

What is Financial Risk Management & its career opportunities in banks?

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Sharing to HKU SAAS students

What is the risk in banks?

- Usually, the term “risk” is associated with financial losses.
- It can be more broadly described as any **uncertainty** that might trigger losses or adverse fluctuations in profitability.
- *Mathematician Bernoulli (1738): A risk is a random variable.*
- Not necessary to **eliminate risks**...It's about **managing the risk!**
- Risk management is about striking a **balance** between risk and opportunities. It enables the organization to increase financial growth opportunities and mitigate potential loss or damage.



Market Events Affecting the Banking Environment

1971

- Fixed exchange rate system broke down

1973

- Shocks to price of oil, high inflation and volatile interest rates

1987

- Black Monday, which saw a 23% decline in US stock prices

1989

- Japanese stock market bubble deflated

1997

- Asian contagion decimated Asian equity markets

1998

- Russian debt default and the collapse of the Long-Term Capital Management hedge fund

2001

- September 11 attacks on the World Trade Center and Pentagon set in motion the 2001 US equity market collapse

2007

- Credit Crisis resulting from mortgage market meltdown and huge amounts of the bank leverage

Establishment of Basel Committee on Banking Supervision



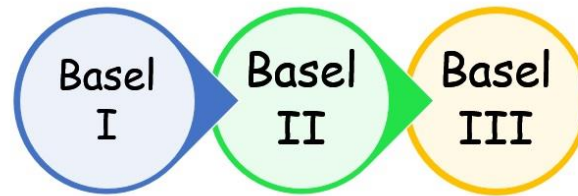
- **Basel Committee on Banking Supervision (BCBS)** was established by the central bank Governors of the **G10 countries** in **1974** in the aftermath of serious disturbances in international currency and banking markets (notably the failure of Bankhaus Herstatt in West Germany).
- Current network: 45 institutions from **28 countries/jurisdictions**
- The Committee, headquartered at the **Bank for International Settlements (BIS) in Basel**, Switzerland.

