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- Rearranging the equation of exchange, we arrive at:

$$V = P \times T / M = \text{Nominal GDP} / \text{Quantity of Money (Money Supply)}$$

Where:

V = velocity of money

P × T = nominal GDP/Value of sales

M = quantity of money (the money supply).

Fisher makes two key assumptions:

1. Velocity (V) is fairly constant in the short run:
 - This is due to his belief that velocity is affected by institutions and technology that change slowly over time.
2. Aggregate output – transactions (T) was also constant in the short run:
 - This is due to his belief that flexible wages and prices guaranteed output to be at its full employment level.

- With these two assumptions on board, let us re-examine the equation of exchange:

$$M \times V = P \times T$$

- Since both V and T are constant, changes in M must cause changes in P to preserve equality between MV and PT
 - If money supply (M) doubles, the price level (P) must also double.
 - Thus, an increase in M leads to an increase in inflation.

Consequently:

- Movements in the price level (P) result solely from changes in the quantity of money (M)
- Money demand becomes a function of income

This supports the Fisherian Theory as it suggests that there is a mechanical and fixed proportional relationship between changes in the money supply and the general price level.

More information: https://www.investopedia.com/terms/q/quantity_theory_of_money.asp

There are other competing models of money demand theory:

Another theory of money demand is by John Maynard Keynes:

- **Why is permanent income sufficient to approximate money demand measurement under Friedman?**

Friedman considered other variables in his money demand function ($M^d/P = f(Y_p, r_b - r_m, r_e - r_m, \pi^e, -r_m)$), which are the return on bonds, equity and the expected inflation rate. These variables constitute the gaps between expected return of alternative investments to expected interest rate on cash (deposits) or money. However, Friedman believes that the gaps do not change much and stay constant as banks compete to retain customer deposits by changing their interest rates on deposits.

Therefore, Friedman concluded that the variables of the alternative investments have a slight impact on money demand and only permanent income can be directly used to estimate money demand.

- **What does Friedman say about velocity of money?**

Velocity of money is dependent upon permanent income which is predictable and stable and therefore is constant

Summary

- Fisher developed the transaction-based theory of M^d , where;
 - Velocity of money is constant in the short run and income is key factor impacting M^d .
- Keynes identified three motives for holding money
 - Transactions: Income impacts M^d .
 - Precautionary: Income impacts M^d .
 - Speculative: Interest rates and income impact M^d .

Velocity is not constant but positively related to interest rates which fluctuate.

- Friedman employed the theory of asset demand
 - Did not deal with the motives for holding money.
 - Expands wealth to also include equity and goods.
 - Money demand: Essentially a function of permanent income.
 - Velocity is predictable and stable.
- Empirical evidence shows that M^d is sensitive to interest rates

Q3. Explain why expectations theory cannot account for characteristic 3.

The characteristic 3 suggests that long-term bond yields tend to be higher than short-term bond yields. However, expectations theory states that long-term interest rates are all averages of expected future short-term interest rates, therefore long-term bond yields must equal the short-term bond yields, rather than being higher.

Market-segmentation theory/segmented markets theory

- Segmented markets theory rejects two of the assumptions of the expectations theory that;
 - Investors are indifferent between holding short-term and long-term bonds; and
 - That all bonds are perfect substitutes for one another

Segmented markets theory is based on the assumptions below:

1. Markets for different maturity bonds are completely segmented
2. Investors will operate within some preferred maturity range; short-term securities vs long-term securities
3. Investors who have preferences for different segments of the market are motivated out of the desire to reduce the riskiness of their portfolios rather than seeking profit maximisation – whether short-term or long-term investors.
4. Longer term bond maturities have different inflation and interest risks than short-term bond maturities long-term and short-term bonds are not perfect substitutes.

Matching principle

- Short-term assets should be funded with short-term (money market) liabilities
- Longer term assets should be funded with equity or longer term (capital market) liabilities
- Shape and slope of the yield curve – is determined by the relative demand and supply conditions of securities that exist along the maturity spectrum. – it is decided with different segments

- Segmentation theory cannot explain:
 - a) Why short-and long-term yields move together; and
 - b) Why short-term yields are more volatile
 - (characteristics 1 and 2).

- **Liquidity premium theory**

Addresses all 3 characteristics:

The liquidity premium theory distinguishes from the expectations theory and holds the characteristic that long-term to maturity bonds are more susceptible than short-term instruments to a risk of large price fluctuations.

