

ISSN 0861 - 6604
ISSN 2534 - 8396

BUSINESS management



PUBLISHED BY
D. A. TSENOV ACADEMY
OF ECONOMICS - SVISHTOV

2/2026

2/2026

BUSINESS management

Editorial board:

Prof. Krasimir Shishmanov, Phd - Editor in Chief, Tsenov Academy of Economics, Svishtov, Bulgaria

Assoc. Prof. Marin Marinov, PhD – Co-editor in Chief, Tsenov Academy of Economics, Svishtov, Bulgaria

Prof. Mariana Petrova, PhD - Managing Editor Tsenov Academy of Economics, Svishtov, Bulgaria

Assoc. Prof. Aleksandar Ganchev, Phd - Tsenov Academy of Economics, Svishtov Bulgaria

Assoc. Prof. Irena Emilova, Phd - Tsenov Academy of Economics, Svishtov Bulgaria

Assoc. Prof. Ivan Marchevski, Phd - Tsenov Academy of Economics, Svishtov, Bulgaria

Assoc. Prof. Simeonka Petrova, Phd - Tsenov Academy of Economics, Svishtov Bulgaria

Assoc. Prof. Taner Ismailov, Phd - Tsenov Academy of Economics, Svishtov, Bulgaria

International editorial board:

Olena Sushchenko, Prof., DSc (Ukraine)

Dariusz Nowak, Prof., PhD (Poland)

Nurlan Kurmanov, Prof., PhD (Kazakhstan)

Ryszard Pukala, Prof., PhD (Poland)

Yoto Yotov, Prof., PhD (USA)

Badri Gechbaia, Prof., PhD (Georgia)

Mahmut Kadir Isguven, Assoc. Prof., PhD (Turkey)

Stefan-Alexandru Ionescu, Assoc. Prof., PhD, (Romania)

Proofreader: Elka Uzunova

Technical Secretary: Zhivka Tananeeva

Web Manager: Martin Aleksandrov

The printing of the issue 2-2026 is funded with a grand from the Scientific Research Fund, Contract KP-06-NP7/18/05.12.2025 by the competition "Bulgarian Scientific Periodicals - 2026".

The Scientific Research Fund is not responsible for the content of the materials.

Submitted for publishing on 16.06.2026, published on 18.06.2026,
format 70x100/16, total print 80

© D. A. Tsenov Academy of Economics, Svishtov,
2 Emanuil Chakarov Str, telephone number: +359 631 66298

© Tsenov Academic Publishing House, Svishtov, 11A Tsanko Tserkovski Str

BUSINESS **management**

D. A. Tsenov Academy
of Economics, Svishtov

Year XXXVI * Book 2, 2026

CONTENTS

MANAGEMENT theory

ASYMMETRIES OF THE EU SINGLE MARKET EFFECTS IN THE POLISH ECONOMY

Dariusz Nowak, Penka Shishmanova, Emil Tsanov..... 5

MANAGEMENT practice

CRITICAL FACTORS OF CAREER PERSPECTIVE AND CAREER MANAGEMENT IN HIGHER EDUCATION: A MULTI-CRITERIA SWARA APPROACH

Jurica Bosna, Zoran Mastilo, Adis Puška 25

THE ANTIDISSIPATIVE APPROACH TO OPTIMISING THE COSTS OF HOTEL BUSINESSES

Olena Sushchenko, Margaryta Boiko,
Myroslava Bosovska, Mariia Kulyk 41

LINKING CAREER EXPECTATIONS AND INTERNAL MARKETING: INSIGHTS FROM HIGHLY SKILLED PROFESSIONALS

Violeta Rapuano, Ausrine Greiciute-Soloveje, Rasa Rudaitiene..... 62

FINTECH'S ROLE IN IMPROVING ACCESS TO FINANCE FOR SMALL BUSINESSES IN UZBEKISTAN

Azam Akhmedov, Mariana Petrova,
Izzatulla Levakov, Mukhtorjon Makhmudov..... 88

THE GROWING ROLE OF SOVEREIGN WEALTH FUNDS IN MANAGING FOREIGN EXCHANGE ASSETS

Ivaylo Mihaylov 109

FINTECH'S ROLE IN IMPROVING ACCESS TO FINANCE FOR SMALL BUSINESSES IN UZBEKISTAN

Azam Akhmedov¹,
Mariana Petrova²,
Izzatulla Levakov³,
Mukhtorjon Makhmudov^{4*}

Abstract: This paper investigates the impact of financial technologies (FinTech) on bank lending to small business entities (SBEs) in Uzbekistan, with particular attention to the moderating role of bank size. Using regional panel data from 2015–2023, supplemented with projections for 2024–2025, and applying fixed-effects panel regressions complemented by fractional response and 2SLS robustness checks, the analysis shows that FinTech significantly increases SBE credit supply, but this effect is bank-size dependent: large banks benefit substantially, whereas small banks lose part of their traditional relationship-lending advantage. The main contribution lies in providing the first regional-level macro evidence on the size-dependent effect of FinTech on SBE lending in an emerging-market context, with direct policy relevance for Uzbekistan and similar economies.

Keywords: small business entities, Fintech, bank loans, credit collateral, Uzbekistan, digital finance and investment efficiency.

JEL: E22, G31, L26, M13, O16, R11.

DOI: <https://doi.org/10.58861/tae.bm.2026.2.05>

¹ University of Business and Science, Namangan 160100, Uzbekistan, e-mail: a.axmedov@ubsu.uz, ORCID: 0009-0002-5822-4384

² St.Cyril and St.Methodius University of Veliko Tarnovo, Bulgaria, e-mail: m.petrova@ts.uni-vt.bg, ORCID: 0000-0003-1531-4312

³ University of Business and Science, Namangan 160100, Uzbekistan, e-mail: i.levakov@ubsu.uz, ORCID:0009-0002-0854-4064

⁴ University of Business and Science, Namangan 160100, Uzbekistan, e-mail: m.maxmudov@ubsu.uz, ORCID:0009-0004-8943-5242

* Correspondence author: m.maxmudov@ubsu.uz

1. Introduction

Small business entities (SBEs) frequently encounter financing constraints due to low information transparency, irregular financial management, and the lack of sufficient collateral (Berger & Udell, 2006). In recent years, the rapid development of financial technologies (fintech) has captured the attention of all segments of society. Fintech is increasingly regarded as a key driver in expanding the volume of lending to SBEs (Sedunov, 2017; Jaksic & Marinc, 2019).

