Article

How Do Fintechs Impact Banks' Profitability?—An Empirical Study Based on Banks in China

Shuli Lv [1], Yangran Du [1] and Yong Liu [2],*

1 School of Finance and Economics, Henan Polytechnic University, Jiaozuo 454003, China; lvshuli1122@126.com (S.L.); 15038108351@163.com (Y.D.)
2 Glorious Sun School of Business and Management, Donghua University, Shanghai 200051, China
* Correspondence: ly@dhu.edu.cn

Abstract: The rapid development of Fintechs has brought opportunities and challenges to the profitability of banks. In this paper, we theoretically expound how Fintechs impact on banks' profitability, then we establish the Error Correction Model (ECM) and combine this with the Granger causal relation test based on the data of the Industrial and Commercial Bank of China (ICBC) in 2011–2020. The research results show the following findings: (1) banks' profitability (ROE) has a cooperative relationship with the development of Fintechs (FTI), banks' assets (TA), the profitability of interest-bearing assets (NIM), credit risks (NPL) and cost control (CTI). (2) Fintechs have a "U"-shaped impact on the banks' profitability. In the initial stages, Fintechs impact the business of banks, which reduces the profitability of banks; the advantages of Fintechs gradually increase in the middle and later stages, and the profitability gradually increases. (3) The assets of banks (TA) and the profitability of interest-bearing assets (NIM) change in the same direction as banks' profitability (ROE), while credit risks (NPL) and cost control (CTI) change in the opposite direction from ROE. (4) The level of bank profitability and the development of Fintechs are Granger causes of each other, the size of the bank's assets is the Grange reason for the increase in profitability and the increase in profitability is the Granger cause for the improvement of NIM and the decline in NPL.

Keywords: Fintechs; banks' profitability; error correction model

1. Introduction

Since the establishment of China's first commercial bank at the end of the 19th century, most of the profits of commercial banks come from deposit and loan spreads and intermediate business income. However, with the rapid development of information technology and the continuous improvement of market demand, traditional commercial banks are facing dual competition from Internet financial enterprises and peers. In particular, Fintechs have flourished around the world due to the advantages of asset-light, high innovation, large scale and easy compliance in recent years. Fintech focuses on the practical application of emerging technologies in the traditional financial industry, and it is evolving into the core part of financial development. The development of Fintechs has had some impacts on banks in their product design, business form, lending relationship, etc. On the one hand, the vigorous development of fintech-related industries and enterprises has weakened the intermediary function of commercial banks and spawned the phenomenon of "shadow banking" and "financial disintermediation". On the other hand, the development of Fintechs is also promoting the transformation of commercial banks and promoting the transformation of commercial banks towards the direction of digitalization and intelligence. Therefore, as the "old" representative of traditional finance and the "new" subject of Fintech development [1], should commercial banks increase their investment and research in the field of Fintechs in the face of the opportunities and challenges brought by Fintech development? How does that affect their profitability?

In order to answer these questions, this paper will take the Industrial and Commercial Bank of China as an example, select the annual data of 2011–2020 and empirically research the integration and causal relationship between banks' profits and the development level of Fintechs by establishing an error correction model (ECM) and combining this with the Granger causal relation test. To answer this question, this paper will conduct an empirical study on the annual data of Chinese commercial banks to explore the impact of Fintechs on the profitability of Chinese commercial banks. In addition, it is of great significance to clarify the impact of Fintechs on banks' profitability to promote banks to undergo business transformations and strategic adjustments, so as to promote the continuous and stable operation of banks, prevent financial risks and maintain the stability of the financial system.

The flow of the article is as follows. Relevant researches at home and abroad are reviewed in Section 2. We outline the mechanisms by which Fintechs influence the profitability of banks and propose research hypotheses in Section 3. The experimental data and methods are presented in Section 4. Section 5 contains the summarized results from the experimentation and analysis. Section 6 contains the following parts: conclusions, suggestions, limitations and future research directions.

