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Human Capital, Human Resource Slack and Bank Performance: The Role of Bank Age

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ABSTRACT
Fintech development has brough serious effects on banking operations in financial markets, which causes commercial banks to be concern about operational strategies, especially human resources aspect. Commercial banks need well-educated staffs with IT-related knowledge and skill to upgrade the financial products and services. On the other hand, commercial banks may have over-staffs hired before and then need to provide on-job training programs for the current staffs to meet the requirement of Fintech knowledge and skills. Thus, the study uses annual data of 63 commercial banks for the period from 2014 to 2019 investigates the effect of human capital and human resource slack on bank performance. The empirical results of the study reveal that human capital and human resource slack has significant and negative impact on bank performance. Second, by adding bank age as a moderator, it mitigates negative effect of human capital on bank performance, while it also foresters the significant and positive effect of human resource slack on bank performance.
***Keywords**: Human capital, human resource slack, bank performance*

1. INTRODUCTION

Recently, commercial banks have encountered highly serious competition in financial markets due to rapid Fintech development (Yang, Chu, and Kuang, 2020) [1]. Also, ICT, stayed into 5G stage, has been applied in financial industry. Commercial banks have aggressively employed ICT to facilitate financial transactions, which can lower transaction costs, create new financial products, and thus expand bank profits. In practice, commercial banks have promoted service facilitates like internet banking, mobile-phone banking, and different e-banking services for customers to do financial transactions. To the end, commercial banks gradually adopted down-sized staff policy. For instance, state-owned banks have slowly decreased in staffs over the past several years shown in Table 1.

On the other hand, Fintech companies, like Tencent, Ant financing and so on, have already eroded the stake of financial markets. This leads that commercial banks lost operational opportunities and lower bank profits. Commercial banks have aggressively spent large amounts of capital in Fintech-related investments. To compete with Fintech companies, commercial banks have begun organizational restructure in order to fight ICT-context financial market competition. Commercial banks have to recruit larger number of new staffs with well-educated and/or IT-related background and provide on-job training programs for current staffs. Table 1 indicates that the average schooling years in state-owned banks have increased. In addition, a report presented by Prospective Industry Research Institute in 2019 shows that fintech staffs in state-owned banks have gradually increased over past several years; among them, Industrial and Commercial Bank of China has 34,800 fintech staffs, accounting for 7.8 percent of its total workforce.China Construction Bank's figure was 102,000, 2.78%;The Agricultural Bank of China's figure was 74,000, 1.6%;Bank of China has 7,000 fintech staffs, accounting for 2.58%;Bank of Communications has 3,500 fintech staffs and accounting for 4.05%.

In general, commercial banks have to face the changes in human resource policy due to Fintech development. The aim of the study is to investigate the effect of human capital and human resource slack on bank performance. Section 2 is literature review and research hypothesis. Section 3 is research method and section 4 shows empirical results. Conclusion and suggestion are in final section.

2. LITERATURE REVIEW AND HYPOTHESIS

2.1. Human Capital and Performance

According to resource-based theory, a firm with sufficient resources will sustained competitive advantages in the markets (Barney, 1991) [2]. Human capital is treated as crucially intangible assets and plays a vital role in firms (Kaplan and Norton, 2004) [3]. Human capital is related to schooling and training (Romer, 1990; Medase, 2020) [4, 5] Generally, people would like to attain high-level education in school because schooling refers to return on education. People can have competence by learning more knowledge and skills to put their contribution in firms. In addition, employees can accumulate knowledge and skills through on-

job training programs provided by firms (Yang, Chu and Liu, 2019) [6].

Table 1 Numbers and Schooling Years of Stated-Owned Bank Staffs

Bank/ Year	ICBC		CCB		BOC		ABC		BCM	
	No. of Staffs	Schooling years	No. of Staffs	Schooling years	No. of Staffs	Schooling years	No. of Staffs	Schooling years	No. of Staffs	Schooling years
2019	445106	15.54	347156	15.65	309384	15.83	464011	15.32	87828	16.06
2018	449296	15.45	345971	15.59	310119	15.78	473691	15.25	89542	16.00
2017	453048	15.35	352621	15.56	311133	15.73	487307	15.18	91240	15.96
2016	461749	15.27	362482	15.52	308900	15.66	496698	15.12	92556	15.87
2015	466346	15.22	369183	15.48	310042	15.60	503082	15.08	89269	15.87

Especially, commercial banks have paid more attention on knowledge and skill of banking businesses. To step into Fintech stage, commercial banks need to invest in information and communication technology to lower transaction costs, reduce banking risks and earn profits. Thus, commercial banks need to hire high-level educated staffs and further train those staffs to be familiar with new processes and new financial products.