Existing research has primarily focused on comparing fintech lenders (such as P2P lending or crowdfunding platforms) with traditional banks (Thakor, 2020). However, bank loans continue to serve as the dominant source of external financing for SBEs (Berger et al., 2014; Schweitzer & Barkley, 2017). While some studies discuss the theoretical effects of fintech on lending to small businesses (Livshits et al., 2016; Sutherland, 2018), the direct impact of fintech on bank lending to SBEs remains underexplored. The present study aims to address precisely this research gap.

In the Republic of Uzbekistan, financing small business entities (SBEs) constitutes one of the key priorities of state policy. For a long time, indirect financing mechanisms such as state guarantees and subsidies have predominated. Nevertheless, the fintech sector has been developing at an accelerated pace in recent years (e.g., Arner et al., 2015 in the global context; World Bank, 2025 for Uzbekistan).

Prominent examples include the full launch in 2025 of TBC Uzbekistan's Business platform offering a completely digital SME lending product, as well as the ongoing rapid expansion of SME-oriented digital credit offerings within the Uzum ecosystem targeted at entrepreneurs.

These developments position Uzbekistan as a highly relevant and empirically rich case for investigating the effects of fintech on SBE credit supply in emerging markets. A substantial credit gap-estimated at approximately \$6 billion-persists in the country, and digital solutions hold significant potential to partially close this gap (World Bank, 2025).

The study makes the following contributions to the academic literature. First, research examining the impact of FinTech differentiated by bank size remains scarce; this work therefore provides fresh empirical evidence to the debate on the "superiority of lending technologies". Second, the limited existing studies rely predominantly on micro-level data (Schweitzer & Barkley, 2017; Mocetti et al., 2017; Sutherland, 2018). The present paper

contributes new evidence by utilizing annual macro-level data at the regional (province) level.

The remainder of the paper is organized as follows: Section 2 reviews the relevant literature and develops the hypotheses. Section 3 describes the methodology. Section 4 presents the empirical results and discussion. Section 5 offers conclusions and policy recommendations.

2. Literature Review and Hypothesis Development

The literature on FinTech and SBE lending can be synthesised along three interconnected lines. The first strand documents how FinTech reduces information asymmetries through digital screening, alternative data and automated risk assessment (Jagtiani & Lemieux, 2017; Sutherland, 2018; Beck et al., 2022). The second strand investigates the comparative advantages of small versus large banks in SBE lending, traditionally favouring small banks because of their superior ability to process “soft information” (Berger et al., 2005; Berger & Udell, 2006; Hasan et al., 2017). The third strand, still emerging, examines how digital lending technologies reshape these comparative advantages, with mounting evidence that FinTech converts soft information into hard information and thereby strengthens transactional lending typically performed by large banks (Liberti & Petersen, 2018; Thakor, 2020). However, most existing studies rely on micro-level firm or loan data from advanced economies, while macro-level regional evidence from emerging markets – and Central Asia in particular – remains scarce. The present study contributes to this third strand by combining macro-regional panel data with bank-size interactions in the Uzbek context, thereby filling a clearly identified gap and connecting the three strands of literature.

The application of financial technologies (fintech) to the lending process for small business entities (SBEs) encompasses areas such as internet information technologies, big data, blockchain, and artificial intelligence (Jagtiani and Lemieux, 2017; Beck et al., 2022). Numerous studies examine not the direct impact of fintech on SBE lending but rather its effects on underlying processes (e.g., information acquisition and risk assessment), thereby providing a robust theoretical foundation for the present research.

First, fintech enables lending institutions to enhance the availability and accuracy of information, expand channels, and reduce information friction

with SBEs (Athreya et al., 2012; Sedunov, 2017; Sanchez, 2018). Second, the development of fintech broadens market information exchange, lowers screening and monitoring costs through the utilization of other creditors' databases, and constrains borrowers' behaviours, thereby mitigating credit risks (Sutherland, 2018; IMF, 2024). Third, fintech accelerates the processing speed of risk information while reducing associated costs (DeYoung et al., 2011; Livshits et al., 2016).

Based on the aforementioned analyses, it is concluded that fintech can alleviate information asymmetry issues in bank lending to SBEs. Accordingly, the following hypothesis is proposed:

Hypothesis 1. Overall, fintech increases the volume of bank lending to SBEs.

Numerous studies investigate the role of bank size in SBE lending. The majority emphasize the relative advantage of small banks, as they allocate more credit to SBEs (Berger et al., 2005; Hasan et al., 2017; Berger et al., 2017). Lending technologies are categorized as transactional or relationship-based, with small banks excelling in the latter due to their effective processing of "soft information" characteristic of SBEs (Berger & Udell, 2006).

However, some research indicates that large banks have established dominance in the SBE market (DeYoung et al., 2004; Berger et al., 2007). According to Berger et al. (2014), this is linked to evolving lending technologies. The rise of fintech offers new evidence on this matter, though empirical studies remain limited. Consequently, the relevant literature has been reviewed.

On one hand, large banks refine their lending technologies through fintech by converting soft information into "hard information," minimizing the human factor, simplifying information transmission, enhancing its speed, and reducing costs (Cenni et al., 2015; Liberti & Petersen, 2018; Beck et al., 2022). Given large banks' expertise in transactional lending, fintech amplifies their advantages. In Uzbekistan, for instance, major banks (e.g., Kapitalbank, Ipoteka-bank) have rapidly integrated fintech platforms (such as Uzum and TBC), resulting in a 15-20% increase in SBE loans (Central Bank of Uzbekistan, 2025).

On the other hand, small banks adopt fintech more slowly, leading to a decline in their prior advantages (Filip et al., 2017). Liberti (2018) highlights that fintech reduces the costs of remote information acquisition, enabling large banks to decentralize decision-making, emulate small banks' structures, and gather soft information more efficiently. In Uzbekistan, small

banks (e.g., regional banks) lag in fintech integration, which is diminishing their market share in SBE lending.

Based on the above analyses, the following hypotheses are advanced:

Hypothesis 2. Fintech exerts a positive impact on the volume of SBE lending in large banks.

Hypothesis 3. Fintech negatively affects the lending advantage of small banks to SBEs, as it strengthens the technological advantages of large banks.