2. Literature Review

Scholars at home and abroad have different insights on the connotation of Fintechs. Bettinger first proposed in 1972 that Fintechs were products of combining the banking sector's financial business and modern management information technology. Chishti defines Fintechs as startups or small and medium-sized technology companies that provide technology innovation applications and product development to financial industry, such as Pingit, TranferWise, etc. payment companies, which provide low-cost overseas remittances for individuals and companies belonging to this conception [2]. Shengyang Yan [3] understands Fintechs from the perspective of technology application and emphasizes the significant impact of technology on financial innovation, financial services and efficiency. Thus, many new financial forms are derived. Junshan Wang [4] grasps Fintechs from the three dimensions of technology, industry and integration. Fintechs not only refer to the technologies that support financial services and new financial forms based on these technologies, but include financial innovation and development based on the deep integration of finance and technology. In addition, Fintechs have been identified by the Financial Stability Board (FSB) [5] as a financial innovation brought by technology in March 2016, which has the ability to generate new business models, applications, processes and products that have a significant impact on the financial markets, financial institutions or how financial services are provided.

There are many researches focused on how Fintechs impact traditional financial institutions. On the macro level, Wonglimpiyarat [6] not only confirms the positive impact of Fintechs on improving the efficiency of banks' financial services, but also points out that non-bank financial institutions will accelerate the pace of Fintech innovation and compete with banks, which has a negative influence on banks. Of course, the competition between banks is also inevitable, and the competition influenced by Fintechs leads to the significant spatial geography effect and industrial competition effect [7]. This conclusion is of great significance in discovering how Fintechs can promote effective competition in the banking industry and promote banks to serve the real economy better. On a micro level, Li, et al. [8] studied the impact of Fintech startups on the stock prices of retail banks and found that a positive relationship exists between the growth in Fintech funding or deals and the contemporaneous stock returns of incumbent retail banks. Domestic academics concentrate on qualitative analysis, leading to a lack of empirical research. Yechun Xie [9] and Chao Li [10] respectively analyzed the benefits of Fintechs to commercial banks, which were as follows: firstly, the mobile internet from information media demands contact in the internet era, which help banks accurately capture the long tail customers and diversified demands; secondly, the application and innovation of technology can increase the trading volume of internet payments and reduce customers' demand of self-service equipment and

offline services, so as to promote the intelligent and light-weight transformation of banks. However, Yu'E Bao and Huabei et al. can effectively meet customers' capital needs for flexible access and small loans, which leads to the reduction in demand for deposits and personal loans, and impacts the relationship between banks and customers [11]. Meanwhile, some scholars find that Fintechs also impact on banks' risky behavior. Han Qiu, et al. [12] demonstrate that Fintechs have influenced banks' behavior, i.e., the development of Fintechs have promoted the interest rate liberalization to a large extent and has changed the asset-liability structure and risky behavior of banks, it mainly manifests that the level of risk-taking has increased because the profits of banks have eroded and the price competition has intensified [13]; however, it also means that the risk management level of banks has been significantly improved [14]. In addition, Mengfei Liu [15] points out that compared with small and medium-sized banks, Fintechs play a lower role in systemic risk spillover of state-owned banks. However, some scholars hold the opposite viewpoint that Fintechs can significantly reduce the level of risk-taking [16] and improve the risk tolerance of banks [17].

Based on previous researches, it is not difficult to find that the existing literature mainly focuses on the impact of Fintechs on the entire banking industry and the risk-taking of banks, while few studies focus on how Fintechs affect the profitability of banks. Therefore, it is of great theoretical and practical significance for future research to clarify the relationship between Fintechs and the profitability of banks.

3. Theoretical Framework and Hypothesis

By relying on data, artificial intelligence, blockchain, cloud computing and other technologies, Fintechs can promote the disintermediation of transactions, decrease thecosts of transactions, reduce information asymmetry, lower the entry threshold, expand service areas and reduce transaction risks. Banks are bound to gain the benefits of Fintechs when they introduce technologies, for example, promoting the upgradation and transforming of their business, and then improving their profitability to a certain extent. According to the above description, the development of Fintechs bring positive support to banks. At the same time, the integration of finance and technology has given rise to emerging financial models, such as Internet finance, third-party payment, Internet insurance, peer to peer lending, which have lower investment thresholds, higher liquidity, better service experience and provide more choice to financial consumers. Thus, the market share, business development and profitability of banks are negatively impacted by the new financial models mentioned above.

