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**The risk analysis between development of internet finance and profitability of
commercial bank in China**

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by

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ABSTRACT

With the diversified development of Internet finance, its multiple service modes have gradually penetrated into all walks of life, also bringing many risks to traditional financial environment in China. This paper aims to propose a regression model that would test the relationship between development of internet finance and probability of commercial bank in China. One selected variable represents the development degree of Internet finance, another one can represent the profitability of commercial bank. Descriptive-correlational study can be applied to determine the relationship of the two variables. Specifically, I propose that by examining rate of Return on Assets (ROA), Return on Equity (ROE), and net profit growth rate, which could be determined whether the internet finance is likely to bring risk to commercial banks for their profitability. Net asset value represents the development of internet finance. Data was collected from Bloomberg. Finally, I addressed some practical implications and suggested some reasonable strategies for the impact of commercial Banks on Internet finance and future business direction.

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Introduction

Under the drive of national environment, demand of society and technology development, the internet finance is expected to increase rapidly with emergence of regulatory technology. Internet finance its own advantages including convenience and high efficiency which give it more competitiveness than traditional commercial banks. With on the rapidly development of internet finance, the financial status of commercial bank is challenged. However, the Internet has had a huge impact on business on all walks of life, there is currently no model for a comprehensive assessment of Internet business field of commercial bank. Moreover, the strategy of effective competition in such an environment that has only just begun to materialize (Afuah, 2002).

Based on the tendency, commercial bank and internet finance should have mutually beneficial cooperation and make up each other's disadvantage. This paper tends to indicate the condition between commercial bank under the internet environment and help them make reasonable strategies for the impact of commercial Banks on Internet finance and future business direction

Based on literature, I will propose regression model, in which the relationships between financial ratio factors and profitability. To specify, I am hoping to gain a better understanding of the risk brought from internet, which is a financial problem, as impacting on commercial banks. For a prediction of bank profitability and

development of internet finance, several content-related factors will be examined, including: 1) ROA, 2) ROE, 3) net profit growth rate, and 4) net asset value all of which are gathered from Bloomberg. More details regarding past literature and development are discussed in the following section.

Problem Statement

It's important to detect potentially serious risks brought by internet finance to commercial banks in China, so commercial banks can make reasonable strategies and find future direction at an early stage.

Since whether the commercial bank should adapt the internet finance tools to transit their main business for following the development of information age, or just increase their original business to compete with internet finance by considering that its own disadvantages may limit their development.

Research questions

Research question 1:

What is the ROA of selected commercial banks from 2013 to 2018?

Research question 2:

What is the ROE of selected commercial banks from 2013 to 2018?

Research question 3:

What is the net profit growth rate of selected commercial banks from 2013 to 2018?

Research question 4:

What is the net asset value of the selected internet finance company from 2013 to 2018?

Research question 5:

Is there a significant relationship between net asset value of internet finance company and ROA of commercial bank?

Research question 6:

Is there a significant relationship between net asset value of internet finance company and ROE of commercial bank?

Research question 7:

Is there a significant relationship between net asset value of internet finance company and net profit growth rate of commercial bank?

Hypotheses

The hypotheses formulated to provide the direction of the study:

H1: There is significant relationship between net asset value of internet finance company and ROA of commercial bank.

H2: There is significant relationship between net asset value of internet finance company and ROE of commercial bank.

H3: There is significant relationship between net asset value of internet finance company and net profit growth rate of commercial bank.

