



BFC1001

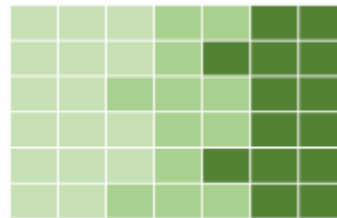
Pre-load 1

What is Finance?

Please join the active LC session upon entering class.



In BFC1001, we employ a *flipped* learning approach which may be new to many students. So let's review what we'll be doing and what it achieves.



The full rectangle represents the complete Learning Map for each topic

Each Topic is taught by ...

1. A Pre-load (1 hr)



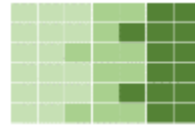
- Where students are introduced to key aspects of the Topic
- Directed as how to conduct further study into the key aspects.
- L e t ' s g o t h o u g h a n e x a m p l e ...

2. Self-study

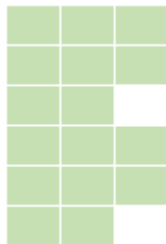


- Where students do the required reading and quizzes to build on the
T o p i c i n t r o d u c t i o n .

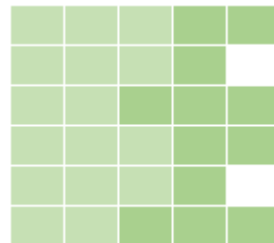
3. Workshop (2 hrs)



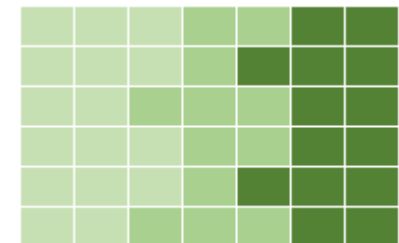
- Where key aspects of topic knowledge and understanding are emphasized and applied in a one-hour interactive study followed by
o n e - h o u r o f p r o b l e m b a s e d l e a r n i n g (P B L).



Pre-load: Introduces topic components & directs self-study



Self study: Reading & quizzes to build on topic knowledge & understanding



Workshop: Completes Topic knowledge, understanding & application



Important points of understanding and expectation behind *Flipped* learning ...

- As a pre-load introduces the topic, there will be gaps in topic knowledge. That is d e l i b e r a t e .
- The pre-load directs students to fill in those gaps via self-study which builds the topic introduction from the pre-load to a higher level. Does self-study complete topic learning? *No*. Will there still be gaps and questions? *Yes*.
- In the following workshop, your self-study will be corrected, reinforced and topic knowledge will be understood and applied; this completes the learning c y c l e .

Why this is a better approach than the traditional pre-class reading, lecture then tutorial format?

1. Your *self study is more engaging and effective* being orientated by the pre-load; as to the *key aspects* of the topic and *why* you are studying it.
2. There is far more *interaction* and *consultation* between staff and students in pre-loads and workshops than in a l e c t u r e .
3. Students actually do the work of topic problem-solving in the PBL *whilst consulting* with staff. This allows better topic understanding than doing tutorial questions, by yourself, before class.



D. U. A.

1. Definitions

When you read any subject literature (pre-load notes, the textbook, PBL questions etc.), be able to define any term used.

2. Understanding

Being able to define any term in subject literature will allow you to understand the concept being presented, to see relationships between concepts and allows deeper level critical thinking such as making evaluations and drawing conclusions.

3. Application

Being able to understand the subject literature allows you to apply it in new and unseen circumstances and problems. This skill is required in the test and the exam.

Create your own course notes, in your own words which comes from your own understanding.



In the Orientation workshop PBL, we introduced the 1st critical thinking concept of BFC1001 ...

- Students need to understand and be able to articulate the relationship/link between finance and investment.
- It is the first foundation of finance and a key aspect of understanding *What is Finance?*
- It is a fundamental truth upon which all businesses operate.
- A bit of repetition helps understanding & memory
- So let's quickly review it ...



Our Perspective; a business/company.

What is Finance?

=

The raising of money (Capital)

How do we Finance?

- Raising Equity**
1. Existing funds of owners
 2. Sharing ownership
 - Selling part of the business to the public

- Raising Debt**
3. Borrow money

Capital Raised
...

What is Investment?

=

The making of money, using capital

How do we Invest?

Used to buy assets that make money (generate a return)

- Assets bought depend on the type of business being run.
- The process of using capital to buy assets is called... capital _____ ?

(Preload 1 LC Question 1)

(Preload 1 LC Question 2)



Investment Decision

Assets

\$100

What to buy?

How does a RRoR of 5%, which arises from raising \$100 of capital, affect the Investment decision, aka how does having to pay 5% for capital, affect the choice of which assets the company should buy?

The asset bought must earn a return that is greater than the RRoR.

$$E(R) > 5\%$$

That is the essential link between finance and investment, the 1st critical thinking concept learnt in Foundations of Finance.

$$E(R)_{\text{Assets}} > RRoR_{\text{Capital}}$$

Financing Decision

Liabilities/Debt

$$K_d = 5\%$$

Equity

$$K_e = 5\%$$

The partition of capital between debt & equity is called **Capital Structure**. Knowing the capital structure; how much of capital is equity, how much of capital is debt, provides the weights used to calculate WACC

\$50

\$50

\$100

Overall Cost of Capital = 5%

Why?... using a Weighted Average (you learn this in statistics) of the above 2 components of capital...

$$50/100 \times 5\% + 50/100 \times 5\% = 5\%$$

This is called the **Weighted Average Cost of Capital or WACC**.

The cost of capital, WACC, is a Required Rate of Return (RRoR). *Why Required?* If the company does not pay 5% to its financiers, it cannot continue its business.



Now that we have a clearer understanding of finance and it's link with investment, let's introduce the other key aspects of this topic.

- **Flow of funds**

Finance involves a flow of funds, we formalise this concept.

- **Financial Intermediation & Direct Financing**

The flow of funds occurs through either intermediation or direct financing

- **Financial Markets**

We need to be able to define and understand the markets used in finance

- **Rate of return**

How we measure the cost of finance and the what we earn on an asset.



The *flow of funds* is where capital is transferred from surplus units to deficit units in an economy.

- This is important as it enables money to be transferred from those who have excess capital to those who need it.
- A **well functioning** and **developed** financial system allows for the efficient flows of funds.

Self-study:

- *Define surplus and deficit units, be able to provide examples.*
- *Attempt to answer the question: How does the flow of funds help an economy grow and develop? (HD level question, answer is not found in the textbook, but developed through critical thinking and internet research)*
- *Subject link: Macroeconomics, which also examines the flow of funds in an economy.*
- *What does the efficient flow of funds allow? We will explore this in the workshop.*



There are 3 ways for the flow of funds to occur in an economy ...

1. Direct transfer between surplus & deficit units.
2. Indirect transfer; using an investment bank (a type of financial intermediary)
3. Indirect transfer; using a financial intermediary

Self-study:

- *Which figure in Chapter 2 shows these 3 methods?*
- *What is another term for the “flow of funds” used in the textbook?*
- *Define a financial intermediary.*
- *Define an investment bank and a commercial bank.*
- *What is the difference? The difference will be revisited in Topic 7: Financial Institutions.*



The flow of funds occur within the Financial System of an economy. The components include ...

1. *Financial Institutions*: businesses that facilitate the flow and transfer of funds by providing intermediation.
2. *Financial Instruments*: primarily types of debt & equity that are vehicles for the flow/transfer of funds.
3. *Financial Markets*: where financial instruments are created and traded.

(Preload 1 LC Question 3 & 4)

Self-study:

- *Provide examples of financial institutions in Australia and attempt to classify them.*
- *Provide examples of financial instruments in Australia and classify them as debt/equity*
- *As per the LC question 3, be able to identify and distinguish between institutions, instruments and markets.*
- *What other term can be used in place of Financial Instrument? (hint: a financial sec_)*



Next, we introduce *Financial Intermediation Vs Direct Financing*

Intermediation ...use of a 3rd party to

- Bring together surplus and deficit units
- Allows the preferences of both to be met

Self-study:

- *Define intermediation*
- *We shall explore benefits of intermediation in the workshop.*

Direct Financing ...

- Deficit and surplus units seek each other out and enact the flow of funds between them without the use of an intermediary.



Self-study:

- *Attempt to find examples of intermediation and direct financing.*
- *Attempt to understand why not all business can engage in direct financing.*
- *This allows us to better understand the benefits of intermediation.*
- *We shall explore the benefits and disadvantages of direct financing in the workshop,*



It is essential to be able to define and recognise the following types of Financial Markets ...

- Primary market
- Secondary market
- Public market
- Private market
- Money market
- Capital market
- Wholesale market
- Retail market

Self-study:

- *Define each market. Research outside of the textbook can help.*
- *The textbook defines additional markets that will be relevant in Topics 8 and 9.*



Rate of Return = the percentage earned on the capital invested.

- E.g. you invest \$100, you earn \$10 over 1 year. The rate of return is 10% p.a.
- Needs to be qualified over a time period. E.g. per annum or over the holding period of the investment.
- *How is the rate of return relevant to finance?*
- Applies to financial instruments that are used to raise capital and assets that are bought as investments.

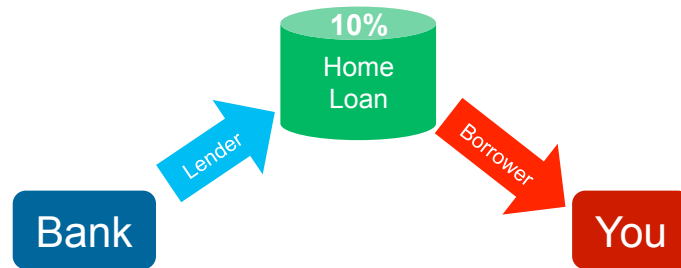
Critical thinking concept: A financial instrument can be both an asset and a liability.

- Let's examine how though the next LC question.

(Pre-load 1 LC Question 5)



The interest on the home loan is 10%.



- Bank: home loan is an asset that earns a Rate of Return of 10%
- Borrower (You): home loan is a liability, the cost of which is what the banks earns as interest. ∴ The cost of debt is 10%.
- The home loan is both an asset and liability, an asset to the lender and a liability to the borrower.

Critical thinking concept: The Rate of Return is how to objectively compare and evaluate the performance of financial instruments; both as assets and liabilities by what it earns or what it costs, as a % on capital.



Self-study:

Define the following:

- *Real risk-free interest rate*
- *Nominal interest rate*
- *Premium*
- *Inflation*
- *Inflation premium*
- *Default-risk premium*
- *Maturity-risk premium*
- *Liquidity-risk premium*

What is another name commonly used in industry and financial literature for the Rate of Return? (hint: y_i)



Next...Self-study for Topic 1

- **Create your own notes when following the self-study directions of the pre-load**
- **See staff during consults when doing self-study if possible**



BFC1001

Interactive Study :What is Finance?



- To complete the required knowledge base and understanding required for the topic *What is Finance?*

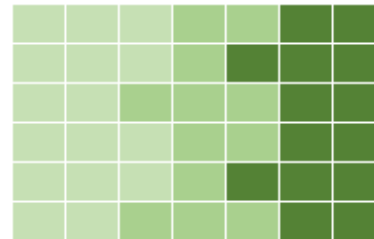
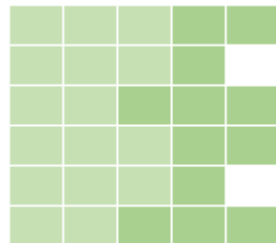
Pre-load:

Introduces key aspects of What is Finance? and directs self-study.



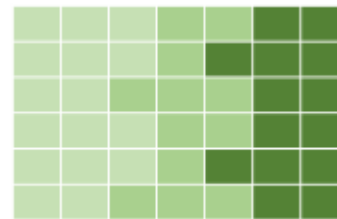
Self-study:

Independent student reading and quizzing that builds upon the topic introduction.



Interactive-study:

With your stream leader, completing the required knowledge base and understanding required for What is Finance.



The full rectangle represents the complete Learning Map for the topic: What is Finance?



Key Topic Aspects being completed ...

1. Relationship between Finance and Investment.
2. Flow of Funds
3. Financial Intermediation & Direct Financing
4. Financial Markets
5. Rate of Return



The relationship between finance and investment has been introduced, so now we confirm your understanding and apply the concept ...

$$\begin{matrix} E(R) \downarrow \text{Assets} > \\ RRoR \downarrow \text{Capital} \end{matrix}$$

Be able to define:

- *Cost of capital* - how much (%) needs to be paid for debt & equity.
- *WACC* - measure of the cost of capital, using a weighted average of debt & equity costs.
- *Required Rate of Return* – minimum % needed to be earned on capital invested. Also called the *Hurdle Rate*.
- *Expected Rate of Return* – what is forecasted to be earned (%) on assets

(Workshop 2 LC 1)



We now move on to discuss the Flow of Funds.

- Firstly, any questions about Flow of Funds definitions and material covered in the Pre-load or your Self-study?

The **Efficient** flow of funds means ...

Answer to self-study question:
What is the efficient flow of funds?

- **Capital is not mispriced** (*define mispriced*)

Mispriced: Price paid for capital is appropriate, not severely over/under capital's fair value. Value is defined later.

- **Surplus & deficit units have liquidity** (*define liquidity, in this context*)

Liquidity: Deficit units are able to raise the capital they need and surplus units have enough capital to meet deficit units need.

- **There is sufficient depth of financial markets**

Self-study question: Commercial Vs Investment banks? This will be explored more in Topic 7



We now move on to discuss Intermediation Vs Direct Financing.

- Firstly, any questions about definitions and material covered in the Pre-load or your Self-study?

Key benefits of Financial Intermediation

*Answer to self-study question:
Key benefits of Intermediation?*

- **Asset transformation** – turning deposits into loans
- **Credit risk transformation & diversification** – low risk deposits turned into higher risk loans and different types of loans.
- **Liquidity transformation** – short-term debt (deposits) used to fund long-term assets (loans)
- **Economies of scale** – the larger banks are, the cheaper intermediation becomes.



Not all economic units can successfully engage in direct financing.

- They need to possess a sufficient level of financial sophistication, market reputation, credit worthiness and economic size/influence.
- While a company like BHP can engage in direct financing, the local Milk Bar or Fish & Chip shop would not be able to borrow money or raise finance directly from surplus units.

*Answer to self-study question:
Attempt to understand why not all
business can engage in direct finance.*

Advantages of Direct Finance ...

- Saves on the cost of intermediation; hiring a 3rd party is not free.
- Allows access to non-standard/unique products not offered by intermediaries.
- Deficit units can issue finance that is unique to their specific funding requirements instead of relying on a “cookie-cutter” product. This allows for greater flexibility in funding.

(Workshop 2 LC 2)



Disadvantage of Direct Finance ...

- Difficulty in matching preferences between surplus & deficit units.
- Higher risk of liquidity & marketability of direct finance instruments.
- Higher search and transaction costs
- Difficulty in assessing risk.

*Answer to self-study question:
Benefits and disadvantages
of direct financing?*



We now move on to discuss Financial Markets.

- Firstly, any questions about definitions and material covered in the Pre-load or your Self-study?

We need to be able to **identify** and **define** the following...

- **Primary market:** where financial securities are created.
- **Secondary market:** where financial securities are traded after creation.
- **Public market:** a central market place open to the public where buyers and sellers of meet to trade.
- **Private market:** where buyers and sellers transact without open advertisement and inclusion of the public.



- **Money market:** short term financial instruments, <12 months
- **Capital market:** long term financial instruments, >12 months
- **Wholesale market:** a direct and private market where large fund flow transactions between government/institutional/corporate surplus and deficit units.
- **Retail market:** primarily an intermediary market where surplus and deficit units are individuals, households and small businesses involve small transactions.

There are other markets which need to be defined and understood that will be covered in later Topics.



We now move on to discuss Rates of Return.

- Firstly, any questions about definitions and material covered in the Pre-load or your Self-study?

Understanding how financial literature (e.g. textbook) presents Rates of Return can be challenging as prior knowledge is often assumed, so let's approach the concept with the following review of important definitions:

■ Risk-free interest rate/rate of return

Investments and assets in the economy are recognised as *risky* or *risk-free*. Risk in finance is defined as uncertainty of future cash flows. Most assets have risk, some element of future uncertainty in their earnings.

However, it is widely accepted that government debt (treasury bonds and bills) is a risk-free investment; as there will always be a government to make claims on.

The existence of a Risk-free asset which provides a risk-free rate of return is vital foundation of finance.



As all other assets in the economy have some risk, a risk-free assets provides a **benchmark** for performance;

All risky assets should earn $E(R) > \text{Risk-free rate of return or } R_f$

Otherwise, why buy a risky asset, where you may loose some or all of your future return, when you can buy the risk-free asset and have a guaranteed future return.

This leads to understanding the concept of a **Premium**, which is a rate of return above a **benchmark**.

- Risk premium = $E(R)_{\text{Asset}} - R_f$ = The rate of return for bearing risk.
- E.g. If you can earn 4% risk-free and earn 10% from a risky asset, 10% - 4% = 6% is what you earn for taking risk, i.e. the risk premium.



This concept of a *Premium* allows us to understand other premiums for specific types of risk that discussed in the financial literature (e.g. the textbook)

- **Inflation premium:** rate of return added to compensate for inflation. Higher inflation = higher inflation premium
- **Default-risk premium:** rate of return added to compensate for default-risk (risk of a borrower defaulting, not making, debt repayments). Higher default risk = high default-risk premium
- **Maturity-risk premium:** rate of return added to compensate for assets that have longer-terms to maturity. The longer it takes to get your money back, the more risky it is. E.g. a loan of 30 years will have a higher maturity-risk than a loan of 1 year.
- **Risk premium** = $E(R)_{\text{Asset}} - R_f$ = Total Premium for all risks taken (see in the textbook how different premiums are added up)

A discussion on risk is conducted in Topic 5. The discussion of risk premiums and how they are added up to form an interest rate for debt is continued in Topic 8.



We have now finished discussing the knowledge base of Topic 1 where your learning was conducted through different stages over a week ...

1. Pre-load: introduced key aspects of the topic and provided direction for self-study.
2. Self-study: building on topic introduction through reading and quizzing.
3. Interactive study: confirming, reinforcing and finalizing topic knowledge and comprehension.

Next, we will start our PBL hour. Please leave your LC windows open as the next LC question delivered will be the 1st PBL question.



After you finish the PBL, it is highly recommended that you form one set of your own Topic notes that **combines** ...

- Pre-load notes
- Self-study quiz answers
- Interactive study notes
- PBL questions and answers
- Your own notes of summary and comprehension

Revision for the test and exam will be simpler with one set of notes for each topic that is **customised for you, by you.**



BFC1001

Pre-load: Financial Markets & Regulation

Please join the active LC session upon entering class.