Scholars and researchers are concern about the relationship between human capital and performance. Most of them find positive effect of human capital on performance.

Taleb and Khatib (2016) examine the impact of human capital on performance in Jordan Islamic Bank during the period from 2000 to 2014 and find number of employees has significant and positive effect on net income [7]. Perera (2017) comparatively analyzes the effect of human capital on bank performance between Sri Lanka and New Zealand and reveals that banks in New Zealand use employee diversity and creative ideas to enhance performance, while banks in Sri Lanka use physical and mental fitness and internal recruitment to improve performance [8]. Abubakar, Foroutan, & Megdadi (2019) argue that high-performance work systems offer social, psychological and physical job resources that support employees' career goals and work-related goals, which results in increased psychological capital.Psychological capital is a great predictor of firm performance[9].

According to resource-based theory and prior studies, this study proposes the following hypothesis.

H1:Human capital has positive effect on bank performance.

2.2. Human Resource Slack and Performance

Scholars present definitions of HR slack from different aspects of the efficiency and excess employees (Sgourev and Lent, 2017) [10]. Othman (2017) posits that HR slack is the laziness, negligence and unwillingness to work of the employees, which leads to a decrease in productivity of the organization [11]. On the other hand, Titus and Welbourne (2015) argue HR slack as the number of employees required to reach the given sales [12]. Sgourev and Lent (2017) define HR slack as number of surplus sailors relative to number of required sailors by the capacity of the ship in case study of Dutch East India Company [10].

According to agency theory, managers make operation and investment policies to earn profits by taking account of themselves beyond interest of stockholders (Jensen and Meckling, 1976).[13]. Then managers may use slack resources to risky operations and investments causing low efficiency and negative performance. Human resources slack occur as a firm may use over-expansion to drive the firm growth and gain efficiency (Kor & Mahoney, 2000) [14], but slack may not as a resource due to inefficiency of un-skillful workers (Sgourev and Lent, 2017) [10].

Recently, commercial banks in China have made more efforts on non-interest business including bancassurance, credit cards, and related consumer products, which needs more staffs to implement the given sales objective. However, this may arise from human resource slack because commercial banks commonly use person-to-person sales methods of in-house, call-out, and email contact current and potential customers. In addition, Chinese commercial banks have aggressively involved in financial technology to improve financial services and enhance market competitiveness. This may result in excess employees in the current and future operation condition because they do not have enough and well-learn knowledge and skill in internet and artificial intelligence related to financial services.

The relationship between human resource slack and firm performance on most researches are negative. Fonseka, Wang, and Manzoor (2013) examine the effect human resources slack on firm performance in case of developing countries for the period from 2000 to 2009. They find that AHRS and RHRS have inverse U-shaped effects on firm performance. Second, AHRS has positive impact on performance of both state-owned enterprises and private-owned enterprises, while RHRS has negative impact on performance of SOEs [15]. Fonseka et al. (2014) investigate the effect of financial and human resource slacks of

performance in case of Chinese listed companies over the period from 2000 to 2009. Among the empirical results, the study finds that the relative human resource slack has negative and inverse U-shaped effect on return on investment [16]. Sgourev and Lent (2017) analyze Dutch East India Company employed slack in response to resource constraint in the period of 1700 to 1795 but find the negative effect of shortage of skill labor [10].

According to agency theory and the previous studies, the study presents the following hypothesis.

H2:Human resource slack has positive effect on bank performance.

2.3. Firm Age as a Moderating between Human Resource and Performance

Firm age implies that weakly organizational functions of firms in certain industries, which leads to high transaction costs, bureaucratic administration, and operational inefficient (Evans, 1987; Medase, 2020) [17, 5]. A study of Balasubramanian and Lee (2008) reveals negative relationship between firm age and productivity [18].