Establishment of Basel Committee on Banking Supervision

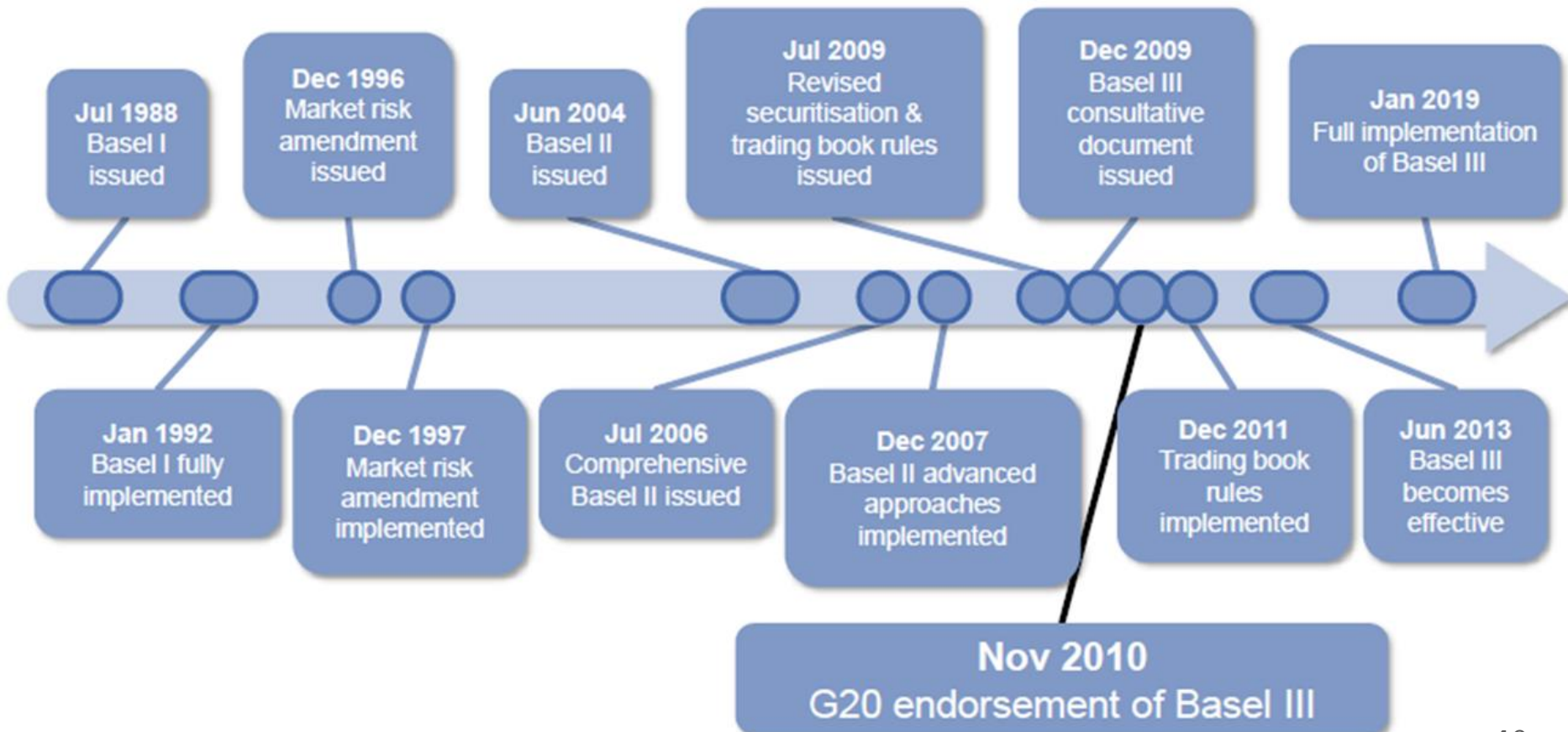


- Its objective was to **enhance financial stability** by improving the quality of banking supervision worldwide, and to serve as a forum for regular cooperation between its member countries on banking supervisory matters.
- Formulates broad supervisory standards and guidelines and recommends statements of best practice.
- Does not possess any formal supranational supervisory authority.
- First major result was the **1988 Basel Capital Accord**.

Evolution of Basel Framework



Thirty Years of Banking Capital Regulation



Bank Safety & Soundness

Capital adequacy requirement

- i) provides a buffer against bank losses
- ii) protects creditors in the event of bank fails
- iii) creates disincentive for excessive risk taking

Why Basel I was Needed?

The reason was to create a level playing field for “internationally active banks”.

- ⇒ Banks from different countries competing for the same loans would have to set aside roughly the same amount of capital on the loans.
- ⇒ Basel I **incorporates risk into the calculation of capital requirements** to **prevent** international banks from building business volume **without adequate capital backing**.

Credit Risk: Risk that a borrower or counterparty may fail to fulfil an obligation

Basel I

Market Risk: Risk that arises from adverse price movements in all market risk-sensitive financial instruments

- In 1988, BCBS introduced capital measurement system called Basel capital accord (also called as Basel I).
- It focused almost entirely on credit risk. Only two risks: **Credit Risk (1988) & Market Risk (1996)**.
- It defined capital and structure of risk weights for banks.
- One size fits all. **Fixed risk weights** on all assets **irrespective of quality of assets**.
- Emphasis only on **minimum capital requirement**. The minimum capital requirement was fixed at 8% of risk weighed assets (RWA).

Basel I

- **Capital Adequacy Ratio (CAR)**

$$\begin{aligned} &= \frac{\text{Capital}}{\text{Risk Weighted Assets}} \\ &= \frac{\text{Tier 1 Capital} + \text{Tier 2 Capital} - \text{Deductible Items}}{\text{Risk Weighted Assets for Credit \& Market Risk}} \geq 8\% \end{aligned}$$

- Credit risk was divided into 5 categories: **0%, 10%, 20%, 50%, and 100%**
 - E.g. Commercial loans were assigned to the 100% risk weight category.
- To calculate required capital, a bank would multiply the assets in each risk category by the category's risk weight and then multiply the result by 8%
=> A \$100 commercial loan would be multiplied by 100% and then by 8%, resulting in a capital requirement of \$8.

Critique of Basel I

Basel-I accord was criticized

- i) for taking a too simplistic approach for setting credit risk weights
 - Risk weights were not based on the actual risk of each asset
 - Risk weights did not flow from any particular insolvency probability standard, and were for the most part, arbitrary.
- ii) for ignoring other types of risk
 - For example, Operational Risk
 - Operational Risk: Risk of direct or indirect loss resulting from inadequate or failed internal processes, staff and systems or from external events.

Basel II

- Three Risks: **Credit risk, market risk and operational risk**
- Risk weights to be **determined on quality of assets.**
- **Three Pillars**



Basel II – Pillar 1:

Minimum Capital Requirements

- Recall, Basel I

Capital Adequacy Ratio (CAR)

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- Basel II

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Basel II

Credit Risk Measurement

- 1) **Standardized Approach (STC Approach):** Using external rating to determine risk weights
- 2) **Internal Ratings Based Approach (IRB Approach)**
 - a) **Foundation IRB (F-IRB):** Bank computes only the probability of default (PD). For retail exposures, bank computes all risk components.
 - b) **Advanced IRB(A-IRB):** Bank computes all risk components

Definitions

- **Default definition:** 90+ days past due, charge-off, bankruptcy
- **Probability of Default (PD):** The probability of a borrower to default over a one-year period.
- **Loss Given Default (LGD):** The percentage of exposure the bank might lose in case the borrower default.
- **Exposure At Default (EAD):** The amount outstanding (drawn amount + likely future drawdown of yet undrawn lines) in case the borrower defaults
- **Expected Loss (EL):**
 - $EL \text{ (in currency amounts)} = PD \times LGD \times EAD$
 - $EL \text{ (in \%)} = PD \times LGD$

Illustration: EL

Assume we are calculating EL amount for this application...

Type: Residential Mortgage Loan (Retail exposure)

Exposure at Default (Loan Amount*): HK\$5,000,000

Probability of Default (PD): 1%

Loss Given Default (LGD): 10%

Expected Loss Amount = $PD \times LGD \times EAD = \$5,000$

Risk Weighted Asset?