Key Topic Aspects being introduced ...

1. Why Regulate?
2. RBA
3. APRA
4. ASIC



Learning Objectives

- Understand why financial regulation is important and how financial regulation can impact upon the flow of funds and cost of capital
- Outline the roles of the RBA, with special attention to monetary policy and the payments system.
- Explain the role of prudential regulation and how APRA, the Australian Prudential Regulation Authority carries out its role.
- Explain the role and responsibilities of ASIC and how it cooperates with other regulators.



The concept of Regulation Vs a Complete Free Market

- Lets define *Free Market Economics* ... *(Subject link: Macroeconomics)*

where prices for goods and services are freely set by supply and demand without the influence of government policy or rules

Contrast complete regulation Vs a completely free market

- *Complete regulation = All prices and trade are set by the government.*
- Neither extreme is desirable in the effort to maximize economic growth and achieve an efficient flow of funds.
- In Australia, we have a balance of regulation in a free market to protect consumers and taxpayers from excessive risk taking and provide an equitable outcome for all stakeholders.



Self-study:

- *The skill to learn in this Key Aspect is to be able to identify the benefits and disadvantages of specific financial regulation on the flow of funds and the economy.*
- *As an example of this, in the Self-study quiz and Workshop, you will apply critical thinking to identify the impacts of changes in the Capital Adequacy Ratio (CAR) imposed by APRA on banks and cost of capital.*
- *CAR is introduced later in this Pre-load on slide 16.*



The Monetary Authorities who regulate Australia's financial system are ...

1. **RBA** www.rba.gov.au
2. **APRA** www.apra.gov.au
3. **ASIC** www.asic.gov.au

Let's watch a short video introducing them ...

<http://www.afr.com/business/banking-and-finance/asic-lays-out-fresh-detail-in-case-against-westpac-for-rate-manipulation-20160514-govcul>

* Note the video above requires a subscription to the Australian Financial Review, Australia's premier financial news publication. To watch the video again, if you don't have a subscription, watch the *Learning Capture* recording of this Pre-load; which will contain this video.



- The **RBA** is responsible for **monetary policy**, the **payments system** and the **stability** of the entire **financial system**.
- **APRA** is responsible for **prudential supervision** of financial institutions including banks, credit unions, building societies, insurance and superannuation companies.
- **ASIC** is responsible for the **enforcement of company and financial services laws**. The objective is to protect consumers, investors and creditors.
- **ASIC** is also responsible for **licensing and monitoring** financial markets, financial instruments and advisors as well as monitoring the disclosure and conduct of Australian companies and services providers.

(Pre-load 2 LC Q1, 2 & 3)



What does the RBA do? It is Australia's Central bank.

- The determination and implementation of monetary policy
- Issuing Australian currency notes
- Overseeing the payments system
- Acting as the government's banker
- Issuing and providing the market for treasury securities
- Managing financial system liquidity and the government's holding of foreign exchange.

<http://www.rba.gov.au/about-rba/our-role.html>

Why is the RBA important in finance?

It plays a prime role in determining the cost of debt capital in the economy.



What is Monetary Policy?

<http://www.rba.gov.au/monetary-policy/>

- Control over the supply of money.
- To affect the behaviour of borrowers and lenders (i.e. the flow of funds)
- That promotes price stability, economic stability and growth through a target level of inflation

Monetary Policy can be Expansionary or Contractionary

- Expansionary: Increasing money supply
- Contractionary: Decreasing money supply

A foundation of finance is to understand how monetary policy is used by the RBA when the economy is weakening or overheating.



What is the Official Cash Rate?

<http://www.rba.gov.au/statistics/cash-rate/>

- The benchmark interest rate of the economy.
- The overnight money market interest rate at which Australian banks borrow and lend to one another. It is set by the RBA.
- This is a key source of funds for banks.
- This sets the benchmark cost of debt in the economy.

When the RBA increases the Cash Rate ...

- Banks will likely increase the interest rates on their products (loans and deposits).
- Why? The cost of an important source of bank funding has ↑
- Banks will pass this higher cost to customers; lending becomes more expensive = ↑ cost of debt in the economy.



When the RBA decreases the Cash Rate ...

- Banks will likely decrease the interest rates on their products (loans and deposits).
- Why? The cost of an important source of bank funding has ↓
- Banks will pass this cost saving on to customers in the competition for market share. Loans become cheaper = ↓ cost of debt in the economy.

When cost of debt ↓, consumers and businesses borrow more.

- = greater consumption & investment, expanding the supply of money.
- This stimulates the economy activity and growth.

When cost of debt ↑, consumers and businesses borrow less.

- = lower consumption & investment, contracting the supply of money.
- This dampens the economy activity and growth.



Conclusion: The RBA affects economic activity by influencing the overall cost of debt in the economy.

(Your group assignment = predicting the next RBA cash rate)

Let's put it all together...

- When the economy weakens, the RBA can enact expansionary monetary policy by lowering the cash rate, which lowers the cost of debt, stimulating consumption and investment.
- When the economy overheats, the RBA can enact contractionary monetary policy by increasing the cash rate, which increases the cost of debt, dampening consumption and investment.

(Pre-load 2 LC Q4 & 5)

How does the RBA measure economic weakening or overheating? ... **Inflation** – this will be continued in the Workshop.



Self-study:

- *Define bank source of funds in your own words.*
- *Understand how the cost paid for bank funding affects interest rates of loan products.*
- *Understand and be able to explain...how do changes in the RBA's official cash rate affect the cost of debt for the overall economy? (i.e. understand slide 10 -12, completely)*
- *This will enable you to explain why ...*
- *↓ official cash rate = ↑ in money supply AND*
- *↑ official cash rate = ↓ in money supply.*
- *We will review this comprehension in the Workshop & PBL.*
- *The above is to facilitate the critical thinking component of this Topic. The self-study reading will provide broad topic knowledge which serves as the background upon which the critical thinking occurs.*



- APRA is responsible for the prudential supervision of:
 - Banks and other ADIs (Authorised Deposit-taking Institutions)
 - Insurance companies
 - Superannuation companies
- APRA's specific functions include:
 - The development, implementation and supervision of prudential regulation.
 - Monitoring regulated entities to ensure they are complying with relevant legislation and prudential policies
 - Advising the government on the development of regulation and legislation affecting regulated institutions and the financial markets in which they operate.



While APRA is responsible for many prudential regulations affecting banks and ADIs, we focus on one that has particular impact on the flow of funds and the cost of capital ...

Capital Adequacy Ratio (CAR)

- When banks raise capital, they cannot lend all of it out as assets. A portion (%) has to be kept as *liquid capital* in reserve to buffer and protect against loan losses.
- This is called Capital Adequacy. The % required to be kept in reserve is called the Capital Adequacy Ratio.
 - ADIs must adhere to an 8% CAR.
 - That is the ratio of capital to risk-adjusted assets must be at least 8 per cent.



Self-study:

- *CAR is introduced as a prime example of how financial regulation can affect the flow of funds and the cost of capital.*
- *Now that CAR has been introduced, the implications of changes in CAR will be discussed in the Workshop. (like we explored the impact of changes in WACC in the prior topics PBL)*
- *There is a self-study quiz question that starts to explore the implications of changes in CAR on the cost of capital.*
- *This will greatly aid in our appreciation of Topic 7 and for subject Management of Financial Institutions*



Australian Securities and Investment Commission

- ASIC is responsible for:
 - Regulating financial markets (e.g. ASX)
 - Regulating financial instruments, securities, futures and corporations
 - Consumer protection in superannuation, insurance, deposit-taking and credit
 - Act to enforce and give effect to the law
 - Receive, process and store information that is given to ASIC
 - Make information about companies and other bodies available to the public as soon as practicable



ASIC Priorities

- Assist and protect retail investors and consumers in the financial economy
- Build confidence in the integrity of Australia's capital markets
- Facilitate international capital flows and international enforcement
- Manage the domestic and international implications of the global financial turmoil
- Lift operational effectiveness and service levels for all ASIC stakeholders
- Improve services and reduce costs by using new technologies and processes



Self-study:

- *Be able to identify who and what ASIC regulates.*
- *In the workshop, we shall explore how ASIC regulation affects the flow of funds and cost of capital.*
- *Optional: For those interested, you can read about the enforcement of financial rules by ASIC in the following article...*

<http://www.abc.net.au/news/2017-03-02/westpac-home-loans-asic-court-action/8317750>



Next...Self-study for Topic 2

- **See self-study direction for Topic Reading.**
- **Disregard the library reading list which is a roll over from last semester.**



BFC1001

Interactive Study: Financial Markets & Regulation

Please join the active LC session upon entering class.



Special programme for today's Workshop...

1. Interactive Study (50min)
2. In-class Financial Literacy Survey (15min).
3. Workshop break (5min)
4. PBL (40 min)



Key Topic Aspects being completed ...

1. Why Regulate?
2. RBA
3. APRA
4. ASIC

A key skill to develop is; when presented with a financial regulation or change in financial regulation, to be able to determine how the flow of funds and cost of capital will be affected.



Firstly, any questions about the *Why Regulate?* material covered in the Pre-load or your Self-study?

So, let us discuss why a balance between regulation and free market economics is desired ...

- Over-regulation inhibits the **efficient** flow of funds.

E.g. The banking system of Australia in the 1970s and 80s was highly regulated. Banks were not free to compete as they had interest rate ceilings imposed on their deposit taking and loan products.

The following period of de-regulation, where such pricing restrictions were removed, saw the ratio of bank assets to GDP grow from 50% to around 200% today.

i.e. With less regulation and restrictions, the flow of funds quadrupled.



Concept Check: What is an interest rate ceiling?

You can learn more about the history of Australian de-regulation in BFC3170.

- Under-regulation also inhibits the **efficient** flow of funds.

Without sufficient rules and parameters to operate by, the financial market will experience wide scale fraud, corruption and distortion. Market participants who possess sufficient market influence will abuse the system for their own benefit at the expense of other stakeholders.

Under-regulation was a primary reason for the onset of the Global Financial Crisis (GFC) in 2007-08. In PBL this week, there is a take home question where you explore anecdotes of failure in the financial system that demonstrate the clear need for financial regulation.

Australian monetary authorities constantly review the balance between regulation and the free market to promote the efficient flow of funds.



We now move on to complete our discussion on the RBA.

- Firstly, any questions about RBA definitions and material covered in the Pre-load or your Self-study?
- Lets do a quick LC question to revise our Pre-load and self-study.

(Workshop 3 LC 1)

How does the RBA measure economic performance; weakening or overheating? ... **Inflation, so ... What is Inflation?**

- The change in the general level of goods & services in the economy
- A result of the supply and demand for goods & services.
- With ↑ demand goods & services, inflation ↑
- With ↓ demand goods & services, inflation ↓

Subject link: You learn about inflation in macroeconomics, how is inflation measured?



A key misconception held by the general public is that inflation is when prices go up and that is undesirable.

- After all, as a consumer, you would not want the prices of what you buy to increase.
- However, as recipients of a financial education, we need a more enlightened view.

Inflation is neither good nor bad. It is a key indicator of economic health.

- When inflation ↑, this indicates that consumption and investment are growing.
- When inflation ↓, this indicates that consumption and investment are declining.



A medium-term goal of the RBA is to maintain inflation with a target band of 2 – 3%

- Too much inflation is undesirable; indicates the economy is overheating where incomes and prices of goods & services are growing at an unsustainable level.
- Too little inflation is undesirable; indicates that economy is weakening where income is flat or declining, resulting in poorer demand for goods & services, which flow on to poorer wage growth and higher unemployment.

(Workshop 3 LC 2)

If inflation consistently breaches the limits of the inflation target, the RBA has cause to enact expansionary or contractionary monetary policy by changing the cash rate.

This concludes our discussion on the RBA and monetary policy, a key starting point for your assignment.



Consequences of inflation:

- $\uparrow$ inflation = $\downarrow$ purchasing power if income/returns don't grow by inflation
- If you earn 3% on an investment, but inflation is 3%, which means goods & services are 3% more expensive, are you able to buy more? Have you earned anything in real terms? *No*
- Implication: if your wages grow by 3%, but inflation is 3%, which means goods & services are 3% more expensive, has your income grown in real terms? Will you be able to buy more? Has your wage growth meant anything? *No*
- This is inflation risk (the potential erosion of purchasing power gained from income and investment) which should be compensated for by an inflation risk premium.

Real Rate of Return = Nominal Return – Inflation rate

*Textbook pg. 63,
formula (2-2)*



Our final area of discussion for the RBA is to understand it's role in the Australian payment system.

- The payments system is used to settle millions of transactions totalling almost A\$200 Billion each day.
- The Australian payments system is a set of arrangements that enables consumers, businesses and other parties to enter into and settle financial transactions.
- This includes: Australian Currency (legal tender), RITS, EFTPOS terminals, Debit cards, Credit cards, PayPal, BPay and other forms of non-cash payment.

In your own time, you can view the following video ..

<https://www.youtube.com/watch?v=N1I-ib71BQ8>

For more on RITS: <http://www.rba.gov.au/payments-and-infrastructure/rits/about.html>



- The RBA has three roles regarding the payments:
 1. It promotes the efficiency and stability of the Australian currency (AUD) and the payments system
 2. It provides the facilities for the settlement of transactions
 3. It acts as the banker to the Australian government.

The Australian Dollar (AUD) is a floating rate currency.

- Turnover: A\$180 Billion/day, 8th largest currency market, globally.
- RBA rarely intervenes in the currency and would do so only to address any gross misalignment of the exchange rate¹.

¹<http://www.rba.gov.au/mkt-operations/ex-rate-rba-role-fx-mkt.html>



Electronic Banking

- Electronic banking (EB) is the execution of banking services by using electronic devices.
- Electronic banking provides many advantages such as low or no fees, speed, efficiency and convenience, greater accessibility and functionality, and a means of supplementing face-to-face banking.
- There are also disadvantages which need to be considered. Some of these include security, privacy and trust concerns; unreliability of internet infrastructure; simple preference for face-to-face banking; and self-perceived inability of consumers to handle electronic banking.



Electronic Banking

The major reasons for financial institutions to offer electronic banking are:

1. Electronic banking allows for a reduction in overheads and personnel costs.
2. It generates productivity gains that increase revenue.
3. It provides better, faster and more convenient services to customers over a wider service and product range.

The growing dominance of electronic banking and payments is important trend in the economy.

(Workshop 3 LC 3)



We now move on to discuss APRA.

- Firstly, any questions about definitions and material covered in the Pre-load or your Self-study?

Prudential Supervision

- A key role of APRA is to supervise ADIs
- It's about controlling the risk-taking of ADIs.
- Why is it so important that ADIs do not take excessive risk?
 - To maintain Investors confidence.
 - To prevent bank failures from spreading to other banks; limit Contagion.
 - Protect the stability of the financial system.



ADIs serve as the main intermediary through which the flow of funds and payments system occurs in the economy, particularly between the general public and the private sector.

- Failure of any ADI has the threat of spreading further to other ADIs. This has the potential to disrupt the entire payments system and the whole economy. E.g. excessive risk-taking and the subsequent failure of key financial institutions in the US brought about the GFC.
- This is why the finance industry is the most heavily regulated in Australia. In no other industry, would failure threaten the well being of the entire economy.
- Thus, risk-taking by ADIs is closely monitored by APRA.
- The impact of CAR will be examined in the PBL.



We now move on to discuss ASIC.

- Firstly, any questions about definitions and material covered in the Pre-load or your Self-study?

Primary regulator of financial markets & instruments

- ASIC produces numerous regulatory guides...
- An area of regulation that is of particular interest in BFC1001 is that pertaining to the raising of equity capital by an IPO.

<http://asic.gov.au/regulatory-resources/find-a-document/regulatory-guides/>

<http://asic.gov.au/regulatory-resources/corporate-governance/corporate-governance-articles/going-public/>

*Students can review these links in their own time.
The links are not assessable.*



As the regulator for IPOs, ASIC directly influences the cost of an IPO through the number and extent of regulations that listing companies need to comply to.

- The more extensive the regulation, the greater the cost of IPO.
- A significant part of the compliance is the construction of an IPO prospectus. Apart from a rather small lodgement fee of A\$2,350¹, it is estimated the cost of underwriting and prospectus preparation amounts to 6 – 10% of funds raised².
- i.e. when raising 100 million, 6 – 10 million is the transaction cost.
- This is not K_e , which is what shareholders expect to be paid, this is just the very expensive transaction cost of raising the equity capital.
- How would such a high transaction cost of capital, affect the flow of funds? Would higher costs encourage or discourage it?

¹<http://download.asic.gov.au/media/4162924/fee-indexation-2016-info-30-fees-for-commonly-lodged-documents.pdf>

²<http://www.asx.com.au/about/faqs-about-listing.htm>



Critical thinking:

- *Greater IPO regulation will increase the cost of equity capital, which discourages the flow of funds and economic growth*
- *However, greater regulation has the positive impact of share buyers having better protection and disclosure of information. This provides buyers with greater confidence to participate and engage in the purchase of capital (i.e. better for liquidity)*
- *So, how can we know when greater regulation is better for the financial system and economy?*
- ***When it fosters net growth in the flow of funds, through greater confidence in the system, despite greater costs to capital.***



Next, we will have our in-class Financial Literacy Survey (15min) and we'll start our PBL after.

We have 4 PBL questions to cover, the remaining 4 are take-home including anecdotes of domestic and international financial crisis.

Please leave your LC windows open as the next LC question delivered will be the 1st PBL question. After the PBL...

We have now finished discussing the knowledge base of Topic 2 where your learning was conducted through different stages over a week ...

1. Pre-load: introduced key aspects of the topic and provided direction for self-study.
2. Self-study: building on topic introduction through reading and quizzing.
3. Workshop: confirming, reinforcing and finalizing topic knowledge and comprehension.



After you finish the PBL, it is highly recommended that you form one set of your own Topic notes that **combines** ...

- Pre-load notes
- Self-study quiz answers
- Interactive study notes
- PBL questions and answers
- Your own notes of summary and comprehension

Revision for the test and exam will be simpler with one set of notes for each topic that is **customised for you, by you.**



BFC1001

Pre-load:

Value, Time & Money (Intro. To
Financial Math)

Please join the active LC session upon entering class.



Key Topic Aspects being introduced ...

1. Value Vs Price
2. Time Value of Money
 - PV & FV
 - Multiple Cashflow Valuation
3. EAR
4. Yield, Return & Discount Rates



Learning Objectives

1. Understand the concept of the Time Value of Money and know how it affects present and future value calculations.
2. Understand value and how it is calculated.
3. Appreciate the concept of yield (also called return) and how it is affected by compounding and inflation.



Financial math is about *Valuation*.

