

The Structural Adjustments in a Chinese Commercial Bank in Response to New Capital Rules: A Case Study of Bank of China

Botao Song*

Department of Economics, University of Birmingham, United Kingdom

** Corresponding author. Email: BXS656@student.bham.ac.uk*

ABSTRACT

This paper analyses the structural adjustments surrounding capital adequacy ratios undertaken by Bank of China in response to the New Capital Rules over the past 10 years. It decomposes the strategies employed by BoC into “Capital” as the numerator and “Risk-weighted Assets” as the denominator, and makes an in-depth analysis of the facts respectively. As the internal capital growth capability was contained by limited room of retained earnings compounded with declining ROE, BoC issued multiple financing instruments to raise capital externally, with great delicacy in choosing suitable vehicles and calibration of timing. BoC implemented an internal rating-based approach to measure the credit risk, and rearranged the business structure based on the underlying risk parameters.

Keywords: *Structural adjustments, capital adequacy ratios, capital raising*

1. INTRODUCTION¹

To fix the flaws perceived in the global financial regulatory regimes during the global financial crisis from 2007 to 2009, the Basel Committee promulgated the New Basel Capital Accord (the Basel III Accord) in December 2010 [1]. All members were required to formulate related rules and regulations correspondingly [2]. As a member of G20 and the Basel Committee, China developed its country version of regulations governing capital of commercial banks (provisional), incorporating the international regulatory reform initiatives proposed by the Basel Committee as well as the Financial Stability Board (FSB) into Chinese banking sector.

Bank of China (abbreviated to “BoC” hereinafter) is the most internationalized commercial bank in China, ranked 3rd among top 1000 banks in terms of Tier 1 capital by The Banker Magazine in 2018, and was selected as one of the Global Systematically Important Banks (G-SIBs) in 2011—the sole representative from the emerging markets. This paper analyses briefly the proactive adjustments surrounding capital adequacy ratios² in terms of the “Capital” (the numerator) and the Risk-weighted Assets (RWA, the denominator), with explanations on underlying

reasons accordingly. All the data of BoC is sorted from its financial reports unless otherwise stated.

2. KEY REGULATORY STANDARDS

To contain excessive credit expansions and foster a sound supervisory environment for large domestic banks, China Banking Regulatory Commission (CBRC), the then regulatory authority of Chinese banking sector, established a multi-tier capital regulatory framework in line with the international standards³ [3].

Minimum level for Common Equity Tier-1 capital adequacy ratio should be no less than 5%, higher than 4.5% in Basel III. Minimum ratios for Tier-1, total capital adequacy and counter-cyclical buffers are same as Basel III (6%, 8% and 2.5% respectively).

Supplemental capital requirement for Global Systematically Important Banks (G-SIBs) should be no less than 1%, and will increase up to 3.5% if the bank is allocated to higher bucket by FSB.

Total Lost Absorb Capability (TLAC) Ratio set by FSB should be no less than 16% effective from January 1 2019, and 18% at the beginning of 2022, with grace period of six years for G-SIBs in emerging markets.

¹ All the data and figures presented in this paper were based on publicly available information.

² Capital adequacy ratio = $\frac{NC}{RWA}$, where NC= Net Capital = Capital- Regulatory Deductions, RWA=Risk-weighted Assets. Capital is referred to as Common Equity Tier-1 (or Core Tier-1), Additional Tier-1 and Total Capital (=Common Tier-1+Tier -1+ Tier-2) respectively where appropriate.

³ The CBRC renamed the China Banking and Insurance Regulatory Commission (the CBIRC) in April 2018 upon the integration with the China Insurance Regulatory Commission (the CIRC).

Implementation deadline one year ahead of schedule (2012) while compliance deadline two years ahead of schedule (2016).

3. ANALYSIS OF NUMERATOR: REPLENISHMENT OF CAPITAL

3.1. Why Capital Inadequate

Although BoC has strengthened the capital base since 2004 through capital injection from the governmental shareholder, investment from strategic investors, the proceeds from IPO, and the augmentation of retained earnings as well, and the capital adequacy ratio peaked at 13.59% at the end of 2006, the bank was still under great pressure to raise capital externally for the following reasons, especially in the wake of global financial crisis: Existing capital consumed dramatically with the surge of lending loans in 2009. The capital adequacy ratio drastically declined to 11.14% at the end of 2009 with the balance of loans increased by 48.97% under the active fiscal policy plus modestly easy monetary policy to head off the economic recession.