Correlation

$$R = 0.15$$

Capital Requirement

$$K = LGD * \left[N \left(\sqrt{\frac{1}{1-R}} * G(PD) + \sqrt{\frac{R}{1-R}} * G(0.999) \right) - PD \right]$$

Risk-weighted assets

$$RWA = K * 12.5 * EAD$$

Standard normal
distribution $N()$

Inverse of
standard normal
distribution $G()$

For residential
mortgage only

Basel II

Market Risk Measurement

- 1) Standardized Approach
- 2) Internal Model Approach

Operational Risk Measurement

- 1) Basic Indicator Approach
- 2) Standardized Approach
- 3) Internal Measurement Approach

Basel II – Pillar 2: Supervisory Review

- Banks should have a **process for assessing** their overall capital adequacy and strategy for maintaining capital levels.
- Many banks have formulated Internal adequacy assessment process (ICAAP).
- Supervisors should review and evaluate banks' internal capital adequacy assessment and strategies.
- Supervisors should expect banks to operate above the minimum capital ratios and should have the ability to require banks to hold capital in excess of the minimum.
- Supervisors should seek to intervene at an early stage to prevent capital from failing below minimum level.

Basel II – Pillar 3: Market Discipline

- **Disclosure** requirements allow market participants to assess key information related to:-
 - Capital Structure
 - Capital Adequacy Ratio
 - Risk Exposure
 - Risk Assessment Process
- Both quantitative and qualitative disclosures
- Some disclosures are required in order to use the more advanced Pillar 1 approaches.

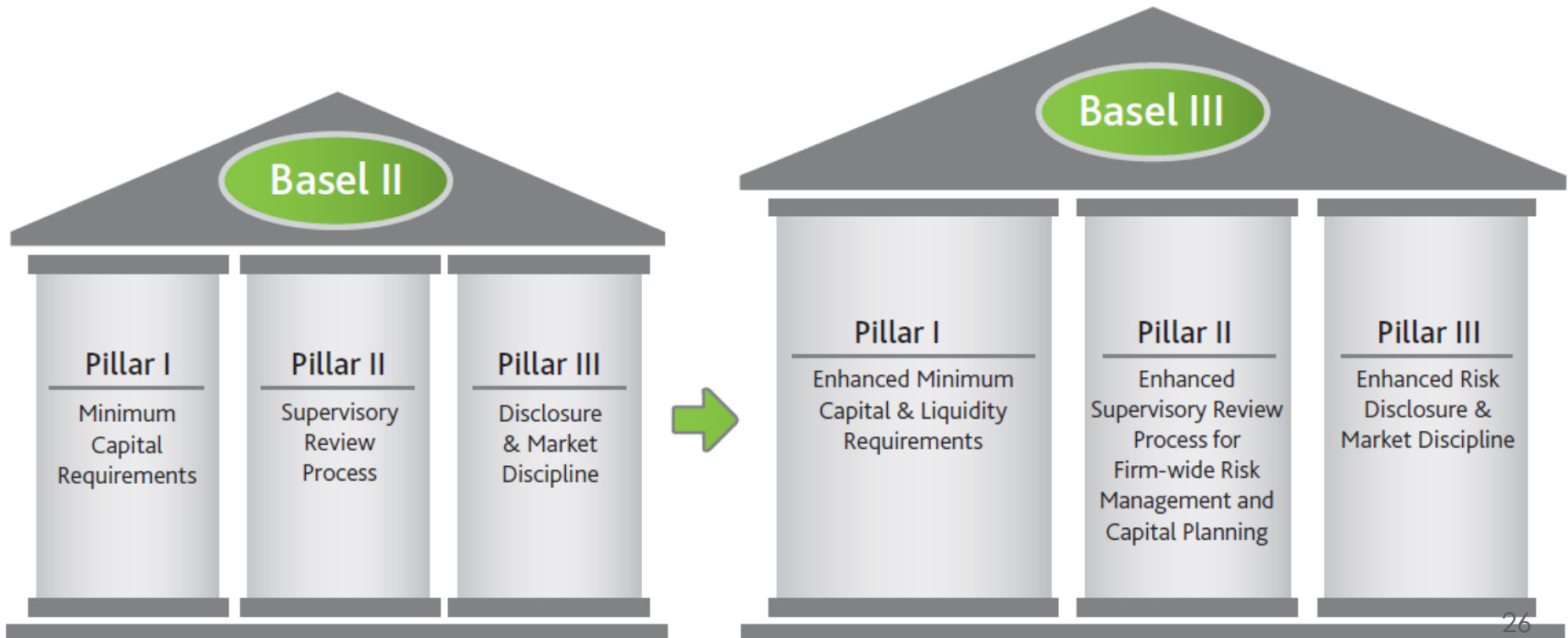
Problems with Basel II revealed by 2007 financial crisis

- Supervisory capital ratios were not sufficiently forward looking and based on credit risk estimated from current bank accounts.
- It led to the understatement of provisions for loan losses and to overstatement of bank asset values and bank capital (Furlong and Knight, 24 May 2010).
- Capital regulation estimated the bank risks under the normal economic conditions and did not consider the cyclicity of the economy.
- Systemically important financial institutions were exposed to greater risks due to the interconnectedness of their transactions.