- **Value is defined as the worth of an asset, the total of what the asset can earn over the period held. The worth of an asset typically comes from net income in the future and terminal value.** How about liabilities?
(Pre-load 3 LC Q1)
- The first step in establishing value is to estimate the components of cash flow streams (money streams) that arise from financial products and real assets
- Examples of financial products: loans, shares, bonds.
- Examples of real assets: Real estate and equipment (that represent investable, tangible projects).



- The value established could be a present value or a future value.
- Value is termed by a number of names; including fundamental value, true value, intrinsic value and economic value.

Ultimately, **value is important because it is used to make buying and selling decisions of financial products and real assets.**

Value needs to be distinguished from the concept of “Price”.

- The price of a financial product or real asset is what it trades at in a market as a function of its supply and demand.

** Subject link: Price as a function of supply and demand is developed further in Macroeconomics*

- The value of an asset, i.e. what it is worth, is one factor that influences the supply and demand of the asset and thus its price. There are other factors that affect supply and demand.



Self-study:

- *Be able to define “value”, appreciate how it is different from price and be able to articulate why value is important in the context of investment.*
- *What are some other factors that affect an assets price apart from value? hint: what did we study last topic? Hint for another factor: when you buy things, are you always rational?*
- *In the Workshop, we shall clearly define how Value and Price are used to answer important investment questions ...*
 - *What price should I pay for this investment?*
 - *What price should I sell this asset for?*



The time at which money is earned or paid affects its value or cost.

- Money received or earned today, is greater in value to the recipient than if received at a later date.
- Money paid today is greater in cost to the payer, than if paid at a later date.

This is intuitively true...

- would you prefer to receive \$1,000 now *OR*
- wait 10 yrs. to receive the \$1,000.

**Subject link: Utility is a concept from economics*

Why would we prefer the earlier option? Because of the **Utility** of money.

- Utility = Satisfaction
- The sooner we get paid money, the greater our satisfaction as we can choose to spend/invest that money earlier and vice versa.



Let us examine the impact of money utility on holders of assets and liabilities ...

- Asset holder = you are receiving money
- Liability holder = you are paying money

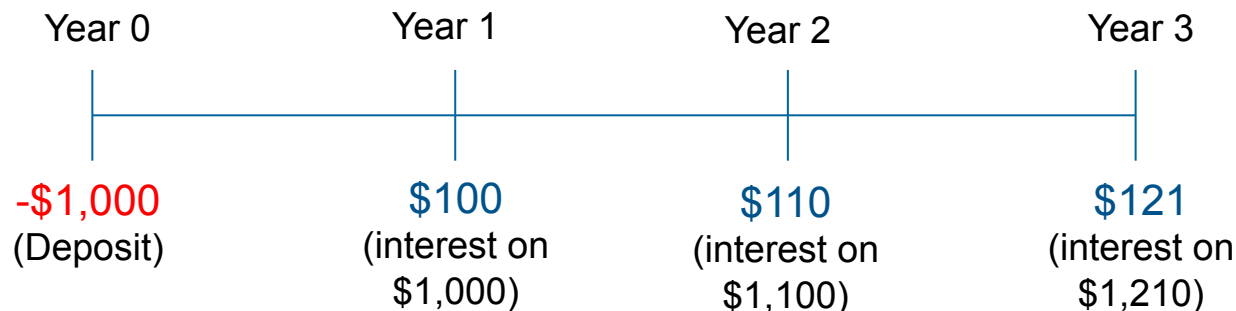
How does the concept of money utility affect your preference of cash flow timing as an asset holder or liability holder?

(Pre-load 3 LC Q2 & 3)



Drawing a time line can help to clearly identify the timing of when money is received or paid for any project, asset or liability.

E.g.: You've opened a bank account for three years with an initial deposit of \$1,000. It calculates and pays interest at 10% p.a. at the end of each year. The cash flows to you can be represented as follows ...



**Concept Check: What is Year 0? When does the timeline end?*



Given that money has different value dependent on the time it is earned or paid, three central rules arise:

1. Money can be only be combined and compared if earned at the same time period. (as they have the same time value)
2. Calculating a Future Value (FV) given periodic growth on an investment is called **compounding**. Often used to work out what capital accumulates to in the future given re-investment of a periodic return. E.g. ...
 - An interest bearing deposit account with a bank
 - A sinking fund or investment fund which earns a periodic return and re-invests that return.

“Compound interest is the eighth wonder of the world. He who understands it, earns it ... he who doesn't ... pays it.” - Albert Einstein.



Given that money has different value dependent on the time it is earned or paid, three central rules arise:

3. Calculating a Present Value (PV) by diminishing money earned in the future to reflect the time value of money is called **discounting**. We review the reasons for discounting in Slide 16. E.g....
 - In capital budgeting, we discount the cash flows of assets to establish PV today so as to compare value with today's price.
 - We can discount cash flows of comparable liabilities to work out the Present Value of cost and identify which is cheaper.



When money is compounded by periodic growth rate, a **future value (FV)** is obtained. A single cash flow, compounded over time is given by:

$$FV = PV(1+i)^n$$

FVIF

When money is discounted, a **present value (PV)** is obtained. A single cash flow, discounted over time can be calculated by:

$$PV = FV / (1+i)^n$$

Where ...

- i is the interest rate for FV and the discount rate for PV
- n is the number of payments.



Self-study:

- *After your self-study reading, be clear on when you use PV and FV, i.e. when do you discount cash flows and when do you compound them? Review Slides 10 & 11 to help.*
- *We pre-load you with the PV and FV of single sums. The reading will also take you through PV and FV of multiple sums/cash flows and which we shall review and practice in the workshop.*
- *In the workshop, we shall guide you through the right method for solving financial math...*
 1. *Write out the formula*
 2. *Make the correct substitutions for variables*
 3. *Work out the answer.*
- *Ignore the textbook references to Texas Instrument or other calculators. In the workshop, we shall guide you through how to use the HP10BII+ calculator to solve for financial math. i.e. Step 3 above.*
- *The self-study quiz gets you started with simple financial problems that you can attempt to solve with the HP calculator.*



EAR: The effective return that includes the compounding effect of the frequency of payment per annum.

$$EAR = \left(1 + \frac{i}{m}\right)^m - 1$$
$$FV = PV \times \left(1 + \frac{i}{m}\right)^{m \times n}$$

Where ...

i = nominal rate or Annual % Rate

m = frequency of payment / annum

n = number of years,

Self-study:

- Be familiar with the common frequencies of payment of financial products. e.g. monthly, fortnightly, weekly, semi-annually, etc., and be able to incorporate EAR into PV and FV formula.
- We shall practice this in the Workshops.



The **Yield** or **Return** of an asset is a widely used metric for relative performance.

- It expresses the money earned by the asset, as a percentage of the price paid for the asset.

**Concept Check: How does yield/return allow comparison between assets of different prices?*

- The money earned can be income, capital gains or a combination of both.

**Concept Check: Define the difference between earnings from income and capital gain.*

- The percentage is usually expressed for a time period, e.g. % per annum.

**Concept Check: What time period is most commonly used and why?*

- The terms Yield and Return are interchangeable. Return is also called the “Rate of return”.



It is important to distinguish between the Yield and the Discount Rate.

- Yield/Return is commonly a relative performance measure, i.e. how an asset performs and which asset is performing better. In a simple form...

Yield = Earnings/Price

- The Discount Rate is used to calculate present value. It is often the required rate of return and that used to discount future earnings/cash flow to a present value. This discounting or diminishing of future earnings to a lower present value reflects and incorporates...
 - The time value of money.
 - Inflation
 - Risk (the concept of risk and how it affects the present value of future earnings is discussed in later topics)

(Pre-load 3 LC Q4)



Self-study:

- *Understanding the a discount rate is diminishing future cash flows to establish their present value is important.*
- *Be clear on why future cash flows are worth less today. i.e. be clear on the concept of the time value of money.*
- *This will set you up well for understanding how the PV formula incorporates the time value of money, risk and inflation in it's formula. We will review this in the Workshop.*



Next...Self-study for Topic 3



BFC1001

Interactive Study: Value, Time & Money (Intro. To Financial Math)

Please join the active LC session upon entering class.



Key Topic Aspects being completed ...

1. Value Vs Price

2. Time Value of Money

- Single cash flow PV & FV
- Multiple Cashflow Valuation

3. EAR

4. Yield, Return & Discount Rates



We start off by continuing our study of Value Vs Price.

- Firstly, any questions about definitions and material covered in the Pre-load or your Self-study?

Let us revise our definition of price from our Pre-load ...

- The price of a financial product or real asset is what it trades at in a market as a function of its supply and demand.
- The value of an asset, i.e. what it is worth, is one factor that influences the supply and demand of the asset and thus its price. There are other factors that affect supply and demand.

What are the other factors that affect supply and demand?

- Financial regulation
- Market sentiment; the “emotion” of buyers and sellers at the time.
- Did your self-study reveal other factors?

*Answer to self-study
question:
Other factors that affect
supply and demand?*



Critical Thinking: Value can be compared to Price to justify buying or selling decisions, depending on the perspective as a buyer or seller:

- Value < Price, the asset can be termed “over-priced”
 - A buyer wouldn’t buy; they pay more than what the asset can earn.
 - A seller would sell; they receive in price more than the asset can earn if kept.
- Value > Price, the asset can be termed “under-priced”
 - A buyer would buy; they pay less than what the asset can earn.
 - A seller wouldn’t sell; they receive in price less than what the asset earns if kept.
- This process of comparing value to price aids in understanding one of the most widely used and important capital budgeting (investment) metrics: **Net Present Value (NPV)** taught in Week 5.

In this topic, we introduce a key foundation of finance; the financial math used to establish value.



Answer to self-study question:
Value Vs Price to answer
important investment questions?

Critical Thinking Conclusion: Why is valuation important in finance? It enables us to answer the following questions

- As a buyer: *What price should I pay for this investment?*

Ans: A price not over the asset's value. The best price is \$0, but it is unlikely a seller would sell for that. Value help sets a price ceiling.

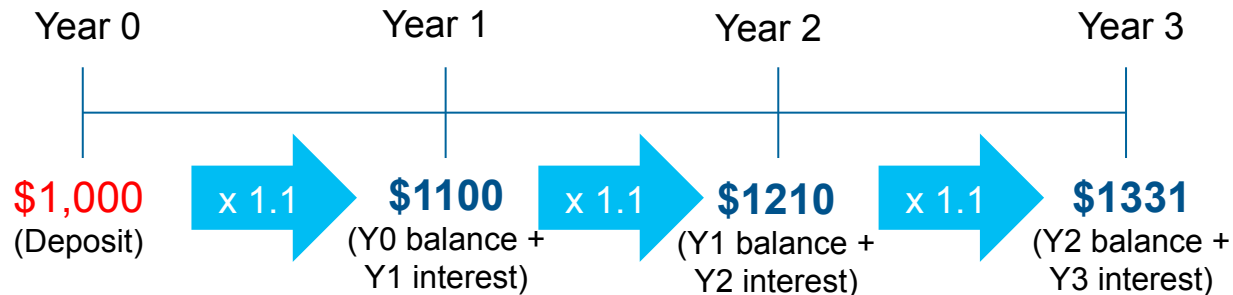
- As a seller: *What price should I sell this asset for?*

Ans: A price over the asset's value. Value help sets a price floor.

The buyer and seller of the same asset can have different present valuations of the same asset as they can have different discount rates.. We shall explore why and how when discussing *discount rates*.



You've opened a bank account with an initial deposit of \$1,000. It calculates and pays interest at 10% p.a. at the end of each year, for 3 years. What is the future value of your investment?



$$FV = PV(1+i)^n$$

$$FV = \$1000(1+0.1)^3$$

$$FV = \$1331$$

- Your SLs will show you how to check the answer above with your HP financial calculator.



If the previous question was on the test on exam, how would be an example of how marks be awarded? Method for solving financial math in BFC1001...

1. Write out the appropriate formula to the question. (1 mark)
2. Substitute in the correct values. (1 mark)
3. Work out the correct answer; with a calculator manually or with calculator functions (1 mark)

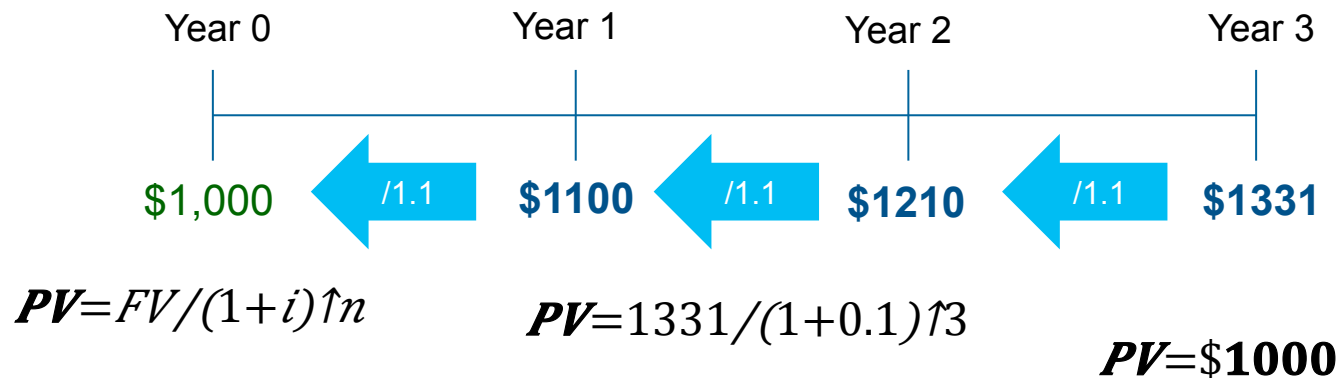
While timelines are not graded unless expressly asked for in a question, they are important for your understanding of financial math, especially for complex math such as in capital budgeting.

Let's get some practice with FV questions following the method above ...

At the discretion of your SL any of W3 LC 1,2 & 3 will be delivered. It is recommended that later, students print out these LC questions and solutions to add/insert into the Interactive Notes.



You'll receive a gift of \$1331 in 3 yrs time, at a discount rate of 10% p.a., what is the present value today of this gift?



Note: n in PV is the period in which the cash flow occurs. Remember this for the coming LC questions.

Let's get some practice with PV questions ...

At the discretion of your SL any of W3 LC 4,5 & 6 will be used for practice.



Note:

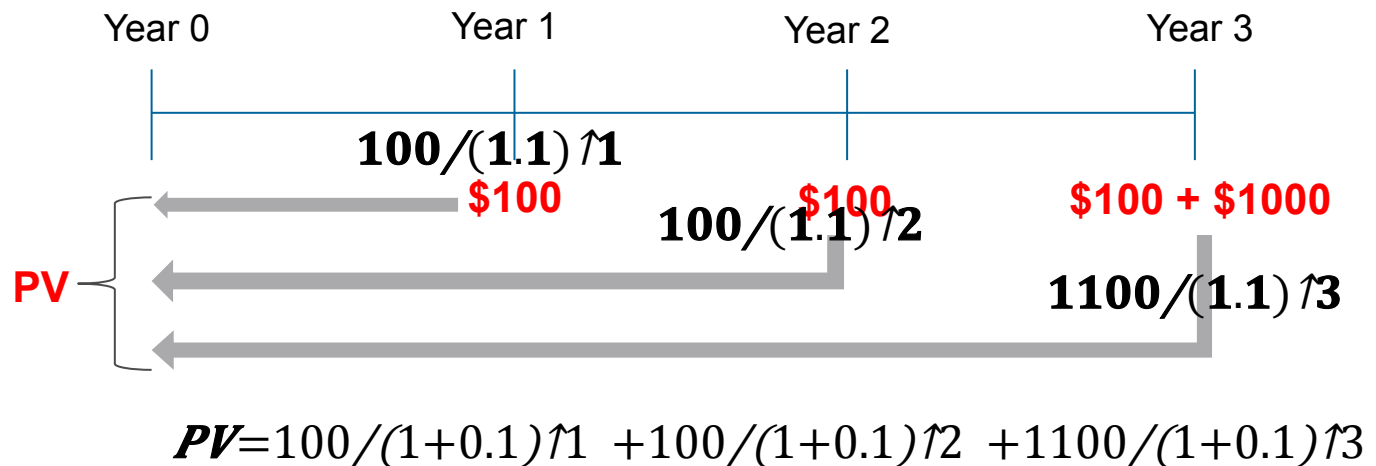
- EARs apply primarily to FV not PV (uses discount rates which are not compounded)
- FV is used primarily for assets, PV is common for both assets & liabilities. In FV, you are compounding future earnings by a growth rate (i). Still, in liabilities, FV can be used to compound future costs. E.g. the interest you receive on a term deposit has to be paid by the bank. The compounding interest to you is a compounding bank cost.



1. Single/Lump sum cash flow for PV & FV. ✓
2. Mixed stream/multiple cash flow for PV & FV.
next
3. Annuities (covered in Topic 4)
4. Perpetuities (covered in Topic 4)



What is the present value cost of a \$1000 loan charging 10% p.a. interest over 3 yrs, discounted at 10%? For multiple cash flows, create a timeline and set out the cash flows clearly before applying the PV formula to each cash flow individually.



$$PV = 90.91 + 82.64 + 826.45 = \$1000$$

- Your SLs will show you how to check the answer above with your HP financial calculator (e.g. with CF_j and NPV buttons)

(W3 LC 7 & 8)



The same methodology is applied to calculating FV with multiple cash flows.

- Create a timeline
- Set out the cash flows clearly
- Applying the FV formula to each cash flow individually.

Let's practice multiple cash flow FV in LC...

(W3 LC 9)



EAR: The effective return that includes the compounding effect of the frequency of payment per annum.

$$EAR = \left(1 + \frac{i}{m}\right)^m - 1 \quad FV = PV \times \left(1 + \frac{i}{m}\right)^{m \times n}$$

Where ...

(W3 LC 10)

i = nominal rate or Annual % Rate

m = frequency of payment / annum

n = number of years,

- Conclusion: The _____ the frequency of payment (m) the _____ the effective return.



It is important to distinguish between various types of return:

1. Nominal return:

- Also known as the annual percentage return (APR).

2. Effective return: e.g. EAR

- The return that includes the effect of compounding.

3. Real return.

- The return that accounts for the erosion of purchasing power due to inflation.

4. Required rate of return

- The minimum return needed. WACC is an example of a RRoR.

5. Expected rate of return

- The anticipated/forecasted return that will be earned on an asset.



The required rate of return is commonly used as a discount rate in PV calculations.

- It incorporates risk, inflation and the opportunity cost of capital (which considers R_f)
- When using the RRoR to calculate value, future earnings are *discounted* by what they have to earn; which is in effect, paying for RRoR.
- The remaining value is then compared to price to help determine buying or selling decisions.

$$PV = FV / (1 + i)^n$$

RRoR ↙

- In capital budgeting, a RRoR is WACC which serves a common discount rate.