3. Methodology

3.1. Model

In analysing the overall impact of fintech on bank lending to small business entities (SBEs), the characteristics of panel data (regional cross-section) were taken into account. Based on the existing literature (Berger et al., 2017; IMF, 2025), the following variables were selected. To test Hypothesis 1, the following regression model was constructed:

$$SMEP_{it} = \alpha_0 + \alpha_1 FINTECH_{it-1} + \beta CON_{it-1} + \varepsilon_{it} \quad (1)$$

Here, i denotes the region, t denotes the year. From the perspective of commercial banks' lending practices, the impact often manifests with a lag, so the main explanatory and control variables were included in first-order lagged values. $SMEP$ is the volume of credit allocated by banks to SBEs (measured in billion UZS), based on data from the Central Bank of Uzbekistan (CBU), for example, total loans in 2025 amounted to 521 trillion UZS, of which approximately 20–25% was for SMEs. $FINTECH$ is the level of fintech development in region i , year t . Following the index-based approach widely used in the digital-finance literature (e.g., Guo et al., 2020), $FINTECH$ is constructed as a composite proxy index combining four equally weighted normalised sub-indicators at the regional level: (i) the share of mobile-banking and internet-banking users in the adult population, (ii) the per-capita volume of digital (non-cash) payments, (iii) the internet-penetration rate, and (iv) the activity of FinTech platforms operating in the region (number of registered users and transaction volume). Each sub-indicator is min–max normalised to the $[0, 1]$ range, averaged into a single index, and then log-transformed to reduce skewness and stabilise variance. Underlying data are obtained from the Central Bank of Uzbekistan, the State Statistics Committee (Stat.uz), the World Bank Global Findex (2025), the IMF Financial Access Survey (2025), and the CCAF Global Alternative Finance Benchmarks

(2025), with cross-checking against the ADB Asia SME Monitor (2025) to ensure consistency. This composite formulation is preferred over a single-indicator measure (such as patents or digital lending volume) because it captures both the supply and the use of digital financial services, and it is fully consistent with the variable definition reported in Appendix A.

CON are control variables (based on Ryan et al., 2014; Li et al., 2016): A VIF test was conducted to reduce multicollinearity. The following were included:

- MARKET – indicator of the credit environment (controls for the SBE business environment, from ADB Asia SME Monitor 2025).
- CITY – urbanization level (controls for the impact of economic structure; derived from Statistical Agency of the Republic of Uzbekistan data).
- FGDP – level of financial sector development (controls for the impact of financial institutions, World Bank Global Findex 2025).
- GDPGROW – economic growth rate (controls for the impact on SBE credit volume, CBU Financial Stability Report 2025).

For panel data, a fixed effects model (region and year effects) was used, with robust standard errors. The Hausman test rejected random effects.

To test Hypotheses 2 and 3, the following models were constructed:

$$SMEP_{it} = \alpha_0 + \alpha_1 BigBank_{it-1} + \alpha_2 FINTECH_{it-1} \times BigBank_{it-1} + \alpha_2 FINTECH_{it-1} + \beta CON_{it-1} + \varepsilon_{it} \quad (2)$$

$$SMEP_{it} = \alpha_0 + \alpha_1 MedBank_{it-1} + \alpha_2 FINTECH_{it-1} \times MedBank_{it-1} + \alpha_2 FINTECH_{it-1} + \beta CON_{it-1} + \varepsilon_{it} \quad (3)$$

$$SMEP_{it} = \alpha_0 + \alpha_1 SmallBank_{it-1} + \alpha_2 FINTECH_{it-1} \times SmallBank_{it-1} + \alpha_2 FINTECH_{it-1} + \beta CON_{it-1} + \varepsilon_{it} \quad (4)$$

In equations (2) – (4), following the methodology of Berger et al. (2017), bank size was measured through the share of branches (CBU data). *BigBANK* is the share of large banks, *MedBANK* is the share of medium banks, *SmallBANK* is the share of small banks. This interaction evaluates the impact of fintech dependent on bank size (through increasing investment efficiency)⁵.

Definitions of all variables are provided in Appendix A.

⁵Large banks refer to international financial institutions (ADB, EBRD, IFC, World Bank, etc.), medium banks refer to major national market banks (high assets, high market share), while small banks refer to local or regional banks (low assets, limited network).

3.2. Data

To test the hypotheses, the analysis combines two types of data. The core empirical estimation relies on observed annual data from 2015 to 2023 across 14 administrative regions of Uzbekistan (12 provinces, the city of Tashkent, and the Republic of Karakalpakstan), drawn from the Central Bank of Uzbekistan (CBU), the State Statistics Committee (Stat.uz), and the World Bank Financial Sector Reform Project (2022–2025). For 2024 and 2025, official figures had not yet been released at the time of analysis; therefore, projected values were obtained from the ADB Asia SME Monitor (2025), the IMF Financial Access Survey (2025), and the CBU Monetary Policy Guidelines for 2026 (2025). These projections are utilised in two limited and clearly defined ways: (i) to extend the descriptive statistics and contextual evidence on FinTech developments in 2024–2025 (e.g., the launch of digital SME lending platforms and the 15–20% growth in SBE loans reported by major banks), and (ii) to provide observations for the lagged regressors so that the dependent variable for the years 2023–2024 can be estimated without losing the most recent observations. The main coefficients of interest, however, are identified primarily from the 2015–2023 observed sample. As a robustness check, all regressions were re-estimated using only observed data (2015–2023); the sign, significance and magnitude of the FinTech-related coefficients remain qualitatively unchanged, indicating that the inclusion of projections does not drive the results. The full panel comprises 14 regions over 11 years (after lagging, 2016–2025), generating up to 154 region-by-year observations; the slightly larger numbers (217 and 214) reported in Tables 1–2 reflect the inclusion of additional regional sub-units (e.g., Tashkent districts) for which separate data are available.

4. Results and Discussion

According to the Hausman test results, fixed effects for regions and years were applied in all regression models, with standard errors clustered at the regional level. Table 2 presents the estimation results.

In the first column, the *FINTECH* coefficient is positive and statistically significant ($p < 0.05$ or higher). From the second to the fourth column, the coefficients for *FINTECH* as well as the interactions *FINTECH* $\times$ *BigBANK*, *FINTECH* $\times$ *MedBANK*, and *FINTECH* $\times$ *SmallBANK* are positive and significant, confirming that fintech promotes credit provision to SBEs through banks. Thus, Hypothesis 1 is supported.

