

Capital

July 2012

***Asia Pacific Economic Cooperation Forum
– Financial Regulators Training Initiative***

Capital Adequacy

- quality: what kind
quantity: how much
- Summarizes the level, quality, and adequacy of capital relative to the current (and prospective) financial condition of the institution.
 - Considers prospective / emerging risks.
 - Heavily influenced by asset quality, but considers all risks and risk management.
 - Reflects growth, strategy, management, and ability to get new capital.
 - “Capital supports risk-taking activities.”

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Objectives

- Quantity and quality of capital
- Management of capital: capital vs. risk
- Management of capital: capital plans and risk appetite (including growth & innovation)
- Synthesize information and determine preliminary conclusion for capital

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Quantity and Quality of Capital

Amount and type...

- Risk-based capital ratio
 - Risk-based capital (Tier 1 + Tier 2) / Risk-weighted Assets
 - Regulatory minimum percentages [new BCP 16]
- Minimum capital funds why? depends on activities and location etc. makesure every bank has shareholders.
- Other capital measures
 - Leverage capital: Tier 1 / Average Total Assets (50 million USD)
 - Tier 1 RBC: Tier 1 / Risk-weighted Assets
 - ... Common Equity Tier 1 / Risk-weighted Assets

Why minimum capital funds for a new bank are required?

depends on activities and location etc. makesure every bank has shareholders. (50 million USD)

Base II requirement

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has great absorption at capacity

Capital Management (1/3)

Policies and procedures:

- Is capital sufficient for current risk? *and future*
- All business lines and risks identified and addressed by policy or practice? (a few examples)
 - Credit risks
 - Market risks
 - Liquidity risk
 - Growth plans
 - Provisions / Reserves
 - Open position limits
 - Min/Max levels / Credit lines
 - All planned activities
- Most internal limits should be based on capital!

[new BCP 15,17,19,21-25]

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模型是否合適
改變

Capital Management (2/3)

Internal capital measurement & monitoring

- Capital levels: minimum, target, maximum
- Measure and monitor all identified risks
- MIS reported to / reviewed by board and management

Ability to maintain satisfactory capital:

- Earnings retention (versus dividends)
- Plan and ability to augment capital if needed

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→ Internal Plan should be reviewed by Supervisors (Basel III)

Capital Management (3/3)

- Basel II capital accord
 - Pillar 1: minimum requirements
 - Pillar 2: supervisory review process
 - Pillar 3: market discipline (*disclosure*)
- Bank management responsibilities under Pillar 2: **“Have a valid process to ensure the bank has enough capital!”** → **Internal Capital Adequacy Assessment Process (ICAAP)**

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Current and Prospective Risks

- Planning and budgeting includes capital
 - Growth
 - Systems
 - Product lines
 - Innovation
 - Macroprudential
 - Regulatory environment
- Does the bank have enough capital relative to growth plans?
- What are bank’s sources for new capital? And are those sources reliable?

✓ Capital supported
 Risk activities
 large
 ✓ Why bigger banks require
 more capital?
 - more activities
 - more hazardous
 - if they fail, they
 have to decide who
 to support them
 higher level of capital!

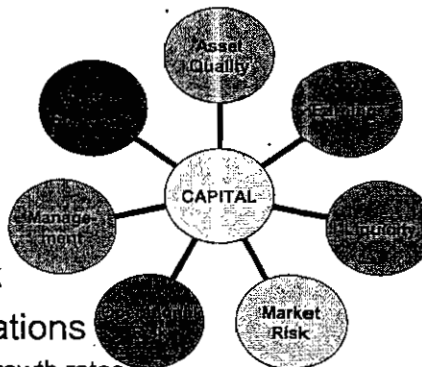
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Evaluating Capital

- Capital ratios
- Asset Quality
- Earnings
- Operational risk
- Liquidity risk
- Sensitivity to market risk
- Other relevant considerations
 - Open positions
 - Internal standards
 - Systemic importance
 - Growth rates
 - Macprudential considerations...
 - Economic conditions



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Summarizing Capital

Does the bank have sufficient capital?

- Preliminary conclusion with support
- Consider risks and risk management
- Capital ratios and trends
- Earnings (and dividend payouts)
- Equity growth vs. risk appetite
- Management of capital
- Plans to maintain or increase capital
- Macroprudential considerations

bank's plans?

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Liquidity Analysis: Indicators, Techniques, and Contingency Funding

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Asia Pacific Economic Cooperation Forum – Financial
Regulators Training Initiative
Bank Analysis and Supervision School
Manila, Philippines

Liquidity Definition

Liquidity refers to the ability of a bank to meet the demands of its counterparties and customers for:

- *Withdrawals from deposits*
- *Repayment of other liabilities*
- *Funding of new loans* 信用状
- *Settlement of letters of credit*
- *Performance on other off-balance sheet obligations, such as guarantees*



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Liquidity

Sources of Liquidity

- Drawdowns of liquid assets
- Repayment of loans
- Sales of securities and other assets
- Attraction of new deposits and other financial liabilities, and additions to existing deposits

↑
good customer service



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Liquid Assets (1 of 4)

What do we mean?

- The **liquidity** of an asset is the ease with which this asset can be used to make payments or advance funds, without having to be converted to another kind of asset.
- **All** assets have a **degree** of liquidity and can be ranked.



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Liquid Assets (2 of 4)



High degree of liquidity

- Cash (banknotes and coins)
- Current account at the central bank
- Correspondent accounts at other banks
- Funds placed on overnight deposit with other banks (Federal Funds in the U.S., sometimes called "money at call and on short notice" in other countries)

高流动性

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Liquid Assets (3 of 4)

Medium degree of liquidity

- Time deposits at other financial institutions
- Securities that are traded on an active, deep market (especially government securities)

ex. G.M. (General Motors)



會計上對 securities 之分類，
並非完全以「流动性」為分類目的

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Liquid Assets (4 of 4)



Low degree of liquidity

- Securities not traded on active, deep market or not traded at all
- Loans *not easily be sold.*
- Real estate held for investment (if permitted)
- Seized collateral
- Fixed assets

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Liquidity Risk – and Its Avoidance

- **Liquidity risk** is the risk arising from the inability to meet obligations on time without incurring unacceptable losses.
- Banks would not need a liquidity policy if all assets were highly-liquid assets.
- What are the **drawbacks** to this approach?
 - Banks lose their role as intermediaries
 - Very little profit could be earned by following this approach



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Indicators of Liquidity Position

Question to ask: Does this bank have enough liquidity? Are there measurable characteristics that either increase or decrease the probability that the bank will have a liquidity crisis?



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Answer: We should distinguish between “background” and “foreground” liquidity indicators

- **Background:** indicators requiring infrequent monitoring *foundation sticky*
- **Foreground:** indicators requiring frequent monitoring

Background Indicators of Liquidity Position (1 of 2)

Background indicators are those that make a bank more or less vulnerable to a liquidity crisis, but do not or cannot change rapidly and need to be monitored only monthly or quarterly. Banks sometimes apply limits.

Examples:

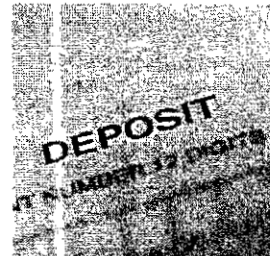
- **Credit-deposit ratio.** Useful as a “check” on unacceptably fast loan growth.
- **“Small” deposits as percentage of total deposits.** The higher the ratio, the more stable the deposit base. *generally stable, good liability*
- **Average size of “large” deposit accounts.** The lower the amount, the more stable the deposit base.

How to define small or large?

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Background Indicators of Liquidity Position (2 of 2)

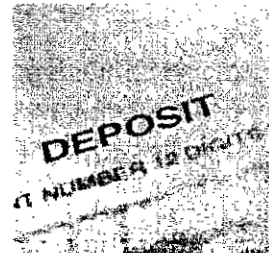
Examples:

- **Concentration of financial liabilities:** funds can be supplied by other financial institutions, by corporations and other institutions, by governmental entities, or by individuals. The greater the dependence on a single supplier of funds – or group of similar suppliers – the more vulnerable the bank is to a liquidity crisis.
 - Ratio of top 5 or top 10 suppliers to total financial liabilities
 - Herfindahl-Hirschman Index (HHI): sum of the squares of the percentages of each supplier of total financial liabilities – considered to be concentrated if over 1,800
- **Net Stable Funds Ratio (Basel III – more later)**

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Banks need to diversify sources of deposit!

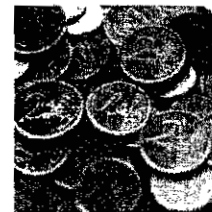
Foreground Indicators of Liquidity Position (1 of 5)

Foreground indicators are those that make a bank more or less vulnerable to a liquidity crisis and **can change rapidly and require frequent monitoring – daily or weekly**. Limits are often placed on these indicators, and they are often used as regulatory requirements.



Examples:

- **Ratios of liquid assets (various measures) to liabilities (various measures) – with a lower limit**
 - Many regulatory requirements are stated in this way
 - What should be in the numerator? What should be in the denominator?
 - Numerator represents the *availability* of liquid assets; denominator represents the *need*.
 - Should certain off-balance sheet items be in the denominator? Which ones?



