AFIN8003 - Workshop 3

Banking and Financial Intermediation

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Welcome to this workshop on assessing banks' capital adequacy. Our primary objective is to ensure you gain a comprehensive understanding of how capital ratios are determined taking into account both on-balance-sheet and off-balance-sheet activities. While the questions may seem straightforward, they are designed to effectively achieve this goal. Through a series of targeted questions and practical exercises, we aim to demystify the complexities of capital adequacy and provide you with the tools needed to apply these concepts effectively.

1 Recap

Under Basel III, depositary institutions (DIs) calculate and monitor four capital ratios:

1. **Common equity Tier 1 (CET1) risk-based capital ratio**

$$\text{CET1 capital ratio} = \frac{\text{CET1 capital}}{\text{Risk-weighted assets}} \tag{1}$$

2. **Tier 1 risk-based capital ratio**

$$\text{Tier 1 capital ratio} = \frac{\text{Tier 1 capital}}{\text{Risk-weighted assets}} \tag{2}$$

3. **Total risk-based capital ratio**

$$\text{Total capital ratio} = \frac{\text{Total capital}}{\text{Risk-weighted assets}} \tag{3}$$

4. **Tier 1 leverage ratio**

$$\text{Tier 1 leverage ratio} = \frac{\text{Tier 1 capital}}{\text{Total exposure}} \tag{4}$$

2 Question 1 - Appetizers

Suppose a bank has CET1 capital of \$100 million, Tier 1 capital of \$120 million, total capital of \$200 million. The bank uses IRB and calculates its risk-weighted assets (RWA) to be \$2,000 million.[1] What are the bank's CET1 capital ratio, Tier 1 capital ratio, and total capital ratio?

Given the calculated capital ratios, does the bank meet the minimum required capital adequacy ratios?

[1] Recall that large banks can use their **Internal Ratings-Based (IRB)** models to calculate RWA, subject to regulatory approval. In this case, we don't bother computing RWA ourselves (as an outsider).

3 Question 2 - Capital buffers

Meeting the minimum required capital adequacy ratios is nothing to be proud of, because in practice there are also capital buffers applied.

Suppose now a **Capital Conversion Buffer** of 2.5% applies, while the **Countercyclical Capital Buffer (CCyB)** is lifted[2], does the bank in Question 1 still have sufficient capital? If not, what would be the consequences?

Let's now assess another bank that reports a CET1 capital ratio of 8%. With a Capital Conversion Buffer of 2.5%, does the bank have sufficient CET1 capital? What if there is also a CCyB of 1.5%?

4 Question 3 - RWA! RWA! RWA!

> **!** Important
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> Note that when calculating capital ratios in Equation 1, Equation 2, and Equation 3, the denominator RWA should be the sum of three components: RWA for credit risk, RWA for market risk, and RWA for operational risk.

In this course, we covered the calculation of RWA (for credit risk). This question aims to progressively examine your skills to compute RWA.

4.1 A bank without off-balance-sheet activities

Suppose that Bank of Adrianland has no off-balance-sheet activities. The following table lists its assets, values, as well as the associated risk weights. Complete the table by filling the last column, then calculate the total RWA.

Asset type	$ million	Risk weight	Risk-weighted value
Cash, Treasury Bonds and deposits at RBA	10	0%	
Local government bonds, AA-	20	20%	
Loans to other Australian banks, BBB+	10	100%	
Standard eligible residential mortgages	50	35%	
Corporate loans, BB- to BBB+	20	100%	
Corporate loans, B+ or lower	20	150%	

4.2 A bank with off-balance-sheet activities

Suppose now that Bank of Adrianland has off-balance-sheet activities. Its RWA should include both on-balance-sheet and off-balance-sheet components.

Two categories of off-balance-sheet activities receive different treatments for RWA calculation.

4.2.1 Contingencies and guarantees

The following table lists the bank's off-balance-sheet contingencies and guarantees. Complete the table by filling the columns CEA (credit equivalent amount) and Risk-weighted value. Calculate the RWA from off-balance-sheet contingencies and guarantees.

[2]Basically it means that the current CCyB is 0%. CCyB is likely set to zero during periods of economic downturn or recession, regulatory authorities may set the CCyB to zero to reduce the capital requirements for banks. This is done to encourage lending and support economic activity.

OBS item	Face value ($M)	CCF	CEA	Risk weight	Risk-weighted value
Loan commitment	100	0.4		20%	
Standby letter of credit	20	1		20%	
Commercial letter of credit	30	0.2		75%	

4.2.2 Market contracts and derivatives

The following table lists the bank's off-balance-sheet market contracts and derivatives. Complete the table by filling the columns Potential exposure and Current exposure. Calculate the RWA from off-balance-sheet market contracts and derivatives.

4.2.2.1 Calculation of potential exposure

Type of Contract	Notional Principal	Potential Exposure Conversion Factor	Potential Exposure
3yr interest rate swap	$100 m	0.005	
2yr FX forward	$ 80 m	0.05	

4.2.2.2 Calculation of current exposure

Type of Contract	Replacement Cost	Current Exposure
3yr interest rate swap	-$5 m	
2yr FX forward	$3 m	

4.2.2.3 Calculation of CEA and RWA

Now, given the potential exposure and current exposure, calculate the CEA and finally RWA.

5 Extra

Consider the Bank of Adrianland in Question 3. If it has both on-balance-sheet and off-balance-sheet items as specified in Question 3, what is the bank's total RWA?