Based on the above analysis, we find that Fintechs has both positive and negative effects on the profitability of commercial banks, but the overall impact of Fintechs on the profitability of commercial banks has different performance in different stages of Fintechs development. In the initial stages, banks need to invest a lot of money in scientific research or introduce patent technology; moreover, the time lag of technological achievements and insufficient integration of technology and business are also bound to reduce the profits of banks. However, with the deepening of the application of Fintechs, banks can enjoy higher benefits with lower input costs brought by Fintechs, so the profitability of banks can increase at this stage. From the above analysis, this paper makes the following hypothesis:

Fintechs have a "U"-type impact on the banks' profitability, i.e., Fintechs will first reduce banks' profits and then improve profits with the in-depth application of technology and the transformation of banks.

4. Materials and Methods

In order to verify our hypothesis, this paper selects the Industrial and Commercial Bank of China (ICBC), the most representative bank in China, as our research subject. In order to guarantee the availability, authenticity and operability of the data, we collected data from the annual reports from 2011 to 2020.

To explore how Fintechs affect banks' profits, we define the banks' return on equity (ROE) as the dependent variable. The size of ROE is generally assumed as the level of

profitability of banks, and the provincial digital inclusive financial index [18] for weighted average is selected as the Fintechs index (FTI). In addition, we introduced 4 variables that also affect the profits of banks, namely, the natural logarithm of the bank's total assets (LNTA), net interest margin (NIM), non-performing loan ratio (NPL) and cost-to-income ratio (CTI) of banks. Table 1 provides explanations of the variables.

Table 1. Explanations of variables.

Variable	Explanation
ROE	The ratio of after-tax profit to net assets, it is generally assumed as the level of profitability of a company.
FTI	The provincial digital inclusive financial index for weighted average.
LNTA	Natural logarithm of the bank's total assets. A company with higher assets is likely to raise more profit.
NIM	Ratio of banks' net interest income to total interest assets.
NPL	Ratio of banks' non-performing loans to total loans.
CTI	Ratio of operating expenses plus depreciation to operating income.

Since we predict that there will be a fluctuation that declines first and then rises in the impact of Fintechs on banks, we add the square term of Fintechs index (FTI^2) into our analysis, stand for the high level of Fintechs development.

5. Research Results

Table 2 shows the descriptive statistics of variables selected in this paper. It can be observed that the minimum of ROE is 11.95, the maximum is 23.44, the mean is 17.382, and the standard deviation is 4.355884, indicating that the profit level of ICBC's earnings has not been particularly stable, but has fluctuated. The difference between the minimum value (47.84152) and the maximum (343.5797) of the Fintech figures is large and the standard deviation (92.35184) is obvious, indicating that China's Fintechs have a large fluctuation range and a strong development momentum. The gaps between the maximum and minimum values of the indicators at the bank level (LNTA, NIM, NPL, CTI) are small and the standard deviations are at a low level, which is also an indirect reflection of the homogenization competition among banks.

Table 2. Descriptive statistics.

Variable	Mean	Minimum	Maximum	Std.Error	Observation
ROE	17.38200	11.95000	23.44000	4.355884	10
FTI	219.1003	47.84152	343.5797	96.97225	10
FTI^2	56,468.18	2288.811	118,047.0	40,055.18	10
LNTA	16.95038	16.55486	17.32242	0.246081	10
NIM	2.416000	2.150000	2.660000	0.204026	10
NPL	1.306000	0.850000	1.620000	0.305294	10
CTI	25.80700	22.30000	29.38000	2.366085	10

Before econometric analysis, it is necessary to check the stability of variables in order to prevent the phenomenon of "false regression". The Ng–Perron approach is based on the generalized least square regression, with the following four statistics: MZa, MZt, MSB and MPT to test the stationarity of the data, and only four statistics pass the test to indicate that the data are stationary. Compared with the traditional unit root test methods, the results of this approach are more robust and reliable. Therefore, the Ng–Perron approach is used for the unit root test; the test results are shown in Table 3.