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Foreground Indicators of Liquidity Position (2 of 5)

Examples:

- Ability of liquid assets to cover liquidity gaps (Liquidity Coverage Ratio from Basel III – more later)
- “Large” deposits as a percentage of total deposits (the higher the ratio, the less stable)
- “Volatile” liabilities as a percentage of total financial liabilities (the higher the ratio, the less stable)
- Funds obtained from other financial institutions as a percentage of total financial liabilities (dependence on “interbank” market – the higher the ratio, the less stable)



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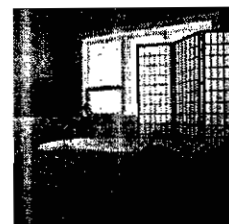
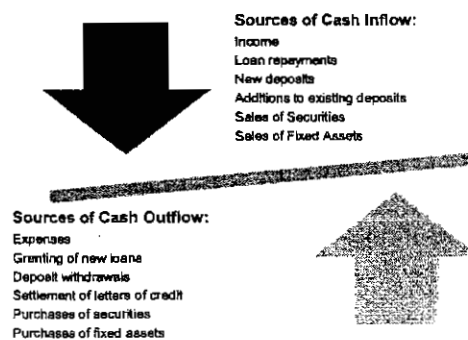
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Foreground Indicators of Liquidity Position (3 of 5)

Examples:

- Cash flow mismatches (excess of projected cash outflows over cash inflows)



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Foreground Indicators of Liquidity Position (4 of 5)

Examples:

- Cash flow mismatches (excess of projected cash outflows over cash inflows)



	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
IN	30	50	20	30	60	10	70	60	60	20	30	60
OUT	50	30	10	50	20	60	30	20	60	70	50	30
NET	-20	20	10	-20	40	-50	40	30	-10	-50	-20	30
CUM	-20	0	10	-10	30	-20	20	50	40	-10	-30	0



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Foreground Indicators of Liquidity Position (5 of 5)

- Banks should set limits on the monthly and cumulative outflows.
- *The use of cash flow projections is mandatory!*



Cash Flow	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
IN	30	50	20	30	60	10	70	60	60	20	30	60
OUT	50	30	10	50	20	60	30	20	60	70	50	30
NET	-20	20	10	-20	40	-50	40	30	-10	-50	-20	30
CUM	-20	0	10	-10	30	-20	20	50	40	-10	-30	0



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What to do with indicators – both banks and banking supervision personnel

- Monitor historical trends
- Establish a range of preferred values
- Set a limit and ENFORCE the limit
- Compare the subject bank to similar banks (peer group comparison)



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The Basel III Indicators: Net Stable Funds Ratio and Liquidity Coverage Ratio

- Revealed in December 2010, with a phase-in envisioned
 - LCR implemented in January 2015
 - NSFR implemented in January 2018
- NSFR is a “background indicator” – available stable funding must \geq need for stable funding
- LCR is a “foreground indicator” – high-quality liquid assets must \geq projected net cash outflows over next 30 days under stressed scenario



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Net Stable Funds Ratio

NSFR addresses an underlying concern that banks fund long-term, generally illiquid assets with short-term, perhaps volatile, liabilities.

- Ratio is “available stable funding” (ASF) as a percentage of “required stable funding” (RSF).
- ASF measures availability, RSF need
- The standard is met if $ASF/RSF = 1$ or 100%
- Time horizon is one year
- Assumes a stressed environment : some liabilities won't be available



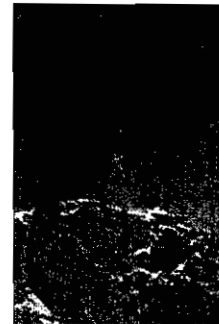
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Net Stable Funds Ratio: “Available Stable Funding” (simplified)

- Amounts included in ASF all come from the “liabilities and capital” side of the balance sheet, multiplied by coefficients indicating their stability.
- The higher the stability, the higher the coefficient.
 - Regulatory capital (100 percent)
 - Liabilities with a remaining maturity of one year or more (100 percent)
 - Current, savings, and time deposits of natural persons or small business customers in “small” accounts (90 percent)
 - The above categories in “large” accounts (80 percent)
 - All other monetary liabilities, except amounts owed to financial institutions (50 percent)
 - Amounts owed to financial institutions (0 percent)



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Net Stable Funds Ratio: “Required Stable Funding” (simplified)

- Amounts included in RSF are assets and off-balance sheet items with coefficients giving the degree to which they are illiquid or long-term, and therefore require stable funding.
- The more long-term or illiquid, the higher the coefficient.
- Assumes that individuals and small businesses will be *less* likely to repay their loans due within a year than corporations will, and therefore require *more* stable funding.



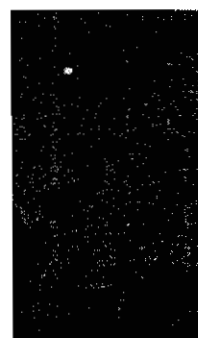
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Net Stable Funds Ratio: Required Stable Funding (simplified)

- Components of RSF
 - All loans and debt securities with residual maturity of one year or more (100 percent)
 - Debt securities, regardless of maturity, issued by other financial institutions (100 percent)
 - Fixed assets (100 percent)
 - Non-traded equity securities (100 percent)
 - Loans to individuals or small businesses with a residual maturity less than one year (85 percent)
 - Residential mortgages, regardless of maturity, that qualify for the 35 percent risk weight under the Basel II Standardized Approach (65 percent)
 - Loans to non-financial clients, other than individuals or small businesses, with a residual maturity of less than one year (50 percent)
 - Publicly-traded equity securities (50 percent)
 - Loans to, and deposits in, domestic financial institutions (20 percent)
 - Loans to, and deposits in, financial institutions abroad (0 percent)
 - Cash on hand and claims on the central bank (0 percent)
 - All other assets not mentioned above (100 percent)



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Liquidity Coverage Ratio (1 of 2)

LCR addresses an underlying concern that the “liquid” assets banks have do not adequately support the bank in a crisis situation.

- Banks should always have a stock of ready liquid assets on hand to meet their requirements over the next month.
- LCR measures need for liquid assets in a *stressed* environment, in which deposits and other sources of funds (both secured and unsecured) run off, to various extents, and unused credit facilities are also drawn down in various magnitudes.
- Put differently, the LCR is a stress test translated into a regulatory mandate.



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Liquidity Coverage Ratio (2 of 2)

Calculation of LCR requires three quantities to be defined:

- A. Total value of stock of highly liquid assets
- B. Total cash outflows, next 30 days (stressed scenario)
- C. Total cash inflows, next 30 days (stressed scenario). Capped at 75 percent of B.

Requirement is met if $A > (B - C)$, or $A/(B - C) \geq 100$ percent



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LCR: Stock of Highly-Liquid Assets (simplified definition)

Highly-liquid assets include:

- Cash on hand
- Deposits in the central bank (denominated in either domestic or foreign currency)
- Government securities that are eligible collateral in repurchase agreements with the central bank, included at estimated market value with the standard repo "haircut."
- **Note: if there is not an active secondary market for government securities, they are only eligible if central bank is explicitly committed to purchase them for resale even under extremely stressed conditions!**



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LCR: Total cash outflows, next 30 days (simplified definition)

- Includes actual, contractual outflows over the next 30 days (*except for operating expenses*)
- *Plus: assumed outflows under a stressed scenario*
- Assumed outflows use *balance sheet liability and off-balance sheet categories*, multiplied by a "run-off" factor which is the assumed percentage of the liability that will be withdrawn (or refused to be rolled over) under stressed conditions. OBS run-off factors are assumed percentages where bank will receive a demand to fund under stressed conditions.
- For a bank, it is advantageous to have liabilities and OBS with low run-off factors.



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LCR: Total cash outflows, next 30 days (simplified definition, 1 of 2)

LCR cash outflow liability and off-balance sheet categories, with sample run-off factors (regulatory authorities can set their own):

- Current and savings deposits of individuals or small business customers in small accounts (5 percent)
- Time deposits of individuals or small business customers in small accounts with more than 30 days remaining until maturity and significant early withdrawal penalty (0 percent)
- The above category with 30 days or fewer remaining until maturity, or no significant early withdrawal penalty (5 percent)
- The above three categories in large accounts (10 percent)
- The above four categories in accounts held by all other entities except financial institutions (75 percent)
- Accounts held by financial institutions, if unsecured (100 percent)



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LCR: Total cash outflows, next 30 days (simplified definition, 2 of 2)

LCR cash outflow liability and off-balance sheet categories, with sample run-off factors (regulatory authorities can set their own):

- Secured funding backed by high-liquid assets (0 percent)
- Secured funding backed by assets that are not considered high-liquid assets, if central bank or government is supplying the funds (25 percent)
- The above category if other than central bank or government is supplying the funds (100 percent)
- All other monetary liabilities that do not fit into one of the above categories (75 percent)
- Undrawn portion of lines of credit to individuals and small business customers (5 percent)
- Undrawn portion of lines of credit to other customers (10 percent)
- Amounts outstanding of commercial letters of credit (100 percent)
- Amounts outstanding of guarantees, standby letters of credit, performance bonds, bid bonds, and similar instruments (20 percent)
- All contractual cash outflows within next 30 days (100 percent)



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LCR: Total cash inflows, next 30 days (simplified definition, 1 of 3)

Assumptions on cash inflows are more complicated than for outflows!

- Distinction between financial and non-financial counterparties is very important
- Treatment of financial counterparties is complicated and sometimes counter-intuitive
- In terms of **BORROWING**, bank is assumed **NOT** to be able to draw down **ANY** facilities it may have pre-arranged with other financial institutions
 - Lines of credit
 - Liquidity facilities
 - Other contingent funding facilities
- This provision cuts down on "financial contagion" – risk that liquidity problems at one bank will spread to another bank that needs funds from it
- In terms of **LENDING**, bank is assumed **TO BE ABLE** to receive funds back from other financial institutions ✓



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LCR: Total cash inflows, next 30 days (simplified definition, 2 of 3)

Assumptions on cash inflows are more complicated than for outflows!