Literature review

This review of literature is presented in the background of explosive development of internet finance. This review provides the definition of internet finance, some insights from previous studies about internet finance which are relevant to this research topic, and some examples that the recent researches focus to study. The definition of Internet Finance is a new financial model that combines internet technology with finance activities such as payment, capital loan and transaction processing (Yam and Xu, 2017). The business of internet finance tends to combine internet technology to financial activities, such as a third-party payment and raising capital. Operating parties in this industry are mainly played by information technology companies which also providing financial services like Tencent with WeChat Pay (Shen and Huang, 2016). Internet finance is a forward-looking concept which depends more on the development situation of internet technology than finance itself. Internet finance includes all financial transactions and organizational structure under the influence of internets, such as banks, securities, insurances and funds (Xie, Zou and Liu, 2015). Due to the insufficient supply of financial services in households and enterprises, Internet finance has developed rapidly today. On the supply side, the household has a lot of savings to invest. On the demand side, many enterprises, especially SMEs, lack adequate and appropriate financial services. In addition, the developing information technology has reduced the cost of financial services, expanded the market scope and created new business models, making the internet finance extremely competitive

(Yam & Xu, 2017). Internet Finance can solve the SMEs problem of high financing cost and cover the shortage of information asymmetry (Zhang, 2016). Consumers are transferring from traditional channels to digital channels, and the multi-channel model is now the fashion in banking (Uyen Le, 2015).

The literature review further explores the risk of internet finance and commercial banks. The development of Internet finance reduces the interest income of loans, increases the interest cost of deposits, reduces the growth rate of loans and deposits, and brings more risks to traditional commercial banks. Represented by P2P lending and third-party payment, Internet financial operations have a negative impact on Banks. A study found that P2P and third-party payment have a negative effect on loan growth in China. The rural commercial bank is highly affected by the Internet, but state-owned Banks affected smaller. Banks have long been a monopoly in the financial markets, but now they have been the Internet financial competition forces (such as third-party payment and P2P). At least in initial, it will use interest payments, loans and deposits to cover the negative influence to the operational efficiency of Banks. If they want to keep the high competitiveness, they must make some changes to maintain its business and markets, for example, providing new products and improving service, to be able to defend themselves against a strong impact from Internet Finance. Lower interest bank loans can provide some convenience to attract more deposits, because it can increase deposits as well as the interest and reduce the financing cost of this deposit (Chen, Li and He, 2019).

For the risk, commercial banks have their own drawbacks, including insufficiency of information technology, which will expose the banks to information security risks. On the one hand, commercial banks cannot increase efficiency of risk supervision system, so that it is difficult to provide an early warning of the risks. On the other hand, as an emerging thing, internet finance has not received strict regulation from regulators and there are many vacuum fields. The emergence of internet finance has influence to the profitability of commercial banks. Therefore, commercial banks may take methods with higher risk to make more profit under the pressure from the development of internet finance. With the high-speed development of science and technology, internet finance will continue to increase the exposure level of some commercial banks. Some commercial banks gradually start a combination of Internet finance with their traditional business. But the acceleration of such cooperation is likely to be directly responsible for the technical risk, operating risk, credit risk of their operation and internet financial risk is persistence. Meanwhile, the internet financial is so aggressive that it strengthens the ability of commercial banks to take risks. (Liao, 2018)

A study took Alibaba as an example to analyze the current situation of internet finance in China because it is the largest internet finance company in China. Alipay is one of the most important part of Alibaba group, it is the largest online payment system.

There are more than 350 million registered users and 80 million transactions processed in Alipay, which controls more than half of online business in China. When customers use Alipay to pay their bill, money is deducted directly from their bank

accounts. In addition, Alipay also comes up with some free financial service, such as transfer accounts between different cards or users, utilities payment, checking bank balance. Most importantly, more than 98% of convenience store can accept Alipay payment in China, which reduce the use of cash largely. With rapid development of technology in China, it is impossible for the legislature to regulate internet finance on time. In 2013, Yu 'E Bao is introduced by Alipay and Tianhong Asset Fund jointly, which has advantages of simple operation, lower-entry, zero service charge and it can be used at any time. In addition to financial management functions, Yu 'E Bao can also be directly used for shopping, transfer, payment, repayment and other consumer payments. It is a cash management tool in the era of finance internet. Yu 'E Bao is still the largest money fund on internet finance field in China(Yam and Xu, 2017).