- Liquidity premium theory is based on the assumptions below:
 - Bonds of different maturities are substitutes but not perfect substitutes
 - Investors prefer successive shorter-term instruments to invest in due to:
 1. Greater liquidity
 2. Lower inflation and interest rate risk in short term investments

Therefore, lenders are willing to accept lower yields on short-term investments as a trade-off for greater liquidity and reduced risk exposures.

An investor also requires compensation for investing for a longer period – which is the liquidity premium

- Shape and slope of curve is explained by:
 - Current short-term interest rate and expectations about future short-term interest rates; along with compensation for holding a longer-term bond
 - This compensation is called: liquidity premium

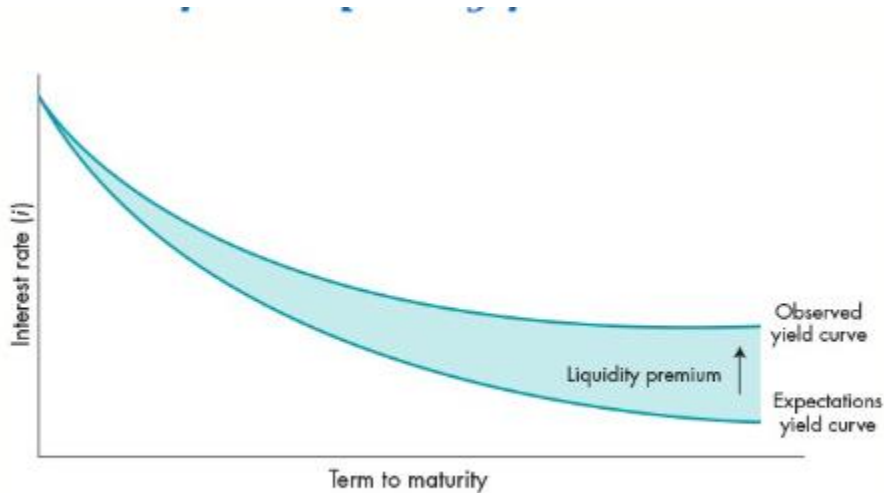
Example: one-year rates over the next five years: are: 5%; 6%;7%;8%;9% per annum. Suppose investors' preferences for holding short-term bonds gives us the following liquidity premiums for one to five-year bonds respectively: 0%; 0.25%; 0.50%; 0.75%; and 1.0%

- The interest rate on the two-year bond is:
 - $(5\% + 6\% / 2) + 0.25\% = 5.75\%$

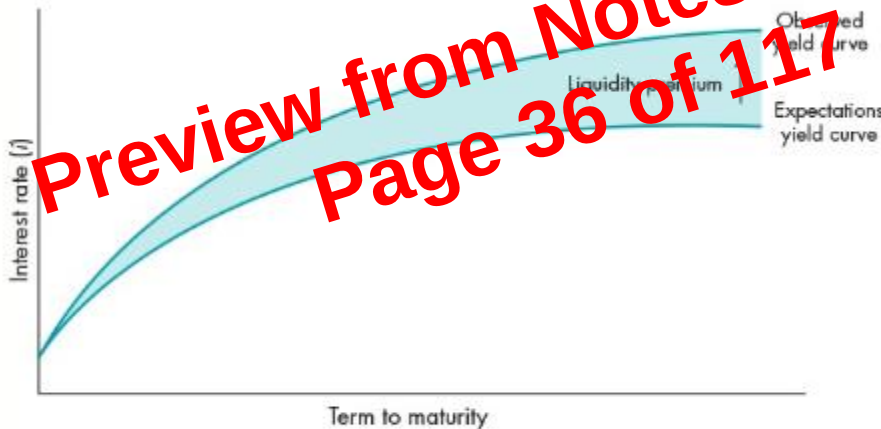
- The interest rate on the five-year bond is:
- $(5\% + 6\% + 7\% + 8\% + 9\%) / 5 + 1.0\% = 8\%$

Thus, interest rates for one to five-year bonds are:

5%; 5.75%; 6.5%; 7.25%; and 8% ... these essentially form your yield curve



Source: Viney & Phillips Ch. 13, Financial Institutions, Instruments and Markets



Source: Viney & Phillips Ch. 13, Financial Institutions, Instruments and Markets

Liquidity premium theory can explain the three characteristics:

- It explains characteristics one and two since, like expectations theory, long term rates are essentially tied to expected future short-term rates.
- Satisfies characteristic three since the liquidity premium increases with time to maturity (i.e., compensation increases with longer bond durations).
- Hence, the yield curve should normally slope upwards

Summary

- The loanable funds framework is conceptually simple
 - It Relies on aggregate supply and demand of funds
- Shape and slope of the yield curve explanations:
 - Expectations: current short-term rate and expectations about future short-term interest rates.
 - Segmented markets: relative supply and demand in each segmented market (along the maturity spectrum)
 - Liquidity preference: current short-term interest rate and expectations about future short-term interest rates, along with compensation for holding a longer-term bond.
 - The yield curve is an analytical tool employed widely by financial analysts and managers of financial institutions

Week 2 Session 4

Australian Payments system infrastructure

- An exchange settlement account (ESA) is an account between the Reserve Bank of Australia (RBA) and an approved authorised deposit-taking institution (ADI).
- An ESA is not a prerequisite for any institution to participate in the payments system
- Settlement of high-value payments
- Settlement of low-value payments

- Investment securities are much more important to the portfolios of small and medium-sized banks than for larger ones.
- This is due to larger banks having access to many more sources of liquid funds than smaller banks, so therefore they do not need to rely heavily on investment securities for liquidity.
- Banks also hold securities for the purpose of trading or selling them to clients and other market participants to generate profits on **buy and sell differentials** and through **fees** for providing the securities. These are referred to as **trading securities** and are accounted for separately to investment securities.

Main uses of Bank funds: Loans

Bank loans and leases are the primary business activity of a commercial bank and are the most important earning assets held by banks. Loans generate the bulk of a bank's profits and help attract valuable deposits.

- Although loans are very profitable to banks:
 - They take time to arrange;
 - They are subject to greater default risk;
 - They have less liquidity than other bank investments (Loans have high yields but are not typically very liquid).

Large banks concentrate on commercial and industrial loans, while small and medium-sized banks focus on real estate loans.

Most bank loans consist of promissory notes.

Promissory notes can be made:

- Periodically, in instalments;
- In total on a single date;
- In some cases, on demand (if the loan is due on demand, either the borrower or lender can end the contract at any time).

Bank loans are mostly secured (via collateral), however some are unsecured.

Collateral – the purpose is to reduce the financial injury to the lender if the borrower defaults.

Banks make either fixed-rate or floating-rate loans.

Loans vs investment

Loans = personalised contract

Investment = impersonal or open market transaction

Commercial and industrial loans

Terms for option contracts

Strike price – the point at which both parties make an agreement on the expected future value of the item/stock.

Premium compensation - the amount of money transferred from the buyer to the seller for entering that agreement

Time consideration – options contracts have an expiration date. A date where the agreement between two parties ends. This can be between a week to multiple years.

- The longer the time, the more valuable the contract is as there is more time for the security to make changes (possibly favourable)

Exercise vs assignment

Exercise – when the agreed price of the future item increases above that price, the option buyer exercises their agreement and request to the seller to buy the stock at the agreed price to sell it at the higher price (for a profit).

Assignment – the seller gives up their item/stock that they have to the option buyer for the agreed price.

- A premium is paid for the agreement of the option & to prove validity of the buyer.
 - If the buyer does not execute the options contract the premium is a compensation.

Derivative securities: Interest rate swaps

- An agreement between two parties to exchange interest payments on a specified principal amount for a specified period.
- By convention:
 - If a firm negotiates a plain vanilla swap, it will provide fixed-rate payments in exchange for floating-rate payments.

Thus:

Before Swap:

Bank A = Variable/floating interest payments

Bank B = Fixed interest payments

After Swap:

- Swap buyer (Bank A) makes fixed-interest payments
- Swap seller (Bank B) makes floating interest payments
- Purpose of swap:
 - By economically converting variable-interest rate instruments into fixed-interest rate (or vice versa), FIs can better match the duration of its assets and liabilities.

Derivative securities: Micro & Macro Hedges

Micro Hedge (hedging applied to individual items)

Hedge **single** asset/liability in the balance sheet

- E.g. Bank attempts to lock in the cost of funds to protect itself against a possible rise in short-term interest rates.