- However, in terms of **DEPOSITING**, bank is **NOT EXPECTED** to be able, or have the desire to, withdraw from its accounts that it maintains at other financial institutions for clearing, custody, and cash management purposes

Interbank A or L	Summary of Treatment	Coeff.
Deposit (asset)	No withdrawal possible or desired	10%
Unsecured loan (asset)	Bank will receive all contractual paym.	100%
Secured loan, high liquid collateral (asset)	Bank will "roll over" loan	0%
Secured loan, not high liquid collateral (asset)	Bank will not roll over loan; will receive contractual payments	100%
Deposit or loan (liability)	Other banks will not increase deposits with, or loans to, this bank	NA



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LCR: Total cash inflows, next 30 days (simplified definition, 3 of 3)

Assumptions on cash inflows are more complicated than for outflows!

- *Inflows from contractual loan repayments on loans extended to non-financial customers (individuals, small businesses, corporates):*

50 percent of expected inflows only!

(Justification: these customers will continue to make payments, but there will also be some new lending to them too.)



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Contingency Funding Plans (CFP)

CFP is a necessary component of a liquidity management strategy

- Required by Basel III and many national regulatory authorities
- Necessary for handling unanticipated stressful scenarios that could result in significant erosion of bank-specific or general market liquidity
- Should be updated regularly



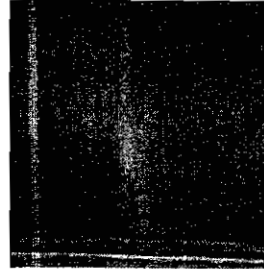
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Essential Components of a CFP (1 of 2)

- Should identify and assess all possible sources of funds in time of crisis.
- Identify all backup facilities, conditions related to their use, and circumstances under which the bank might use them.
- Should require that management periodically test all sources of funds in the CFP.
- Must take into account complications such as notice periods that could affect access to backup funding sources.
- Should distinguish between bank-specific and general market liquidity situations, and have appropriate responses for each.



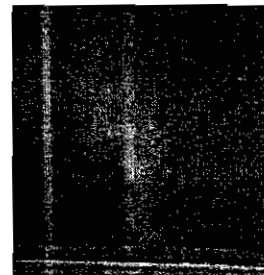
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Essential Components of a CFP (2 of 2)

- Should define responsibilities and decision-making authority so that all personnel understand their roles in a crisis.
- Should identify the *sequence* that the bank will mobilize the identified sources of funds.
- Should address implementation issues such as procedures to obtain emergency funds or release funds from one use to transfer to another.
- Must ensure that there are no constraints, such as blanket liens on all collateral, in event of unexpected contingency.
- Should assess potential for funding erosion (magnitude and rate of outflow) by source of funds under different scenarios.



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Essential Components of a CFP (conclusion)

And finally...

- CFP should assess the potential liquidity risk (market liquidity risk) posed by other activities, such as asset sales or securitization programs.

Exercise: Answer the questions about the attached CFP for Blue Orchid Bank

- What are the strengths of this CFP?
- What are the weaknesses, and how could it be improved?
- Does the funding structure and strategy of BOB expose it to the possibility of a liquidity crisis? How?



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What do good banks do?

Banks that survived the financial crisis that began in 2007 did many things right, but here are some common features...

- They kept their Boards informed. They compiled for the Board and senior management relevant measures of liquidity risk and how the risk levels compared with internal limits.
- They shared information about liquidity risk throughout the organization.
- They took a firm-wide approach. They did not rely on individual business lines to carry it out.
- They charged business lines for the cost of keeping liquidity. For example, they charged the trade finance department for the cost of keeping liquidity to settle commercial letters of credit, and that department passed along the cost to customers.
- They analyzed deposits thoroughly to better understand which ones would be likely to be withdrawn in the event of a firm-specific or generalized run.
- They enforced limits on their liquidity indicators!



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Market Risk and Market Risk Management

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*Asia Pacific Economic Cooperation Forum – Financial
Regulators Training Initiative (APEC-FRTI)*

Market Risk (definition)

Market risk is the risk that movements in market rates, including foreign exchange rates, interest rates, equity and commodity prices will reduce the bank's income, capital, or the value of its portfolios.



Impact of Market Risk

- Market risk can have an impact on:
 - Earnings*, by reducing income or increasing expenses due to adverse movements in market risk factors (e.g. reducing interest income from loan or increasing interest expenses)
 - Economic/Market Value or Price of Assets (a.k.a Price Risk)
 - Ultimately, a loss from decrease in market value will impact earnings when assets are sold at the lower price**

*eventually, will have impact on capital

**except for trading portfolio where mark-to-market losses are recognized even prior to sale



Sources of Market Risk in the Balance Sheet

- Banks take market risk in two main areas of the balance sheet:
 - Trading Book
 - Typically has a short-term time horizon
 - Usually marked-to-market on a daily basis
 - Price risk is more "transparent" within a trading book
 - Banking/Accrual Book
 - Typically has a long-term time horizon
 - The banking book is usually not marked-to-market

Sources of Market Risk

- Interest Rate Risk 
- Foreign Exchange Risk 
- Equity Risk 
- Commodity Risk 

Relationship of Financial Instruments and Market Risk Factors

FX	Interest Rate	Equity	Commodity
Spot	Fixed Income	Shares	Metals, oil, textiles, etc
Forwards	Loans, Deposits, CDs,	Convertible bonds	Commodity futures
Derivatives	Interest Rate Swaps, Derivatives	Derivatives	Derivatives

underlier

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Interest Rate Risk (definition)

Interest rate risk is the inherent risk of adverse effects on earnings or capital arising from movements in interest rates.



Interest Rate Risk Sources

- All interest-bearing assets
- All interest-paying liabilities
- Off-balance sheet items with specific rates
- Market competition



Interest Rate Risk: Identification

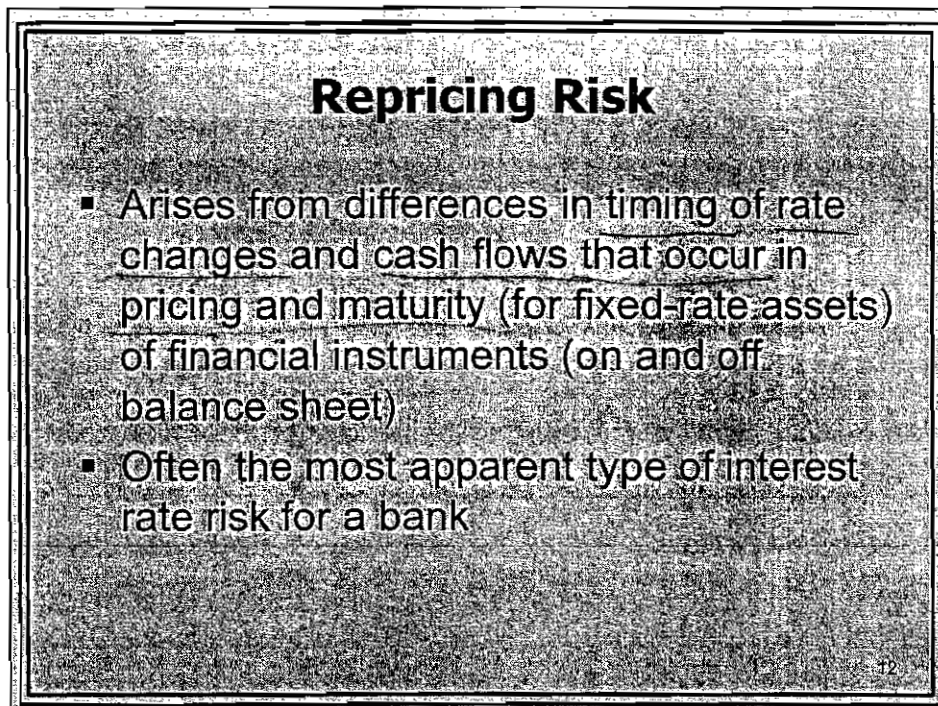
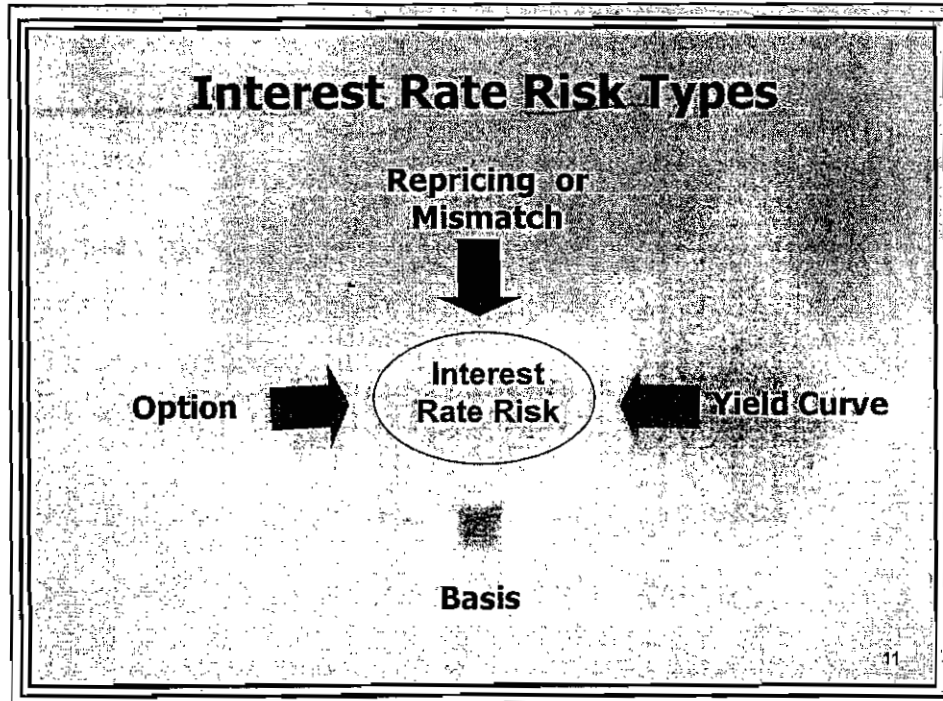