BFC1001

Interactive Study: Wealth, Time & Money (Intro. To Financial Math)

Please join the active LC session upon entering class.

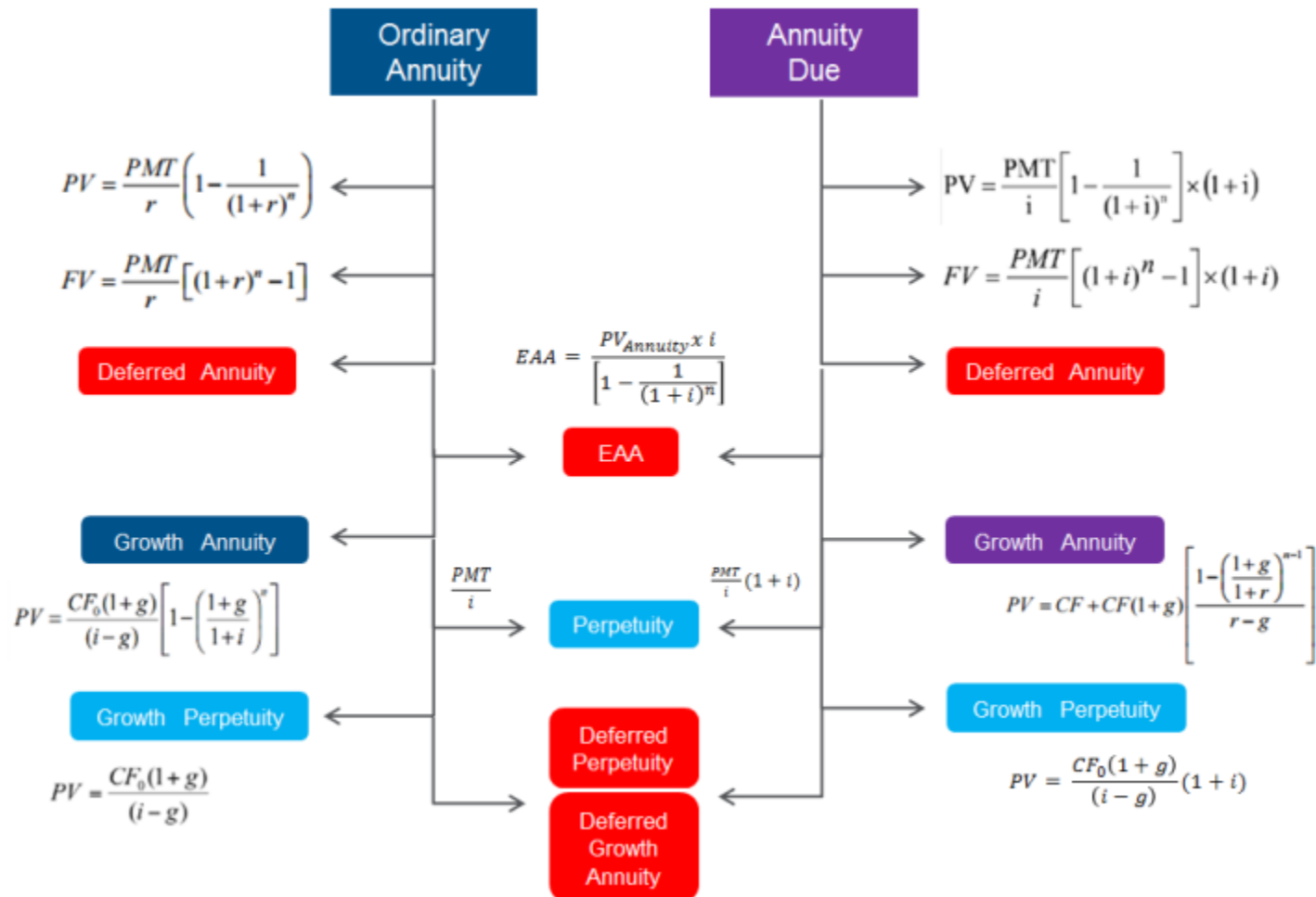


Key Topic Aspects being completed ...

1. Annuities
2. Growth Annuities
3. Annuity Applications
4. Perpetuities



Our interactive study is primarily about practicing the application of annuity financial math and formula of the Annuity Learning Map.





From our Pre-load ...

$$PV = \frac{PMT}{i} \left[1 - \frac{1}{(1+i)^n} \right] \quad FV = \frac{PMT}{i} \left[(1+i)^n - 1 \right]$$

Where ...

- FV = the future value of the annuity
- PV = present value of the annuity
- PMT = the cash flow received/paid under the annuity
- n = the number of payments
- i = the per-period discount rate (PV) or compound rate (FV). i and r are used interchangeably.

Important note: PV of Ordinary annuities, is at the time stamp of when the annuity starts; one time period before the 1st payment. E.g. $PMT_1 \rightarrow PV_0$

■ Lets do 2 quick and easy LC questions ...

(W4 LC Q1 & 2)



From our Pre-load ...

$$PV = \frac{PMT}{i} \left[1 - \frac{1}{(1+i)^n} \right] \times (1+i) \qquad FV = \frac{PMT}{i} \left[(1+i)^n - 1 \right] \times (1+i)$$

Where ...

- FV = the future value of the annuity
- PV = present value of the annuity
- PMT = the cash flow received/paid under the annuity
- n = the number of payments
- i = the per-period interest rate

Important note: PV of Annuity Due, is at the time stamp of when the annuity starts which at the time period of the 1st payment. E.g. $PMT_0 \rightarrow PV_0$

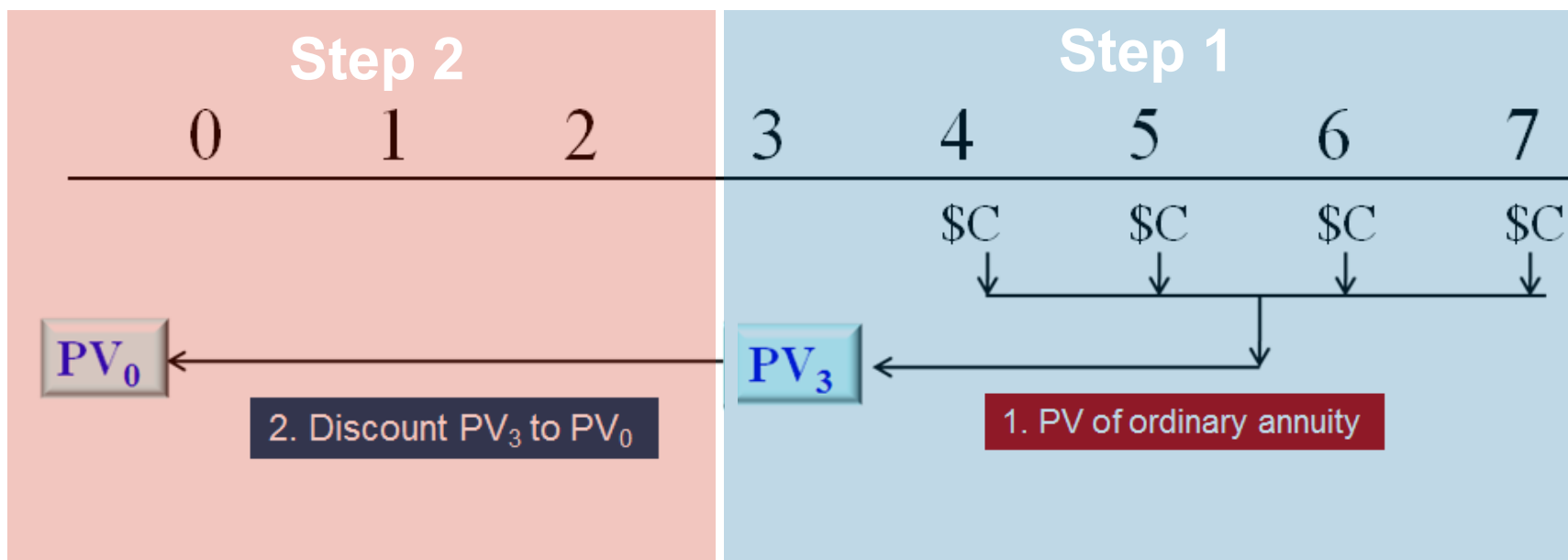
■ Lets do 2 quick and easy LC questions ...

(W4 LC Q3 & 4)



From our Pre-load ...

- An ordinary annuity starts in 3 years from today for 4 years.
- Methodology for solving this **Deferred Ordinary Annuity** starting in Y_3 , where $n = 4$: Construct the time line then...



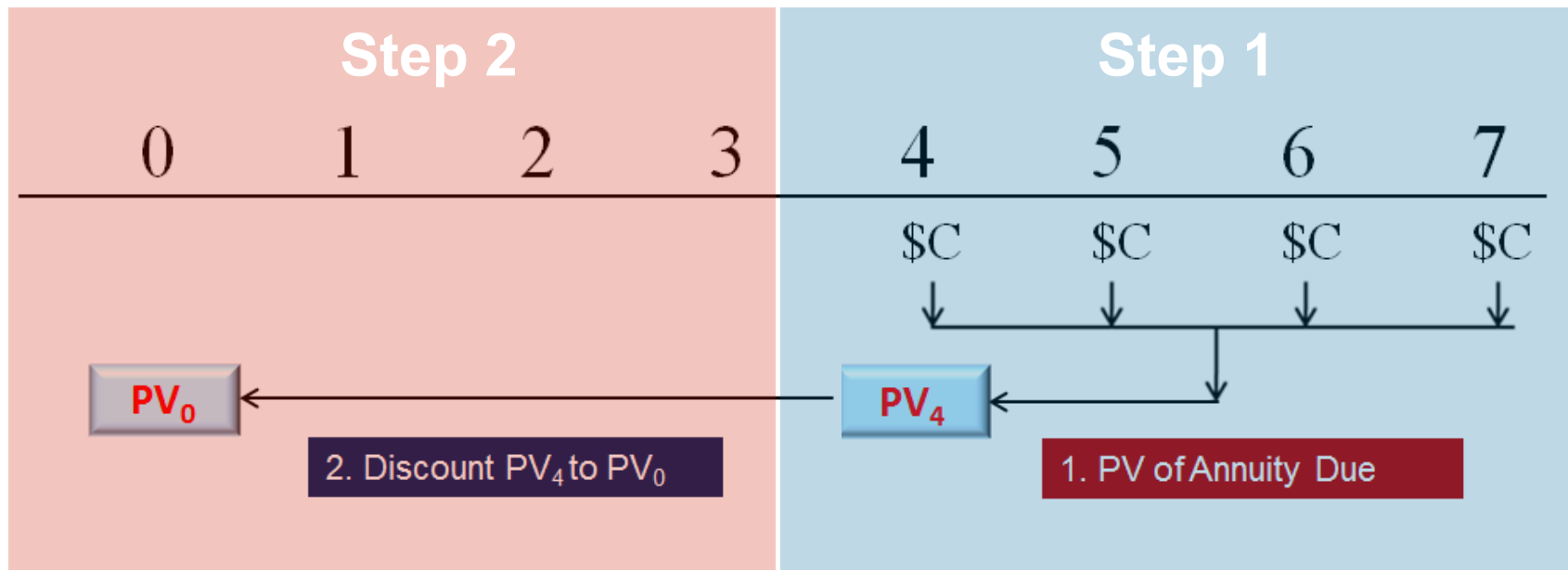
- Lets apply this methodology ...

(W4 LC Q5)



From our Pre-load ...

- An annuity due starts 4 years from today with a maturity of 4 years.
- Methodology for solving a **Deferred Annuity Due** starting in Y_4 , where $n = 4$: Construct the time line then...



- Lets apply this methodology ...

(W4 LC Q6)

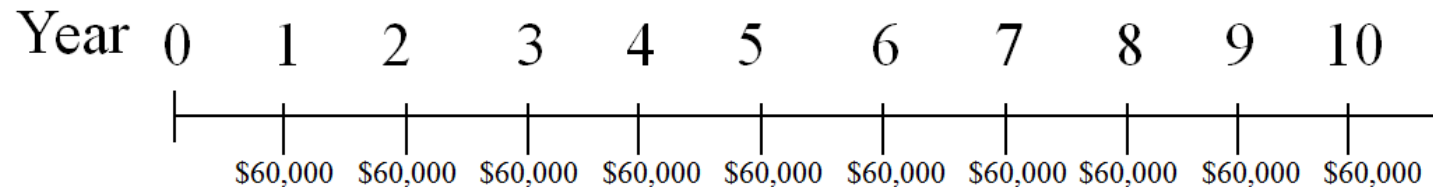


If your rich uncle includes you in his will and leaves you with the option of either

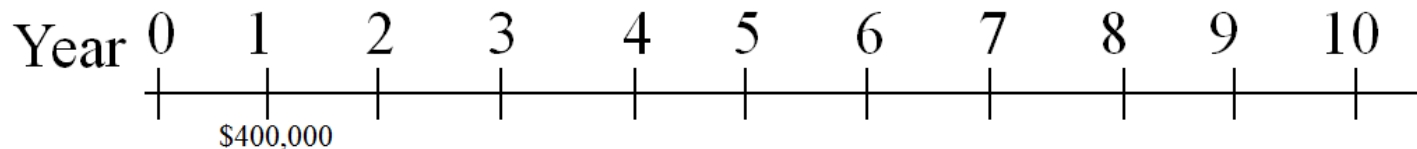
- i. Receiving \$60,000 each year for the next 10 years ; Or,
- ii. Receiving a lump sum of \$400,000 in one year

If the interest rate applicable is 14% which option will you accept?

Asset 1: Annuity Stream (Due)



Asset 2: Lump Sum



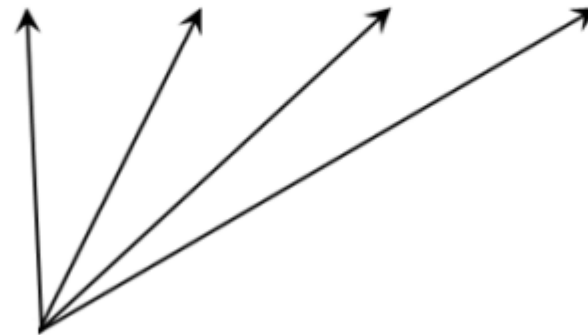
Answer: PV both lump sum and annuity to PV_0 in Y_0 . The one with the greatest value is the one to pick.



An alternative is to find an **equivalent annuity** for Asset 2



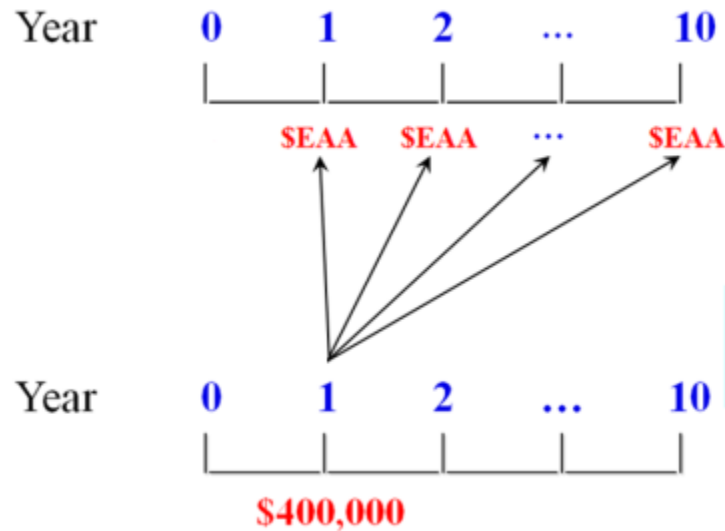
SEAA SEAA ... SEAA



Convert the single Lump sum in year one into an **equivalent Annual Amount (EAA)** spanning over ten years as option 1



\$400,000



To convert the \$400,000 lump sum into an annuity, we apply...

$$PV = \frac{PMT}{r} \left(1 - \frac{1}{(1+r)^n} \right)$$

...and solve for PMT by re-arranging the formula

1. For Option 1, we assume that we receive the \$60,000 at the end of the year, so we want an equivalent ordinary annuity, where the 1st payment is in Y_1 .
2. PV of the ordinary annuity which starts in Y_1 is PV_0 . However, \$400,000 is in Y_1 , so we need to bring it back to Y_0 before we can do any substitution into our formula to solve for PMT.

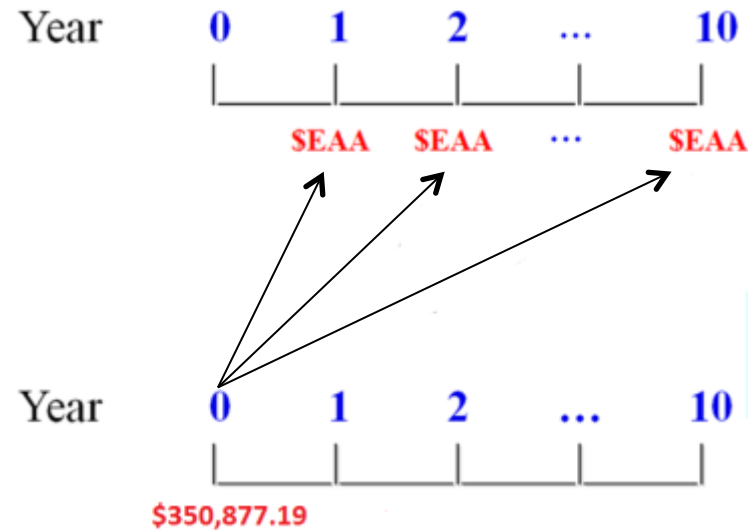


3. So $PV_0 = 400000 / 1.14^{11} = \$350,877.19$

4. Then we solve for PMT, re-arranging

$$PV = \frac{PMT}{r} \left(1 - \frac{1}{(1+r)^n} \right)$$

gives
$$EAA = \frac{PV_{Annuity} \times i}{\left[1 - \frac{1}{(1+i)^n} \right]}$$



$$EAA = 350877.19 \times 0.14 / [1 - 1/(1.14)^{10}] = \$67,267.91$$

Conclusion:

EAA of \$400,000 is \$67,267.91 > \$60,000. So we choose Option 2, receiving the \$400,000 in 1 years time.

(We shall practice this in the PBL)



From our Pre-load:

Ordinary Growth Annuity

Growth Annuity Due

$$PV = CF_0(1+g)/i - g [1 - (1+g/1+i)^{-n}]$$

$$PV = PMT + PMT(1+g)[1 - (1+g/1+i)^{-n-1}] / i - g$$

Where

- CF_0 = the cash flow in Period 0
- i = interest rate per period, note i & r are used interchangeably
- g = constant growth rate per period
- n = number of payments/periods

Important note: There is no formally supported calculator method of solving growth annuities (there is no g button on the calculator). Students will need to solve these formula manually on the calculator. Students are still free to source external calculator methods but these are not taught or supported by staff.