Thus:

- Bank takes a short (sell) position in **futures contracts** on certificate of deposit or treasury note.
- AIM: Best to pick a contract whose underlying deliverable asset is closely matched to the asset (or liability) position being hedged to prevent basis risk (uncorrelated prices).

Macro Hedge (hedging applied to a bank's balance sheet)

Hedge total assets/liabilities in the balance sheet

- E.g. A bank's balance sheet exposure is fully hedged by constructing a futures position such that if interest rates rise, the bank will make a gain.

Q4. Under what conditions would a bank use the option securities: cap and floor?

- Cap – Banks(seller) can agree on an interest rate cap with another party (buyer), setting a limit on interest rates payable on future borrowing, which protects the buyer in case of any rise in interest rates that exceeds the strike rate. This provides the buyer with periodic payments (protection against losses) based on the difference of the strike rate and exceeding rate. This cost of this strategy is that the buyer must pay the premium to the bank to secure this comfort.
- Floor – At the same time, the bank must offset the cost of the cap premium (periodic payments). They do this by selling an options contract and placing a minimum(floor) on how low the interest rate payable may fall (the maximum a bank can compensate relative to the cap). The Bank

Week 2 Session 6

Non-Bank Financial Institutions

Types of NFBI's

- Money market corporations (Investment banks)
- Managed funds
- Superannuation funds
- Cash management trusts
- Public unit trusts
- Life insurance and general insurance offices
- Hedge funds
- Finance companies and general financiers
- Building societies and credit unions
- Export finance corporations

The following NFBI's are of importance:

- Non-ADI financial institutions
 - Money market corporations (investment bank)
 - Finance companies
- Insurers and fund managers
 - Cash management trusts
 - Superannuation funds
 - Life insurance companies
 - General insurance companies
 - Hedge funds

Sources of funds

- Pooled savings into a mutual investment fund account, which typically managed by a financial intermediary

Uses of funds

- Established under a trust deed via a trust fund
- Primary investment is cash securities/bank deposits, followed by short-term money-market instruments
- Provides low risk and high liquidity for the investor – short-term interest earning assets are less risky.
- Provides retail investors with access to the wholesale market.

Superannuation funds

Superannuation funds are a Government supported strategy to provide resources e.g. money upon retirement – at aged 60-65.

Sources of funds

- Superannuation funds accept and manage contributions from their members.
- Fund members make periodic contributions while they are employed
- Income derived from investments also added to the savings.
- Contributory (employer and employee contribute)
- Non-contributory (only employer contributes)
- Currently 9.5% (only contributed by the employer) with a target of 12% by 2025 via 0.5% increases commencing from 2021.
- Life insurance premiums
- A small, but increasing, source of funds for superannuation companies.

Uses of funds

- Offer members a choice of investment strategies to meet their particular risk and liquidity preferences e.g.:
 - Minimise risk exposure prior to retirement (conservative)
 - Young person may want a more aggressive risk strategy
- Some strategy types:
 - Capital guaranteed; (less risky)
 - Capital stable; (less risky)
 - Balanced growth; (riskier)
 - Managed growth (riskier)

Therefore, **rising interest rates increase the discount rate on those cash flows and reduce the market value** of that asset or liability, conversely, **falling interest rates increase the market values of assets and liabilities**.

Mismatching maturities of assets and liabilities means that the change in their market value will not be the same.

This exposes an FI to the risk of economic loss and potentially the risk of insolvency.

E.g. $\text{Equity} = \text{Assets} - \text{Liabilities}$ means that changing interest rates can impact the FI's net worth.

Scenario 1 – Assume an FI holds longer term assets than liabilities/the maturity (duration) of assets exceeds the maturity of liabilities (short-funded)

- a) If interest rates rise:
 - The market value of the FI's assets falls by a greater amount than its liabilities (more assets than liabilities will lose value);
 - Thus, reducing the value of the bank's equity.
- b) If interest rates fall:
 - The market value of the FI's assets increases by a greater amount than its liabilities (more assets than liabilities will gain value);
 - Thus, increasing the value of the bank's equity.

Scenario 2 – Assume an FI holds shorter term assets than liabilities/the maturity (duration) of liabilities exceeds the maturity of assets (long-funded)

- a) If interest rates rise:
 - The FI's liabilities falls by a greater amount than the market value of its assets (more liabilities than assets will lose value);
 - Thus, increasing the value of the bank's equity.
- b) If interest rates fall:
 - The FI's liabilities increases by a greater amount than the market value of its assets (more liabilities than assets will gain value);
 - Thus, reducing the value of the bank's equity.