- Interest-earning assets:
 - Due from (interest bearing)
 - Loans
 - Investment securities
- Interest-paying liabilities:
 - Deposits
 - Borrowings

Interest Rate Risk: Identification



- Off-balance sheet items, commitments, guarantees, L/Cs... with stated interest rates
- Repricing relationships of assets and liabilities



Repricing Risk (example)

Base Case : Mar 1		+ 100 basis points(bp) (1%) Sept 1	
Assets	Liabilities	Assets	Liabilities
loans = 90 @ 8% fixed	deposits = 80 @ 6% float	loans = 90 @ 8% fixed	deposits = 80 @ 7% float
fixed assets = 10	<u>Equity</u> capital = 20	fixed assets = 10	<u>Equity</u> capital = 20
NIM = (7.2 - 4.8) = 2.4		NIM = (7.2 - 5.6) = 1.6	

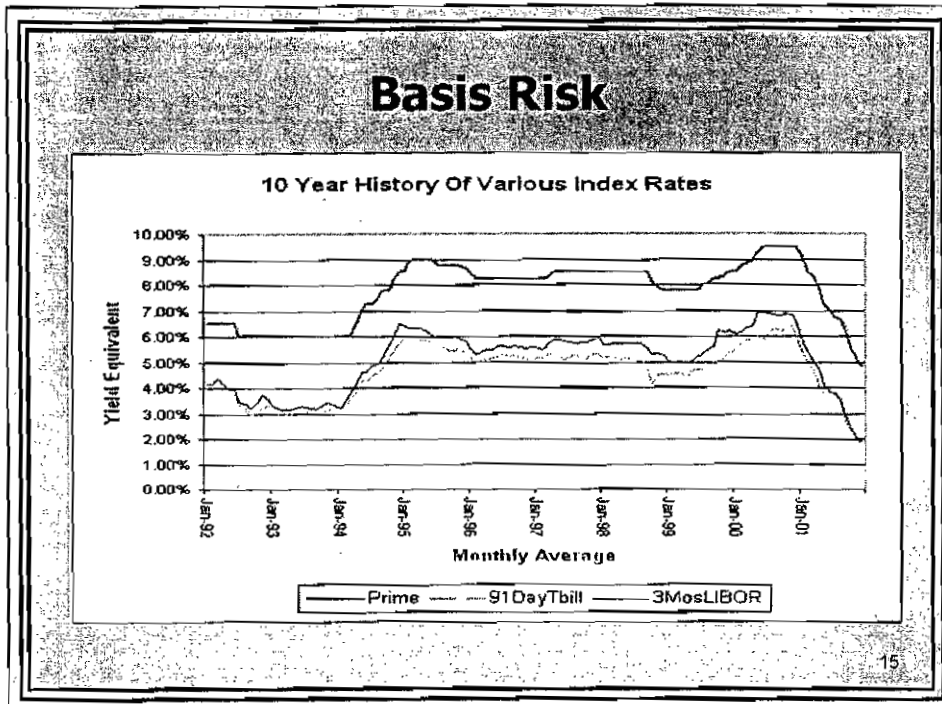
NIM=Net Interest Margin

→ price ↑ 1/2%

3 months later
Assets
Liability 80
80 90
(Liability) (80)

Basis Risk

- Arises from a shift in the relationship of interest rates in different markets or on different financial instruments
- Includes risk inherent in changes in relationship between market and managed rates (e.g., prime versus LIBOR)
- Arises from imperfect correlation in the adjustment of rates earned and paid on different instruments with otherwise similar repricing characteristics

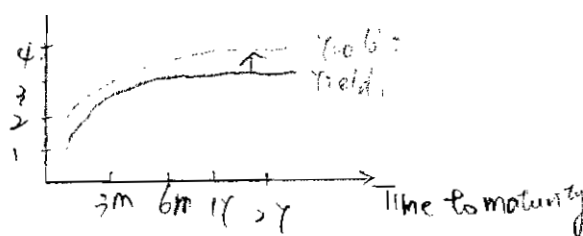


Basis Risk (example)

Base case:		After:	
T = 6%, L = 4.5%		T = 5.5%, L = 4.75%	
<u>Assets</u>	<u>Liabilities</u>	<u>Assets</u>	<u>Liabilities</u>
loans = 90 @ T + 200 bp (= 8%)	deposits = 80 @ L + 10 bp (= 4.6%)	loans = 90 @ T + 200 bp (= 7.5%)	deposits = 80 @ L + 10 bp (= 4.85%)
fixed assets = 10	<u>Equity</u> capital = 20	fixed assets = 10	<u>Equity</u> capital = 20
NIM = (7.2 - 3.68) = 3.52		NIM = (6.75 - 3.88) = 2.87	

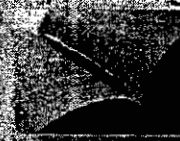
NIM = Net Interest Margin

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Yield Curve Risk

- Yield curve risk is the risk that rates of different maturities (of the same instrument, index or market) may change by different magnitude
- Arises from variations in the movement of interest rates across the maturity spectrum
- *Example: Difference between US Treasury 2-yr and 3-yr notes grows from 50bp to 100bp during first quarter 2011.*



Option Risk

- Risk that payment patterns for assets and liabilities will change when interest rates change
- Arises when a bank or a bank's customer has the right but not the obligation to alter the level and timing of the cash flows of an asset, liability, or other instrument
- *Example: Depositor withdraws time deposit early or borrower repays loan early*



Managing Interest Rate Risk

Internal models in banks *measure*
IRR

- Repricing gap analysis (RSA-RSL)
 - Earnings-at-Risk model
 - Static gap or Dynamic gap
- Income simulation & “what if” scenarios
- Duration analysis
- Historical analysis

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Managing Interest Rate Risk

Which indicators of IRR might management,
supervisor, or the market *monitor*?

- Net interest margin
 - Big changes in asset yields
 - Big changes in funding costs
 - Squeezing or expanding margin
- Trading Activities
- Expansion of bank's products and activities
- Market trends, competition, and general environment

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Managing Interest Rate Risk

How do banks *identify, measure, monitor, and control* IRR?

- Internal models to track and report
- Setting exposure limits
- Reliable MIS
- Strategic coordination (e.g. "ALCO")
- Vetting of new products and promotions
- Adjusting balance sheet and hedging
- Contingency planning

[new BCP 22,23,24]

Managing Interest Rate Risk

Discussion

- Which type of IRR do you believe is greatest challenge for ALCO committees?
- What measures can you recommend to limit this risk?
- How often should ALCO (or equivalent group) meet to review IRR?



22

CEA → Analysis
 covered!

FX Risk (definition)

Foreign exchange risk is the inherent risk to earnings or capital arising from movements in foreign exchange rates.

Exposure to this risk mainly occurs during a period in which the credit institution has an open position, either on- and off-balance sheet, and/or in spot and forward markets.



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FX Risk Sources

- All FX* assets
- All FX* liabilities
- All FX* commitments or hedging positions

*FX-denominated or FX-indexed



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Managing FX Risk: Identification

FX Assets

- Foreign currency
- Due from foreign correspondents
- Loans
- Investments
- Other assets

FX Liabilities

- Foreign currency deposits
- Due to foreign correspondents
- Borrowings
- Other Liabilities

OBS: FX-denominated commitments, forward contracts, swaps, guarantees, and other obligations

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Managing FX Risk

- Management *measures and monitors* the "Net open FX position" (long minus short)
 - By time period and currency
 - Total by currency
 - Total for all currencies
 - Net position for all currencies relative to capital
- Periodic mark-to-market of net positions

[new BCP 22&23]

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Managing FX Risk

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- Management and the Board control FX risk by setting limits, monitoring net open positions, and giving authority to specific managers for enforcing them.
- Central Bank or Supervisor may impose prudential limits

[new BCP 22&23]

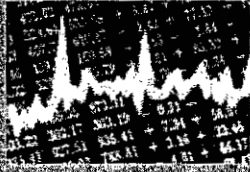
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Price Risk (definition)

Price risk means the inherent risk of negative effects on earnings or capital due to adverse changes in the **values** of financial instruments and other investments or assets owned by the bank or any of its subsidiaries, whether on- or off-balance sheet, as a result of changes in market prices or values.



Price Risk Sources



- Commodities
- Fixed-rate investments
(IRR \rightarrow Price)
- Equities

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Managing Price Risk: Identification

- Gold and precious metals
- Commodities and commodity-linked items
- Fixed-rate investment securities
- Equity positions: Investments in other companies
 - Traded: market value available daily
 - Non-traded: market value needed periodically

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Managing Price Risk: Measurement & Monitoring

- Market value of assets / Total assets
- Traded Equities } **Active Quotes**
- Commodities }
- Changes in market value / Capital
- For non-traded equities:
 - Estimated value / Book value

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Managing Price Risk: Control

- Strategy for bank
- List of acceptable investments
- Limits on exposures by type
- Trading limits (trader, position, stop-loss)
- Regular reports of activity & position
- Systems and controls which enforce limits (e.g., supervisory override required)

[new BCP 22,23]

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Managing Price Risk

Discussion

- What are some significant price risk exposures which banks in your economy face?
- What controls are in place to protect banks in from this price risk?