Meanwhile, the internet finance still has nonnegligible disadvantages. In China, telecommunication sectors regulate e-commerce suppliers before financial sectors. The position of telecom has given internet finance a lot of room to develop their electronic financial system rapidly but lack regards for data security and personal privacy. In recent years, internet finance has divulged a large amount of personal privacy information. Take Alipay as an example, its account information records a large amount of private content like fingerprint and face information. In addition, due to the lack of bank participation, this rapid cash flow leads to a large number of money laundering problems. Chinese regulators have responded with measures such as banning large transfers of funds between users and limiting daily payments to

prevent money laundering. But the adopted fingerprint or face recognition technology is still likely to reveal the user's personal information, so the security of authentication is still one of the difficulties of Internet finance. However, only if the information can be exchanged safely and securely between users and content providers, internet business will achieve to a higher level of prosperity and popularity (Hu, Lee and Kou, 2005).

The literature review also mentions the methodology of the research related to this topic. According to a previous research, the factors including growth, profitability, cost, operating efficiency or competitive advantage of commercial banks can be influenced by internet finance (Wood, 2003). Performance like return on equity (ROE), return on assets (ROA) can become the indicator of operation efficiency of commercial bank. Regression model is available for test the impact of the internet finance on traditional financial institution. (Uyle, 2015).

One study use Z-SCORE value to test the risk of insolvency bank. Z-SCORE is usually used as a basis variable for the bank insolvency risk's probability, and the ratio is shown by this model:

$$Z - SCORE_{it} = (ROA_{it} + CAR_{it}) / \sigma_i (ROA_{it})$$

The i represents the bank, and t stands for time. In addition, ROA_{it} represents the rate

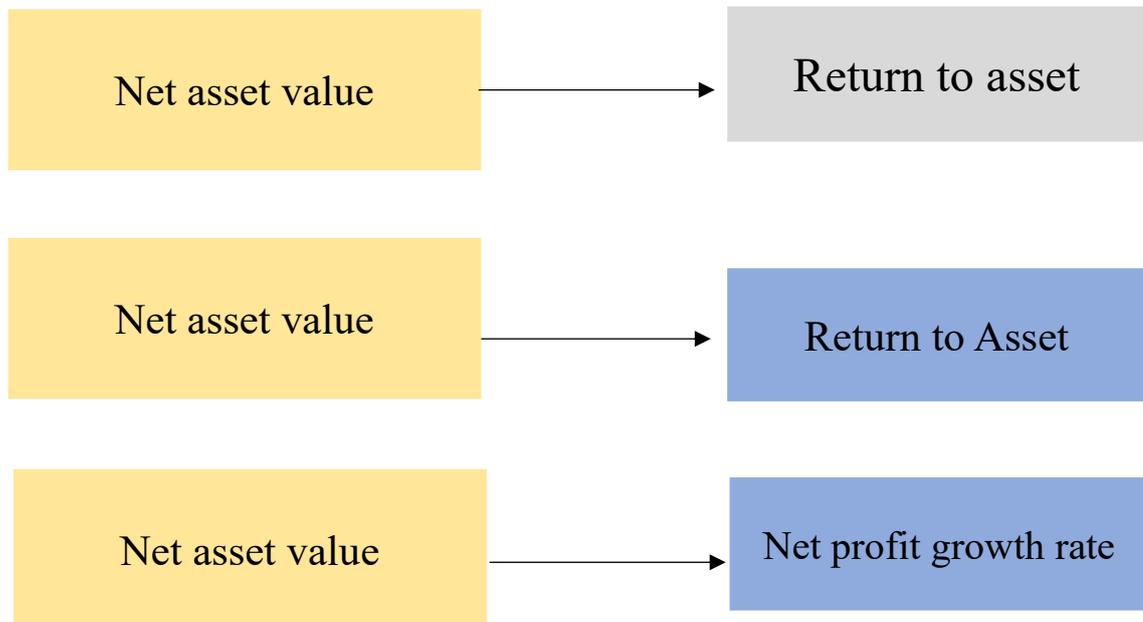
of return on assets, and σ_i (ROAit) is the estimation of the standard deviation of ROAit, CARit is the rate of equity to assets. The paper uses Z-SCORE to represent the probability of insolvency, the value is higher, the greater stability the bank has. It means an increasing value is related to a decrease of the preference of bank for risk. (Qiao, Chen and Xia, 2018)