- Lets practice growth annuities ...

(W4 LC Q7)



From our Pre-load:

Ordinary Perpetuity

$$PV = PMT/i$$

Perpetuity Due

$$PV = PMT + PMT/i$$

Ordinary Growth Perpetuity

$$PV = CF(1+g)/(i-g)$$

Growth Perpetuity Due

$$PV = CF(1+g)/i - g(1+i)$$

Lets practice perpetuities ...

(W4 LC Q8 & 9)



We shall be applying all that we have learned over the past 2 weeks in the later topics:

- **Debt:** PV of ordinary annuity
- **Stocks:** PV of perpetuities, growth perpetuities & deferred perpetuity applications.
- **Applications of finance:**
 - **Mortgages** – PV of ordinary annuities, solving for i , n , PMT and mortgage balances.
 - **Superannuation** – Growth annuity valuation.

We shall continue our financial math practice with the PBL.



BFC1001

Pre-load:

Wealth, Time & Money (Annuity
Financial Math)

Please join the active LC session upon entering class.



Key Topic Aspects being introduced ...

1. Annuities
2. Growth Annuities
3. Annuity Applications
4. Perpetuities



Learning Objectives

1. Describe how to calculate the present value of an ordinary annuity and it differs from an annuity due.
2. Understand the methodology of valuing Deferred Annuities and Annuities of Unequal lives.
3. Discuss growing annuities and perpetuities, as well as their application in business, and be able to calculate their value.

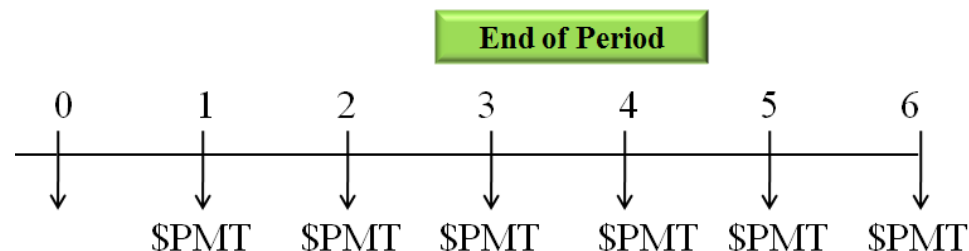


- In finance we commonly encounter situations which calls for payments of **equal** amount of cash at **regular** intervals of time over **several time periods**.
- Example: Business, Personal, Car and Home Loans, Insurance Policies, etc.
- Any financial contract that calls for **equally spaced** and **level cash flows** over a **finite number of periods** is called an annuity.
- When valuing annuities, rather than discount/compound each cash flow individually, as each cash flow is the same and equally spaced over time, a single formula can be applied for easy of understanding and calculation.



Ordinary Annuities:

- Most annuities are structured so that cash payments are **paid** or **received** at the **end** of each period. As this is the most common structure, these annuities are called *ordinary*.



- A **fixed** amount of money is paid/received at **fixed** intervals of time for a **fixed** period of time.
- Ordinary Annuities** are also called... **Annuity in Arrears** or a **Deferred Annuity**.
- If nothing is said about the cash flows, always assume it is an ordinary annuity. **1st cash flow occurs 1 period after the start of the annuity**



$$PV = \frac{PMT}{i} \left[1 - \frac{1}{(1+i)^n} \right] \quad FV = \frac{PMT}{i} \left[(1+i)^n - 1 \right]$$

Where ...

- FV = the future value of the annuity
- PV = present value of the annuity
- PMT = the cash flow received/paid under the annuity
- n = the number of payments
- i = the per-period discount rate (PV) or compound rate (FV). *i and r are used interchangeably.*

Important note: PV of Ordinary annuities, is for the time period before the 1st payment.



Ordinary
Annuity

$$PV = \frac{PMT}{r} \left(1 - \frac{1}{(1+r)^n} \right)$$

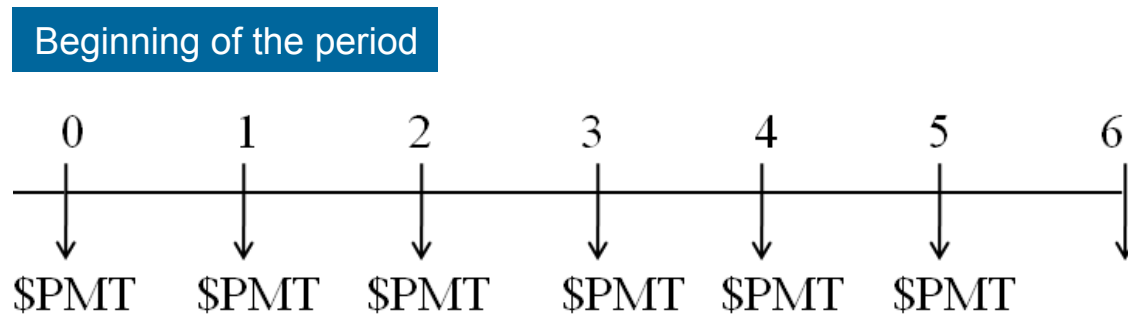


$$FV = \frac{PMT}{r} [(1+r)^n - 1]$$





- Annuity where payments are **paid** or **received** at the **start** of each period.



- **Annuity Dues** are also called... **Annuities in Advance.**
- 1st cash flow occurs at the start of the annuity.

(Pre-load 4 LC Q1)



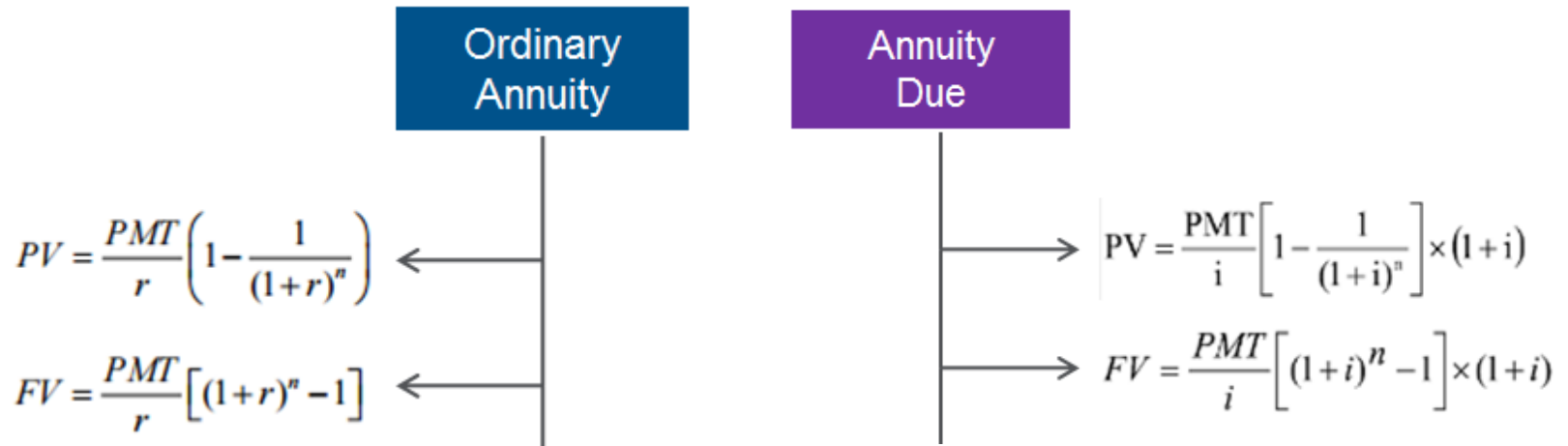
$$PV = \frac{PMT}{i} \left[1 - \frac{1}{(1+i)^n} \right] \times (1+i) \quad FV = \frac{PMT}{i} \left[(1+i)^n - 1 \right] \times (1+i)$$

Where ...

- FV = the future value of the annuity
- PV = present value of the annuity
- PMT = the cash flow received/paid under the annuity
- n = the number of payments
- i = the per-period interest rate

Important note: PV of Annuity Due, is for the time period of the 1st payment.

(Pre-load 4 LC Q2)





Self-study:

- *Be clear on the key defining characteristics between ordinary and annuity dues ...*
- *When do cash flows start for both? When PVing either what time period is the PV for?*
- *Attempt to find examples of financial instruments/securities that provide annuity payments.*
- *In the Workshop, we shall practice applying these formula in annuity math.*



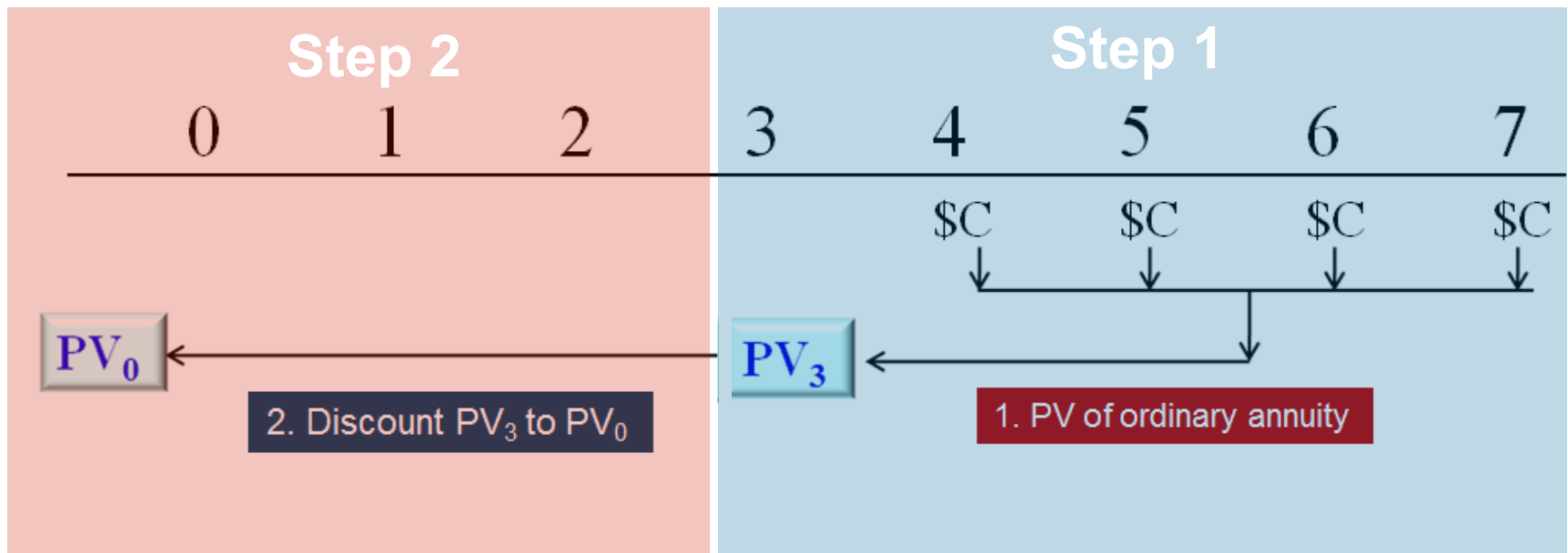
Deferred Annuities

- Annuities that do not start in Y_0 but in the future.
- This methodology will be used frequently in numerous later finance subjects.

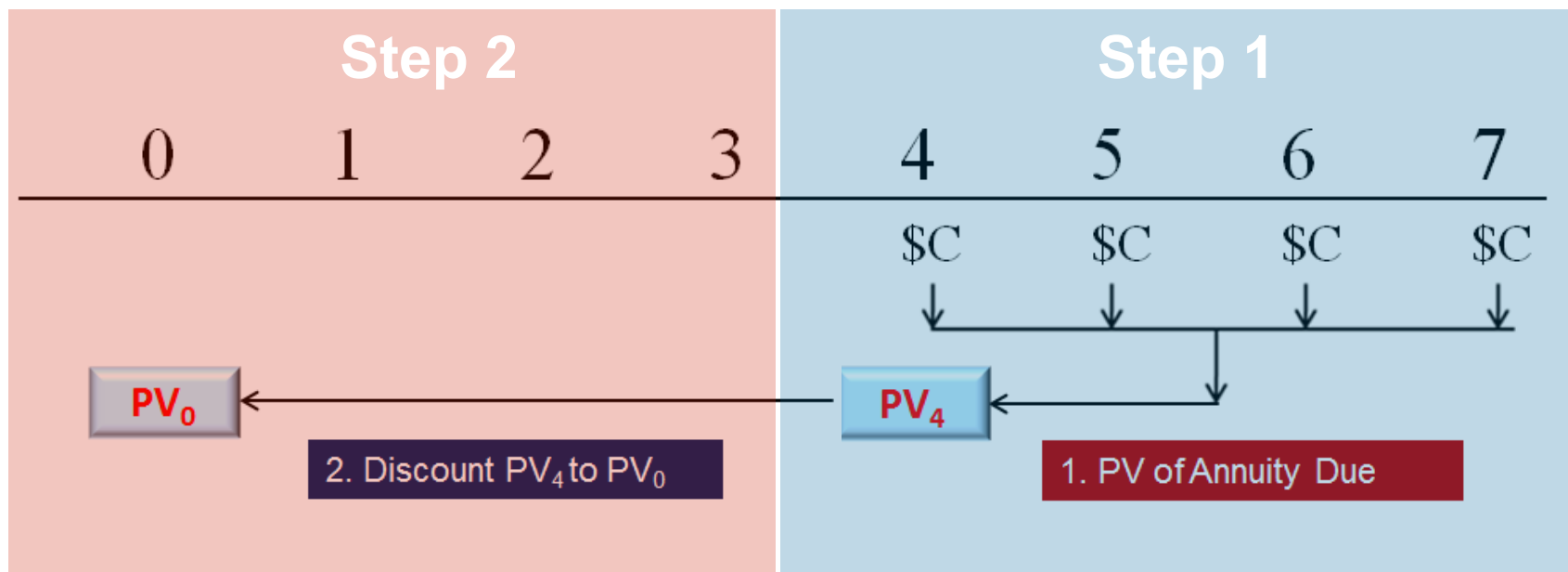
Equivalent Annuities

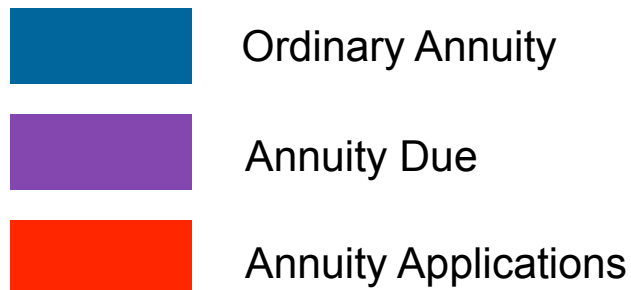
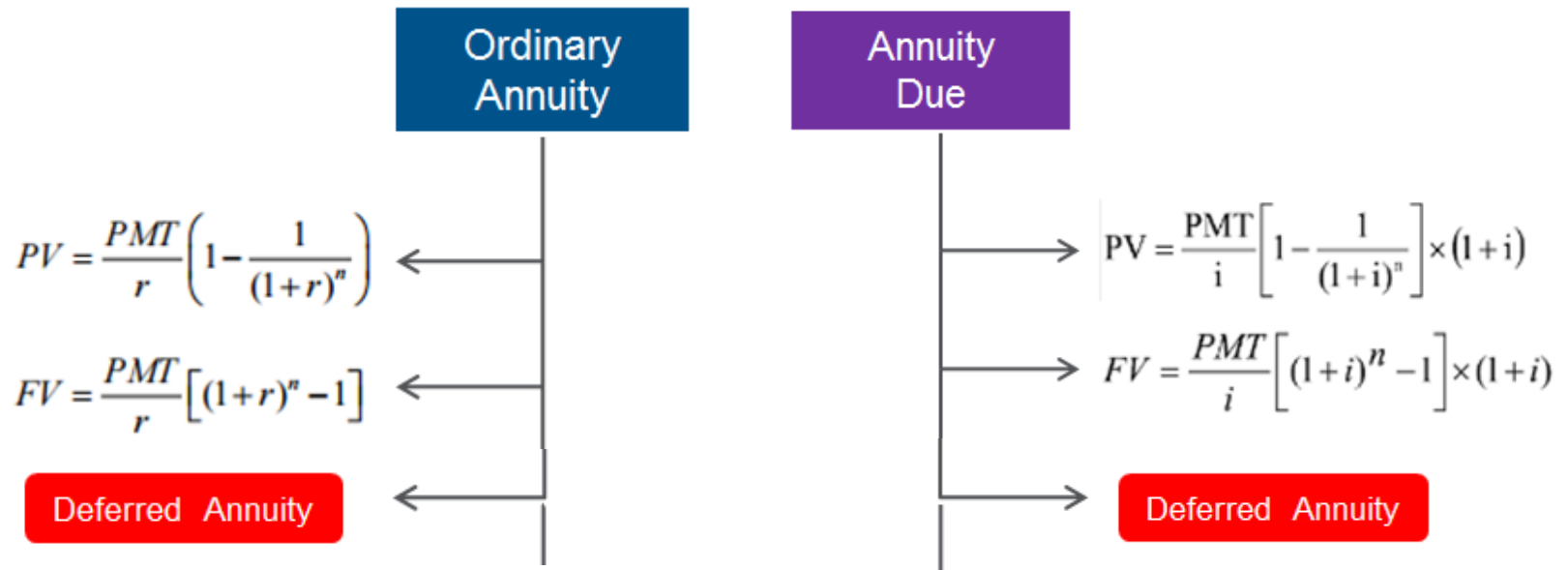
- Used to evaluate annuities with uneven lives.

- An ordinary annuity starts in 3 years from today for 4 years.
- Methodology for solving this **Deferred Ordinary Annuity** starting in Y_3 , where $n = 4$: Construct the time line then...



- An annuity due starts **4 years from today** with a maturity of 4 years.
- Methodology for solving a **Deferred Annuity Due** starting in Y_4 , where $n = 4$: Construct the time line then...