Operational Risk: Identification, Measurement, Management, and Control

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Asia Pacific Economic Cooperation Forum – Financial
Regulators Training Initiative
Bank Analysis and Supervision School
Manila, Philippines

Operational Risk *Definition*

Operational risk is the risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events.

The definition includes legal risk.

Losses can be direct (monetary) or indirect (effects of negative media coverage, loss of customers)

reputational risk

Operational Risk Sources

- **People**... make mistakes, act unethically or carelessly
- **Processes**... sometimes not adequate
...sometimes not followed
- **Systems**... have limitations
...can have programming errors
...can have security issues
...can be "down" or unavailable
- **External events**... aren't preventable, but sometimes the consequences are

totally crash!

*hurricane
earthquake*

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Operational Risk Sources (1 of 4)

People *→ failed*

ChoicePoint, a data aggregation company, had to acknowledge selling personal data on over 140,000 customers to an identity theft ring

Resulted in over \$30m in fines and costs – company is no longer independent



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4

Operational Risk Sources (2 of 4)



Processes

Citi (one of the largest US banking groups) confirmed that UPS (a logistics and delivery service) had lost computer tapes containing information on nearly 4 million customers while they were in transit to the bank's credit bureau

Bank of America admitted to losing tapes with customer identifiers and account information on 1.2 million

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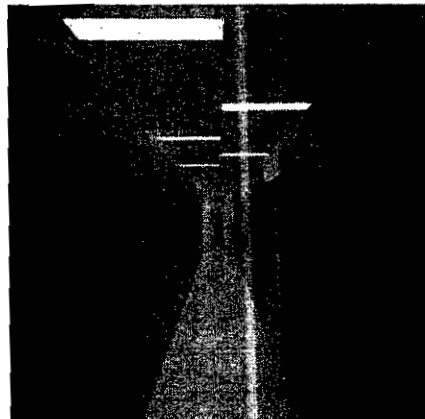
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Operational Risk Sources (3 of 4)

Systems

- Citigroup in 2011 said that ^{break}computer hackers breached the bank's network and accessed the data of about 200,000 credit-card holders in North America. It would not discuss what new security measures Citi is taking.
- The third-largest U.S. bank waited more than a month before making the full extent of the breach public, drawing criticism from lawmakers and lawyers.



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Operational Risk Sources (4 of 4)



External events

- Natural disasters
- Terrorism

Cantor Fitzgerald, a U.S. Government securities dealer, lost 658 out of its 960 New York employees in 9/11 attacks

It survived as a business because it had an electronic trading subsidiary, and also was able to reconfigure its system so trades went through London instead of New York

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BCD's

Operational Risk: Spectacular News (some trading examples)

- **Bruno Iksel, aka "London Whale,"** JP Morgan Chase, lost more than \$2b in 15 days
- **Jerome Kerviel, Soc Gen,** bet 200% of the bank's capital, or €50 b
- **John Rusnak, AIB,** bet 3,000 times his \$2.5 m trading limit
- **Yasuo Hamanaka, Sumitomo,** held 5% of the global copper market
- July 2012



Losses: €4.9 billion

\$40 million

\$2.6 billion

character's yang, hardwaker. be rolled on. Stock players.

not management (sb. was against sb. else)

→ 3/20

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Another way of categorizing Operational Risk – by Event Types

"The best way to Robber a Bank is to Own it!"

- Event type A: Internal Fraud
- Event type B: External Fraud
- Event type C: Employment Practices and Workplace Safety
- Event type D: Clients, Products, and Business Practices
- Event type E: Damage to Physical Assets
- Event type F: Business Disruption and System Failure
- Event type G: Execution, Delivery, and Process Management



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What are the most common event types? Which cause the biggest losses?

- Event type A: Internal Fraud
 - Event type B: External Fraud
 - Event type C: Employment Practices and Workplace Safety
 - Event type D: Clients, Products, and Business Practices
 - Event type E: Damage to Physical Assets
 - Event type F: Business Disruption and System Failure
 - Event type G: Execution, Delivery, and Process Management
- **Number of instances**
 - G: 37% of all instances (2004-2008)
 - B: 36% of all instances
 - **Monetary volume of losses**
 - G: 35% of losses (total losses €41.5 b in 2004-2008)
 - D: 33% of losses

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中發也以此為據大寫字，可和事件之損失

Consider: Important Event Types in Detail (1 of 3)

• Event type B: External Fraud *eg:*

- Client misrepresentation of information (*people lie to bank*)
- Theft
- Loan fraud
- Cybercrime *Hacker taking money from sb. else's account*
- Forgery *偽造*
- Check fraud
- Theft of information
- Fraudulent transfer of funds
- Payment fraud



Is it a crime that client provide wrong information to banks?

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Consider: Important Event Types in Detail (2 of 3)

• Event type D: Clients, Products, and Business Practices *eg:*

- Regulatory violation
- Compromised customer information *記録*
- Fiduciary breach
- Mis-selling products, ignoring customer suitability
- Noncompliance with anti-money laundering regulations



fall fined

SOME banks can sell financial products like mutual fund, insurance.

AML cost lot!

AML regulation

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External audit: 監視者通常對交易及如何訂作. 或 fraud!
early warning sign.

Usually, 事後規範

How much does regulator access to the information of these events?

Consider: Important Event Types in Detail (3 of 3)

• Event type G: Execution, Delivery, and Process Management

- Inaccurate/incomplete contract
- Transaction, processing, data entry error
- Staff error in lending process
- Mismanagement of account assets
- Model risk
- Pricing error
- Failure of external supplier/vendor
- Failure to follow procedures
- Lost or incomplete loan documentation
- Tax noncompliance



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Business Linc.

Event 1

Which business lines generally have the most operational risk? (1 of 2)

- Corporate Finance
- Trading and Sales
- Retail Banking
- Commercial Banking
- Clearing (esp. wire transfer)
- Agency services
- Asset management
- Retail brokerage
- Private banking
- Corporate items
- Across multiple lines



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Which business lines generally have the most operational risk? (2 of 2)

- Corporate Finance
 - Trading and Sales
 - Retail Banking *most customers*
 - Commercial Banking
 - Clearing (esp. wire transfer)
 - Agency services
 - Asset management
 - Retail brokerage
 - Private banking
 - Corporate items
 - Across multiple lines
- **Number of losses:**
 - 1. Retail banking 61%
 - 2. Trading and sales 10%
 - **Monetary volume of losses:**
 - Retail banking 30%
 - Trading and sales 23%

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Operational Risk Risk Management Environment

Four steps in OR risk management

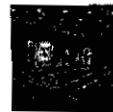
Identification and Assessment



Monitoring and Reporting



Control and Mitigation



Business Resiliency and Continuity



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Four Steps in OR Risk Management Identification and Assessment (1 of 6)

- **Conditions that increase exposure to operational risk**
 - Bank engages in new activities or develops new products
 - Bank enters unfamiliar markets *always risky*
 - Bank implements new business processes or ICT systems *Information C...*
 - Bank has far-flung operations geographically distant from HQ *(Chief Information Officer)*
 - New activities transition from low level to key revenue drivers
 - High staff turnover

- ***Under these circumstances, banks have to be especially alert!***



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Four Steps in OR Risk Management Identification and Assessment (2 of 6)

- **Tools to use in identifying and assessing OR:**
 - Audit findings (can uncover inherent risk or vulnerabilities)
 - Internal loss data collection and analysis
 - Categorize actual losses according to Event Type and Business Line
 - Quantify losses *comparing*
 - External loss data collection and analysis *(www.orx.org)*
 - Use industry studies to determine most common/most costly events *ORX → studies cases. use the information.*
 - Stay up to date on actual bank OR events as reported in media
 - Risk assessments
 - Bank reviews its processes against a **library of potential threats and vulnerabilities** and considers potential impact



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Four Steps in OR Risk Management Identification and Assessment (3 of 6)

- Tools to use in identifying and assessing OR:

- Business process mapping (can show exact points of possible vulnerability)

- Scenario analysis:

- Purpose is to identify high-impact, low-frequency events in business units
- Business unit heads may not like this!
- Requires putting estimated value and probability of occurrence on possible events
- May lead to higher capital requirements for business unit



→ ROA ↓
May push down the expect profit.

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since 10-12 years ago
Used for Operational Risk Man

New area developing in Phil and world

Four Steps in OR Risk Management Identification and Assessment (4 of 6)

- Tools to use in identifying and assessing OR:

- Scenario analysis (continued)

“Are you saying that you want us to figure out how to lose \$10 million?” – business line head

Goal of scenario analysis is to identify potential scenarios that could create losses above some threshold (say, \$10 million)



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Four Steps in OR Risk Management *Identification and Assessment (5 of 6)*

- **Tools to use in identifying and assessing OR:**
 - Scenario analysis (continued)

The risk of catastrophic loss is difficult to measure by other means.

Has some drawbacks:

Humans are poor at estimating probabilities of catastrophic events (also known as "tail Events")

Managers may be shy about discussing potential vulnerabilities in their business units



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Four Steps in OR Risk Management *Identification and Assessment (6 of 6)*

- **Tools to use in identifying and assessing OR:**
 - Scenario analysis (continued)

Example of successful scenario analysis:

Participants identified a large loss due to a duplicate wire sent overseas that was not recoverable.

Expected loss was \$10 million and probability estimated as one event every five years.