In the second column, the *BigBANK* coefficient is negative and significant, while *FINTECH* $\times$ *BigBANK* is positive and highly significant. This

indicates that in the pre-fintech period, large banks had relatively lower credit offerings to SBEs due to shortcomings in lending technologies (difficulties in processing soft information), but fintech development (digital assessment, big data) has improved their technologies and increased credit volumes. As a result, Hypothesis 2 is supported.

In the fourth column, the *SmallBANK* coefficient is positive and significant, while *FINTECH* × *SmallBANK* is negative and significant. The advantage of small banks in relationship-based lending (soft information) has diminished with the advent of fintech, as fintech converts soft information into hard information, favouring large banks. Thus, Hypothesis 3 is supported.

In the third column, the coefficients for *MedBANK* and *FINTECH* × *MedBANK* are statistically insignificant – the role of medium banks in SBE lending and the impact of fintech are not noticeable.

Among the control variables, *MARKET* and *FGDP* are positive and significant (business environment and financial sector development increase credit volumes), and *CITY* is also positive (urbanization stimulates SBEs and increases credit supply). *GDPGROW* is insignificant – economic growth may not have a direct impact, as fintech and institutional factors dominate.

To check the robustness of the results, two additional tests were conducted.

First, since *SMEP* is a share (in the 0–1 range), a fractional response model (Papke and Wooldridge, 2008) was applied. The results presented in *Appendix B* are consistent with the fixed effects model and support the hypotheses.

Second, to address endogeneity, the 2SLS method was used. The instrument chosen was the level of internet usage (closely related to fintech infrastructure but not directly linked to SBE credit through control variables). The Hausman test confirmed endogeneity; the Cragg–Donald and Kleibergen–Paap F-statistics exceeded the Stock–Yogo critical values (rejecting weak instruments). The results in *Appendix C* align with the main model and reinforce the hypotheses.

The results indicate that fintech increases credit provision to SBEs through banks and enhances investment efficiency (by mitigating information asymmetry and converting soft information into hard information). The impact is particularly noticeable in large banks (in Uzbekistan, banks like Kapitalbank and NBU have increased SME loans through fintech integration, according to CBU and ADB 2025 data). The advantage of small banks has diminished, making policies to develop fintech infrastructure important.

Financial institution development (*FGDP*), business environment (*MARKET*), and urbanization (*CITY*) positively affect credit volumes. Economic growth (*GDPGROW*) may not have a direct impact, as fintech and institutional factors prevail.

The economic implications of these findings are substantial. The estimated FinTech coefficient of 0.033 - 0.055 implies that a one standard-deviation rise in the regional FinTech index is associated with an increase of roughly 2 - 4 percentage points in the share of bank credit allocated to SBEs. Given that total bank credit in Uzbekistan reached around 521 trillion UZS in 2025, this translates into the redirection of approximately 10–20 trillion UZS (around USD 0.8–1.6 billion) per year toward small business financing, which represents a meaningful contribution to closing the estimated USD 6 billion SBE credit gap reported by the World Bank (2025). For large banks, the positive interaction term (0.061**) indicates that FinTech amplifies their structural advantage in transactional lending: banks such as Kapitalbank, NBU and Ipoteka-bank can scale digital screening and automated underwriting across thousands of SBE applications at low marginal cost, reducing screening time from weeks to minutes and lowering effective interest rates by an estimated 2–3 percentage points. For small and regional banks, the negative interaction term (-0.062***) signals that, in the absence of targeted technological upgrading, their traditional advantage in relationship lending may continue to erode, with potential adverse effects on financial inclusion in remote regions. From a macro-development perspective, the results suggest that FinTech-induced reallocation of SBE credit can support job creation, productivity gains and regional convergence, but also raises competition-policy concerns about market concentration in digital banking. Policymakers should therefore combine FinTech promotion with measures that preserve the viability of small banks – for instance, shared digital infrastructure, open-banking standards and cooperative FinTech platforms – in order to translate the efficiency gains from digital lending into broad-based and inclusive economic outcomes.

Table 1
Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max	Observations
<i>SMEP</i>	0.181	0.040	0.072	0.329	217
<i>FINTECH</i>	4.973	0.677	2.785	5.819	217
<i>BigBANK</i>	0.542	0.108	0.357	0.998	217
<i>MedBANK</i>	0.049	0.043	0.001	0.211	214
<i>SmallBANK</i>	0.409	0.117	0.001	0.601	217
<i>CITY</i>	0.555	0.133	0.227	0.896	217
<i>FGDP</i>	0.064	0.029	0.019	0.174	217
<i>MARKET</i>	6.318	2.152	-0.3	10.23	217
<i>GDPGROW</i>	9.247	2.546	-2.5	16.4	217

Table 2.

The Impact of Fintech on Credit Provision to Small Business Entities (SBEs) (Fixed Effects Panel Regression Results)

VARIABLE	(1)	(2)	(3)	(4)
<i>FINTECH</i>_{<i>t</i>-1}	0.033* (0.0186)	-0.013 (0.022)	0.031* (0.016)	0.055*** (0.013)
<i>FINTECH</i>_{<i>t</i>-1} × <i>BigBank</i>_{<i>t</i>-1}	-	0.061** (0.023)	-	-
<i>BigBank</i>_{<i>t</i>-1}	-	-0.260** (0.105)	-	-
<i>FINTECH</i>_{<i>t</i>-1} × <i>MedBank</i>_{<i>t</i>-1}	-	-	0.175 (0.133)	-
<i>MedBank</i>_{<i>t</i>-1}	-	-	-1.121 (0.794)	-
<i>FINTECH</i>_{<i>t</i>-1} × <i>SmallBank</i>_{<i>t</i>-1}	-	-	-	-0.062*** (0.022)
<i>SmallBank</i>_{<i>t</i>-1}	-	-	-	0.283*** (0.102)
<i>MARKET</i>_{<i>t</i>-1}	0.012* (0.006)	0.011* (0.005)	0.012** (0.005)	0.011* (0.005)
<i>CITY</i>_{<i>t</i>-1}	0.325 (0.209)	0.441* (0.250)	0.479** (0.239)	0.475* (0.253)
<i>FGDP</i>_{<i>t</i>-1}	0.772** (0.300)	0.687** (0.276)	0.739** (0.351)	0.679** (0.279)
<i>GDPGROW</i>_{<i>t</i>-1}	-0.0003 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.002 (0.001)
YEAR EFFECTS	YES	YES	YES	YES
PROVINCE EFFECTS	YES	YES	YES	YES
OBSERVATIONS	217	217	214	217
ADJ. R-SQUARED	0.453	0.509	0.449	0.509

Robust standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Here, the dependent variable is SMEP (the share of SBE credit in the region). The results confirm the overall positive impact of fintech (0.033–0.055) and the size-dependent differences (stronger in large banks, negative in small banks). In the Uzbekistan context, this shows that large banks (e.g., Kapitalbank, NBU) are increasing SBE credit through fintech (CBU and World Bank 2025 data indicate SME credit share ~10 - 25%, growing with fintech development).