Basel III

Covers 3 major areas:

- Additional requirements of **Capital**
- A global **Liquidity** standard
- Additional non-risk weighted **Leverage** Ratio



Basel III – Additional Requirements of Capital

- Increase of minimum requirement
- Capital conservation buffer
- Countercyclical capital buffer
- Enhanced quality of capital base
- Additional capital charge for credit risk
- Additional capital charge for market risk

In short, more capital the Bank needs to reserve.

Basel III –Liquidity & Leverage Standard

- **Liquidity Coverage Ratio (LCR)**

$$= \frac{\text{Stock of high quality liquid assets}}{\text{Total net cash outflows over the next 30 calendar days}} \geq 100\%$$

- **Net Stable Funding Ratio (NSFR)**

$$= \frac{\text{Available amount of stable funding (ASF)}}{\text{Required amount of stable funding (RSF)}} \geq 100\%$$

- **Leverage Ratio**

$$= \frac{\text{Tier 1 Capital}}{\text{Non-Risk Weighted Assets}} \geq 3\%$$

Its purpose is to control the use of a highly geared capital structure for expansion.

Hong Kong Monetary Authority



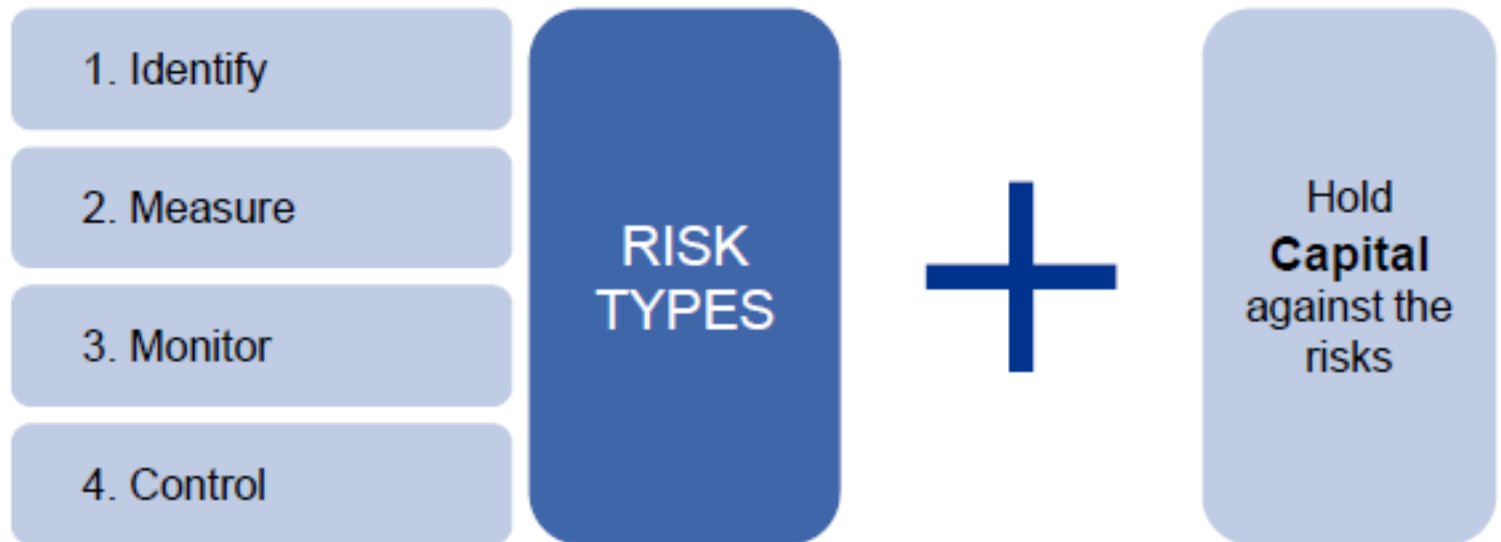
HONG KONG MONETARY AUTHORITY
香港金融管理局

- The Hong Kong Monetary Authority (HKMA) was established on 1 April 1993 by merging the Office of the Exchange Fund with the Office of the Commissioner of Banking.
- Its main functions and responsibilities are governed by the Exchange Fund Ordinance and the Banking Ordinance and it reports to the Financial Secretary.
- The HKMA is the government authority in Hong Kong responsible for maintaining monetary and banking stability.