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Four Steps in OR Risk Management *Monitoring and Reporting*

- Senior management **MUST** regularly monitor operational risk profiles and material exposures to losses
- Reports on OR to senior management should include:
 - Actual losses
 - Inventory of possible events and expected losses
 - Narrative of internal and external vulnerabilities
 - Progress on correcting gaps



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Four Steps in OR Risk Management *Control and Mitigation (1 of 2)*

- Internal controls are key to avoiding operational risk events
 - Code of conduct
 - Segregation of duties and dual control (to avoid concealment of losses, errors, or other inappropriate actions)
 - Clear authorities, approval processes
 - Monitoring for adherence to limits
 - Safeguards for access to and use of bank assets, records
 - Appropriate staffing level and training
 - Identification of business units where activity seems excessive
 - Vacation policy (absence for two consecutive weeks)

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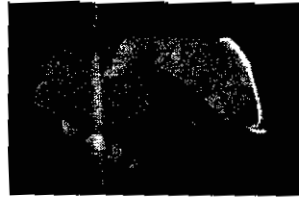
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Four Steps in OR Risk Management Control and Mitigation (2 of 2)

- Control over ICT risks and outsourcing risks
 - Business continuity, disaster recovery
 - Careful selection of service providers *outsourcing*
 - Contingency plans in case of non-performance by service provider

- *Transferring risk* is sometimes an option
 - Insurance
 - *Insurance is a complement, not a substitute, for internal controls!*



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Operational Risk Some Summary Remarks

- Categorize potential event losses by *impact* and *frequency*

Impact of Loss Event	High	Scenario analysis External data, scaled to fit bank	Out of Business
	Low	Loss indicators Risk transfer and capabilities	Loss indicators Risk transfer and capabilities
		Low	High
		Frequency of Loss Event	

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Operational Risk Some Summary Remarks

- Have a *governing structure* for OR

Business units, subsidiaries, support functions	Risk identification		
CFO's office (Operational Risk Section)	Determination of risk owner and creation of Top Risk List		
Business units, subsidiaries, support functions	Key Risk Indicator Identification	Creation of mitigation plans	<i>How to contain the risks</i>
Operational Risk Committee	Mitigation of risk <i>put process</i>	Acceptance of risk	Transfer of risk
Business units, subsidiaries, support functions	Implementation of mitigation		Outsourcing or Insurance

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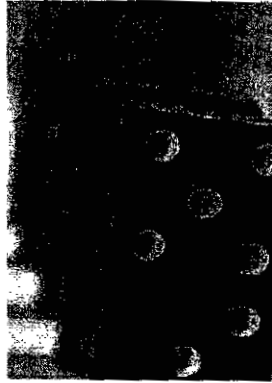
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Must decide which unit to take responsibility for it!

Every risk must have an owner!

Consider political risk?

Broad 職責



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Macro-Prudential Supervisory Issues

A brief introduction

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Asia Pacific Economic Cooperation Forum
– *Financial Regulators Training Initiative* –
Bank Analysis and Supervision School

→ 5年前很少討論此話題

2008, 2009 後才較多

Macroprudential concepts

- Business of banking
- Mission of supervisor
- Supervisory approach
- Concept of contagion
- Systemically Important Banks (SIBs)
- Macroprudential issues and authority
- What should supervisors do?

Business of Banking

Main Business

- Take deposits
- Make loans
- Create money
- Fuel economic growth
- Provide services and advice



Handwritten notes:
 → *Assets*
 ← *Liabilities*
 → *Equity*

Mission of Supervisor

“Promote Safety and Soundness”

New Core Principle 1, essential criterion 2:

The primary objective of banking supervision is to promote the safety and soundness of banks and the banking system. If the banking supervisor is assigned broader responsibilities, these are subordinate to the primary objective and do not conflict with it.

safety, soundness

Supervisory Approach

**Forward-looking – Proportionate – Risks –
Early Intervention – Take Action**

New Core Principle 8:

“...to develop and maintain a forward-looking assessment of the risk profile of individual banks and banking groups, proportionate to their systemic importance; identify, assess and address risks emanating from banks and the banking system as a whole; have a framework in place for early intervention; and have plans in place, in partnership with other relevant authorities, to take action to resolve banks in an orderly manner if they become non-viable.”

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Contagion

...when disease or crisis spreads from one place to another, regardless of previous good health or condition.



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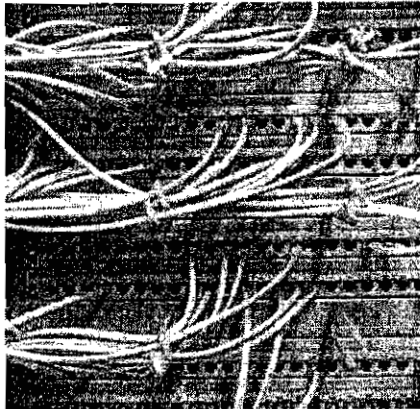


“...assesses how group-wide risks are managed and takes action when risks arising from the banking group..., in particular contagion and reputation risks, may jeopardise the safety and soundness of the bank and the banking system.” New CP 12. EC1

6

Handwritten notes in Chinese: 歐盟對銀行業大銀... 任... prudential supervision... Contagion does not...

Systemically Important Banks



What makes a bank systemically important? (Domestic or Global)

- Size *size to be set by BCBS (of G20)*
- Interconnectedness
- Substitutability *Does the system unique?*
- Complexity *for systemically important & global.*
- Global only: Cross-jurisdictional activity

[D: Principle 5, BCBS 224; G: ¶15, BCBS 201]

↓
 仍從監管者中找尋
 以判斷其系統重要性

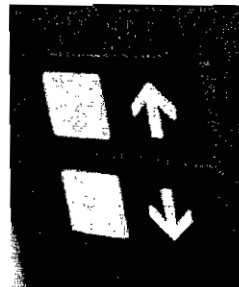
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Macroprudential Issues and Authority

- Micro-prudential
 - Individual banks
 - Bottom-up approach
- Macro-prudential
 - Banking system
 - Top-down approach



Getting information from internal and external data.
(bank) (bank)

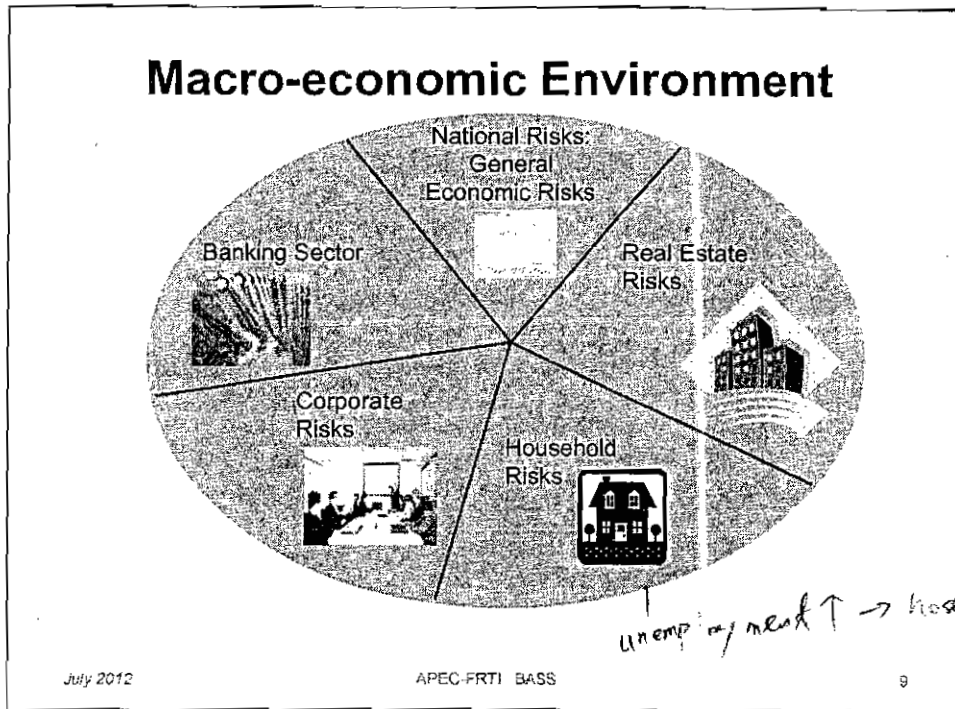
Supervisor considers macroeconomic environment in risk assessment [BCP8, EC4]

Supervisor seeks to identify, assess, and mitigate any emerging risks across banks and to the banking system as a whole... [BCP9, EC5]

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- ## What should supervisors do?
1. Be aware of macro-prudential ideas *large bank information.*
 2. Know which banks are SIBs – expect stronger risk management in them
 3. Consider the “big picture” (macro economy)
 4. Keep information about SIBs flowing smoothly – all oversight functions
 5. Be conscientious (as always)!
- July 2012 APEC-FRTI BASS 10

BPC 14
15

Management

the over all of a ban
in the end.

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Asia Pacific Economic Cooperation Forum
– Financial Regulators Training Initiative

Management

- Considers conclusions from all examination areas
- Level and quality of expertise and oversight of all activities by the board and management. [new BCP 14]
- Reflects overall adequacy of risk management (BO, P3L, MIS, IC/IA) for all risk areas, including whether all processes are working and effective. [new BCP 15]
- Reflects significant violations noted by examiners.
- Notes responsiveness to risks, to business conditions, and to concerns from supervisor.
- Considers depth and succession of management.