Self-study:

- *Be clear as to the PV period difference in Step 1 between deferred ordinary and annuity dues.*
- *Be able to explain the above PV period difference.*

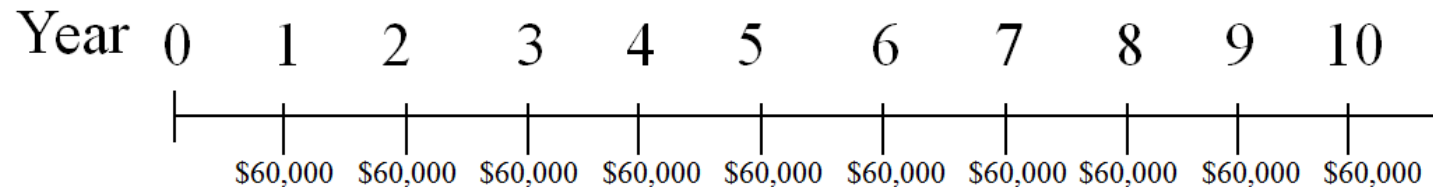


If your rich uncle includes you in his will and leaves you with the option of either

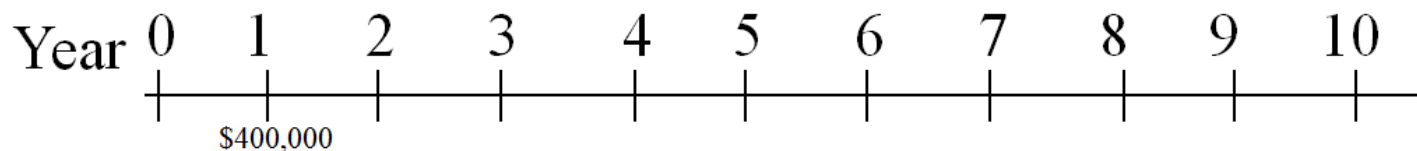
- Receiving \$60,000 each year for the next 10 years ; Or,
- Receiving a lump sum of \$400,000 in one year

If the interest rate applicable is 14% which option will you accept?

Asset 1: Annuity Stream (Due)



Asset 2: Lump Sum



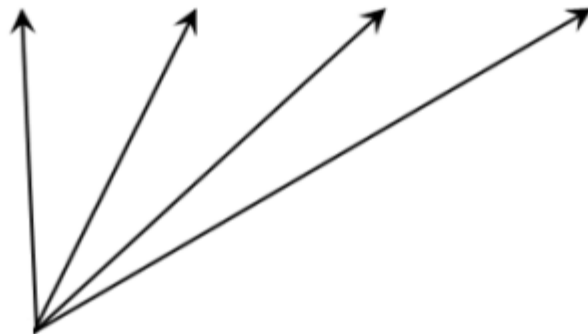
Answer: PV both lump sum and annuity to PV_0 in Y_0 . The one with the greatest value is the one to pick.



An alternative is to find an **equivalent annuity** for Asset 2



SEAA SEAA ... SEAA



Convert the single Lump sum in year one into an **equivalent Annual Amount (EAA)** spanning over ten years as option 1

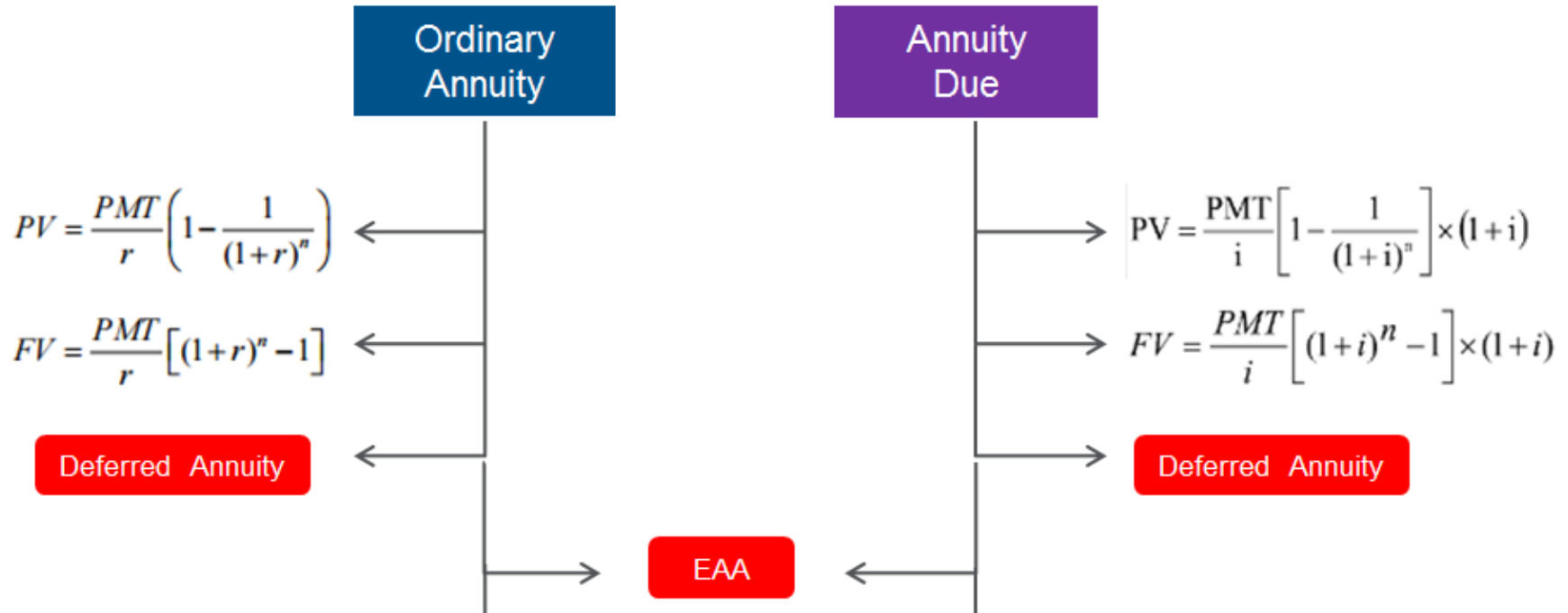


\$400,000



Self-study:

- *Recognise the 2 methods of comparing annuities with different lives and lump sums.*
- *By PVing cash flows to a common time period, commonly Y_0 , to allow for comparison. Or converting a lump sum into an annuity.*



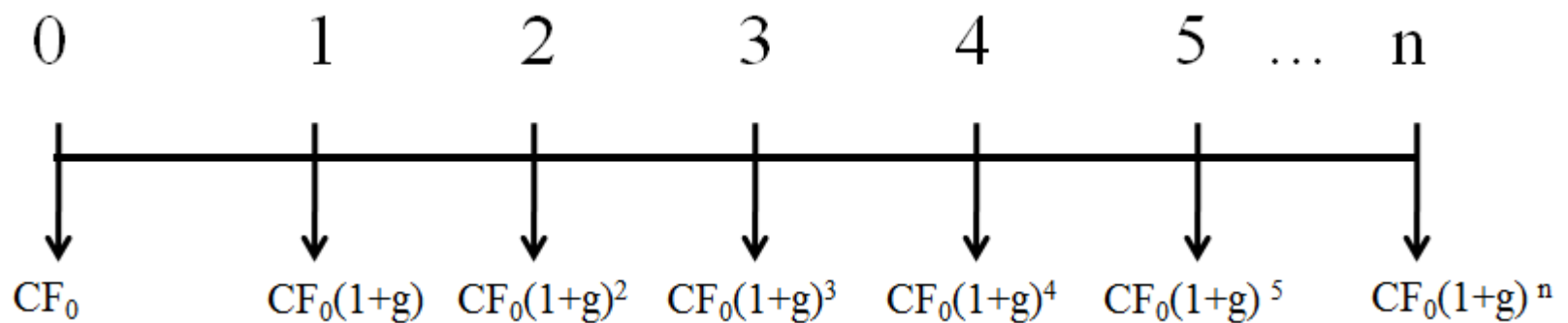
-  Ordinary Annuity
-  Annuity Due
-  Annuity Applications



Our original definition of an annuity was a fixed payment, at equal intervals over time.

We now expand that concept to allow for the fixed payment to grow at a constant rate over time.

- Growth annuities: where the cash flow increases each period at a constant growth rate.





The original annuity formula are expanded to the following:

Ordinary Growth Annuity

$$PV = \frac{CF_0(1+g)}{(i-g)} \left[1 - \left(\frac{1+g}{1+i} \right)^n \right]$$

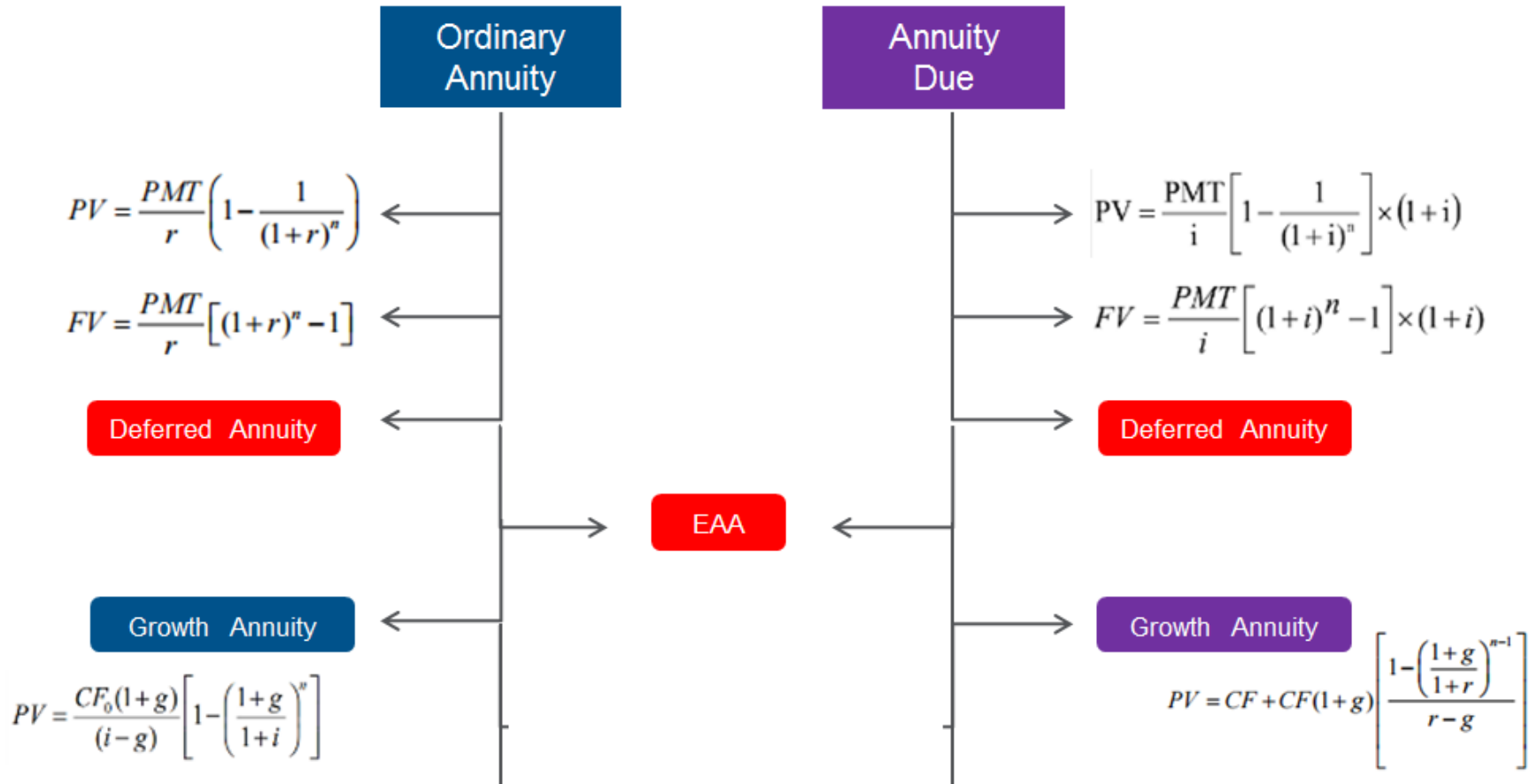
Growth Annuity Due

$$PV = CF_0 + CF_0(1+g) \left[1 - (1+g/1+i)^{n-1} / i \right]$$

Where

- CF_0 = the cash flow in Period 0
- i = interest rate per period, note i & r are used interchangeably
- g = constant growth rate per period
- n = number of payments/periods

(Pre-load 4 LC Q 3)





An annuity where the cash flow continues for an indefinite period.

- $n = \infty$

Ordinary Perpetuity

$$PV = PMT/i$$

Perpetuity Due

$$PV = PMT + PMT/i$$

Where

- PMT = the cash flow per period
- i = interest rate per period
- As with annuities, the ordinary perpetuity formula establishes PV one period before the first cash flow. The perpetuity due formula establishes PV at the same period as the first cash flow.
- Perpetuities can also be deferred as with annuities.

(Pre-load 4 LC Q4)



A growth perpetuity is where the cash flow increases each period at a constant rate for infinity.

Ordinary Growth Perpetuity

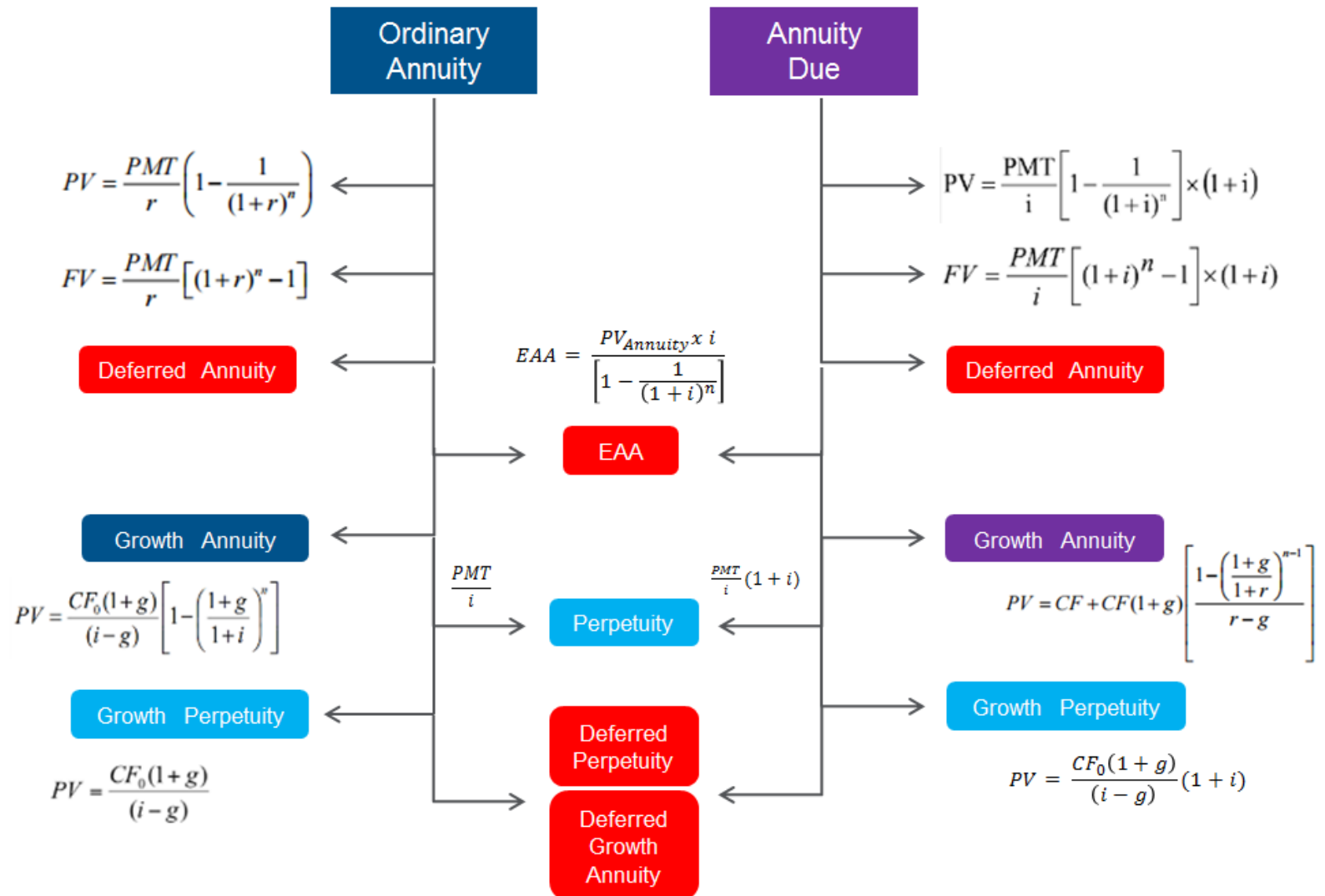
$$PV = CF_0 (1+g) / (i - g)$$

Growth Perpetuity Due

$$PV = CF_0 (1+g) / i - g (1+i)$$

Where

- CF_0 = the cash flow in Period 0. Note $CF_0(1+g) = CF_1$
- i = interest rate per period, note i & r are used interchangeably
- g = constant growth rate per period





Self-study:

- *In preparation for this Topics workshop, make sure you are also comfortable with the prior Topics Workshop LC and PBL questions.*
- *Be practiced at drawing time lines, applying formula and establishing the correct n and i under various investment or liability scenarios.*
- *If unclear, see staff in consultation to make sure you understand the last topic as well as possible.*



Next...Self-study for Topic 4



BFC1001

Interactive Study: Financial Choices & Decisions (Capital Budgeting)

Please join the active LC session upon entering class.



Key Topic Aspects being completed ...

1. Risk & Return

2. Payback Period

3. NPV

4. IRR



Is Risk Good/Bad?

Risk is neither good/bad but is considered by both potential ...

- Upside: uncertainty in timing and magnitude of future cash flows that provides benefit.
- Downside: uncertainty in timing and magnitude of future cash flows that provides disadvantage or added cost.

Asset upside risk: Receiving **greater** future earnings than expected.
Receiving future earnings **sooner** than expected.

Liability upside risk: Paying **lesser** future cost than expected. Paying
future cost **later** than expected.

Asset downside risk: Receiving **less** future earnings than expected.
Receiving future earnings **later** than expected.

Liability downside risk: Paying **greater** future cost than expected. Paying
future cost **sooner** than expected.



Perceptions of risk about future earnings/costs are dynamic and can change. When considering the risk of future cash flows:

- Our expectation of risk needs to be nuanced and specific ...
Is there both upside and downside? Or just either?

e.g. The value of the Aussie dollar tomorrow has both upside and downside risk. It could go up or down.

e.g. The US Federal Reserve (US central bank) is likely to push up the US official cash rate soon. It is most unlikely to fall. To borrowers of USD, there is just downside risk. To investors in USD, there is just upside risk.

- Historical and recent CF or return patterns of asset/liabilities can help us form perceptions of risk. We need to be able to assess risk broadly from CF/return patterns.

(W5 LC Q1 & 2)



This allows us to update our Pre-load Slide 5...

When downside risk increases, a greater return is needed to compensate for the added risk burden.

- A foundational relationship in Finance: **↑ Risk, ↑ Return** & vice versa.

What is the implication on value and subsequently price?

Ans: Holding all else equal, when the downside risk of future cash flows increases, the present value of their worth today falls.