HKMA's Expectations on Banks

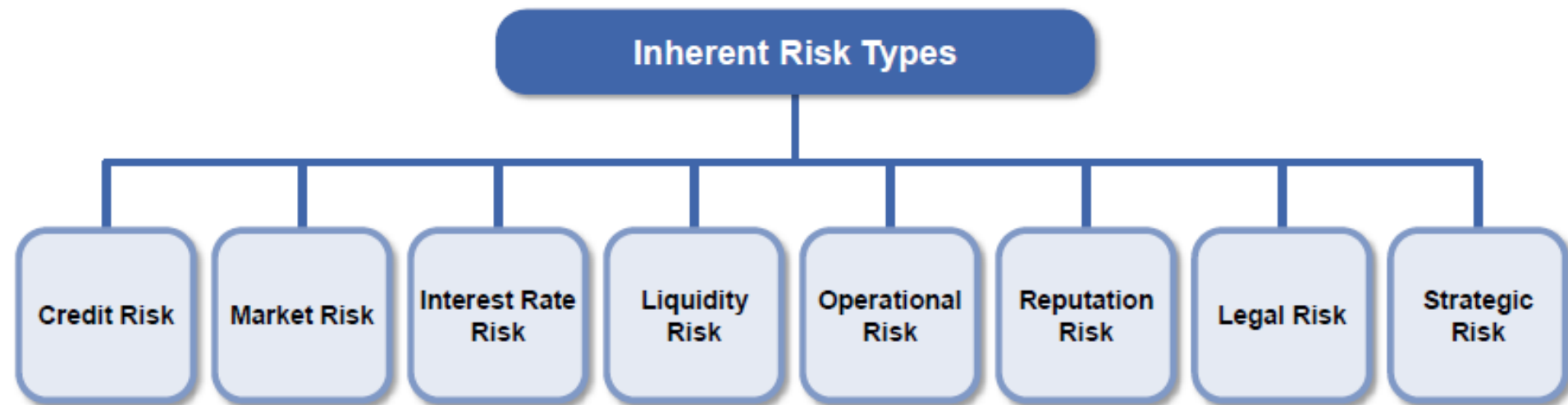


HKMA expects Banks to have a **comprehensive risk management system** to:



The risk management system should be established according to your Bank's size and complexity of operations so that the risks undertaken are well managed within your Bank's risk appetite.

Inherent Risks Identified by HKMA



HKMA's Definition of Each Risk Type

Risk type	Definition	Assessment Factors
Credit Risk	Risk that a borrower or counterparty may fail to fulfil an obligation.	<ul style="list-style-type: none"> • Probability of default by the counterparty, obligor or issuer • Exposure or financial impact on the bank in the event of default
Market Risk	Risk to a bank's financial condition resulting from adverse movements in market rates or prices such as foreign exchange rates, commodity or equity prices.	<ul style="list-style-type: none"> • Interaction between market volatility and business strategy
Interest Rate Risk (in Banking Book)	Risk to a bank's financial condition resulting from adverse movements in interest rates.	<ul style="list-style-type: none"> • Levels of re-pricing risk, basis risk, options risk and yield curve risk • Funding strategy with respect to interest rate movements and the impact of the overall business strategy on interest rate risk
Liquidity Risk	Risk that a bank may be unable to meet its obligations as they fall due	<p>Caused by:</p> <ul style="list-style-type: none"> • funding liquidity risk (i.e. bank's inability to liquidate assets or to obtain funding to meet its obligations) • market liquidity risk (i.e. where the bank cannot easily unwind or offset specific exposures without lowering market prices significantly).

HKMA's Definition of Each Risk Type

Risk type	Definition	Assessment Factors
Operational Risk	Risk of direct or indirect loss resulting from inadequate or failed internal processes, staff and systems or from external events.	<ul style="list-style-type: none"> • Products: maturity of the product in the market, the need for significant fund movements, the impact of a breakdown in segregation of duties and the level of complexity and innovation in the market place • AI-related: quality of the audit function and programme, volume of transactions in relation to systems development and capacity, complexity of the processing environment and level of manual intervention required to process transactions
Reputation Risk	Potential that negative publicity regarding an AI's business practices, whether true or not, will cause a decline in the customer base or lead to costly litigation or revenue reductions.	<ul style="list-style-type: none"> • Market rumours or public perceptions
Legal Risk	Risk arising from the potential that unenforceable contracts, lawsuits or adverse judgments may disrupt or otherwise negatively affect the operations or financial condition of an AI.	<p>Refer to assessment factors under 'Operational Risk'</p> <p><i>Note: Legal Risk is part of Operational Risk per Supervisory Policy Manual CA-G-5: Supervisory Review Process (consistent with Basel's definition of Operational Risk).</i></p>
Strategic Risk	Risk of current and prospective impacts on earnings, capital, reputation or standing arising from poor business decisions, improper implementation of decisions or lack of response to industry, economic or technological changes.	<ul style="list-style-type: none"> • Compatibility of an organisation's strategic goals, the business strategies developed to achieve these goals, the resources deployed to meet these goals and the quality of implementation

Case Illustration for Risk Type

**What
risks are
these?**

1

A customer is unable to pay back its loan.

2

The bank's have mortgage loans priced at a different rate to that for its funding.

3

A customer complained about bad customer service by the bank in its twitter.

4

One of the branches of the bank is unable to operate after facing severe damage by fire accident.

5

The bank is unable to successfully implement its joint venture deal.

6

The foreign exchange rate moved against the favour of the bank.

7

An employee filed a legal claim against the bank as he feels that the bank has failed to protect his rights.

8

The top 10 largest depositors withdraw their money at the same time.