Comitte work
together, cooperati

provision for loss

Objectives

- Review overall performance (A-E-C-L-S) relative to strategy, budget, & other banks
- Consider adequacy of board oversight, policies, procedures, MIS, controls, audit
- Consider violations, exceptions, and responsiveness to previous criticism
- Review managers' qualifications, tenure, leadership, and succession plans *任期*
- Prepare management summary

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3

Most important component

- Reflective of current performance and plans
 - Existing and emerging risks *make simple questions*
 - Classification levels and trends
 - Profitability / Liquidity / Capital / Sensitivity
 - Plans and strategies
- Effectiveness of risk management [new BCP 15]
- Strongly correlated to composite rating
- Most forward-looking component

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Risk management

- BO: qualifications, attendance, meeting content, participation, management
- P3L: policies comprehensive, approved annually, followed, working
- MIS: significant risks included, accurate and timely data, reviewed by right people
- IC: large transactions tested before final
- IA: qualified, risk focused, high-level reporting, sufficient number, well paid

*Policy. procedure.
MIS*

board management →

[new BCP 14 & 15]

Violations and Responsiveness

- Number and severity of violations of law
- Additional exceptions to good practice
- Responsiveness to previous recommendations



Strategy, Publicity, & Reputation

Does it work?
Is it reasonable?

- Strategy: Consistent?
Profitable?
- Negative publicity (true or not)
- Reputation: beware of unexpected changes in
 - Strategy
 - Results
 - Products
 - Leadership

reputation risk

bankers:

be transparent disclosure



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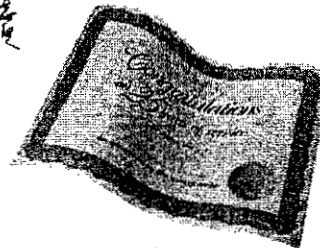
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Management depth and succession

- Qualifications
- Effectiveness
- Tenure
- Depth and succession

培纒



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Risk definitions, descriptions, indicators, and interrelationships

Credit Risk

Definition:

Credit Risk is the inherent risk to earnings or capital arising when a borrower or counterparty fail to meet the terms of a contract or do not fully perform as agreed by provision of contracts.

Examples:

- Borrower does not or cannot repay a loan
- Correspondent bank does not or cannot forward and finalize a payment. (also called counterparty risk)
- Borrower or bank in another country does not or cannot forward funds due to lack of correct currency, or due to controls imposed by the other country. (also called transfer risk)
- Government debt (domestic or foreign) is not repaid according to its terms. (also called sovereign risk or country risk)

Indicators¹:

Classified assets 3,4,5 / (Tier 1+ALLL)
Classified assets 3,4,5 / Total assets
Nonperforming loans / Total loans
Weighted classified (20/50/100) / (Tier 1+ ALLL)
ALLL / Nonperforming loans

Leading indicators:

Classified assets 2,3,4,5 / (Tier 1 + ALLL)
Classified assets 2,3,4,5 / Total assets
Past due loans 30+ days / Total loans
Loan growth / Total loans
ALLL / Total loans

Important relationships to other risks:

Market	→	Credit	(repayment costs change with FX or interest rate changes)
Liquidity	← →	Credit	(unpaid loans reduce available funds; liquidity needed for new loans)
Operational	→	Credit	(errors in analysis, approval, documentation, or monitoring)
Reputation	←	Credit	(unpaid loans, more reserves, lower profits, bad reputation)
Strategic	→	Credit	(overall plan, goals, targets, and lending standards)
Compliance	← →	Credit	(lending results vs. rules; internal / external rule changes)

Important relationships to CAMELS rating:

Credit risk	→	Capital	(more risk requires more capital to support)
Credit risk	→	Asset Quality	(credit performance reflected in asset quality rating)
Credit risk	← →	Management	(mgmt decisions affect risk taking; performance reflects mgmt)
Credit risk	→	Earnings	(credit losses affect performance and earnings)
Credit risk	← →	Liquidity	(funds needed for new loans; unpaid loans reduce liquidity)
Credit risk	←	Sensitivity to Market risk	(repayment costs change with rate changes)

¹ Indicators referencing classified assets "2, 3, 4, and 5" refer to special mention as 2, substandard as 3, doubtful as 4, and loss as 5. Weighted classified assets, a measure sometimes used by the US Federal Reserve adds 20% of substandard loans, 50% of doubtful loans, and 100% of loss loans relative to tier 1 capital plus reserves.

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Risk definitions, descriptions, indicators, and interrelationships

Market Risk

Definition:

Market risk is the risk that movements in market rates, including foreign exchange rates, interest rates, equity, and commodity prices will reduce the bank's income, capital, or the value of its portfolios.

There are different types of market risk:

- Interest rate risk (IRR) is the inherent risk of adverse effects on earnings or capital arising from movements in interest rates. *Additionally, there are four sub-types of interest rate risk: Mismatch risk (or Repricing risk), Basis risk, Yield curve risk, Options Risk. Each has its own definition, but these are not included in this high-level view of risks.*
- Foreign exchange (FX) risk is the inherent risk to earnings or capital arising from movements in foreign exchange rates. Exposure to this risk mainly occurs during a period in which the bank has an open position, either on- and off-balance sheet, and/or in spot and forward markets.
- Price risk means the inherent risk of negative effects on earnings or capital due to adverse changes in the values of financial instruments and other investments or assets owned by the bank or any of its subsidiaries, whether on- or off-balance sheet, as a result of changes in market prices or values. Common sources of price risk are investments in equities, commodities, and fixed-rate instruments, such as government bonds.

Examples:

- Net interest income declines when the quantity of assets and liabilities repricing in one time period varies greatly and rates move unfavourably: e.g. Liabilities reprice more quickly than assets (0-90 day period) *and* interest rates are increasing. (IRR – Mismatch)
- Net foreign currency holdings decline in value when the exchange rate shifts unfavourably relative to local currency. (FX risk)
- Market value of equity investments in other companies declines due to poor performance of the other companies. (Equity Price risk)
- Market value of a government bond declines as interest rates rise. (IRR-influenced Price risk)

Indicators:

IRR:	Repricing assets / Repricing liabilities (each time bucket) Repricing mismatch (time buckets) / Total earning assets <i>Basis, yield curve, and options risk are best measured using internal models.</i>
FX:	Net open position FX (each currency) / Regulatory capital FX assets / FX liabilities (each currency & time bucket)
Price:	Market value / Carrying value equities, commodities, or fixed-rate instruments

Important relationships to other risks:

Credit	←	Market	(floating rate loan payments change with interest rates)
Liquidity	←	Market	(IRR: rate changes affect cost of liquidity) (FX: rate fluctuations affect value of FX positions) (Price: price changes affect asset values & ability to sell without loss)
Operational	→	Market	(errors in models, reports, or assumptions lead to bad decisions)
Reputation	← →	Market	(very high or low rates on loans or deposits affect reputation) (poor reputation forces up deposit rates)
Strategic	→	Market	(plans, goals, targets, and limits set tolerance)
Compliance	← →	Market	(actual market risk vs. rules; Internal / external rule changes)

Important relationships to CAMELS ratings:

Market risk	→	Capital	(more risk requires more capital to support)
Market risk	→	Asset quality	(repayment costs change with interest rate changes)
Market risk	← →	Management	(decisions affect market risk; actual market risk reflects mgmt)
Market risk	→	Earnings	(IRR, FX, & price changes affect net income or market value)
Market risk	→	Liquidity	(IRR, FX, & price changes affect asset values and liquidity costs)
Market risk	→	Sensitivity	(sensitivity rating reflects volatility of market risk positions)

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Risk definitions, descriptions, indicators, and interrelationships

Liquidity Risk

Definition:

Liquidity Risk is the risk arising from the inability to meet obligations on time without incurring unacceptable losses.

Examples:

- Maturing deposits exceed available liquid funds. Bank raises interest rates on deposits to attract new funds and reduce amounts customers plan to withdraw. Net interest income falls.
- New loan commitments cannot be met using available liquid funds. Bank sells investment securities for less-than-carrying value to raise cash, realizing a loss.

Note that each type of currency the bank holds is also subject to liquidity risk.

- Available USD in next 7 days are not sufficient to meet USD obligations during next 7 days. Bank buys USD from correspondent bank but must pay higher exchange rate due to quantity needed and correspondent's limited supply of USD. Net income lower due to high exchange rate paid for supply of USD.

Asset-liquidity indicators:

Short-term (liquid) assets / Total assets

Total loans / Total assets

Value of available-for-sale investments

Unfunded commitments / Short-term (liquid) assets (or the reverse ratio)

Liability-liquidity indicators:

Time (long-term) deposits / Total deposits

Bank deposits / Total deposits

Available and unused borrowing lines

Mixed asset-liability liquidity indicators:

Short-term (liquid) assets / Short-term liabilities

Short-term assets / Short-term liabilities (each foreign currency, different time periods)

Short-term funding / Medium-and-long-term assets

Important relationships to other risks:

Credit	← →	Liquidity	(funds needed for new loans; unpaid loans reduce liquidity)
Market	→	Liquidity	(interest rate: rate changes affect cost of liquid funds) (FX: rate changes affect value of FX positions) (price: price changes affect asset values & ability to sell without loss)
Operational	→	Liquidity	(large frauds, errors in L models, reports, or assumptions)
Reputation	← →	Liquidity	(liquidity problems affect rep.; bad rep. slows new funds)
Strategic	← →	Liquidity	(liquidity needed to grow; strategy incl. minimum L standards)
Compliance	← →	Liquidity	(internal / external rule changes; actual liquidity vs. rules)

Important relationships to CAMELS ratings:

Liquidity risk	← →	Capital	(new capital provides liquidity; liquidity attractive to investors)
Liquidity risk	← →	Asset Quality	(unpaid loans reduce liquidity; funds needed for new loans)
Liquidity risk	← →	Management	(mgmt decisions affect liquidity; actual liquidity reflects on mgmt)
Liquidity risk	← →	Earnings	(inversely related: more liquidity less earnings)
Liquidity risk	→	Liquidity	(liquidity risk reflected in liquidity rating)
Liquidity risk	←	Sensitivity	(varies based on sensitivity and market risk environment)

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Risk definitions, descriptions, indicators, and interrelationships

Operational Risk

Definition:

Operational risk is the risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events. (This risk category includes "legal risk" which does not fit within compliance risk.)