Research design

Based on the Altman Z-Score Formula to test the financial health of commercial bank, this paper absorbs the thought of the previous idea but it does not use the whole model. Altman Z-Score Formula is aimed to test the bankruptcy level of corporates rather than the profitability.

This paper proposed a descriptive-correlational to determine the relationship of the two variables. Regression model to test the relationship between the profitability of commercial banks (y) and the development of internet finance(x). Net asset value is chosen to represent the degree of development of internet finance. Return to asset, return to equity and net profit growth rate are the ratios relevant to profitability is chosen to represents independent variable.

The level of significance used for each test was set at 0.05.



Data and basic information

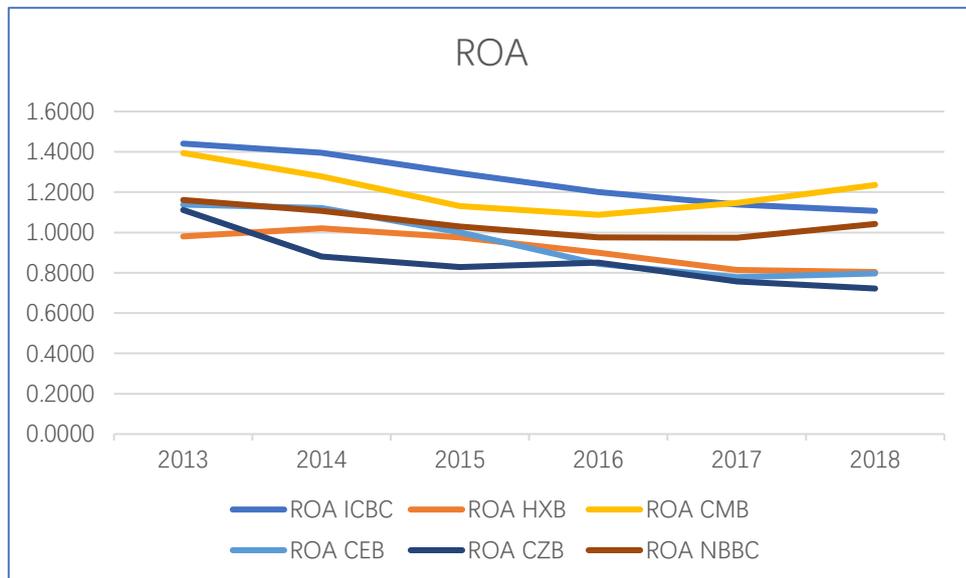
The data of dependent variable: return on asset(y_1), return on equity (y_2), and net profit growth rate(y_3) are gathered from financial statement of ICBC, Hua Xia Bank, China Merchants Bank, China Everbright Bank, China Zheshang Bank, and Ningbo Bank from Bloomberg. Because Yu'E Bao is one of the largest mobile Internet era of cash management tools and the largest money fund in China, the independent variables (x) including net asset value and total asset are chosen from Yu'E Bao and also selected from Bloomberg.

Results and discussion

Research question 1:

What is the ROA of selected commercial banks from 2013 to 2018?

Figure 1 presents the ROA of six selected commercial banks in China. The ROA of ICBC, HXB, CEB, CZB were generally on downward trends, but that of CMB and NBBC were in decrease firstly and then increase.