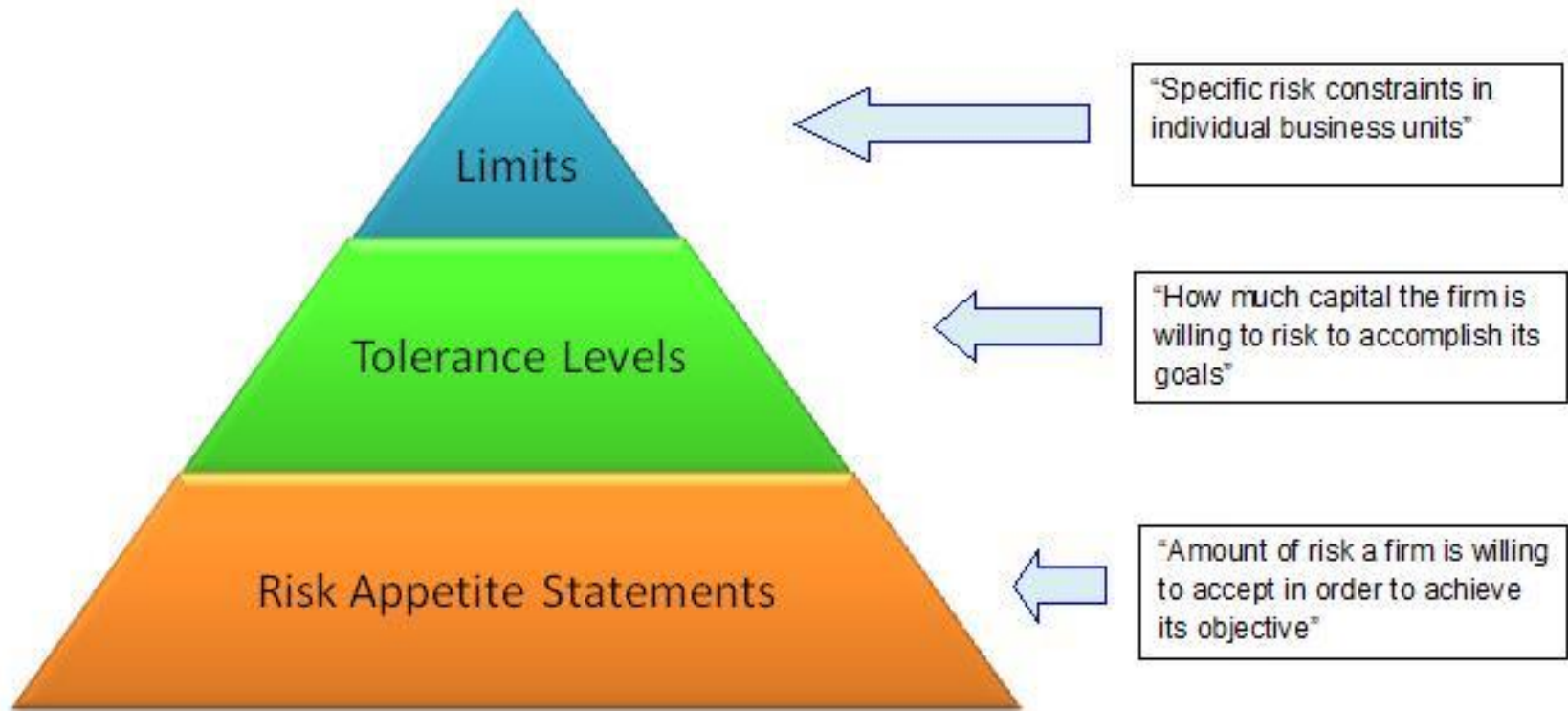
Case Illustration for Risk Type

1	Credit Risk	A customer is unable to pay back its loan.
2	Interest Rate Risk	The bank's have mortgage loans priced at a different rate to that for its funding.
3	Reputation Risk	A customer complained about bad customer service by the bank in its twitter.
4	Operational Risk	One of the branches of the bank is unable to operate after facing severe damage by fire accident.
5	Strategic Risk	The bank is unable to successfully implement its joint venture deal.
6	Market Risk	The foreign exchange rate moved against the favour of the bank.
7	Legal Risk	An employee filed a legal claim against the bank as he feels that the bank has failed to protect his rights.
8	Liquidity Risk	The top 10 largest depositors withdraw their money at the same time.

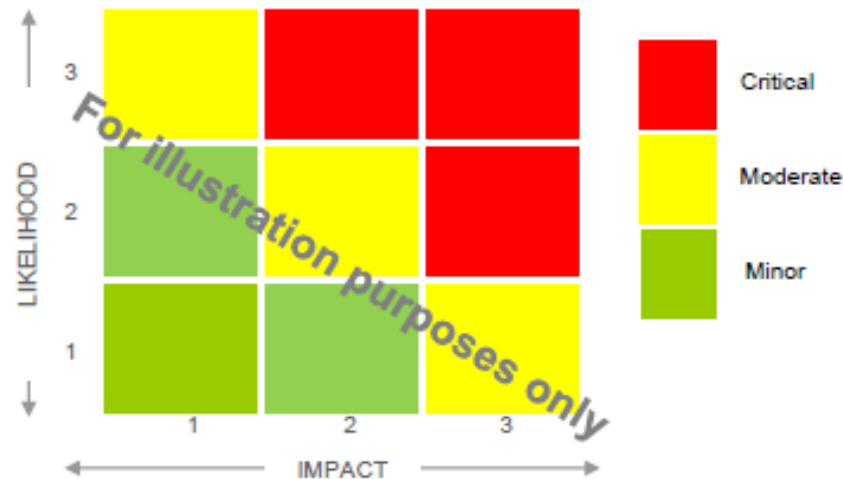
Additional Info FYR.