More stringent regulatory requirements for capital. As one of the G-SIBs, the total CAR for BoC is required to be no less than 11.5% (Table 1). Since 2019 the additional capital surcharge on BoC has been increased by 0.5% to 1.5%, hence the CAR should be no less than 12% thereafter. And in accordance with the provisions by FSB, the Total Lost Absorb Capability (TLAC) Ratio should be no less than 16% by 2025 and 18% by 2028. This ratio of BoC, at the end of September 2019, is only 11.51% [4, 5] after adjustment for capital buffers⁴ -- there is still a long way to go.

Business expansions and fierce competition with capital-robust international foreign banks in financial opening call for more capital. Capital adequacy is not only reflective of the development potential, but also an indicator of credit rating and market reputation in global markets. At the end of 2017, the three minimum CARs of BoC were lower than the means of five leading global commercial banks (Wells Fargo, Citibank, Bank of America, JP Morgan Chase, and HSBC) by 1.85, 2.88 and 3.01 percentage points respectively⁵.

3.2. How Much Space to Raise Capital Internally

One of the approaches to filling the capital gap is internal accumulation. It is easy to understand that [7]:

⁴ The conservation capital buffer of 2.5%, counter-cyclical buffer of 0-2.5% and the additional capital surcharge on G-SIBs of 1.5% are excluded.

⁵ Calculated with reference to the data from [6].

$$\begin{aligned}
 ICGR &= \frac{RE}{EC} = \frac{NI}{EC} \times \frac{RE}{NI} \\
 &= ROE \times RR \\
 &= ROE \times (1 - PR) \quad (1)
 \end{aligned}$$

Table 1 Key Regulatory Standards on Commercial Banks in China

Ratio	Key Standards
Capital Adequacy Ratio ⁶ (CAR)	<ul style="list-style-type: none"> • Minimum level: Common Equity Tier-1 ≥ 5%, Tier-1 ≥ 6%, Capital ≥ 8% • CAR = Minimum + Conversion Capital Buffer of 2.5% + Countercyclical buffer of 0-2.5% + additional capital surcharge on G-SIBs of 1%-3.5% ≥ 11.5% (for G-SIBs) • Total Lost Absorb Capability (TLAC) Ratio ≥ 16%⁷

Source: Sorted from relevant rules and regulations, CBRC/CBIRC [3]

where:

ICGR= Internal capital growth rate

RE= Retained earnings

EC= Equity capital

NI= Net Income

ROE= Returns on Equity

RR= Retention ratio

PR= Dividend pay-out ratio

As shown in Figure 1 [4], the retention ratio of BoC has risen steadily since 2008, arriving at nearly 70% in 2018, while the Returns on Equity (ROE) declined slightly after a peak of 18.87% from the end of 2010 to 2014, and then plunged sharply to 12.06% at the end of 2018. As a result, the Internal Capital Growth Rate (ICGR)⁸ sloped downward from 11.90% in 2011 to 11.58% in 2014, and then dropped steeply to 8.43% at the end of 2018. Theoretically, given the downward trend in ROE, the only way to grow capital internally is to increase the retention ratio further, in other words, to cut the dividends pay-out. Actually the dividend pay-out ratio has been consistently reduced since 2008 and flattened out around 30% over the past four years. There is little space to lower the dividend, if any, would be detrimental to the image of a large bank with stable dividend track records (RMB0.17-0.18 of dividends pay-out per share over the last two years).

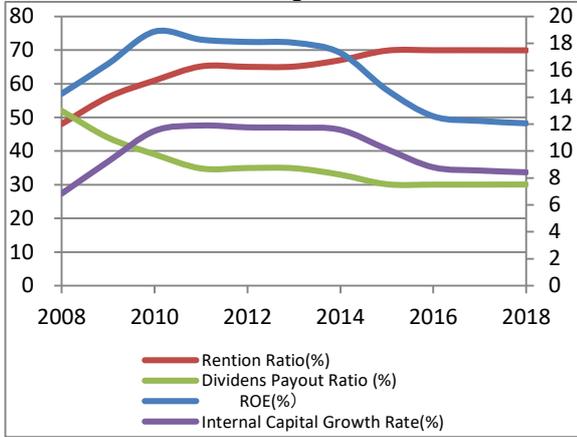
3.3. Issuance of Multiple Capital Raising Instruments

⁶ Guiding Options on the Implementation of New Regulatory Standards in China's Banking Industry, CBRC, 2011. Rules Governing Capital Management of Commercial Banks (Provisional), the CBRC, 2012.