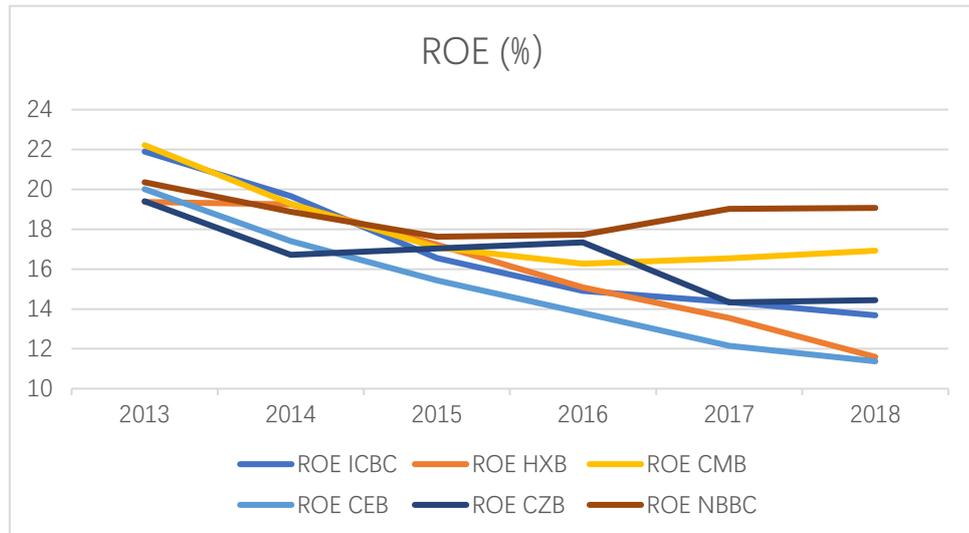
(Figure 1)

Research question 2:

What is the ROE of selected commercial banks from 2013 to 2018?

Figure 2 presents the ROE of six selected commercial banks from 2013 to 2018. The ROE of ICBC, HXB, CMB, CEB, and CZB were generally on downward trends, but

that of NBBC was in decrease firstly and then increase.

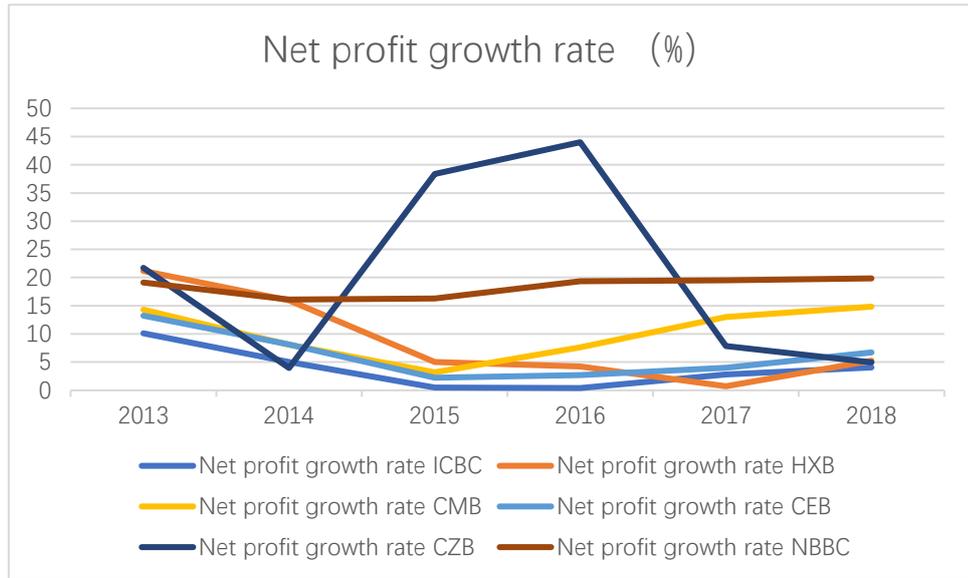


(Figure 2)

Research question 3:

What is the net profit growth rate of selected commercial banks from 2013 to 2018?