- Risk Appetite Statements?
- Risk Assessment Tool?

Risk Appetite Statement(RAS)



Common Risk Assessment Tool: Heat Map

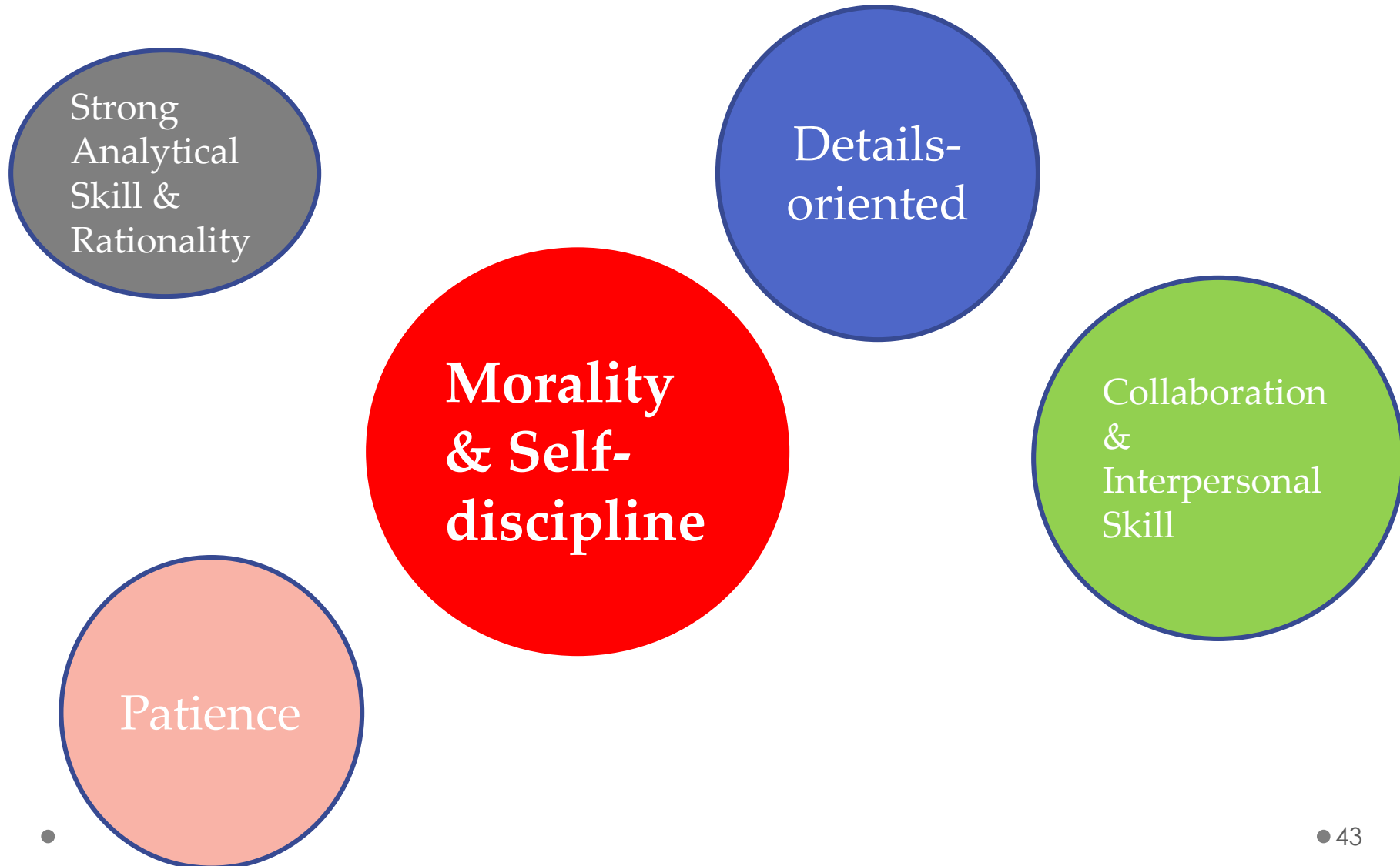



Impact can be financial & non-financial

Likelihood Rating	Description
3	Almost Certain - High probability of recurring within 12 months
2	Probable - Likely to occur in a 1-2 year timeframe.
1	Rare - Not likely to occur more than once in 2-3 years.