⁷ Set by FSB effective since 2019 with grace period of six years for G-SIBs in emerging markets.

⁸ The Internal Capital Growth Rate = ROE x Retention Ratio.

BoC accelerated the replenishment of external capital through issuance of various financing instruments on large scales since 2010 (see Table 2), in the domestic and overseas equity and bond markets, with delicacy in choosing suitable vehicles to meet specific capital needs and calibration of timing under complex market conditions. The main financing events after 2010 are:



Source: BoC Annual Reports of 2008-2018

Figure 1 Retention Ratio and Internal Capital Growth Rate of BoC (2008-2018)

Rights issues of RMB60 billion to raise the Common Equity Tier-1 capital in 2010 [4]. Financing directly from the equity market is the most efficient approach to replenishing the bucket of Core Tier-1 capital. But it is heavily reliable on the prevailing market conditions. As indicated in Figure 2, for most of the time since November 2012 the PB ratios had been below 1, demonstrating its share prices had been lower than its book value per share in a sluggish secondary equity market. The proceeds from either the rights issues or seasoned new issues, even if offered, would have been quite limited, so financing directly through the ordinary shares have not occurred since then.

Preference shares of RMB32 billion and USD6.5 billion in 2014, and RMB100 billion in 2019 [4] for additional Ties-1 Capital. But the issuance is subject to prolonged regulatory approval. Some real cases showed it might take almost over two years, with tough issues to be coordinated during the issuance process. Hence it cannot be used in case of emergency.



Source: Wind

Source: Wind Financial Terminal [8]

Figure 2 P/B Ratios of BoC (2008-2019)

Convertible bonds of RMB40 billion. As a hybrid financing instrument, its financing cost is fairly low prior to conversion, and can be converted into Common Equity Tier-1 capital upon conversion into ordinary shares. This was exactly the case in 2014 when RMB24.54 billion of convertible bonds were converted thanks to the recovery in China’s domestic stock markets [4]. But its issuance also need to go through a lengthy approval process by related regulatory authorities, its efficiency will not be achieved until the conversion period concludes and provisions triggered, which in turn, depends on the market conditions. Hence it cannot be used frequently or as an instrument to meet immediate capital requirement.

Tier-2 capital instruments of RMB30billion and USD3 billion in 2014, and RMB210 billion from 2017 to 2019, all for Tier-2 Capital [4]. This instrument is frequently used owing to the relatively simple authorization process. But it is just efficient for Tier-2 Capital, only suitable to situations where total CAR is inadequate but Common Equity Tier-1 and Tie-1 capital enough.

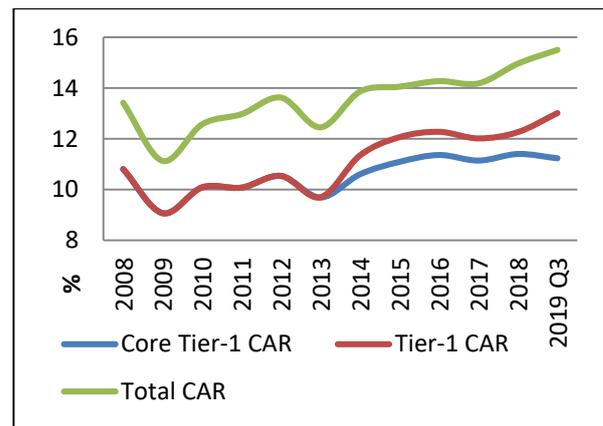
Undated capital bonds of RMB40 billion for additional Tier-1 Capital in 2019. As an innovative financing instrument with “Chinese Characteristics”, its provisions conform to Chinese Corporate Law, recognizable as equities in accordance with accounting rules, tax-efficient because interest payment is deductible on a pre-tax basis. More importantly, the approval process is simplified and the issuance mechanism is flexible. Additionally, it is issued in the form of bond in the Chinese Inter-bank Market (CIBM), with vast market potential and broad investors base [9], and less prone to be affected by equity market. Underpinned by matched policies of the People Bank of China (the PBOC), such as liquidity enhancement by the collateral eligibility for the Medium-term Lending Facility (MLF), the Undated capital bond is expected to be one of the most important capital raising vehicles.