Figure 3 presents the ROE of six selected commercial banks from 2013 to 2018. The net profit growth rate of ICBC, HXB, CMB, CEB, and NBBC were generally on in decrease firstly and then increase. However, the net profit growth rate of CZB had a largest fluctuation, with a higher growth in 2015 and 2016 and relative lower growth in other years.

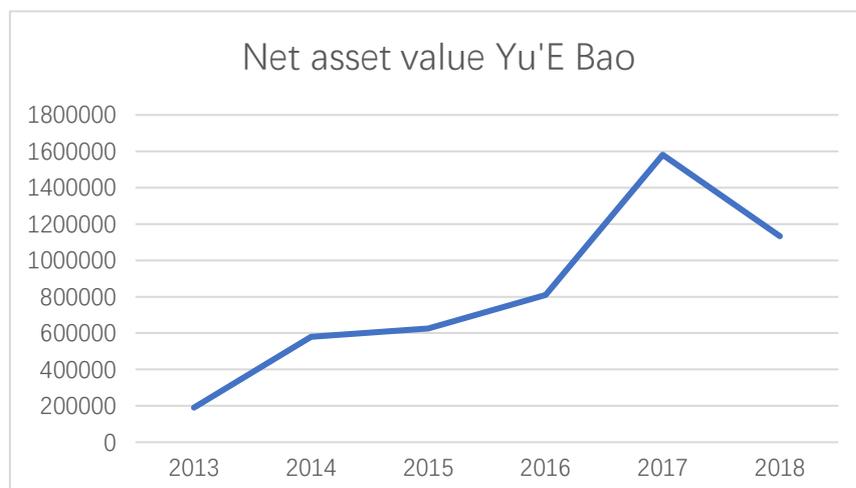


(Figure 3)

Research question 4:

What is the net asset value of the selected internet finance company from 2013 to 2018?

Figure 4 presents the net asset value of Yu'E Bao from 2013 to 2018. The net asset value of Yu'E Bao had a increase from 2013 to 2017, and especially in 2017, it had a leap increase. In the end, it decreased in 2018.



(Figure 4)

Research question 5:

Is there a significant relationship between net asset value of internet finance company and ROA of commercial bank?

This research question was hypothesized that there would be a significant relationship between net asset value of internet finance company and ROA of commercial bank.

This analysis of data utilized a regression model with ROA of commercial bank as dependent variable, and net asset value of Yu' E Bao as independent variable. This regression indicates that the dependent variable (ROA) can be explained by the independent variables (net asset value) if $R^2 > 0.05$, $P < 0.05$.

The data of ICBC, CEB, CZB, and NBBC can match this condition, but the P-value of HXB and CMB shows that there is no significant relationship between their ROA and the net asset value of Yu' E Bao. According to the regression output, net asset value of internet finance delivers a significant predictor for the independent variable ROA of most of commercial banks. In addition, the negative coefficient means that the independent variable has negative influence to the dependent variable, although it has such a small number because the number of net asset value and ROA with a percent number have a large difference. (Table 1)

For most of banks, the hypothesis of "There is significant relationship between net asset value of internet finance company and ROA of commercial bank." is accepted.

| | R² | P-Value | Coefficient |
|------|----------------------|----------------|--------------------|
| ICBC | 0.71141 | 0.034844 | -0.0000057067 |
| HXB | 0.28188 | 0.278442 | -8.02961E-08 |
| CMB | 0.323682 | 0.238681 | -1.33571E-07 |
| CEB | 0.784582 | 0.018829 | -2.96865E-07 |
| CZB | 0.702513 | 0.037169 | -2.37997E-07 |
| NBCC | 0.60984 | 0.056735 | -1.19717E-07 |

(Table 1)

Research question 6:

Is there a significant relationship between net asset value of internet finance company and ROE of commercial bank?

This research question was hypothesized that there would be a significant relationship between net asset value of internet finance company and ROE of commercial bank.