Greater Downside Risk = Less Value

This places down pressure on it's price, as buyers should rationally pay less for lower value. So...

Greater Downside Risk = Less Value = Lower Price

The opposite is also true, greater upside risk only = greater value.



Holding all else equal, a greater return/yield is the result.

- The asset has a lower price because of the greater downside risk, so the future cash flows earned on the lower price paid provides for a greater return/yield for the investor.

e.g. An asset's future earnings has higher downside risk...

↑ ↑ **Risk** = future CF having a ↓ PV,

↑ ↓ PV of future CF = ↓ Value = ↓ price,

↑ As $\% \text{ Return} = CF / \text{Price}$, $CF / \boxed{?} \text{Price} = \uparrow \%$ **Return**

**Note: expected CF remains unchanged, it is the expected risk of future CF that increases. As it is the future, we may be unable to factor or estimate the higher risk into less CF or later CF, so in response to this uncertainty = we pay a lower price.*



From our Pre-load LC, we understand the intuition of how ↑ Risk = future CF having a ↓ PV. How is this phenomenon reflected mathematically?

- We calculate PV by discounting future CF. So a ↓ PV due to higher risk is achieved by applying a higher discount rate; i.e. ↑ i or r .

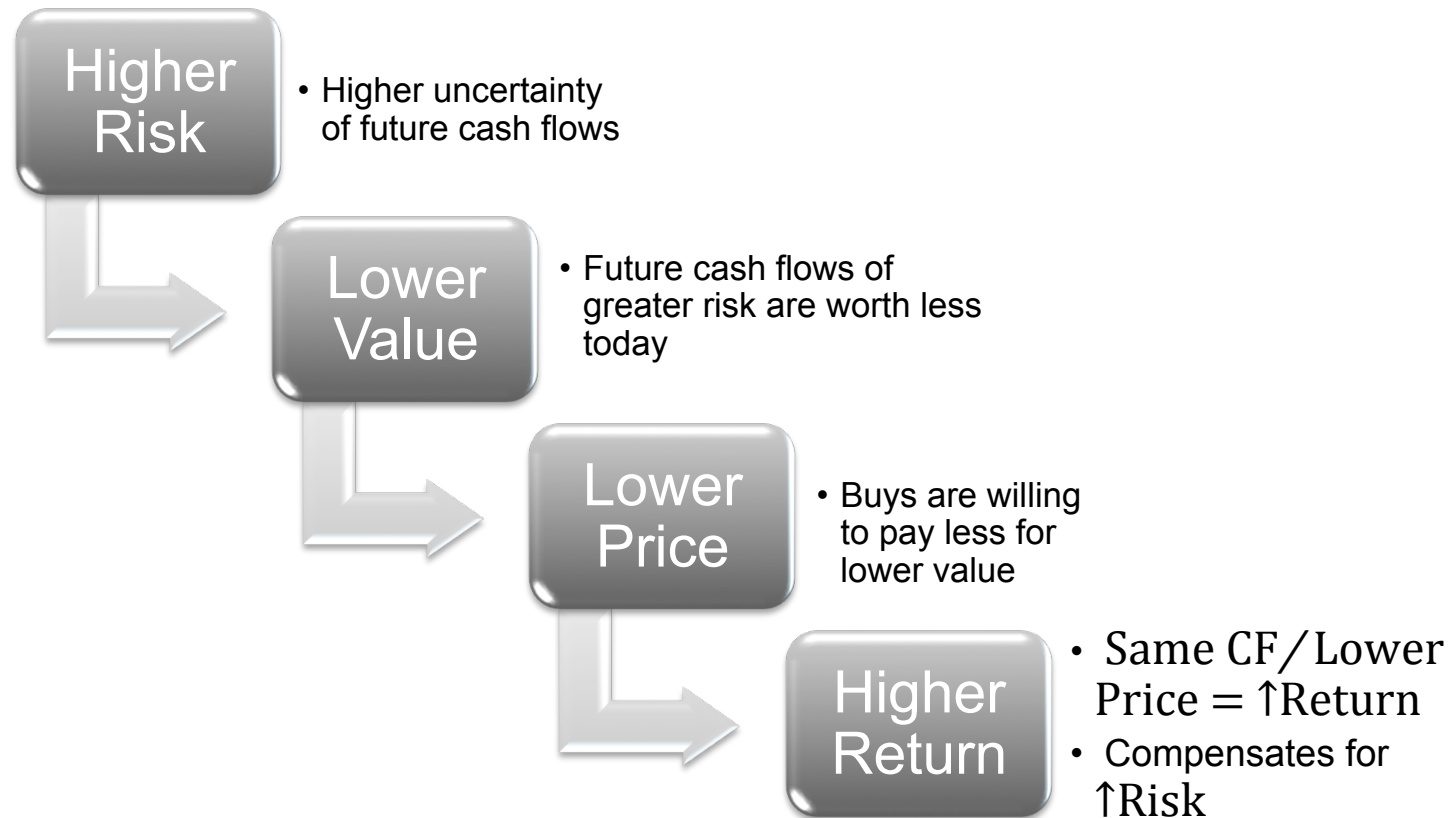
Concluding Critical thinking concept:

↑ Risk = ↑ discount rate for PV (↑ i or r) and vice versa

$$PV = \frac{FV}{(1 + i)^n}$$

↑

Financial literature, financial media and industry are often not nuanced in the way risk is discussed. Risk is often not discerned in terms of upside or downside. When risk is mentioned, it is usually in terms of downside. This also applies to later finance subjects. So our terminology convention is: when the word *risk* is used, we are referring to **downside risk**, unless specific reference is made to upside risk.



Therefore, $\uparrow$ Risk $\Rightarrow$ $\uparrow$ Return & Vice Versa



Net Present Value (NPV)

$$NPV = NCF_0 + \frac{NCF_1}{(1+k)^1} + \frac{NCF_2}{(1+k)^2} + \dots + \frac{NCF_n}{(1+k)^n}$$

$$NPV = \sum_{i=0}^n \frac{NCF_i}{(1+k)^i}$$

Where...

NCF_i = Net cash flow/Free Cash Flows in periods $i = 0, 1, 2 \dots n$

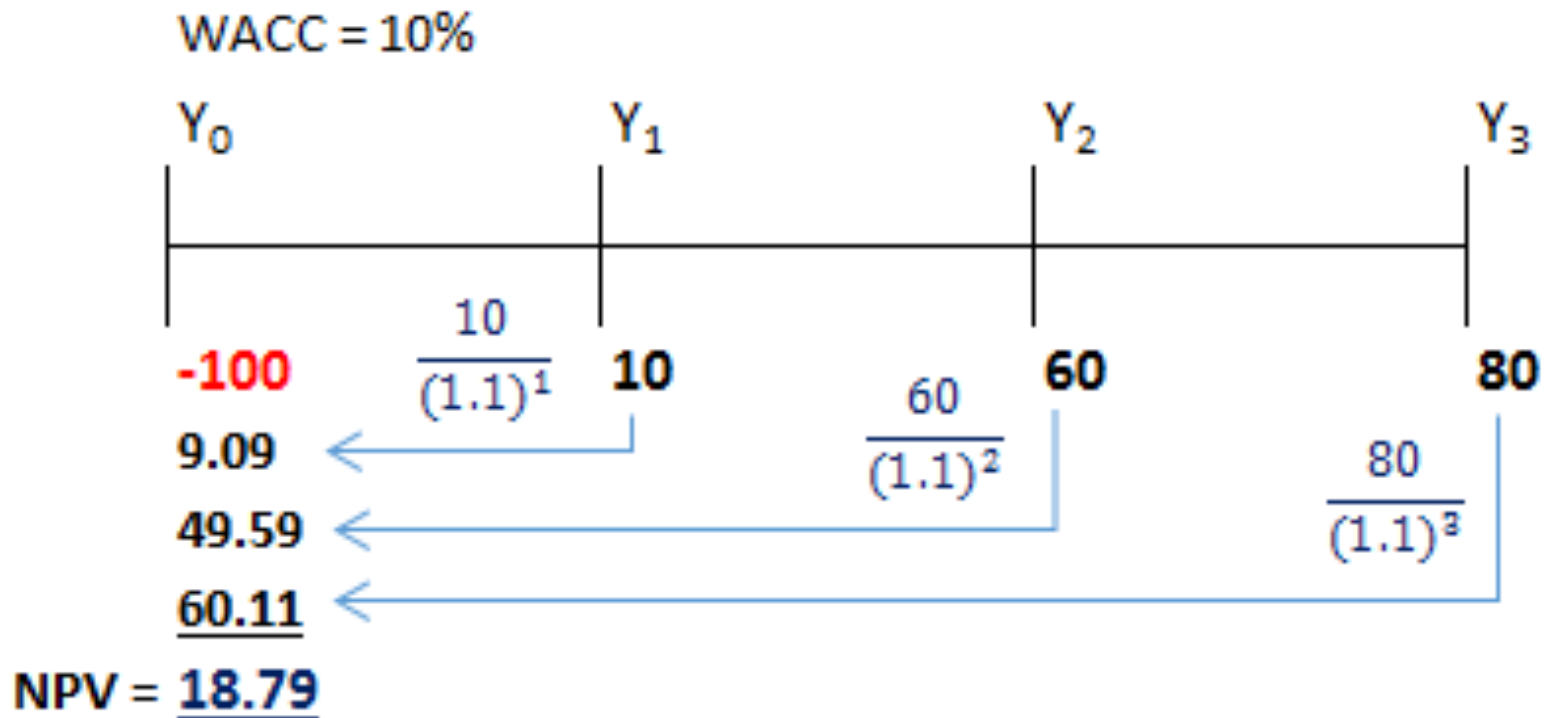
NCF_0 = Typically the price/project cost; but also including any cash flow in advance.

k = discount rate, typically a required rate of return.

n = the project's estimated life



Example: Net Present Value (NPV)



(W5 LC Q4)



Next, we shall explore the impact of WACC on NPV

- How do changes in WACC affect NPV?

↑ WACC = ↓ NPV, ↓ WACC = ↑ NPV

- How and why might WACC change? ...

Through 2 ways ...

1. Changes in capital structure
2. Changes in the cost of debt and/or cost of equity.

$$WACC = E/V \times k_e + D/V \times k_d$$

(W5 LC Q5)

**Concept Check, does a company desire a ↓ or ↓ WACC?*



Critical Thinking Concept: For a given company, $K_e > K_d$

- **Why? From Microeconomics, we learn about the pecking order of payments in a company. The last two stakeholders to be paid are debt holders (capital creditors) and finally, equity holders.**
- **As equity investors are paid last, or perhaps not at all, their risk is always higher than debt capital creditors (who always have to be paid).**
- **So given the choice of investing in the debt or equity of a company, a rational investor would always require a higher rate of return for the company's equity. Hence $K_e > K_d$**
- **However, as $K_d < K_e$, would there not be an automatic bias for company managers to finance most of capital through cheaper debt rather than equity, so as to lower WACC?**



$$WACC = E/V \times k_e + D/V \times k_d$$

Critical Thinking Concept: For a given company, $K_e > K_d$

- Yes, $K_e > K_d \rightarrow \Delta$ capital structure, favouring D; where $D/V \uparrow$ $E/V \downarrow$
- $D/V \uparrow$ means a greater weight applied to the lower K_d , $E/V \downarrow$ means a lesser weight applied to the more expensive K_e ; $\therefore WACC \downarrow$
- So far, a capital structure favouring debt = $\downarrow$ WACC.
- However, when $D/V \uparrow$, debt repayments increase; so there is greater risk of less residual cash flow left to pay equity holders.
- So when $D/V \uparrow$, faced with greater risk of less residual cash flow, equity holders will require a greater return; $K_e \uparrow = \uparrow WACC$



$$WACC = E/V \times k_e + D/V \times k_d$$

To summarise:

- A capital structure favouring debt = $\square$ WACC as a greater weight is applied to the cheaper form of capital.
- However, $K_e \uparrow$ as the remaining equity holders, facing greater risk, would required a higher return. This $\uparrow$ WACC.
- The opposite is also true. $\downarrow D/V$ = lower weight on the cheaper form of capital, $\uparrow$ WACC, but K_e then $\downarrow$ as equity holders face less risk with less debt in the company; $\square$ WACC.
- Our above understanding of the relationship between K_e , K_d and capital structure is all that is required for BFC1001.
- These competing & offsetting forces mean there is an optimal, minimal WACC; which is explored in Corporate Finance II.

$$NPV = NCF_0 + \frac{NCF_1}{(1+k)^1} + \frac{NCF_2}{(1+k)^2} + \dots + \frac{NCF_n}{(1+k)^n}$$

$$0 = NCF_0 + \frac{NCF_1}{(1+k)^1} + \frac{NCF_2}{(1+k)^2} + \dots + \frac{NCF_n}{(1+k)^n}$$

$$-NCF_0 = \frac{NCF_1}{(1+IRR)^1} + \frac{NCF_2}{(1+IRR)^2} + \dots + \frac{NCF_n}{(1+IRR)^n}$$

- Another way of re-writing the above to better comprehend IRR ...

$$\text{Project Cost or Price} = \frac{NCF_1}{(1+IRR)^1} + \frac{NCF_2}{(1+IRR)^2} + \dots + \frac{NCF_n}{(1+IRR)^n}$$

- IRR is the per period (typically annual) discount rate that equates the sum NCF of a project to its cost. It is solved through your financial calculator, using the CF_j button. Calculating IRR through interpolation is not required in BFC1001.



- In essence, what we are doing is solving for i in $PV = FV / (1+i)^n$, given PV as the project cost and multiple FVs as project net future cash flows.
- In solving for i , we also solving for $PV(1+i)^n = FV$, which is the periodic growth rate at which PV, our project cost = capital invested, grows into the multiple project NCFs over n .

IRR is formally defined: as the periodic yield of the project, determined as what the capital invested grows by each period, into the expected future net cash flows of the project.

- Important assumption: surplus project cash flows are re-invested at the IRR.



IRR is solving for i the per period growth of capital invested in the project ...

$$\text{Project Cost or Price} = \frac{NCF_1}{(1+IRR)^1} + \frac{NCF_2}{(1+IRR)^2} \dots \frac{NCF_n}{(1+IRR)^n}$$

Solving for IRR, given NCFs and Price

In NPV, we are solving for PV, applying a discount rate, which is a required rate of return ...

$$NPV = \text{Present Value of Project} - \text{Cost}$$

$$PV = \frac{NCF_1}{(1+RRoR)^1} + \frac{NCF_2}{(1+RRoR)^2} \dots \frac{NCF_n}{(1+RRoR)^n}$$

Solving for PV, by apply RRoR to NCF

Assuming payments at the end of the period

- IRR > RRoR, accept project. IRR < RRoR, reject.

(W5 LC Q6)



BFC1001

Pre-load:

Financial Choices & Decisions (Capital Budgeting)

Please join the active LC session upon entering class.



Key Topic Aspects being introduced ...

1. Risk & Return

2. Payback Period

3. NPV

4. IRR



Learning Objectives

1. Know the relationship between risk and return and understand the implications upon valuation and pricing.
2. Understand the concept of capital budgeting.
3. Apply and calculate the capital budgeting metrics of...
 - a) Payback period
 - b) NPV
 - c) IRR.



What is Risk in the context of finance and investment?

Ans: ***Uncertainty of cash flows; in timing & magnitude of cash flow.***

How is Risk/uncertainty quantified and measured?

Ans: Typically, through the ***standard deviation of cash flows.***

** Subject link: The rationale and application of variance and standard deviation (σ) to estimate uncertainty is developed in Statistics.*

(Pre-load 5 LC Q1 & 2)

What is considered to have risk?

Ans: ***Both assets and liabilities can have risk.***

For asset holders, risk is uncertainty in earnings (cash inflow).

For liability holders, risk is uncertainty in cost (cash outflow).

**Concept Check: Is risk a “good” thing or “bad” thing?*



When risk increases, a greater return is needed to compensate for the added risk burden.

- A foundational relationship in Finance: **↑ Risk, ↑ Return** & vice versa.

What is the implication **↑ or ↓ Risk** of on value and subsequently price?

Ans: Holding all else equal, when future cash flows become more uncertain (risk increases), the present value of their worth today falls.

Greater Risk = Less Value

This places down pressure on it's price, as buyers should rationally pay less for lower value.

Greater Risk = Less Value = Lower Price



Self-study:

- *Our introduction of risk in BFC1001 is very specific and targeted towards achieving the following ...*
 1. *You should be able to examine competing cash flows of assets or liabilities and identify which is more or less risky. (We shall go through an example of this skill in the workshop)*
 2. *You should know the consequence of higher risk on return, on valuation and on price.*
- *Our scope for exploring risk finishes there. It will be continued in later subjects.*
- *E.g. In your self-study reading, the textbook discuss further concepts of the formulation of $E(R)$ and Risk (standard deviation) using probabilities. The use of probabilities is not part of our introduction to finance (not assessable) and this area will be developed in BFC2240 and BFC2140. Diversification is also explored in these later subjects.*
- *Be able to answer the Concept Check questions on pg. 232 of your textbook.*
- *Can risk be characterised as simply just “good” or “bad”? Be clear what risk is and what it represents from the context of a finance professional.*



- **Capital Budgeting** is the process by which organisations determine whether their **long term** investments such as new machinery, replacement machinery, new plants, new products, and research development projects are worth pursuing.
- The important question to ask here is: Do these capital investments **create value** for the company, given the cost to purchase?
- The **objective** of **Capital Budgeting** decisions is to select investments in **assets** that will increase the **value** of the company. It is said that the corporate objective is to **maximise shareholders' wealth** (i.e. Maximise firm value).
- **Capital Budgeting** is important because these investment involve **large cash outlays**, they **create value** when the **cash flows** they generate are **worth** more than they **cost** and once made these investments are **not easily reversed**.



Investment Decision

Assets

\$100

What to buy?

How does a RRoR of 5%, which arises from raising \$100 of capital, affect the Investment decision, aka how does having to pay 5% for capital, affect the choice of which assets the company should buy?

The asset bought must earn a return that is greater than the RRoR.

$$E(R) > 5\%$$

That is the essential link between finance and investment, the 1st critical thinking concept learnt in Foundations of Finance.

$$E(R)_{\text{Assets}} > RRoR_{\text{Capital}}$$

APPLYING THIS CONCEPT = CAPITAL BUDGETING

Financing Decision

Liabilities/Debt

$$K_d = 5\%$$

Equity

$$K_e = 5\%$$

The partition of capital between debt & equity is called **Capital Structure**. Knowing the capital structure; how much of capital is equity, how much of capital is debt, provides the weights used to calculate WACC

\$50

\$50

\$100

Overall Cost of Capital = 5%

Why?... using a Weighted Average (you learn this in statistics) of the above 2 components of capital...

$$50/100 \times 5\% + 50/100 \times 5\% = 5\%$$

This is called the **Weighted Average Cost of Capital or WACC**.