Impact Rating	Description
3	Severe- Serious undesirable impact
2	Moderate – Significant undesirable impact
1	Negligible – No noticeable impact

Personality

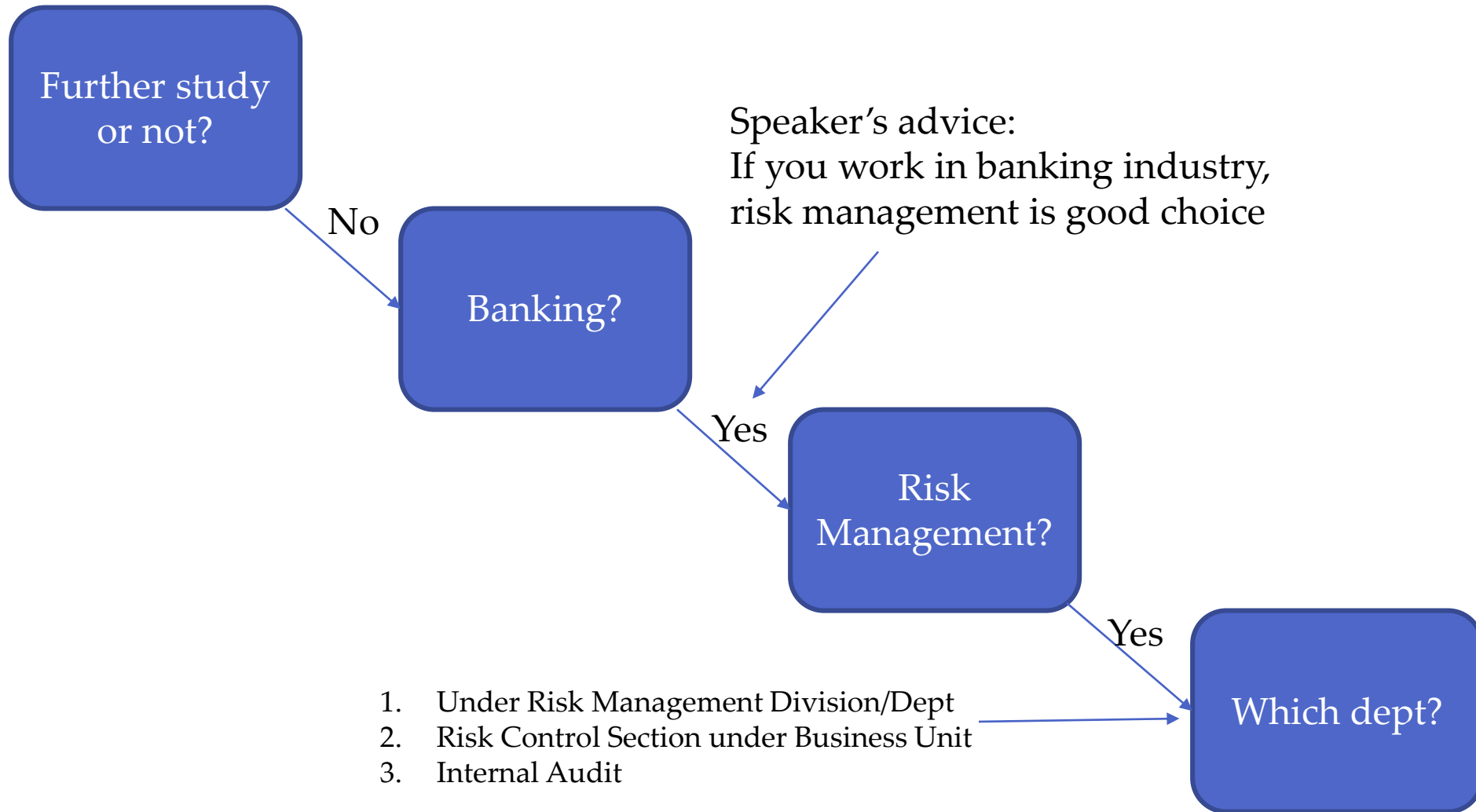


A person is seen from behind, holding a large, glowing paper lantern. The lantern is lit from within, casting a warm orange light. The person's hand is visible, holding the rim of the lantern. The background is a dark, cloudy night sky. Another lantern is visible in the distance to the right.

...

**Where do you want to be
X years from now?**

Opportunity? Think about this first...



Do and Don't

<https://www.transunion.hk>

DO

- **TU:** Maintain a good credit record !!!
- **CV:** Customize your CV according to the job specification
- **Internship**
- **Certificate:** FRM, CFA, SAS, ...
- **Skill:** Excel VBA, SAS, Bloomberg, ...

Especially if you apply job at Market Risk Dept

Especially if you apply job at Credit Risk Dept

DON'T

- Don't be too "jumpy" ...

Reference Material

BIS

<http://www.bis.org/>

- > Select "Research & publications"
- > Select "Committee publications"
- > "Basel Committee on Banking Supervision"

"Basel II Bible"
<http://www.bis.org/publ/bcbs128.pdf>

"Basel III Bible"
<http://www.bis.org/publ/bcbs189.pdf>

HKMA

<http://www.hkma.gov.hk>

- IRB Model Validation (CA-G-4)
- Market Risk (CA-G-3)
- Interest Rate Risk Management (IR-1)
- Liquidity Risk (LM-1)
- Operational Risk (OR-1)
- Stress Testing (IC-5)
- CAR (MA(BS)3)

Annual reports of banks

Many information can be found in BIS and HKMA websites. Let's download and read the documents first ! ☺

End

Thank you !

Wishing you a successful career ahead~~



Work hard! Don't quit! Move forward!