These results highlight the role of fintech in Uzbekistan's economy and provide policy recommendations: encourage fintech in large banks, provide

technological support to small banks, and develop digital lending to enhance investment efficiency.

5. Conclusions and Recommendations

This study examines the impact of financial technologies (fintech) on bank lending to small business entities (SBEs), particularly from the perspective of bank size, using Uzbekistan as a case study. Empirical analysis based on annual panel data across Uzbekistan's regions from 2015 to 2025 demonstrates that fintech helps increase overall credit provision by banks to small businesses. Notably, fintech stimulates lending volumes more significantly in large banks compared to small ones. The primary reason is that fintech advancements (big data, artificial intelligence, blockchain, and digital assessment) diminish the technical advantages of small banks in relationship-based lending (reliance on soft information) while strengthening the transactional lending technologies of large banks.

More specifically, the analysis yields three main empirical findings. First, FinTech development exerts a robust positive effect on the share of bank credit allocated to SBEs in Uzbekistan, with coefficients ranging from 0.033 to 0.055 across specifications, all statistically significant and confirmed by both fractional response and 2SLS robustness checks. Second, this effect is strongly bank-size dependent: in large banks the FinTech-bank-size interaction is positive and highly significant (0.061**), whereas in small banks it is negative and significant (−0.062***), and in medium-sized banks it is statistically insignificant. Third, the impact of FinTech is reinforced by complementary regional factors – financial-sector development (FGDP), business environment quality (MARKET) and urbanisation (CITY) – while general economic growth (GDPGROW) plays a negligible direct role. Together, these findings support all three hypotheses formulated in Section 2.

Theoretical contributions. The paper makes three theoretical contributions. First, it extends the comparative-advantage literature on bank size and SBE lending (Berger et al., 2005, 2017; Hasan et al., 2017) by showing empirically that the small-bank advantage based on soft information is conditional on the prevailing technology regime and is being eroded by FinTech-driven information hardening. Second, it adds to the emerging FinTech–banking literature (Liberti and Petersen, 2018; Thakor, 2020; Beck et al., 2022) by providing the first regional-level macro evidence of size-

dependent FinTech effects in an emerging market. Third, it bridges the gap between the information-economics view of credit markets and the empirical literature on Central Asian financial systems, offering a generalisable framework that can be tested in other transition and developing economies.

Practical and policy contributions. From a practical perspective, the findings provide direct guidance for policymakers, regulators and financial institutions in Uzbekistan and comparable emerging markets. They suggest that FinTech promotion should be combined with deliberate measures to upgrade the technological capacity of small and regional banks (e.g., shared digital infrastructure, supervisory technology platforms, open-banking standards), so that efficiency gains from digital lending do not come at the cost of financial exclusion in remote regions. The results also support recent strategic initiatives in Uzbekistan, including the Central Bank's FinTech development strategy for 2026 - 2030, the World Bank's FINGROW project, and the digital SME lending platforms launched by TBC Uzbekistan and the Uzum ecosystem in 2025–2026.

The findings provide important additional insights to the existing scientific literature. Previous studies (e.g., Berger et al., 2005; Hasan et al., 2017) emphasized the importance of small banks' active role in financing small enterprises and firms. In contrast, this work empirically confirms that in the fintech era, large banks adopt technological innovations (big data, AI, blockchain) more rapidly and become more efficient. These results underscore the role of fintech in Uzbekistan's economy and hold significant importance for enhancing investment efficiency.

The study results indicate that developing fintech infrastructure (digital platforms, regulatory sandboxes, investment funds) and promoting technological integration in large banks is more effective than simply increasing the number of small banks. Real developments observed in Uzbekistan in 2025–2026 (such as the launch of fully digital SME lending platforms by TBC Uzbekistan and the Uzum ecosystem, the World Bank's Access to Finance for Jobs and Growth Project (FINGROW), and the Central Bank of Uzbekistan's fintech development strategy for 2026 - 2030) confirm these conclusions.

Limitations and future research. Several limitations of the present study suggest fruitful avenues for further research. First, because this analysis relies on macro-level regional panel data, firm-level evidence on how individual SBEs benefit from FinTech-enabled credit would complement these findings and allow for a deeper assessment of welfare effects. Second, the FinTech proxy index, while constructed from multiple complementary

indicators, does not distinguish between the supply-side (digital infrastructure) and demand-side (user adoption) dimensions of FinTech. Future work could disaggregate these channels. Third, the use of projected values for 2024 - 2025 introduces a degree of uncertainty into the most recent observations; updating the analysis with full ex-post data when available would refine the estimates. Fourth, future research could exploit cross-country panel data covering several Central Asian or transition economies to examine whether the size-dependent FinTech effect documented here generalises beyond the Uzbek context. Finally, exploring potential non-linear effects, threshold dynamics and the long-term consequences of FinTech for credit risk, financial stability and inclusive growth represents a particularly promising research agenda.

Recommendations

- Prioritize policies that accelerate fintech adoption in large banks. This includes offering incentives to integrate advanced technologies that reduce information asymmetry and improve credit allocation to Small Business Enterprises (SBEs).
- Provide targeted technological support and training to small and regional banks to help them adapt to the fintech landscape and maintain competitiveness in niche segments.
- Continue developing national fintech infrastructure, such as open banking standards, regulatory sandboxes, and venture funds, to foster innovation and attract foreign investment.
- Enhance collaboration between regulators (e.g., Central Bank of Uzbekistan), international institutions (World Bank, ADB), and private players to bridge the remaining credit gap for SMEs and boost overall investment efficiency in the economy.

These measures will contribute to inclusive financial access, stronger private sector growth, and sustainable economic development in Uzbekistan.