With comprehensive use of multiple instruments, the Common Equity Tier-1, Tier-1 and total capital adequacy ratios of BoC, as the “Numerators” in the capital adequacy ratios, have raised steadily since 2010, reaching 11.24%, 13.02% and 15.51% respectively at the end of September 2019, with an increase of 2.17, 3.95 and 4.37 percentage points compared to those at the end of 2009 (Figure 3), paving the way for further business development.

Table 2 Instruments Issued by BoC to Replenish Capital (2010 -2018) Unit: RMB/USD billion

Year	Refinancing Instruments	Amount	Items of Capital to be Raised
2010	A Share and H Share Rights Issues	RMB 60	Common Equity Tier-1
2010	Convertible bonds	RMB 40	Supplementary Capital upon issuance. 2,270 convertible bonds converted into 60,464 A shares in 2010.
2014	Tier-2 Capital Instruments	RMB 30	Tier-2 Capital
2014	Tier-2 Capital Instruments	USD 3	Tier-2 Capital
2014	Preference Shares	USD 6.5	Additional Ties-1 Capital
2014	Preference Shares	RMB 32	Additional Ties-1 Capital
2014	Existing Convertible Bonds converted into A shares	RMB 24.5	Common Equity Tier-1 upon large scale of conversion into A shares from convertible bonds
2017	Tier-2 Capital Bonds	RMB 60	Tier-2 Capital
2018	Tier-2 Capital Bonds	RMB 80	Tier-2 Capital
2019	Tier-2 Capital Bonds	RMB 70	Tier-2 Capital
2019	Preference Shares	RMB 100	Additional Ties-1 Capital
2019	Undated Capital Bonds	RMB 40	Additional Ties-1 Capital

Source: BoC Annual Reports of 2009- 2019 [4, 5]



Source: BoC Annual Reports of 2009-2018 [4, 5]

Figure 3 Changes of Capital Adequacy Ratios of BoC (2008-2018)

4. ANALYSIS OF DENOMINATOR: OPTIMIZATION IN RISK-WEIGHTED ASSET

4.1. Comparison between Regulatory Weighting Approach and the IRB

From the perspective of business development, the main challenges for BoC were to allocate funds appropriately to various assets with different risk-return profiles, aimed at achieving an optimized RWA through keeping balance between capital consumption and expected returns. This paper focuses on the credit risk-weighted assets in view of it accounts for a dominant portion (over 90%) of total risk-weighted assets.

In April 2014, upon regulatory approval from the CBIRC, BoC began to apply the advanced capital measurement approach to corporate and retail exposures with internal credit ratings⁹. Based upon internal data and the long-term default records, BoC developed statistical default model to estimate the risk parameters to ensure the accuracy and prudence. Since the introduction of the Internal Ratings-based (IRB) Approach, the rating results have been penetrated into credit approval, risk monitoring and limit setting and risk reporting. A comparison between the Regulatory Weighting Approach (RWA) and the IRB Approach is tabulated in Table 3 as below:

⁹ The regulatory weighting approach was applied to financial institutions, sovereign exposures and others without internal credit ratings.

Table 3 Comparison between the RWA and the IRB Approach

	RWA	IRB
Basis of risk weighting	External credit ratings and regulatory weighting	Risk parameters based on internal rating model
Risk parameters	On-balance-sheet asset: Book value adjusted for provision \times risk weighting; Off-balance-sheet asset: Notional amount \times credit conversion factor \times risk weighting	Probability of default (PD), loss given default (LGD), exposure at default (EAD), Maturity (M)
Source of key risk parameters	Rating agencies, regulatory authority	Corporate risk exposure: PD independently calculated by the bank; Retail risk exposure: PD, LGD and EAD independently estimated by the bank
Suitability	Limited rating agencies Limited rating results More likely to be gamed Less reliable Higher cost	Free access to data of clients and default information; More applicable to large banks; Strict requirement for robust management information system.