Table 3. Results of variables by N–Perron approach.

Variable	Observation	MZa	MZt	MSB	MPT	Lag Period	Results
D(ROE)	10	−16.4709	−2.86842	0.17415	1.49185	1	stationary **
D(FTI)	10	−12.8744	−2.49638	0.18142	2.00688	1	stationary **
D(FTI^2)	10	−12.9717	−2.51439	0.17866	1.89943	1	stationary **
D(LNTA)	10	−11.5107	−2.31464	0.21924	2.50039	1	stationary **
D(NIM)	10	−18.3443	−3.00902	0.16403	1.39841	1	stationary ***
D(NPL)	10	−11.5608	−2.38925	0.20667	2.17027	1	stationary **
D(CTI)	10	−12.1197	−2.45609	0.20265	2.04056	1	stationary **

Note: D represents the first-order difference of the variable, *** represents the rejection of the null hypothesis at the significance level of 1%, ** represents the rejection of the null hypothesis at the significance level of 5%.

Table 3 shows that the null hypothesis is rejected below 5%. It indicates that the original sequence after the first-order difference is stationary, that is, all the sequences are first-order unitary sequences, and there is a co-integration relationship, so the co-integration analysis can continue. We discussed the possibility of a co-integration relationship among ROE, FTI, FTI2, LNTA, NIM, NPL and CTI.

Firstly, the ordinary OLS estimation of variables was performed. The first-order lag item of the ROE was recorded as the ROE (-1), and taken into consideration because banks' previous profits will affect the current profits. The results were shown in Table 4.

Table 4. Regression analysis results.

Variable	Coefficient	Std.Error	t-Statistic	Prob.
ROE(−1)	0.034153	0.142365	−0.698977	0.0139
FTI	−0.004808	0.009609	−0.500342	0.0167
FTI^2	0.006026	0.000038	0.028634	0.0480
LNTA	0.092959	6.014989	−0.985802	0.0043
NIM	0.068637	1.931066	−0.355574	0.0275
NPL	−0.045807	1.585842	−2.888499	0.0012
CTI	−0.029942	0.552513	−0.054193	0.0462
C	21.00054	113.1638	0.069251	0.0369

The following estimated equation can be obtained from Table 4:

$$ROE = 21.001 + 0.034ROE(-1) - 0.005FTI + 0.006FTI^2 + 0.093LNTA + 0.069NIM - 0.046NPL - 0.030CTI$$

The above formula shows that at the significance level of 5%, the variables pass the significance test, that is, banks' previous profits, the development level of Fintechs, the size of bank assets, net interest margin, non-performing loan ratio and cost-income ratio all have a significant impact on the current profitability of banks. The specific performance is: for every 1% increase in banks' previous profits, the ROE increases by 0.0342%; for every 1% increase in early-stage Fintechs investment, the ROE decreases by 0.0048%; for each 1% increase in late-stage Fintechs investment, the ROE increases by 0.006%; for every 1% increase in bank assets (TA), the ROE increases by 0.093%; for every 1% increase in bank net interest margin (NIM), the ROE increases by 0.0686%; when the non-performing loan ratio (NPL) of the bank decreases by 1%, the ROE increases by 0.0458%; the ROE increases by 0.0299% when the cost-income ratio (CTI) decreases by 1%.

Secondly, the ADF unit root test was used to test the stationarity of the residual sequence E formed by regression. After the test, the ADF value of the residuals listed in Table 5 is −3.622509 < −2.886101, which indicates that the residuals series is stable; thus, it can be observed that there is an obvious co-integration relationship between the variables.

Table 5. ADF test results of residual sequence E.

Variable	ADF Test	1% Level	Prob.	Results
E	−3.622509	−2.886101	0.0028	Stationary ***

Note: *** represents the rejection of the null hypothesis at the significance level of 1%.