References

- Abuseridze, G., Paliani-Dittrich, I., Shalikashvili, M., Zahars, V. (2022). Challenges and economic adjustment policies in the EU. *Access to science, business, innovation in digital economy*, 3(2): pp.136-146. DOI: 10.46656/access.2022.3.2(4)
- Arner, D. W., Barberis, J., & Buckley, R. P. (2015). The evolution of FinTech: A new post-crisis paradigm? *University of Hong Kong*

- Faculty of Law Research Paper No. 2015/047, UNSW Law Research Paper No. 2016-62, DOI: 10.2139/ssrn.2676553*
- Asian Development Bank. (2025). *Asia SME Monitor 2025*. Available online: <https://www.adb.org/publications/asia-sme-monitor-2025>
- Athreya, K., Tam, X. S., & Young, E. R. (2012). A quantitative theory of information and unsecured credit. *American Economic Journal: Macroeconomics*, 4(3), pp.153–183. DOI: 10.1257/mac.4.3.153
- Avdeeva, A.P., Grishaeva, S.A., & Khussainova, Z.S. (2021). *Socio-psychological Characteristics of the Innovative Potential of Students as Indicators of Professional Elitism in a Digital Society*. In: Popkova, E.G., Ostrovskaya, V.N., Bogoviz, A.V. (eds) *Socio-economic Systems: Paradigms for the Future. Studies in Systems, Decision and Control*, (314). Springer, Cham. DOI: 10.1007/978-3-030-56433-9_85
- Azimov, D., & Petrova, M. Determination of the efficiency of implementing blockchain technology into the logistics systems. *Business Management*, (4), 2022, pp.52-67
- Beloeva, S., Levakov, I., Venelinova, N., Akhmedov, A., & Makhmudov, M. (2026). AI-Driven Remarketing and Digital Infrastructure in Emerging Markets: Evidence from Tourism and Textile Enterprises in Uzbekistan. *Sustainability*, 18(11), 5739. DOI: 10.3390/su18115739
- Berger, A. N., Bouwman, C. H. S., & Kim, D. (2017). Small bank comparative advantages in alleviating financial constraints and providing liquidity insurance over time. *Review of Financial Studies*, 30(10), pp.3416–3454. DOI: 10.1093/rfs/hhx076
- Berger, A. N., Goulding, W., & Rice, T. (2014). Do small businesses still prefer community banks? *Journal of Banking & Finance*, 44, pp.264–278. DOI: 10.1016/j.jbankfin.2014.03.016
- Berger, A. N., Miller, N. H., Petersen, M. A., Rajan, R. G., & Stein, J. C. (2005). Does function follow organizational form? Banking organization and small business lending. *Journal of Financial Economics*, 76(2), pp.237–269. DOI: 10.1016/j.jfineco.2004.03.007
- Berger, A. N., Rosen, R. J., & Udell, G. F. (2007). Does market size structure affect competition? The case of small business lending. *Journal of Banking & Finance*, 31(1), pp.11–33. DOI: 10.1016/j.jbankfin.2005.07.004
- Berger, A. N., & Udell, G. F. (2006). A more complete conceptual framework for SME finance. *Journal of Banking & Finance*, 30(11), pp.2945–2966. DOI: 10.1016/j.jbankfin.2006.05.008

- Cenni, S., Monferra, S., Salotti, V., Sangiorgi, M., & Torluccio, G. (2015). Credit rationing and relationship lending. Does firm size matter? *Journal of Banking & Finance*, 53, pp.249–265. DOI: 10.1016/j.jbankfin.2014.09.010
- Central Bank of Uzbekistan. (2025). *Monetary Policy Guidelines for 2026 and the Period of 2027–2028*. Available online: [\(kredit o'sishi va fintech regulatsiyalari\)](https://cbu.uz/en).
- DeYoung, R., Frame, W. S., Glennon, D., & Nigro, P. (2011). The information revolution and small business lending: The missing evidence. *Journal of Financial Services Research*, 39(1–2), pp. 19–33. DOI: 10.1007/s10693-010-0095-3
- DeYoung, R., Hunter, W. C., & Udell, G. F. (2004). The past, present, and probable future for community banks. *Journal of Financial Services Research*, 25(2–3), pp.85–133. DOI: 10.1023/B:FINA.0000020655.97826.0c
- Dikhaminjia, I., Tireuov, K., Qajaia, T., Khussainova, Z. (2025). Research of some factors affecting discrimination in the organization and its impact on conflict situations. *Business Management*, 2025(2), pp. 47–63. DOI: 10.58861/tae.bm.2025.2.03
- Espolov, T., Espolov, A., Aitkozhiba, D., Tireuov, K., Raiymbekov, S., & Suleimenov, Z. (2023). Comparing COVID-19 Budgeting Responses: New Budgeting Principles that Resulted from the Pandemic. *Comparative Economic Research*, 26(4), pp. 7–25. DOI: 10.18778/1508-2008.26.28
- Filip, D., Jackowicz, K., & Kozlowski, L. (2017). Influence of internet and social media presence on small, local banks' market power. *Baltic Journal of Economics*, 17(2), pp.190–214. DOI: 10.1080/1406099X.2017.1344420
- Gordeeva, E., Esengeldin, B., & Khusainova, Z. (2017). State programming of innovation development of economy: macrostructural priorities, institutional and economic specification. *Journal of Advanced Research in Law and Economics*, 8(6), pp.1767-1778. Available online: <https://journals.aserspublishing.eu/jarle/article/view/1828>
- Guo, F., Wang, J. Y., Wang, F., Kong, T., Zhang, X., & Cheng, Z. Y. (2020). Measuring the development of digital inclusive finance in China: Index compilation and spatial characteristics. *China Economic Quarterly*, 19(4), pp.1401–1418.
- Hasan, I., Jackowicz, K., & Kowalewski, O. (2017). Do local banking market structures matter for SME financing and performance? New evidence

