinese Commercial Banks

Level 1 indicators	Level 2 indicators	Indicator type	Specific indicator measurements
Strategic digitization	Frequency of references to digital technology	continuous variable	The number of mentions of digital technology-related keywords per 10,000 words in the body of the annual report. The keywords include 124 keywords related to digital technology in 6 categories.
Business digitization	Digital channel	categorical variable	Measured by whether the bank has launched mobile banking and micro-banking that year.
	Digital product	categorical variable	Measured by the launch of Internet money management, Internet credit, and e-commerce.
	Digital R&D	continuous variable	Total number of patents on digital technologies in 3 years (logarithmic).

(continued on next page)

Table A1 (continued)

Level 1 indicators	Level 2 indicators	Indicator type	Specific indicator measurements
Management digitization	Digital architecture	categorical variable	Measured by whether the bank has made organizational changes internally and whether it has established a fintech subsidiary.
	Digital talent	continuous variable	Percentage of directors with IT background on the board of directors.
	Digital collaboration	continuous variable	Percentage of executives with IT background in the executive team.
	Digital collaboration	categorical variable	Measured by whether the bank has undertaken investment partnerships with external technology companies during the year.

Appendix B

Table B1

Balance sheet liquidity segmentation and empowerment

Asset			
Current assets (weight - 0.5)	Semi-current assets (weight 0)	Non-current assets (weight 0.5)	
Cash and deposits with the Central Bank	Lendings to Banks and Other Financial Institutions	Release of loans and advances	Long-term Equity Investment
Derivative financial asset		Intangible asset	Investment Real Estate
Transactional Monetary Capital		Construction in process	Expensive Metals
Financial Assets Available for Sale		Deferred Income Tax Assets	Business Reputation
Due from banks and other financial institutions		Held-to-maturity financial assets	Fixed assets
		Accounts receivable-type investments	Other assets
		Redemptory Monetary Capital for Sale	
Liabilities and equity			
Current liabilities (weight 0.5)	Semi-current liabilities (weight 0)	Non-current liabilities and equity (weight - 0.5)	
Demand deposit	Time deposits	Bonds payable	Other liabilities
Due to Placements with Banks and Other Financial Institutions	Borrowings from Banks and Other Financial Institutions	Financial assets sold under repurchase agreements	
Derivative financial liabilities		Deferred Income Tax Liabilities	
Transactional Monetary Liabilities		Taxes and Dues Payable	
Borrowings from the Central Bank		Total owners' equity	

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