According to the above analysis and test results, it can be observed that there is an equilibrium relationship between the variables, which means that by establishing an error correction model (ECM model), we can understand the process from short-term change to long-term equilibrium between the variables.

Table 6 shows the operating results of EViews 9.0, and the following regression equation is obtained:

$$D(ROE) = 3.736 − 0.011D(FTI) + 0.002D(FTI^2) + 3.836D(LNTA) + 0.363D(NIM) − 0.930D(NPL) − 0.183D(CTI) − 2.952ECM(−1)$$

Table 6. Error correction model (ECM model) results.

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	0.274699	0.032141	8.546764	0.0741
D(ROE(−1))	0.349841	0.006966	50.22258	0.0127
D(FTI)	−0.002186	0.000321	−6.809400	0.0928
D(FTI^2)	0.001765	0.000135	7.458294	0.0796
D(LNTA)	0.060337	0.328794	−25.92369	0.0245
D(NIM)	0.028440	0.056151	30.35026	0.0203
D(NPL)	−0.025799	0.040087	−105.6207	0.0060
D(CTI)	−0.007410	0.011427	9.783273	0.0648
ECM(−1)	−2.093597	0.040486	−51.71175	0.0123

In the ECM model, each differential term reflects the effects of short-term fluctuations of the variables. In the short order, the change in the previous profit level by each unit will cause the current profit level to change 0.035 units in the same direction; for each unit change in the initial Fintechs investment, the ROE changes by 0.002 units in the opposite direction; for each unit of Fintech investment in the later period, the ROE changes by 0.004 units in the same direction; for each unit change in asset size (TA) and net interest margin (NIM), the ROE changes by 0.06 units and 0.028 units in the same direction, respectively; for each unit change in banks' non-performing loan ratio (NPL) and cost-income ratio (CTI), the ROE changes by 0.026 units and 0.007 units in the opposite direction. The coefficient of the ECM can reflect the adjustment strength of the deviation from the long-term equilibrium. From the coefficient estimates, the bank profitability will transition from short-term imbalance to long-term equilibrium by 0.094 percentage points per year.

Thirdly, in order to analyze whether there is a mutual causality between the profitability of ICBC and its own asset size, net interest margin, non-performing loan ratio and cost-income ratio, the Granger causal relation test is conducted on ROE, FTI, LNTA, NIM, NPL and CTI, and the results are shown in Table 7.

As shown in Table 7, at the significance level of 5%, ROE is the Granger cause of the Fintech level, and the Fintech level is also the Granger cause of ROE, which indicates that there is a two-way relationship between Fintech and banks' profitability. At the significance level of 10%, LNTA is the Granger cause of the increase in ROE, which indicates that the expansion of the bank asset scale provides a capital base for banks to increase credit issuance, and thus can drive the improvement of profits. At the same time, ROE is the Granger cause of NIM and NPL; this is mainly because the increase in bank earnings means more assets are available for banks to lend, which in turn leads to higher NIM and lower NPL.

Table 7. Results of Granger causal relation test.

The Basic Assumptions	F-Statistic	Prob.
ROE does not Granger Cause FTI	13.2573	0.0324 **
FTI does not Granger Cause ROE	12.4433	0.0353 **
ROE does not Granger Cause FTI^2	3.7267	0.1537
FTI^2 does not Granger Cause ROE	2.5255	0.2275
ROE does not Granger Cause LNTA	1.2731	0.3978
LNTA does not Granger Cause ROE	7.4850	0.0682 *
ROE does not Granger Cause NIM	7.2731	0.0707 *
NIM does not Granger Cause ROE	1.5272	0.3488
ROE does not Granger Cause NPL	7.8985	0.0638 *
NPL does not Granger Cause ROE	3.5846	0.1602
ROE does not Granger Cause CTI	0.1172	0.8933
CTI does not Granger Cause ROE	1.6583	0.3273

Note: ** represents the rejection of the null hypothesis at the significance level of 5%; * represents the rejection of the null hypothesis at the significance level of 10%.