4.2. Structural Changes in Loans to Clients

4.2.1. Changes in Corporate and Personal Loans

BoC allocated loans properly between corporate and personal clients based on their risk weightings. As a critical element of the Risk-weighted Assets, it varies from 100% to 0%, depending on client types and specific risk parameters. Generally:

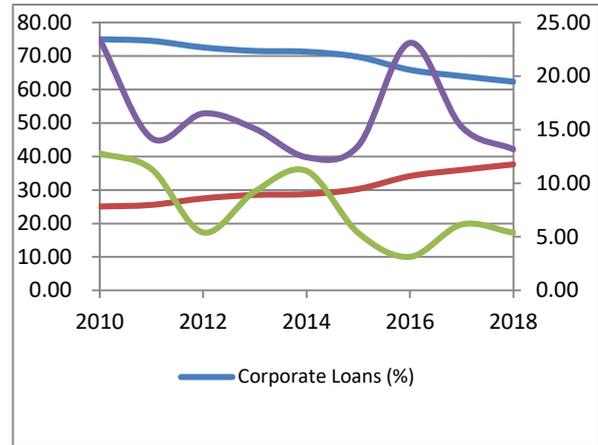
100% for general corporate clients, discountable with lowered value of Loss Given Default (LGD) if enhanced by risk mitigation instruments.

75% for eligible Small and Medium-sized Enterprises.

50% for residential mortgages.

75% for other personal exposures.

As the risk weightings are more favourable for personal loans, and retail banking is counter-cyclical and more cost-efficient during a boom of Fin-Tech, the YoY growth rates of personal loans kept higher than corporate loans from 2010 to 2018, with an arithmetic average of 16.29% versus 7.77%. The proportions of personal loans accelerated stably from 25% in 2010 to 37.6% in 2018, while corporate loans decelerated gradually from 74.9% to 62.3% (Figure 4).



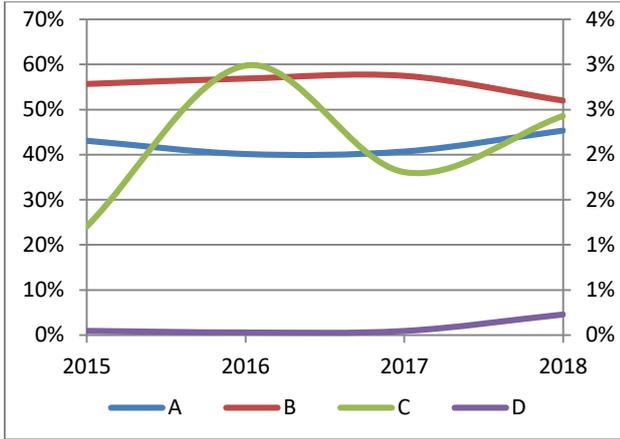
Source: BoC Annual Reports of 2009-2018 [4]

Figure 4 Structures and Growth Rates of Corporate Loans Versus Personal Loans (2010-2018)

4.2.2. Variations in Credit Rating Structure of Corporate Loans

BoC classified the corporate clients into A, B, C and D (signified from high to low) with 15 sub-grades under its internal rating system. Due to unavailability of data¹⁰, the structural changes in internal ratings of risk-weighted assets can only be depicted from 2015 to 2018 (Figure 5). The biggest slice fall into the bucket of B, with creditworthiness above average level, although slightly dropped in 2018, still maintained over 50%. While the proportion of A ascended from 40.12% at the end of 2016 to 45.37% in 2018, indicating a consistent appetite for high quality clients, the ratios of C fluctuated in tandem with the economic performances, reflective of an eternal pursuit of returns and an endogenous relationship between credit markets and real economies. The rating of D stands for the portion in default, although held at a reasonably low level, escalated to 0.23% amid a wave of default in 2018 [4].

¹⁰ BoC started to disclose the Capital Adequacy Ratio Report in 2013. And began to disclose the data of risk-weighted assets in 2015 after the approval by CBRC to implement the advanced capital measurement approach in April 2014.