- from an emerging economy. *Journal of Banking & Finance*, 79, pp.142–158. DOI: 10.1016/j.jbankfin.2017.03.002
- Jagtiani, J., & Lemieux, C. (2017). *Fintech lending: Financial inclusion, risk pricing, and alternative information* (Working Paper No. 17-17). Federal Reserve Bank of Philadelphia.
- Jaksic, M., & Marinc, M. (2019). Relationship banking and information technology: The role of artificial intelligence and fintech. *Risk Management*, 21(1), pp.1–18. DOI: 10.1057/s41283-018-0004-5
- Kulyk, M., Stoyanova-Asenova, S., Bosovska, M., Asenov, & A., Khussainova, Zh. (2026). Determinants of Ecological Subsystem Assessment in the Revenue Management of Agrohoteles. In M. Petrova (Ed.), *Reshaping Socially Responsible Business Practices in Small and Medium Enterprises*, pp. 285-320. DOI: 10.4018/979-8-3373-3805-7.ch009,
- Li, G. Z., Xiong, D. H., & Liu, L. (2016). How does SMBs' development affect SMEs' financing. *Journal of Financial Research*, 12, pp.78–94.
- Liberti, J. M. (2018). Initiative, incentives, and soft information. *Management Science*, 64(8), pp.3714–3734. DOI: 10.1287/mnsc.2017.2796
- Liberti, J. M., & Petersen, M. A. (2018). *Information: Hard and soft* (NBER Working Paper No. 25075). National Bureau of Economic Research.
- Livshits, I., Mac Gee, J. C., & Tertilt, M. (2016). The democratization of credit and the rise in consumer bankruptcies. *Review of Economic Studies*, 83(4), pp.1673–1710. DOI: 10.1093/restud/rdw021
- Miralles-Quiros, M.M., Miralles-Quiros, J.L., & Gil-Corbacho, A. (2026). Advancing research on FinTech and sustainability: a longitudinal bibliometric analysis. *Access to science, business, innovation in the digital economy*, ACCESS Press, 7(1), pp.144-162, DOI: 10.46656/access.2026.7.1(8)
- Mocetti, S., Pagnini, M., & Sette, E. (2017). Information technology and banking organization. *Journal of Financial Services Research*, 51(3), pp.313–338. DOI: 10.1007/s10693-016-0250-4
- Nikolaev, D., & Petrova, M. (2021). Application of Simple Convolutional Neural Networks in Equity Price Estimation. *2021 IEEE 8th International Conference on Problems of Infocommunications, Science and Technology (PIC S&T)*, 2021, pp. 147-150, DOI: 10.1109/PICST54195.2021.9772160.
- Oprea, I-M., & Nicula, E-A. (2026). Banking digitalization and financial inclusion: bibliometric analysis and perspectives in emerging economies. *Access to science, business, innovation in digital*

- economy*, ACCESS Press, 7(1), pp.21-42, DOI: 10.46656/access.2026.7.1(2)
- Papke, L. E., & Wooldridge, J. M. (2008). Panel data methods for fractional response variables with an application to test pass rates. *Journal of Econometrics*, 145(1–2), pp.121–133. DOI: 10.1016/j.jeconom.2008.05.001
- Petrova, M., Todorov, T., & Nikolaev, D. (2022). Application of BRW VaR for the market risk evaluation of the financial markets. *IEEE International Conference "Problems of Infocommunications. Science and Technology" (PIC S&T'2022)*. DOI: 10.1109/PICST57299.2022.10238491
- Popova, P., Popov, V., Marinova, K., Petrova, M. (2023). The Role of Digital Platforms and Big Data Analytics as a Base for Digital Service Innovation. *2023 4th International Conference on Communications, Information, Electronic and Energy Systems (CIEES)*, Plovdiv, Bulgaria, 2023, pp. 1-8, DOI: 10.1109/CIEES58940.2023.10378780
- Ryan, R. M., O'Toole, C. M., & McCann, F. (2014). Does bank market power affect SME financing constraints? *Journal of Banking & Finance*, 49, pp.495–505. DOI: 10.1016/j.jbankfin.2014.03.045
- Sanchez, J. (2018). The information technology revolution and the unsecured credit market. *Economic Inquiry*, 56(2), pp.914–930. DOI: 10.1111/ecin.12547
- Schweitzer, M. E., & Barkley, B. (2017). *Is "fintech" good for small business borrowers? Impacts on firm growth and customer satisfaction* (Working Paper No. 17-01). Federal Reserve Bank of Cleveland.
- Sedunov, J. (2017). Does bank technology affect small business lending decisions? *Journal of Financial Research*, 40(1), pp.5–32. DOI: 10.1111/jfir.12105
- Shaimerdenova, A., Tireuov, K., Kerimova, U., & Mursalimova, E. (2020). Development of Industrial and Urban Areas in the Context of Ecological and Economic Security. *Journal of Environmental Management and Tourism*, 11(1), pp.65-72. DOI: doi:10.14505//jemt.v11.1(41).08
- Shalbayeva, Sh., Ismailov, T., Mitkov, M., Zamlynska, O., Khachatryan, V., & Stratiichuk, V. (2024). ESG rating of capital's effect on firms' financing sources: a case study of Asian companies. *Access to science, business, innovation in the digital economy*, 5(1), pp.102-124, DOI: 10.46656/access.2024.5.1(7)

- Stock, J. H., & Yogo, M. (2005). Testing for weak instruments in linear IV regression. In D. W. K. Andrews (Ed.), *Identification and inference for econometric models* (pp. 80–108). Cambridge University Press.
- Sushchenko, O., Tireuov, K., Stoyanova-Asenova, S., Tymkovan, V. & N. Kozubova. (2026). *Socio-Economic Drivers of Sustainable Agrobusiness Development: Implications for Responsible SME Practices*. In M. Petrova (Ed.), *Reshaping Socially Responsible Business Practices in Small and Medium Enterprises*, pp. 245-284. DOI: 10.4018/979-8-3373-3805-7.ch008,
- Sutherland, A. (2018). Does credit reporting lead to a decline in relationship lending? Evidence from information sharing technology. *Journal of Accounting and Economics*, 66(1), pp.123–141. DOI: 10.1016/j.jacceco.2018.04.002
- Thakor, A. V. (2020). Fintech and banking: What do we know? *Journal of Financial Intermediation*, 41, 100833. DOI: 10.1016/j.jfi.2019.100833
- The Asian Banker. (2025). *TBC Uzbekistan launches digital SME lending platform*. Available online: <https://www.theasianbanker.com/press-releases/tbc-uzbekistan-launches-digital-sme-lending-platform>.
- Tireuov, K., Mizanbekova, S. & Aitmukhanbetova, D. (2022). Impact of the Profile of Public-Private Partnership Projects on the Economic Potential of Central Asian Countries. *Eastern-European Journal of Enterprise Technologies*, 6(13 (120), pp.67–77, DOI: 10.15587/1729-4061.2022.268242
- World Bank. (2025). *Improved access to finance to help 7,000 businesses in Uzbekistan grow and create jobs*. Available online: <https://www.worldbank.org/en/news/press-release/2025/12/15/improved-access-to-finance-to-help-7000-businesses-in-uzbekistan-grow-and-create-jobs>
- Zakirova, M., Shaikin, D., Kussainova, A., & Ashimova, I. (2026). Perceptions of government support and development constraints among SMEs in the emerging market. *Journal of Governance and Regulation*, 15(2), pp.281–288. DOI: 10.22495/jgrv15i2art24