On the contrary, a study of Queiro (2015) finds that there is a strong relationship between manager education and firm year in the case of Portugal firms [19]. Coad et al. (2018) argue that the effect of age on performance is intermediated by some elements such as routines, accrued reputation and managerial inflexibility [20]. Commercial banks can accumulate knowledge and skills in their financial services compared to other firms and industries. Aging banks may obtain better reputation in financial markets because the banks have received strong confidence and long-term relationship of customers over time (Hosono, Takizawa and Yamanouchi, 2020) [21]. This is benefit for bank staffs to engage in financial transactions and eventually earn profits.

According to the previous researches, the study presents the following hypothesis:

H3:Firm age as a moderating effect between human resource and bank performance

3. DATA AND METHODOLOGY

3.1. Research Sample

Annual data, collected from Bankfocus and annual reports of commercial banks, are for the period from 2014 to 2019. The sample objects have 63 Chinese commercial banks including 5 state-owned banks, 7 joint-stock banks, and 51 city banks. The study has 315 observations.

3.2. Research Variables

Refer to the previous studies of Yang, Chu and Liu (2019), Fonseka, Wang, and Manzoor (2013), and Hosono, Takizawa and Yamanouchi (2020) [6, 15, 21], the study selects dependent variable, independent variables and moderating variable to construct the estimation regression.

3.2.1. Dependent variable

Bank performance is commonly measured by return on assets (ROA) and return on equity (ROE) in the previous studies. The study employs ROA as a dependent variable.

3.2.2. Independent variables

(1) Human capital

Human capital is classified into internal human capital in proxy of schooling and external human capital in proxy of training. This study uses average schooling years of bank staffs to measure human capital**.**

(2) Human resource slack

Human resources slack is commonly measured by employee productivity (Kroll, 2006) [22] and categorized into absolute and relative human resource slack. Absolute human resource slack (AHRS) used by the study is in a proxy of the change in employee productivity within the organization over time and is expressed by the current sales per bank staff scaled by the previous sales per bank staff, then minus 1 (Kroll, 2006) [22]. If AHRS value is higher, it indicates that bank staffs have more productivity; conversely if AHRS value is lower, it indicates bank staffs have less productivity.

3.2.3. Moderating Variable

The study employs company year starting from the incorporated year as moderating variable to measure bank year.

3.2.4. Control Variables

Following the bank assessment principles of CAMEL, the study adds asset size, capital adequacy ratio, operational efficiency, Z-score, and operation income as control variables in the estimation equations.

The summary of all variables is shown in Table 2.

3.3. Research Models

In order to investigate research hypothesis, the study constructs the following research models. For investigating hypothesis H1, the study presents the model as follows:

$$ROA_{it} = \alpha_0 + \alpha_1 HC_{it} + \alpha_2 HC_{it-1} + \Sigma_{n=3}^{7} \alpha_n CV_{it} + \varepsilon_{it} \quad \text{(Model 1)}$$

For investigating hypothesis H2, the study presents the model as follows:

$$ROA_{it} = \beta_0 + \beta_1 SLACK_{it} + \beta_2 SLACK_{it-1} + \Sigma_{n=3}^{7} \beta_n CV_{it} + \varepsilon_{it} \quad \text{(Model 2)}$$

Table 2 Research Variables

Variable	Name	Code	Measure
Dependent variable	Return on assets	ROA	Net income scaled by total assets
Independent variable	Average schooling year of staffs	HC	Schooling years of staffs scaled by number of staffs
	Absolute human resource slack	SLACK	[(firm sales$_{it}$/firm employees$_{it}$)/(firm sales$_{it-1}$/firm employees$_{it-1}$)] -1
Moderating variable	Bank age	AGE	Company year starting from the incorporated year
	Assets size	SIZE	Ln (total assets)
	Capital adequacy ratio	CAR	Net worth scaled by risk-adjusted assets
Control variable	Operational efficiency	EFF	1-(operational expenses scaled by total operational income)
	Z-Score	ZS	[(ROA + (Equity/Assets))/σ_{ROA}
	Operation income	BINC	Operation income/total revenues