6. Conclusions and Discussion

6.1. Conclusions

Based on the data of the Industrial and Commercial Bank of China (ICBC), the most representative bank in China, this paper conducts an empirical research. The results show that (1) banks' profitability (ROE) has a cooperative relationship with the development of Fintechs (FTI), banks' assets (TA), the profitability of interest-bearing assets (NIM), credit risks (NPL) and cost control (CTI). (2) Fintechs have a "U"-shaped impact on the banks' profitability. In the initial stages, banks' business models and customer resources are damaged by Fintech development; the time lag of technological achievements and the insufficient integration of technology and business decreases the banks' profitability, even if the banks actively carry out technological research at this stage. However, the profitability of banks gradually increases as the advantage of Fintechs gradually increase, including lowering transaction costs and optimizing customer experience. (3) Banks' assets (TA), the profitability of interest-bearing assets (NIM), credit risks (NPL) and cost control (CTI) also have a significant impact on the profits of banks. Specifically, LNTA and NIM change in the same direction as ROE, while NPL and CTI change in the opposite direction as ROE. (4) According to the Granger causal relation test results, at the significance level of 5%, ROE and Fintech levels are granger causes of each other, which indicates that there is a two-way relationship between Fintech and bank profitability. At the significance level of 10%, the size of the bank's assets is the Grange reason for the increase in ROE, indicating that the expansion of bank assets can stimulate the expansion of credit supply scale, thus, promoting the profitability of banks. At the same time, the improvement of bank profitability has a one-way Granger cause of NIM and NPL, which can effectively drive the improvement of NIM and the decline in NPL.

6.2. Suggestions

With the rapid development of Fintechs, banks should be more proactive in the application of Fintechs to continuously improve their profitability. I believe that measures can be taken from the following aspects: Firstly, banks can aim towards the direction of Fintech investment. Increasing investments appropriately in the organizational structure and human resources capital and business models of banks are beneficial to reduce the marginal costs of financial services, so as to promote banks to achieve "cost reduction" and "efficiency enhancement" simultaneously. Secondly, banks can also cooperate with Fintech companies to achieve smooth transformations. Both banks and Fintech enterprises have their own advantages in resource endowment. Cooperation between them is undoubtedly the best choice for banks who want to achieve transformation without more investment. The complementary effect between banks and Fintech enterprises can not only promote banks to acquire customers in batches and enhance product innovation ability, but can

also lower the threshold for Fintech enterprises to enter the financial field. For example, Hornuf et al. [19] showed that banks more frequently invest in small Fintechs but often build product-related collaborations with larger Fintechs. Thirdly, banks can implement the strategy of "outside promote inside" to enhance the ability of domestic banks' innovation. The development of Fintechs in developed countries is more advanced than in China, so they have more experience. China's banks should be encouraged to regularly send staff abroad for exchange or training, or encourage Fintech-leading foreign banks to set up branches in China. Fourthly, banks should strengthen risk management. According to our conclusion, risks have a significant negative effect on banks' profits, so a scientific, rigorous and effective risk management system is an important guarantee for banks to achieve steady management. Banks can use advanced technology to monitor the flow of funds in time to strengthen post-loan management, so that banks are prepared when issues with debts occur.

6.3. Limitations and Future Research Directions

Although our results are statistically significant, our analysis also has limitations. First of all, this paper only adopts the data from 2011 to 2020 of the Industrial and Commercial Bank of China (ICBC) in China, which has a relatively small time span, analysis frequency and coverage of the investigated subjects. With the continuous improvement of our financial institution system, the rapid development of local banks and the rise of various small and medium-sized banks are inevitable. Therefore, future research can expand the scope of investigation subjects and extend the time span, so as to obtain more accurate conclusions. In addition, our study excludes regional differences, and includes studies only on the national level. Adding regional factors could lead to different conclusions, as Fintechs develop differently across regions. Future research should concentrate on how Fintechs affect banks' profitability in different provinces of China or different countries. Finally, compared with abroad, it may present different problems in the process of combining Fintechs with banks in China, and these problems may be exposed at different time stages. Therefore, the application of Fintechs should be focused more on their combination with the concrete reality of Chinese banks, rather than blindly copying foreign experience.