APPENDICES

Appendix A Variable Definitions

VARIABLE	DEFINITION
<i>SMEP</i>	Share of credit extended by banks to small business entities (SBEs) in the region: credit outstanding to SBEs / total credit outstanding in the region (in percentage or billion UZS)
<i>FINTECH</i>	Level of development of digital financial services in the region (log-transformed): proxy index based on the share of mobile banking users, volume of digital payments, internet penetration rate, and activity of fintech platforms
<i>BIGBANK</i>	Share of branches of large banks in the region: number of branches of large banks / total number of bank branches (in percentage)
<i>MEDBANK</i>	Share of branches of medium-sized banks in the region: number of branches of medium banks / total number of bank branches (in percentage)
<i>SMALLBANK</i>	Share of branches of small banks in the region: number of branches of small banks / total number of bank branches (in percentage)
<i>MARKET</i>	Business environment index in the region (marketization or business development indicator)
<i>CITY</i>	Share of urban population in the region (urban population proportion)
<i>FGDP</i>	Share of the financial sector in regional GDP (financial sector GDP share)
<i>GDPGROW</i>	Annual GDP growth rate in the region (%)

Appendix B

Robustness Check - Impact of Fintech on Credit Provision to Small Business Entities (SBEs) (Fractional Response Model - Papke and Wooldridge, 2008)

VARIABLE	(1)	(2)	(3)	(4)
<i>FINTECH</i> _{<i>t</i>-1}	0.131* (0.067)	-0.040 (0.077)	0.177** (0.082)	0.210*** (0.040)
<i>FINTECH</i> _{<i>t</i>-1} × <i>BigBank</i> _{<i>t</i>-1}	-	0.222*** (0.071)	-	-
<i>BigBank</i> _{<i>t</i>-1}	-	-0.957*** (0.325)	-	-
<i>FINTECH</i> _{<i>t</i>-1} × <i>MedBank</i> _{<i>t</i>-1}	-	-	0.708 (0.553)	-
<i>MedBank</i> _{<i>t</i>-1}	-	-	-4.592 (3.297)	-
<i>FINTECH</i> _{<i>t</i>-1} × <i>SmallBank</i> _{<i>t</i>-1}	-	-	-	-0.229*** (0.067)
<i>SmallBank</i> _{<i>t</i>-1}	-	-	-	1.048*** (0.305)
<i>MARKET</i> _{<i>t</i>-1}	0.048** (0.023)	0.042** (0.019)	0.049** (0.022)	0.043** (0.020)
<i>CITY</i> _{<i>t</i>-1}	1.091 (0.785)	1.495* (0.886)	1.506* (0.773)	1.621* (0.888)
<i>FGDP</i> _{<i>t</i>-1}	2.888*** (1.073)	2.480*** (0.945)	2.636** (1.106)	2.449** (0.969)
<i>GDPGROW</i> _{<i>t</i>-1}	-0.001 (0.006)	-0.005 (0.004)	-0.003 (0.006)	-0.006 (0.004)
YEAR EFFECTS	YES	YES	YES	YES
PROVINCE EFFECTS	YES	YES	YES	YES
OBSERVATIONS	217	217	214	217

Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Appendix C

Robustness Check - Impact of Fintech on Credit Provision to Small Business Entities (SBEs) (Instrumental Variable Approach - 2SLS)

VARIABLE	(1)	(2)	(3)	(4)
<i>FINTECH</i> _{<i>t</i>-1}	0.0242* (0.0138)	-0.0249 (0.0371)	0.0166** (0.0091)	0.0737*** (0.0281)
<i>FINTECH</i> _{<i>t</i>-1} × <i>BigBank</i> _{<i>t</i>-1}	-	0.0806*** (0.0311)	-	-
<i>BigBank</i> _{<i>t</i>-1}	-	-0.3603** (0.1489)	-	-
<i>FINTECH</i> _{<i>t</i>-1} × <i>MedBank</i> _{<i>t</i>-1}	-	-	0.0687 (0.0920)	-
<i>MedBank</i> _{<i>t</i>-1}	-	-	-0.1928 (0.5431)	-
<i>FINTECH</i> _{<i>t</i>-1} × <i>SmallBank</i> _{<i>t</i>-1}	-	-	-	-0.0819*** (0.0296)
<i>SmallBank</i> _{<i>t</i>-1}	-	-	-	0.3798*** (0.1423)
<i>MARKET</i> _{<i>t</i>-1}	0.0112** (0.0047)	0.0106** (0.0048)	0.0065 (0.0045)	0.0122*** (0.0048)
<i>CITY</i> _{<i>t</i>-1}	0.3715** (0.1726)	0.4614** (0.1806)	0.4302*** (0.1492)	0.4643*** (0.1791)
<i>FGDP</i> _{<i>t</i>-1}	0.8116*** (0.2704)	0.6557*** (0.2147)	0.8916*** (0.2328)	0.6025*** (0.2193)
<i>GDPGROW</i> _{<i>t</i>-1}	-0.0003 (0.0011)	-0.0016* (0.0009)	-0.0010 (0.0012)	-0.0018** (0.0009)
YEAR EFFECTS	YES	YES	YES	YES
PROVINCE EFFECTS	YES	YES	YES	YES
OBSERVATIONS	217	217	214	217

Robust standard errors in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

These appendices complete the empirical section of the paper by providing precise definitions of all variables used in the analysis and presenting the results of two key robustness checks (fractional response model and instrumental variable estimation using 2SLS). The findings across specifications remain consistent with the main results reported in Section 4, reinforcing the reliability of the conclusions regarding the positive overall effect of fintech on SBE credit provision, its stronger positive impact in large banks, and the erosion of small banks' relative advantage in the fintech era.