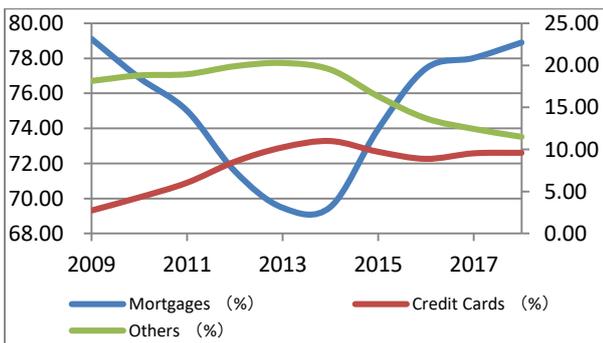
Source: Calculated on the basis of data in Capital Adequacy Ratio Reports of 2015-2018, Bank of China Limited. [10]

Figure 5 Variations in Credit Rating Structure of Corporate Loans (2015-2018)

4.2.3. Changes in Composition of Personal Loans

The largest portion of personal loans lay in residential mortgages. The reasons are quite straightforward: a lower risk-weighting of 50%, with the residential property as qualified collateral and considerable amounts of interest income for one deal. The proportion hit a trough of 69% during 2013 and 2014 under strict regulatory policies, but then climbed to 78.91% at the end of 2018 [4].

As shown in Figure 6, Credit cards loans take up a risk-weighting of 75%, although they represented only 2.73% of total personal loans in 2009, the business grew quickly with the rapid development of consumer finance and online financial services, arriving at 11% in 2014 and then levelled off around 10% [4].



Source: BoC Annual Report s of 2009-2018 [4]

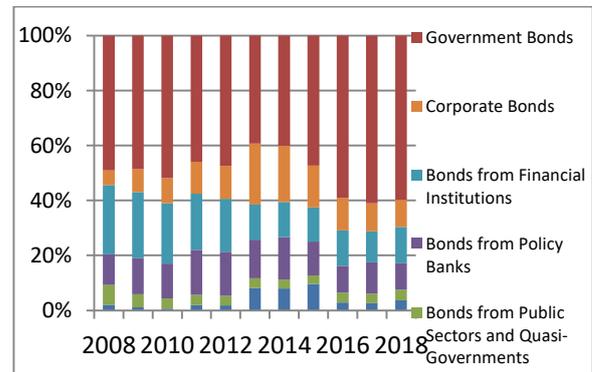
Figure 6 Changes in Composition of Personal Loans (2009-2018)

4.3. Shifts in Structure of Investment

The investment portfolio grew at a compound annual rate of 13.12%, slightly lower than 15.33% of net loans, with a relatively stable ratio ranging from 17% to 23% to the total assets. As a highly-leveraged financial intermediary, BoC is supposed to meet its liabilities with security and timeliness, the surplus portfolio has been managed in a prudent way. The allocation to government bonds and issues from policy banks, with the risk weighting being zero, has been increasing from 60% in 2008 to nearly 70% in 2018. The third largest class is the bonds from financial institutions, with a regulatory risk weighting of 20%-25%. The rest of funds was mainly invested in corporate bonds with highest credit ratings. As the scarcity of capital became a great concern, the investment in corporate bonds declined from 22% in 2013 to around 10% at the end of 2018 (Figure 7) [4].

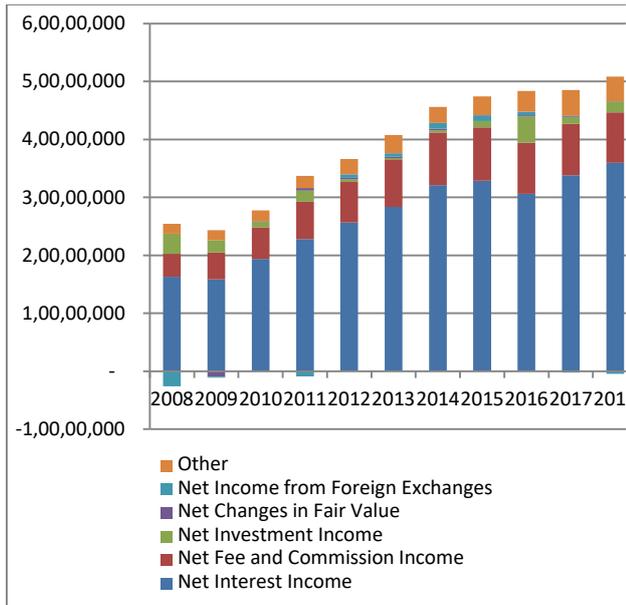
4.4. Further Expansions to Fee-based Business