Hedging interest rate risk

Week 3 Session 8

Risks of Financial institutions part 2

Foreign Exchange risk

Foreign exchange involves; foreign assets and foreign liabilities.

Foreign exchange risk is:

- The risk that exchange rate changes can adversely affect the value of an FI's assets and/or liabilities denominated in foreign currencies.
- **Undiversified** foreign expansion creates foreign exchange (FX) risk, hence, FIs can reduce foreign exchange risk through domestic-foreign activity and/or investment **diversification**.

The returns on domestic and foreign direct investing and portfolio investments are not perfectly correlated for 2 reasons:

1. The underlying technologies of various economies differ and the firms in the economies differ – one economy may be based on agriculture while another is industry based.
 - Given different economic infrastructures, one economy could be expanding while another is contracting e.g. in the late 2000s China's economy was expanding while the US economy was in recession.
2. Macro-economic factors – when domestic interest rates go up, foreign interest rates may go down.
3. Foreign exchange rates changes are not perfectly correlated across countries. E.g. AUD-USD exchange rate may be appreciating while the AUD-YEN exchange rate may be falling.

One potential benefit from an FI becoming increasingly global in its outlook is an ability to expand abroad directly through branching or acquisitions, or by developing a financial asset portfolio that includes foreign securities as well as domestic securities.

- However, foreign investment can adversely affect the value of an FI's assets and liabilities denominated in foreign currencies and therefore exposes an FI to foreign exchange risk.

Example of foreign exchange risk:

- Suppose that an Australian FI makes a loan to a British company in pounds sterling (£). Should the UK pound depreciate in value relative to the Australian dollar (\$);
- The principal and interest payments received by Australian investors would be devalued in Australian dollar terms.

Off-balance sheet risk

Off-balance sheet activities mainly concern the attention of banks but especially larger banks, while it is less of a concern to smaller depository institutions and many insurance companies.

Off-balance sheet activities affect the future shape of an FI's balance sheet in that **they involve the creation of contingent assets and contingent liabilities that give rise to their potential/future placement on the balance sheet.**

e.g.

- standby letter of credit is a contingent liability, should the buying individuals or organisations default on payments/future obligations to a third party.

- if homeowners' default on their mortgage loans, this may result in the banks/loan originators losing their money instead as they will need to pay on behalf of homeowners to bondholders.

However, the fee FIs earn for issuing the LOC guarantee appears on the FI's income statement.

Hence, the ability to earn fee income while not loading up the balance sheet has become an important motivation for FIs to pursue off-balance sheet business/activities.