For investigating hypothesis H3, the study presents the two models as follows:

$$ROA_{it} = \gamma_0 + \gamma_1 HC_{it} + \gamma_2 HC_{\text{it-1}} + \gamma_3 AGE_{it} + \gamma_4 HC_{it} * AGE_{it} + \gamma_5 HC_{it-1} * AGE_{it} + \Sigma_{n=6}^{10} \alpha_n CV_{it} + \varepsilon_{it} \quad \text{(Model 3)}$$

$$ROA_{\text{it}} = \varphi_0 + \varphi_1 SLACK_{it} + \varphi_2 SLACK_{it-1} + \varphi_3 AGE_{it} + \varphi_4 SLACK_{it} * AGE_{it} + \varphi_5 SLACK_{it-1} * AGE_{it} + \Sigma_{n=6}^{10} \alpha_n CV_{it} + \varepsilon_{it} \quad \text{(Model 4)}$$

4. EMPIRICAL RESULTS

4.1. Descriptive Analysis

Descriptive analysis shown in Table 3 is to express the characteristics of all variables including dependent, independent and control variables.

4.2. Correlation Analysis

The results of correlation analysis are shown in Table 4. The correlation coefficients among the pair from independent variables and control variables are less than 0.7, which indicates one variable has not co-linear relationship with any other variables. Thus, each one of independent variables and control variables can explain dependent variable independently.

4.3. Hausman Test

The study uses Hausman test to select fixed effect model or random effect model. If the probability is greater than 1, the study will select random effect model; otherwise, it will select fixed effect model. According to Table 5, the study will select fixed effect models based on the results of Hausman tests on all models.

4.4. Regression Analysis

Table 6 shows the empirical result in three regression estimations of the study. The adjusted R-squared values of all models are between 0.891 and 0.896, which indicates all models have good level of fitness. In addition, the probabilities of F-statistics in all models are significant at 1% of confident interval, which indicates all models have good level of explanation.

In model 1, human capital in proxy of average schooling years has significant and negative effect on bank performance, but it does not support the hypothesis H1. The lag-one average schooling years has insignificant and negative effect on bank performance, and it does not support the hypothesis H1.

In model 2, human resource slack in proxy of absolute human resource slack has insignificant and negative effect on bank performance, but it does not support the hypothesis H2. The lag-one absolute human resource slack has significant and negative effect on bank performance, and it support the hypothesis H2.

Table 3 Descriptive Analysis

Variables	Max	Min	Mean	Median	St. Dev
Return on assets	0.016	0.000	0.007	0.008	0.002
Schooling year of staffs	16.608	15.038	15.919	15.949	1.636
Human resource slack	62.689	0.126	1.429	1.169	3.563
Bank age	111.000	3.000	23.579	20.000	18.010
Assets size	24.128	17.522	19.872	19.379	0.014
Capital adequacy ratio	0.175	0.055	0.128	0.127	0.091
Operational efficiency	0.800	0.244	0.630	0.646	0.671
Z-Score	269.209	0.901	38.103	45.925	104.545
Operation income	0.665	0.004	0.385	0.397	0.109

Table 4 Correlation Analysis

Corr	Schooling year of staffs (HC)	Human resource slack (SLACK)	Bank age (AGE)	Assets size (SIZE)	Capital adequacy ratio (CAR)	Operational efficiency (EFF)	Z-Score (ZS)	Operation income (BINC)
HC	1.000							
SLACK	0.022	1.000						
AGE	-0.153***	-0.028	1.000					
SIZE	0.066	-0.063	0.057*	1.000				
CAR	-0.002	0.047	0.055	0.235***	1.000			
EFF	0.267***	0.008	-0.065	0.422***	0.169***	1.000		
ZS	0.274***	0.009	0.004	0.236***	0.209***	0.227***	1.000	
BINC	-0.073	-0.064	0.018	0.312***	0.301***	0.441***	-0.003	1.000

Note: ***， **， * express significant in the level of 1%, 5% and 10%.

Table 5 Hausman Test

Model	$\chi 2$ stat.	$\chi 2$ d.f.	Prob.
Model 1	81.939	7	0.000***
Model 2	92.676	7	0.000***
Model 3	83.695	10	0.000***
Model 4	102.550	10	0.000***

Note: ***,**,* express significant in the level of 1%, 5% and 10%.