Unlike loans and investment, the fee-based business occupies less capital and is expected to generate more risk-adjusted returns on capital. But it is much easier said than done. As indicated in Figure 8, the non-interest income remained around 30% of the operating income, despite persistent endeavors undertaken, the contribution rate basically stayed at the same level as in 2008 due to slimmer margins. The fee-based financial business has become a battlefield encompassing not only commercial banks, but also other financial institutions and service providers. Nevertheless, it does not suggest that those business lines are insignificant. Actually in face of the disintermediation, BoC expanded the business scopes to investment banking, wealth and asset management, insurance and financial leasing etc, and deployed many resources to exploit potential in those off-balance-sheet areas, not only to generate more non-interest income, but also to facilitate the development of on-balance sheet business with leverages of capital-light business.



Source: BoC Annual Report s of 2009-2018

Figure 7 Alterations in Structures of Investment Portfolios (2008-2018)



Source: BoC Annual Reports of 2009-2018 [4]

Figure 8 Compositions of Operating Income (2008-2018)

5. CONCLUDING REMARKS

This paper analyses the structural adjustments surrounding capital adequacy ratios undertaken by BoC, including the issuance of multiple financing instruments to replenish capital externally, with great delicacy in choosing suitable vehicles and calibration of timing; and the modulation of business exposures based on their underlying risk parameters, leveraged by the internal ratings-based approach. It demonstrates that these adjustments effectively reinforced its risk management system and enhanced its defensive ability against external shocks, promoting it to shift the business development model from scale expansion to capital-efficient development. These strategies are vitally important in the fierce completion in the international banking community.

Loans were lent on the basis of risk weightings as well as the risk-return profiles: The growth rates of personal loans accelerated steadily while corporate loans decelerated gradually. Structural exposures to corporate clients shifted with internal risk parameters. Residential mortgages loans dominated in personal loans and credit cards loans grew rapidly in tandem with consumer finance. Investment portfolios tilted toward government bonds, issues from policy banks and financial institutions while the slice of corporate bonds shrank. The non-interest income remained approximately 30% of the operating income despite relentless endeavours due to slimmer margins amid fierce competition. But business scopes are being actively expanded to off-balance-sheet areas, comprehensive products and services are being offered to facilitate the

development of on-balance sheet business with leverages of capital-light business.

Nowadays an updated version of Basel Capital Accord is reportedly taking shape, and the regulatory framework for measurement of risk-weighting assets is to be further revised. The CBIRC has embarked on amending the capital rules comprehensively. And the forthcoming country version is scheduled to be in place synchronously with the implementation of the updated Basel accord in 2022. For Chinese commercial banks, more proactive measures need to be taken to improve their digital governance structures and infrastructure constructions.

REFERENCES

[1] Bank of International Settlements (2010). “Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems.” Available at: https://www.bis.org/basel_framework/ (Accessed: 5 July, 2020).

[2] Elliot, Douglas J. “Basel III, The Banks, and the Economy”, *Brooking Papers, The Brookings Institution, Washington, DC, March 2011* 159-161.

[3] China Banking and Regulatory Commission (2012). “Regulation Governing Capital of Commercial Banks (Provisional).” Available at: <http://www.cbirc.gov.cn/en/view/pages/ItemDetail.html?docId=13400> (Accessed: 20 July, 2020).

[4] Bank of China Limited (2009-2018). Annual Report 2009-2018. Available at: <https://www.boc.cn/en/index.html> (Accessed: 3 July 2020).

[5] Bank of China Limited (2019). Semi-Annual Report 2019. Available at: <https://www.boc.cn/en/index.html> (Accessed: 3 July 2020).

[6] Li, H. (2019). “Capital Adequacies of Domestic and International Large Banks”, *Financial Times (China)*.

[7] Rose, P.S. and Hudgins, S.C. *Bank Management and Financial Services* (2012) 393.

[8] Wind Financial Terminal.

[9] Liu, X. Optimizing Capital Structure by Undated Bonds, *Issue 14, Chinese Finance* (2019) 62-63.

[10] Bank of China Limited (2015-2018). Adequacy Ratio Reports.