Examples:

- Processes (1): Lending department faces operational risk throughout the credit underwriting and monitoring process: inadequate or incorrect documentation, incorrect estimates of collateral value, or insufficient monitoring of borrowers are all operational risks that can lead to credit losses.
- Processes (2): Assumptions in internal planning and management models are not reviewed and validated resulting in inaccurate information and projections.
- People (1): Teller received cash deposits and issued receipts to customers but kept the money.
- People (2): Rapid growth in staff results in large numbers of employees without training in the areas in which they are working. Risk of errors and losses goes up significantly.
- Systems (1): Computer system does not have capacity to handle planned expansion. Cost of new system is high, but not having a new system will result in frequent network failures.
- Systems (2): Connection to network of bank machines goes off-line every night for four hours. Machines operate based on the latest information but do not communicate with the central system until it is on-line again. A few customers have discovered this and withdrawn their available funds several times over from different bank machines.
- External events (1): Large fire destroys two branch offices in the same district. Most data is protected but some documents must be reconstructed. This will require time and money.
- External events (2): Robbery of a branch results in loss of \$15 000 USD (or local currency equivalent).

Indicators:

Other noninterest expense / Net income

Business resumption plan

Other assets / Total assets

Operational losses / Net income (if available)

Suspense assets / Total assets (if available)

Important relationships to other risks:

Credit	←	Operational	(process errors result in credit loss: valuation, collateral, docs)
Market	←	Operational	(inaccurate data or assumptions results in poor decisions)
Liquidity	←	Operational	(large frauds, errors in L models, reports, or assumptions)
Reputation	←	Operational	(operational errors, especially when published, affect rep)
Strategic	← →	Operational	(errors in assumptions or projections; strategy affects all ops)
Compliance	← →	Operational	(internal / external rule changes; actual operations vs. rules)

Important relationships to CAMELS ratings:

Operational	→	Capital	(new capital provides liquidity; liquidity attractive to investors)
Operational	→	Asset Quality	(unpaid loans reduce liquidity; funds needed for new loans)
Operational	← →	Management	(M decisions affect ops risk; ops issues and losses reflects on M)
Operational	→	Earnings	(ops errors and losses reduce earnings)
Operational	→	Liquidity	(ops errors in Liquidity models, reports, or assumptions)
Operational	→	Sensitivity	(ops errors in Sensitivity models or inadequately trained staff)

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Risk definitions, descriptions, indicators, and interrelationships

Reputation Risk

Definition:

Reputation risk is the inherent risk to earnings or capital arising from negative public opinion of the image, trademark, or products of the bank.

Examples:

- After some negative comments in the media and the closure of two unprofitable branches members of the public perceive that their money is no longer protected in the bank. They start to withdraw funds. Bad news spreads quickly. Soon queues form at five different branches. Perception of higher risk by the public damages the reputation of the institution and causes a liquidity crisis.
- Shareholders express clear dissatisfaction with management and the board of directors at the bank's annual meeting. Several members of management resign under pressure.
 - New deposits decline dramatically during the next six months as bank customers re-evaluate their deposit relationships. New management must increase the rates on deposits to retain existing customers. Earnings suffer.
 - Additionally, the bank's planned share offering does not generate much enthusiasm from investors. Only when the board agrees to increase the quarterly dividend is the new share issue fully subscribed.

Indicators:

- Rates paid on deposits versus other banks in same market
- Quantity and type of complaints received from the public
- Quantity and type of negative press comments or negative public opinion
- High turnover on board of directors or board of management

Important relationships to other risks:

Credit	→	Reputation	(unpaid loans, more reserves, lower profits, bad reputation)
Market	← →	Reputation	(very high or low rates on loans or deposits affect reputation) (poor reputation forces up deposit rates)
Liquidity	← →	Reputation	(liquidity problems affect rep.; bad rep. slows new funds)
Operational	→	Reputation	(operational errors, especially when published, affect rep)
Strategic	→	Reputation	(strategy affects rep: decisions on growth, products, size, etc.)
Compliance	→	Reputation	(penalties from supervisor can result in poor rep)

Important relationships to CAMELS ratings:

Reputation	← →	Capital	(inadequate C leads to poor rep; cost of C higher if rep poor)
Reputation	←	Asset Quality	(unpaid loans, more reserves, lower profits, bad reputation)
Reputation	← →	Management	(mgmt decisions affect rep; rep affects ability to keep good mgmt)
Reputation	← →	Earnings	(earnings affect rep; rep influences new business and profit)
Reputation	← →	Liquidity	(liquidity problems affect rep.; bad rep. slows new funds)
Reputation	←	Sensitivity	(sensitivity can affect rep, especially if rates change often)

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Risk definitions, descriptions, indicators, and interrelationships

Strategic Risk

Definition:

Strategic risk is the inherent risk to earnings or capital arising from strategies, improper implementation of strategies, or inability to adapt to changes in the bank's business environment.

Examples:

- The board of directors and the board of management agree to acquire the shares of another bank and to merge operations. The new larger institution keeps 90% of employees and management from the two old banks, and information systems are integrated successfully. However, after six months of combined operations, the new bank starts to lose employees, managers, and customers. Policies, procedures, and practices are not fully agreed and finalized. Disagreements among employees and managers have become frequent, and customers have become dissatisfied. Profits fall and the board of directors seeks new members for the senior management team to fix the merger implementation.
- Two banks consider the adoption of Internet banking. Both establish web sites and provide basic general information. The first institution keeps this general-information-only approach. The second institution pursues on-line access to account information and allows customers to move money between accounts. As the number of customers with Internet access grows, the institution with a higher level of Internet access sees its customer base grow. The first institution eventually pursues another Internet strategy, but it is at least one year behind the second institution for Internet strategy. The decision *not to pursue* a business line or service delivery channel (Internet) is also a strategic risk.

Indicators:

Strategic plan

Actual results versus budget

Changes in controlling share owners

Mergers, acquisitions, or business combinations

Significant shifts in balance sheet or income statement structure

Important relationships to other risks:

Credit	←	Strategic	(overall plan, goals, targets, and lending standards)
Market	←	Strategic	(plans, goals, targets, and limits set tolerance)
Liquidity	← →	Strategic	(liquidity needed to grow; strategy incl. minimum L standards)
Operational	← →	Strategic	(errors in assumptions or projections; strategy affects all ops)
Reputation	←	Strategic	(strategy affects rep: decisions on growth, products, size, etc.)
Compliance	← →	Strategic	(rule changes affect S; S determines risks to be taken)

Important relationships to CAMELS ratings:

Strategic risk	← →	Capital	(capital supports risk taking; strategy sets risks to be taken)
Strategic risk	→	Asset Quality	(strategy sets risks to be taken and major assets to be held)
Strategic risk	← →	Management	(M sets and implements strategy; successful strategy reflects on M)
Strategic risk	← →	Earnings	(S sets profit goals and risks; good earnings reflect good S)
Strategic risk	← →	Liquidity	(S sets minimum liquidity level; good liquidity reflects good S)
Strategic risk	→	Sensitivity	(S sets products, risks, and limits for sensitivity to market risk)

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Risk definitions, descriptions, indicators, and interrelationships

Compliance Risk

Definition:

Compliance risk is the inherent risk to earnings or capital arising from nonconformance with, laws, rules, regulations, prescribed practices, internal policies and procedures, or ethical standards.

Examples:

- Bank grows more quickly than it is able to generate new capital funds. Over time, the institution fails to comply with the minimum risk-based capital requirement of X%. The supervisory authority requires a plan to get more capital and gives the institution six months to obtain the funds. When it fails to meet the specific requirement, the institution is either closed or forced into a merger with another institution with sufficient capital for the combined entity.
- Bank expands its long-term lending program for investors in the stock market, taking stock shares as collateral. At its peak, the stock loan program reaches 10% of total loans. Supervisory authority changes the prudential limits for this type of loan to a maximum of 3% of total loans. Institution must now adjust its business activities to fit the new limit. Credit officers who specialized in stock loans are retrained and redeployed to other loan functions.
- Following several months of liquidity strains, a bank's board of directors changes the internal liquidity limits to provide for greater flexibility. The treasury function that manages liquidity must adjust its holdings to meet the new standard. Earnings drop slightly as the institution becomes more liquid.

Indicators:

Compliance with prudential risk measures in law and regulation (capital, credit, liquidity, etc.)

Compliance with bank's own rules (This cannot be easily measured off site but can be monitored through discussions with management and members of the board of directors.)

Important relationships to other risks:

Credit	← →	Compliance	(lending results vs. rules; internal / external rule changes)
Market	← →	Compliance	(actual market risk vs. rules; internal / external rule changes)
Liquidity	← →	Compliance	(actual liquidity vs. rules; internal / external rule changes)
Operational	← →	Compliance	(actual operations vs. rules; internal / external rule changes)
Reputation	←	Compliance	(penalties from supervisor can result in poor rep)
Strategic	← →	Compliance	(strategy sets risks to be taken; rule changes affect strategy)

Important relationships to CAMELS ratings:

Compliance	← →	Capital	(prudential rules set minimum C; inadequate C violates rules)
Compliance	← →	Asset Quality	(prudential rules set AQ limits; AQ performance vs. limits)
Compliance	← →	Management	(mgmt sets internal compliance rules and must follow external rules)
Compliance	→	Earnings	(repeated violations of prudential rules can result in fines)
Compliance	← →	Liquidity	(prudential rules set minimum L; inadequate L violates rules)
Compliance	← →	Sensitivity	(internal rules and limits versus model results)