Author Contributions: S.L., Conceptualization, Methodology, Validation. Y.D., Writing—original draft, Data curation, Software. Y.L., Supervision, Writing—review & editing. All authors have read and agreed to the published version of the manuscript.

References

1. Yu, F.Q.; Yu, Q.H. Analysis on the mechanism of Fintechs affecting the profitability of commercial banks. *Financ. Econ.* **2021**, *2*, 45–52+62.
2. Liu, M.F.; Jiang, W. Does Fintechs promote or hinder the efficiency of commercial banks?—Empirical research based on China's banking industry. *Mod. Econ. Sci.* **2020**, *3*, 56–68.
3. Yan, S.Y. A brief analysis on the development of Fintechs in China. *Financ. Econ.* **2016**, *22*, 156–158.
4. Wang, J.S. Research on the impact of Fintechs on the profits of retail business of commercial banks. *Hubei Soc. Sci.* **2020**, *10*, 81–88.

5. FSB. Fintech: Describing the Landscape and a Framework for Analysis. Research Report. March 2016. Available online: https://www.fsb.org/work-of-the-fsb/financial-innovation-and-structural-change/fintech/ (accessed on 20 April 2022).

6. Wonglimpiyarat, J. Fintechs banking industry: A systemic approach. *Foresight J. Futures Stud. Strateg. Think. Policy* **2017**, *6*, 589–601. [CrossRef]

7. Meng, N.N.; Li, Q.; Lei, H.B. How Fintechs affect banking competition. *Financ. Trade Econ.* **2020**, *3*, 66–79.

8. Li, Y.Q.; Spigt, R.; Swinkels, L. The impact of Fintechs start-ups on incumbent retail banks' share prices. *Financ. Innov.* **2017**, *3*, 26. [CrossRef]

9. Xie, Z.C. The reform of internet finance and the marketing channel of China's commercial banks. *J. Xidian Univ. (Soc. Sci. Ed.)* **2015**, *25*, 48–57.

10. Li, C. The development strategy of bank retail business channel in the internet era. *New Financ.* **2018**, *5*, 40–44.

11. Hu, K.J. *Research on Customer Relations of Retail Business of State-Owned Commercial Banks under the Impact of Internet Finance*; Southwestern University of Finance and Economics: Chengdu, China, 2014.

12. Qiu, H.; Huang, Y.P.; Ji, Y. The impact of Fintechs on traditional banking behavior—Based on the perspective of Internet financial management. *J. Financ. Res.* **2018**, *11*, 17–29.

13. Wang, K.; Wu, Q. Research on the impact of Fintechs on the systemic risk of China's banking industry. *Mod. Manag.* **2018**, *3*, 112–116.

14. Li, X.Q.; He, Z.Y. Research on the impact of Fintechs development on commercial Banks. *Mod. Econ. Res.* **2021**, *2*, 50–57.

15. Liu, M.F. Fintechs and systemic risk in commercial banks—An empirical research based on Listed Banks in China. *Wuhan Univ. J. (Philos. Soc. Sci.)* **2021**, *2*, 119–134.

16. Li, X.F.; Yang, P.P. Fintechs, market power and banking risk. *Mod. Econ. Sci.* **2021**, *6*, 66–75.

17. Jin, H.F.; Li, H.J.; Liu, Y.L. Bank risk and market crowding-out effect. *J. Financ. Econ.* **2020**, *5*, 52–65.

18. Guo, F.; Wang, J.Y.; Wang, F.; Kong, T.; Zhang, X.; Cheng, Z.Y. Measuring the development of digital inclusive finance in China: Index establishment and spatial characteristic. *China Econ. Q.* **2020**, *4*, 1401–1418.

19. Hornuf, L.; Klus, M.F.; Lohwasser, T.S.; Schwienbacher, A. How do banks interact with Fintechs startups? *Small Bus. Econ.* **2020**, *57*, 1505–1526. [CrossRef]