This analysis of data utilized a regression model with ROE of commercial bank as dependent variable, and net asset value of Yu' E Bao as independent variable. This regression indicates that the dependent variable (ROE) can be explained by the independent variables (net asset value) if $R^2 > 0.05$, $P < 0.05$.

The data of ICBC, HXB, CEB, and CZB can match this condition, but the P-value of CMB and both R^2 and P-value of NBCC shows that there is no significant

relationship between their ROE and the net asset value of Yu' E Bao. According to the regression output, net asset value of internet finance delivers a significant predictor for the independent variable ROE of most of commercial banks. The negative coefficient means that the independent variable has negative influence to the dependent variable, although it has such a small number because the number of net asset value and ROE with a percent number have a large difference. (Table 2).

For most of banks, the hypothesis “There is significant relationship between net asset value of internet finance company and ROE of commercial bank.” is accepted.

| | R² | P-Value | Coefficient |
|-------------|----------------------|-----------------|--------------------|
| ICBC | 0.780475 | 0.019585 | -0.0000025147 |
| HXB | 0.700982 | 0.037577 | -5.45781E-06 |
| CMB | 0.574626 | 0.080734 | -3.61196E-06 |
| CEB | 0.804115 | 0.015448 | -4.79001E-06 |
| CZB | 0.854071 | 0.00841 | -3.6659E-06 |
| NBCC | 0.044521 | 0.688197 | -4.40137E-07 |

(Table 2)

Research question 7:

Is there a significant relationship between net asset value of internet finance company and net profit growth rate of commercial bank?

This research question was hypothesized that there would be a significant relationship

between net asset value of internet finance company and net profit growth rate of commercial bank. This analysis of data utilized a regression model with net asset value of commercial bank as dependent variable, and net asset value of Yu' E Bao as independent variable. This regression indicates that the dependent variable (net profit growth rate) can be explained by the independent variables (net asset value) if $R^2 > 0.05$, $P < 0.05$. Only the data of HXB can match this condition, all others show that there is no significant relationship between their net profit growth rate and the net asset value of Yu' E Bao. According to the regression output, net asset value cannot deliver a significant predictor for the independent variable net profit growth rate of most of commercial banks. (Table 3).

For most of banks, the hypothesis “There is significant relationship between net asset value of internet finance company and net profit growth rate of commercial bank.” is rejected.

| | R² | P-Value | Coefficient |
|-------------|----------------------|----------------|--------------------|
| ICBC | 0.034844 | 0.324653 | -3.64559E-06 |
| HXB | 0.689095 | 0.040839 | -1.36869E-05 |
| CMB | 0.067465 | 0.619152 | 2.48E-06 |
| CEB | 0.311244 | 0.249981 | -4.79001E-06 |
| CZB | 0.124266 | 0.493132 | -1.2827E-05 |
| NBCC | 0.186196 | 0.392915 | 1.51929E-06 |

(Table 3)

Conclusion

These data draw an conclude that the ROA and ROE can be the indicators representing the influence from the development of internet finance to the profitability of commercial banks. The independent variable, net asset value, has a negative influence of the dependent variable, ROA and ROE. Therefore, we can say that the development of internet finance has negative impact on the profitability of commercial banks.

The result shows the development internet finance will have negative influence to the profitability of commercial banks, rending in ROA and ROE. From the result of this research, I suggest that commercial banks should take methods to cope with the shock from the development of internet finance. Innovating new business model or product combined with internet finance to avoid the market share being occupied by internet finance largely. In addition, it is important to strengthen cooperation among commercial banks to make up the insufficiency of information. The development trend of internet cannot be halted, internet finance certainly will permeate through people's lives. Therefore, commercial banks hardly operate well if they run counter to this trend.

The limitation of this research is only using data from 6 commercial bank, and one internet finance company to test the relationship, resulting in incomprehensive

conclusion. In addition, some of banks selected still have different conclusion, therefore, we cannot provide an identical conclusion for every commercial bank in China.

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