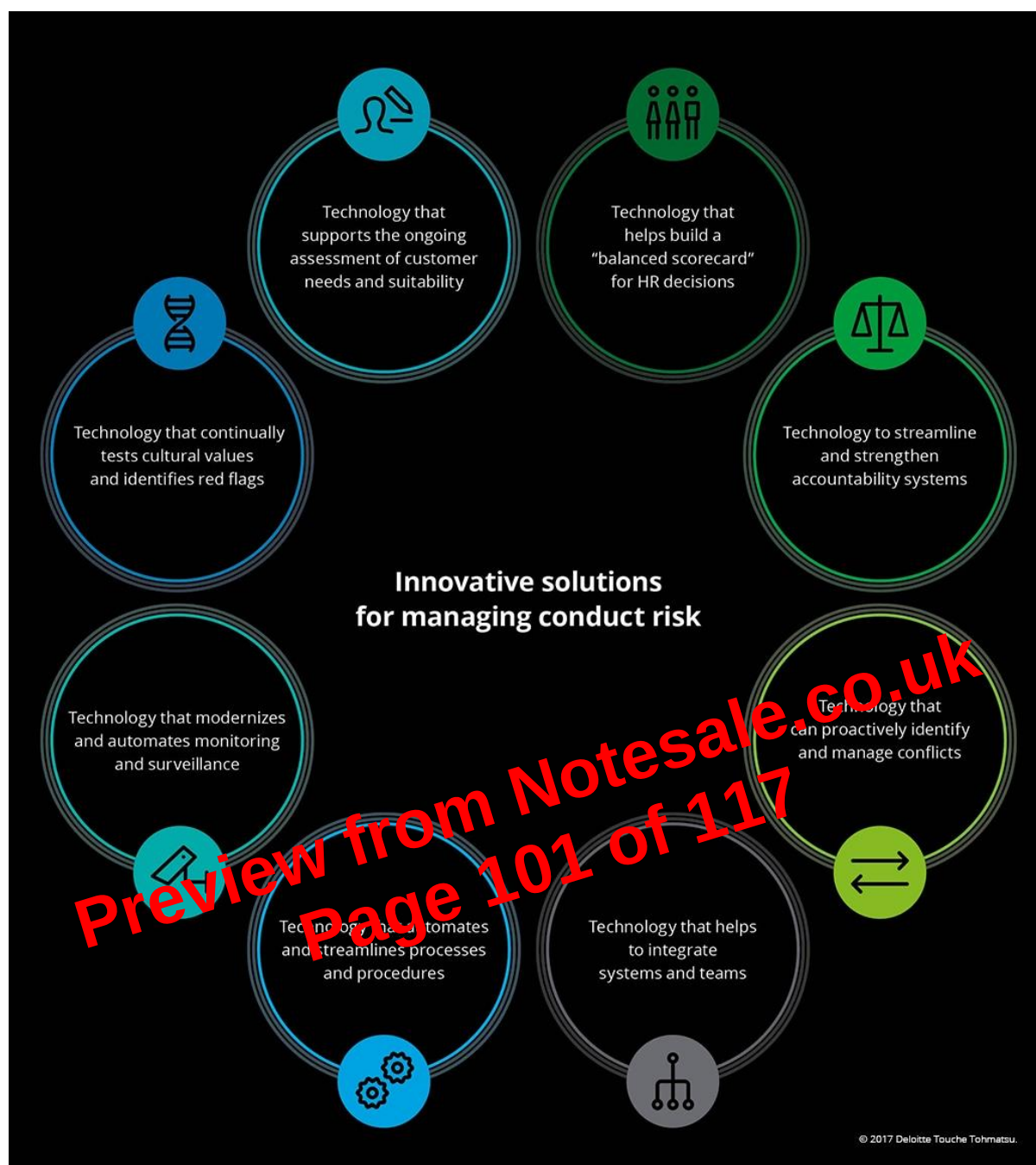
Other increased importance of off-balance sheet activities includes:

- Loan commitments
- Derivative positions
- However, OBS activities come with risks.

Off-balance sheet (OBS) risk is:

- The risk incurred by an FI due to activities related to contingent assets and liabilities.
- Mismanagement or Speculative OBS activities can considerably increase FI's interest rate risk, credit risk and Foreign exchange risk.
 - Increased importance can affect the future shape of FI's balance sheets.
 - Can result in major losses to FIs e.g. Barings Bank and Societe General
- However, hedging OBS activities can be structured to reduce FI risk exposure. Hedging strategies are only to minimise risk not to make a profit, e.g. options/swaps to hedge the risk on contingent assets and contingent liabilities.

Innovative solutions for managing conduct risk



Royal commission findings

- Primary responsibility for misconduct lies with those who managed and controlled banks (e.g. boards and senior management).
 - They must pay close attention to culture, corporate governance and remuneration.

Q1. When country/sovereign risk occurs, what are the realistic options available to a financial institution?

Country risk/Sovereign risk – FIs may eventually recoup at least a portion of its original investment when the assets of the defaulted firm are liquidated or restructured.

- may recoup only a small proportion of the issuer's debt defaults (lowest amount on a debt default).
- Legislation –The country where the risk occurred can involve FIs to persuade government to solve these issues.

Q2. Why is it difficult to place an exact financial value on reputational risk?

It is hard to pinpoint the direct cause of the risk, the person the risk was caused. More generally, reputational risks are not assigned as a responsibility to any specific person(s).

- It is hard to measure and place a framework on assessing the financial value unlike interest rate, foreign exchange, credit risk and etc.

It is also measured by perception; it is subjective rather than objective.

Q3. How can performance-based remuneration help alleviate conduct risk?

Performance-based remuneration which rewards stakeholders in a business e.g. senior, portfolio managers, board of directors, and etc. can encourage them to perform well meaning increased accountability, while it reduces conduct risk and promotes high quality work performance and conduct.