In model 3, the interaction between average schooling year and bank age has insignificant and positive effect on bank performance, but it does not support the hypothesis H3. The interaction between lag-one average schooling years and bank age has insignificant and positive effect on bank performance, and it does not support the hypothesis H3.

In model 4, the interaction between lag-one absolute human resource slack and bank age has significant and positive effect on bank performance, but it supports the hypothesis H3. The interaction between lag-one absolute human resource slack and bank age has significant and positive effect on bank performance, and it supports the hypothesis H3.

Table 6 Empirical Results

Variable	Model 1	Model 2	Model 3	Model 4
	ROA	ROA	ROA	ROA
C	0.0542***	0.0385***	0.0776***	0.0489***
	(0.0097)	(0.0057)	(0.0210)	(0.0109)
Schooling year of staffs	-0.0015*		-0.0032	
	(0.0008)		(0.0023)	
Schooling year of staffs (-1)	-0.0001		0.0008	
	(0.0006)		(0.0019)	
Human resource slack		-0.0001		-0.0001***
		(0.0000)		(0.0001)
Human resource slack (-1)		-0.0006*		-0.0011**
		(0.0003)		(0.0003)
Bank age			0.0001	0.0001
			(0.0007)	(0.0001)
Schooling year of staffs * Bank age			0.0001	
			(0.0001)	
Schooling year of staffs (-1)* Bank age			0.0001	
			(0.0001)	
Human resource slack * Bank Age				0.0001***
				(0.0001)
Human resource slack (-1)* Bank age				0.0001*
				(0.0001)
Assets size	-0.0014***	-0.0020***	-0.0022***	-0.0025***
	(0.0004)	(0.0002)	(0.0006)	(0.0006)
Capital adequacy ratio	-0.0094	-0.0106*	-0.0097*	-0.0111**
	(0.0057)	(0.0057)	(0.0057)	(0.0056)
Operational efficiency	0.0029***	0.0028***	0.0031***	0.0028***

Variable	Model 1 ROA	Model 2 ROA	Model 3 ROA	Model 4 ROA
	(0.0009)	(0.0009)	(0.0009)	(0.0009)
Z-Score	0.0001***	0.0001***	0.0001***	0.0001***
	(0.0000)	(0.0000)	(0.0009)	(0.0001)
Operation income	0.0168***	0.0169***	0.0172***	0.0168***
	(0.0008)	(0.0008)	(0.0008)	(0.0008)
Obs	315	315	315	315
Adjusted R^2	0.892	0.891	0.892	0.896
F-stat	38.778***	38.482***	37.243***	38.733***

Note: ***,**,* express significant in the level of 1%, 5% and 10%.

5. CONCLUSION AND SUGGESTIONS

Facing the serious effects of Fintech development, commercial banks have suffered the substantial competition which leads to engaging in organizational reform. Bank staffs are regarded as more important intangible assets. How to engage in reform of human resources is a key issue to commercial banks. The study uses annual data of commercial banks in China for the period from 2014 to 2019 to investigate the effect of human capital and human resource slack on bank performance. The results of this study reveal that human capital and human resource slack has significant and negative effect on bank performance. In addition, by adding bank age as a moderating factor, the study finds that it mitigates the negative effect of human capital on bank performance, and also foresters the significant and positive effect of human resource slack on bank performance.

Further analyzing main reasons for the results of the study, one reason is that commercial banks have earned the declined profits over the past several years due to macroeconomic adjustment and interest rate marketization. The other reason is that fintech companies have brought great impact on financial markets.

Currently, human resources of commercial banks in quality and quantity cannot meet the requirement of market competitions under the context of Fintech stage. Refer to the Based on the empirical results, the suggestions of the study are presented as follows:

Commercial banks should hire well-educated staffs with IT-related knowledge and skills. Those staffs who hired by commercial banks are suitable for current context of Fintech stage. They have good IT skills, know the essence of financial services and know how to create new financial products according to customers'needs to compete with other financial institutions in financial markets.

Commercial Banks should train their staffs in fintech to improve their financial knowledge and skills, in order to facilitate the marketing of financial products and services to customers.

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