Although it means increased costs for the company, it also reduces the conduct risk that can lead to higher costs resulting from a damage due to poorly performed board managers and etc, e.g. it is a cost-benefit for the company.

Liquidity Risk

Liquidity risk is:

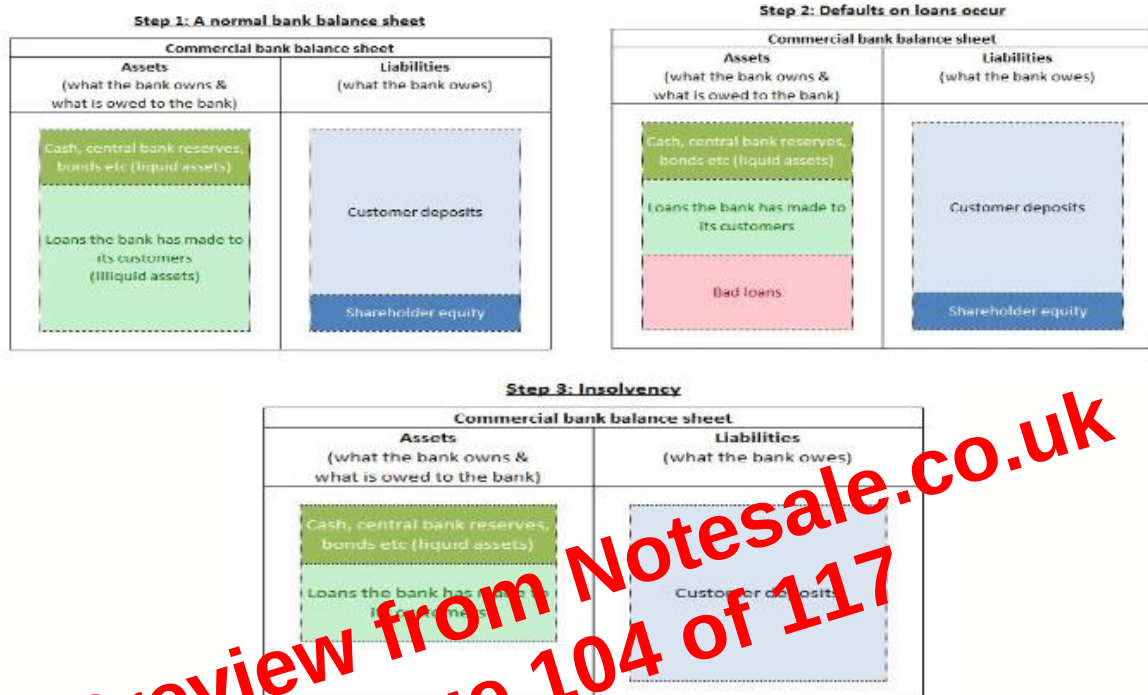
- The risk that a **sudden surge in liability withdrawals** (depositors/insurance policyholders) may require an **FI to liquidate part of its assets** in a **very short period of time** and **at less than fair market prices or low prices**.
-

An example of two FIs that are impacted:

- Banks – depositors
- Insurance companies – insurance policyholders

- In Australia: National Mutual Life Association (NMLA)

- FI management and regulators **focus on capital adequacy to aim to ensure FI solvency.**
 - They are better able to withstand losses with lower leverage (more equity capital compared to borrowed funds).



Source: Collins et al. (2013) Where does money come from? A guide to the UK monetary and banking system

Profitability and safety dilemma

- A bank must balance the demands of three constituencies
 - Shareholders: mainly interested in profitability
 - Depositors: mainly interested in safety as they keep their money in the bank
 - Regulators: mainly interested in safety for the whole financial system

Summary

- Capital requirements are intended to ensure that banks have a cushion against any losses.
- The requirements have become more stringent and are risk adjusted so that banks with more risk are required to maintain a higher level of capital.
- Basel II employs a "three pillars" concept:
 1. Minimum capital requirement (addressing risk);
 2. Supervisory review; and
 3. Market discipline
- Basel III calls for higher capital, leverage and liquidity requirements to offset bank exposures.
- May lead to a modified bank funding mix, reduced investment bank activities and OBS exposures, increase in operational costs.
- Banks may experience a lower return on equity.
- APRA's main bank prudential supervision requirements include PAIRS and SOARS.
- PAIRS is used to assess the probability that a regulated institution will fail and the impact of that failure.
- SOARS determines the supervisory response APRA should take

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