The cost of capital, WACC, is a Required Rate of Return (RRoR). *Why Required?* If the company does not pay 5% to its financiers, it cannot continue its business.



Capital budgeting applies to assets & involves:

1. **Estimating CFs** (inflows & outflows) through a timeline.
2. Assessing the **riskiness** of CFs.
3. Determining an **appropriate discount rate (typically WACC)**
4. Finding **Payback period, NPV** and **IRR**.
5. Acceptance of project **if $NPV > 0$** and/or **$IRR > \text{discount rate}$** (typically WACC).



Project types:

1. Independent
2. Mutually Exclusive

Capital Budgeting Techniques:

1. Payback period
2. NPV
3. IRR



Payback Period

- Defined as the amount of time it takes for the asset to recoup the investment outlay (asset cost).
- A time line is usually set up with the investment outlay as a running cost being diminished over time by the periodic net earnings of the asset.
- When the investment outlay is reduced to 0 is the Payback Period.
- The shorter the payback period, the better investment.

(Pre-load 5 LC Q3)



Net Present Value (NPV) = Present Value - Price

- Free cash flows over the asset holding period are discounted by the required rate of return to establish the asset's present value worth.
(Self-study: Define Free cash flows)
- This is then compared to the cost/price of the asset; by subtracting the cost from the present value worth.
- The result is a net dollar figure that shows how much shareholder value is increased or decreased.
- **Negative NPV implies that the cost > worth. Don't invest.**
- **Positive NPV implies that the cost < worth. Invest if possible.**
- 0 NPV implies that cost = worth

(Pre-load 5 LC Q4)



Net Present Value (NPV)

- The **required rate of return** is the minimum return that a project must earn in order to be acceptable.
- The **cost of capital** is often used as the minimum required rate of return for capital budgeting purposes.
- The cost of capital is the cost of investment funds, usually viewed as a **weighted average of the cost of funds** from all sources (debt and equity).

$$WACC = E/V \times k_e + D/V \times k_d$$

Where E = Equity, D = Debt, V = Capital

k_d = Cost of debt

k_e = Cost of equity



Internal Rate of Return (IRR) = Yield/Return of the project.

- Free cash flows of the asset are discounted to equal the cost/price of the asset.
- This discount rate is effectively the periodic (usually annual) yield/return of the asset.
- This yield is then compared to the required rate of return/hurdle rate.
- **IRR > Required rate of return (e.g. WACC): Invest if possible**
- **IRR < Required rate of return (e.g. WACC): : Don't invest.**



Self-study:

- *Develop a clear understanding as to the advantages and disadvantages of each of the 3 capital budgeting metrics.*
- *The discounted payback period and profitability index are not part of the scope of this subject.*
- *The MIRR Modified Internal Rate of Return is not part of the scope of this subject.*
- *The after-tax WACC is not part of the scope of this subject.*
- *These are covered in further detail in later subjects such as BFC2140.*
- *Attempt to build a clear understanding as to why the IRR is the yield/ return of the project.*
- *Attempt to understand how changes in the risk of a corporate, would cause changes in WACC which then affects capital budgeting decisions through the different valuation of projects.*



Next...Self-study for Topic 5



BFC1001

Interactive Study: Applications of Finance

Please join the active LC session upon entering class.



Key Topic Aspects being completed ...

1. Home Mortgages

2. Managed Funds

3. Superannuation



We continue of discussion of home mortgages by considering what the originator (creator) of the home mortgage can do with the asset...

1. Keep the mortgage till maturity; bearing the credit risk of the borrower and earning the interest return.
2. Sell the mortgage, by itself, to another investor who takes over the credit risk and return of the mortgage.
3. **Securitise the mortgage**; easier to sell than the mortgage than by itself as a single asset.

Securitisation is an important concept that leads to the creation of many financial instruments.

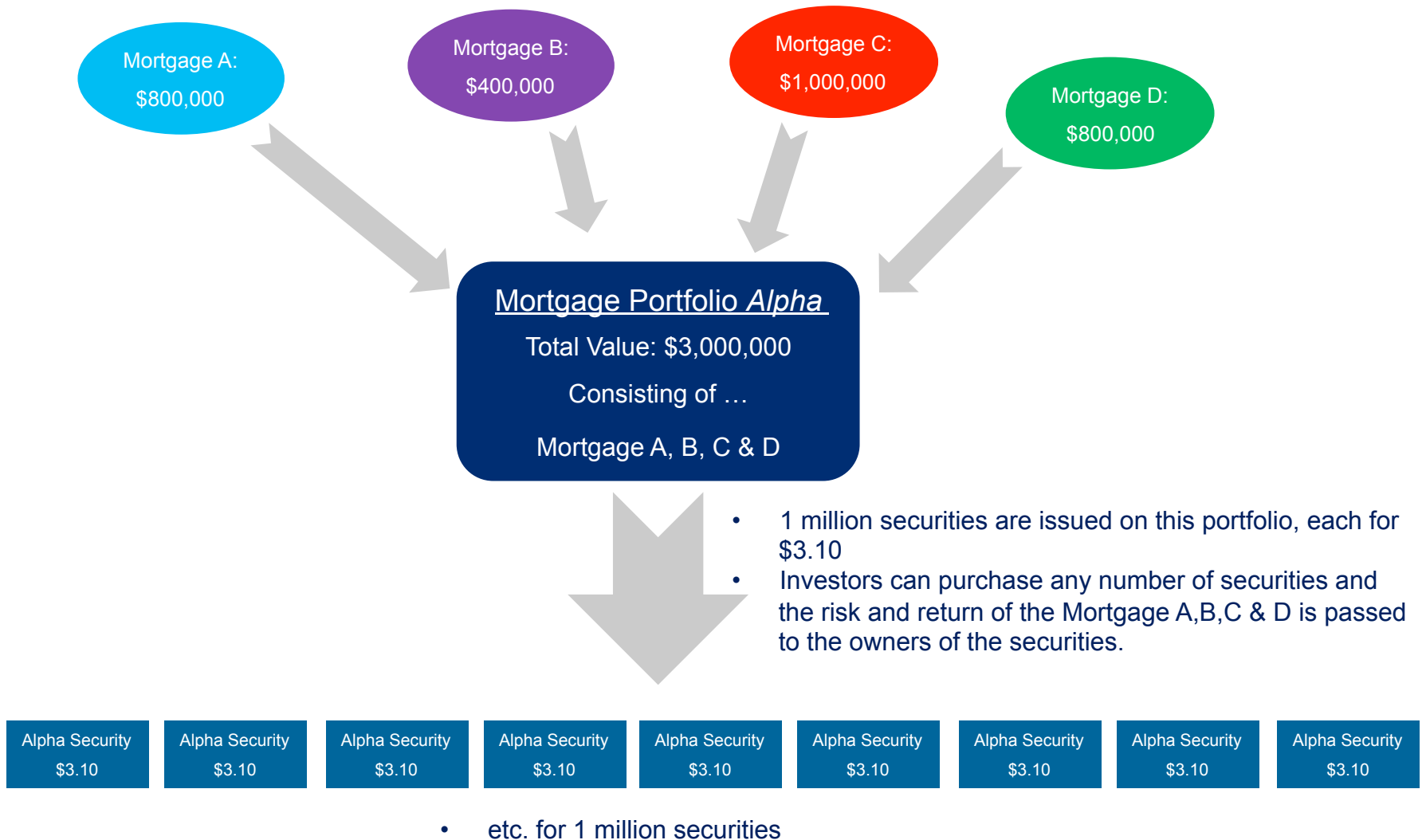
- The pooling of financial assets and non-liquid, real assets into a portfolio, which is then converted to multiple units/shares (called securities) that are serviced with the cash flows of the original assets.
- These units/shares are sold to investors and are often publically traded.



Examples of securitisation:

- Company Shares
- Units in Managed funds; Real Estate Investment Trusts
- Exchange traded funds; Commodity funds
- Mortgage backed securities;
- Collateralised Debt Obligations

Almost any asset can be placed into a portfolio with other assets and securitised. An important characteristic to remember is that originators of the asset earn a fee from selling the securities and then pass on the risk and return of the original asset to the new owners of the security.



(W6 LC Q1)



Securitisation enormously benefits the flow of funds. Without securitisation, we would not have company shares.

Investors in securities also need awareness that the risk and return of the original assets is being passed on to them. So knowing what the original assets are is important to properly assessing the risk of securities.

Mortgage backed securities was how the GFC spread from the US to the rest of the world.

- Sub-prime (bad credit) home loans were issued by US banks, who then securitised them into Mortgage backed securities and sold them to investors; earning a fee and passing on the bad credit risk.
- The risk was not correctly reported to investors as the credit rating agencies in charge of assessing the security risk measured the risk inaccurately.
- When the sub-prime loans defaulted, security investors lost their capital.



We now move on to Managed Funds...

Advantages:

- Access to professional asset management
- Access to a wide range of investments otherwise unavailable
- Enhanced liquidity; particularly for public funds.

Disadvantages:

- Fund managers may not be as competent as advertised. Only 1/3 of money managers beat the market.
- Agent-principal problems where fund managers do not act in the best interest of their client.
- Investors may incur high entry, exit and management fees charged by the fund manager.



Active Management:

- Fund managers seek to 'outperform' the market by proactively trading between asset classes and individual investments to maximise fund returns based on expectations of the market.
- **Market timing** and **asset selection** are two key attributes

Passive Management:

- Also known as a *Buy and Hold* strategy.
- Fund managers are not interested in market timing, asset selection or trading to maximise returns.
- An objective is to follow or mimic the market. E.g. index funds.



Investment Styles - There are a number of fund styles:

- **Growth Funds:** The primary goal is capital appreciation. Most suitable for aggressive investors with long-term investment horizons.
- **Aggressive Growth Funds:** These funds are speculative investments that strive for big profits from capital gains.
- **Balanced Funds:** These hold a portfolio with a fixed and diversified proportion of stocks, bonds and other asset classes.
- **International & Global Equity Funds:** Useful for investors who wish to diversify their asset holdings internationally.
- **Socially Responsible Investment (SRI) Funds:** An investment process that considers the social and environmental consequences of investments (both positive and negative).
- **Income Funds** and more

(W6 LC Q3)



In Foundations of Finance, we introduce a number of philosophies that are vital to building core competence as a finance and investment professional. These have included the Time Value of Money and the relationship between Risk and Return.

We introduce another form critical thinking; how to properly evaluate the performance of funds.

Consider the following Managed Funds ...

Vince Fund: $E(R) = 10\%$

Mikhail Fund: $E(R) = 20\%$

Which fund do you think is performing better? Answer this in our next LC question.

(W6 LC Q4)



The benefit of a financial education is recognising that returns are driven by the type and amount of risk taken; so funds cannot be compared by return alone. The risk taken by the funds should be weighed against the returns earned; the returns need to risk-adjusted.

Vince Fund: $E(R) = 10\%$

Risk (σ) = 5%

Mikhail Fund: $E(R) = 20\%$

Risk (σ) = 20%

*Vince Fund earns 10% by taking 5% of σ , i.e. it earns **2%/unit of risk**.*

*Mikhail Fund earns 20% by taking 20% of σ , i.e. it earns **1%/unit of risk**.*

*The proper method of comparing **risk-adjusted returns** shows Vince fund as the better investment.*



Your textbook self-study reading and quiz reviewed the Sharpe Ratio which measures the **risk-premium adjusted return**.

$$\text{Sharpe Ratio} = (R_p - R_f) / \sigma_p$$

where ...

R_p = Portfolio Return

R_f = Risk-free Return

σ_p = Portfolio standard deviation

Subject link: BFC2140 where you will study further portfolio performance measures such as Treynor's Ratio, Jensen's Alpha and how to calculate portfolio return and standard deviation in later subjects.



Next, we move on to Superannuation. Our appreciation of Superannuation lies in:

- Knowing what it is. (covered in Pre-load)
- Understanding why it exists. (explored in the PBL)
- Applying annuity math and constant growth annuity PV and FV math to answer important questions during retirement. Superannuation math in BFC1001 uses only ordinary annuities as super payments are not made in advance.

Let's review the relevant annuity formula:

$$PV = \frac{PMT}{r} \left(1 - \frac{1}{(1+r)^n} \right) \qquad PV = \frac{CF_0(1+g)}{(i-g)} \left[1 - \left(\frac{1+g}{1+i} \right)^n \right]$$



We now introduce the FV of a constant growth ordinary annuity:

$$FV = PMT \left[\frac{(1+r)^n - (1+g)^n}{r-g} \right]$$

where ...

- PMT = first payment
- r = interest rate/period
- n = number of periods
- g = growth rate of PMT

- Your formula sheet on Moodle has been updated accordingly (W6 LC Q5)



BFC1001

Pre-load: Applications of Finance

Please join the active LC session upon entering class.



Key Topic Aspects being introduced ...

1. Home Mortgages

2. Managed Funds

3. Superannuation



Learning Objectives

1. To appreciate how the finance concepts and math we are learning are applied in the real world through examples of financial products commonly used by the general public.
2. Introducing Home Mortgages
3. Introducing Managed Funds
4. Introducing Superannuation



Individuals in the retail market typically access the debt market by borrowing money and taking out a loan. A loan allows an individual to overcome **equity constraints** and bring forward future consumption to the present at a cost.

There are many types of retail lending including credit cards, personal loans, lines of credit and mortgage finance. Financial intermediaries such as banks and credit unions are the main providers of such loans. To the lender, a loan is an asset. To the borrower, a loan is a liability.

The interest charged on retail loans is influenced by the **availability and cost of funds**, what the loan is used for, the credit worthiness of the borrower and **collateral** (if any) held against the loan. In Topic 7, financial intermediaries and how they do business is formally introduced.

The most common and largest type of loan taken out by the general public is the_____.

(Pre-load 6 LC Q1)



Interest-only loans

- Each loan repayment is interest only. The entire loan principal is due upon loan maturity.

Fully amortising loans

- Each loan repayment comprises of interest and principal so that by the final repayment, the entire loan principal is paid off.

Partly amortising loans

- Each loan repayment comprises of interest and principal. However, by the final repayment, there is a loan principal balance remaining to be paid off.

Fixed rate loans

- Interest cost of the loan is fixed, usually over a term of 1 – 5 yrs.

Variable rate loans

- Interest cost is subject to change depending on the how banks price credit and changes in the official cash rate.



Annuity financial math plays an important role in the calculation of loan amortisation, e.g. ...

- Calculating the periodic loan payment. (PMT)
- Calculating the interest cost of a loan. (i)
- Calculating the time it takes to repay a loan (n)
- Calculating the loan balance. (PV)

In other words, solving for either one of ordinary annuity formula components.

$$PV = \frac{PMT}{i} \left[1 - \frac{1}{(1+i)^n} \right]$$

(Pre-load 6 LC Q2)



Self-study:

- *Be able to define equity constraints.*
- *Be able to define collateral*
- *Topic check: In Financial Regulation we learned about which regulation by APRA that influences the bank cost & availability of funds?*

<http://www.abc.net.au/news/2017-04-05/apra-hints-at-further-home-loan-crackdown-mid-year/8418116?section=business>

- *Though not assessable, students are encouraged to explore the current trends in the Australian mortgage market.*
- *E.g. the explosive growth in size of mortgages driven by low interest rates has caused a housing boom which regulators admit is a bubble and now taking steps to limit mortgage risk.*



Managed funds are one of the most common and largest (by assets under management) investment vehicles in Australia.

Managed funds are popular with uninformed, retail investors (usually ordinary people without a financial education) as ...

1. The investment decision making is handled for them by a better informed, professional investment manager; allowing access to a more diverse range of assets and investment strategies.
2. There is a low barrier to entry as the minimum capital required by many funds is easily affordable.
3. Many managed funds are listed on the stock exchange, making them highly liquid where capital can be redeemed, quickly, easily and cheaply.



Managed funds are investment vehicles which ...

- Pool capital from retail and wholesale investors
- The combined capital is invested by a professional fund manager.
- The assets purchased can be from one or a combination of the assets classes; shares (domestic & international), bonds, currency and property.
- Managed funds can be listed or unlisted.

<http://www.asx.com.au/products/managed-funds.htm>

- Can operate under a Trust or Company structure.



The main categories of funds are:

- Statutory Funds of Life Insurance Offices
- Superannuation Funds
- Public Unit Trusts
- Cash Management Trusts
- Exchange Traded Funds
- Hedge Funds

The main distinctions are Open versus Closed-end-funds.

- Open-ended funds are where capital invested may be redeemed at any time.
- Close-ended funds are where there are restrictions on capital redemptions.

(Pre-load 6 LC Q3 & 4)



Self-study:

- *Be able to define retail and institutional investors.*
- *Be able to define listed and unlisted funds*
- *Be aware of the differences in the Trust and Company legal structures that are taught in Business Law. They have different investment implications.*



Superannuation (Super) Funds are a specific type of Managed Fund where the objective is to save and invest over one's working life to provide a means of income during retirement.

Super funds are the most common type of Australian managed fund as it is mandatory for most Australian employees to pay 9.5% of annual salary into a nominated fund. This is known as the Superannuation Guarantee Scheme and such legislation is common amongst many developed countries.

<https://www.ato.gov.au/Individuals/Super/>

Exploring why Australians are literally forced to save for their retirement despite the availability of a government pension reveals important fiscal and demographic trends.



Annuity financial math plays an important role in super fund management and financial planning for retirement ...

- The future value of the fund can be calculated to determine if sufficient wealth will be accumulated to pay for a desired retirement lifestyle.
- The periodic salary contribution needed to accumulate a target fund future value can be calculated.
- At retirement age, the fund can be paid out as a lump sum or as an annuity over time. Annuity math is used to determine the size of the annuity payments and how long the payments can last given the accumulated fund value.

We shall introduce and explore further annuity math for super fund valuation in the workshop.



Next...Self-study for Topic 6



BFC1001

Interactive Study: Financial Institutions

Please join the active LC session upon entering class.



Key Topic Aspects discussed in the Pre-load ...

1. Role in the Economy ✓
2. Sources & Uses of Funds ✓

We now complete ...

3. Bank Profitability & Risk
4. Bank Regulation & it's impacts
5. Non-Bank Financial Institutions



How do banks make money?

1. Charging interest on assets (loans) – Interest paid on liabilities (deposits)
 - This difference between interest earned from loans and interest paid on sources of funds is known as the **interest rate margin** (IRM).

$$IRM = (IR - IP) / TA$$

... where *IR* = interest received, *IP* = interest paid, *TA* = Total Assets

- Size of the IRM is affected by ...
- Capital adequacy and Reserve requirements
- Product marginal costs
- Demand elasticity

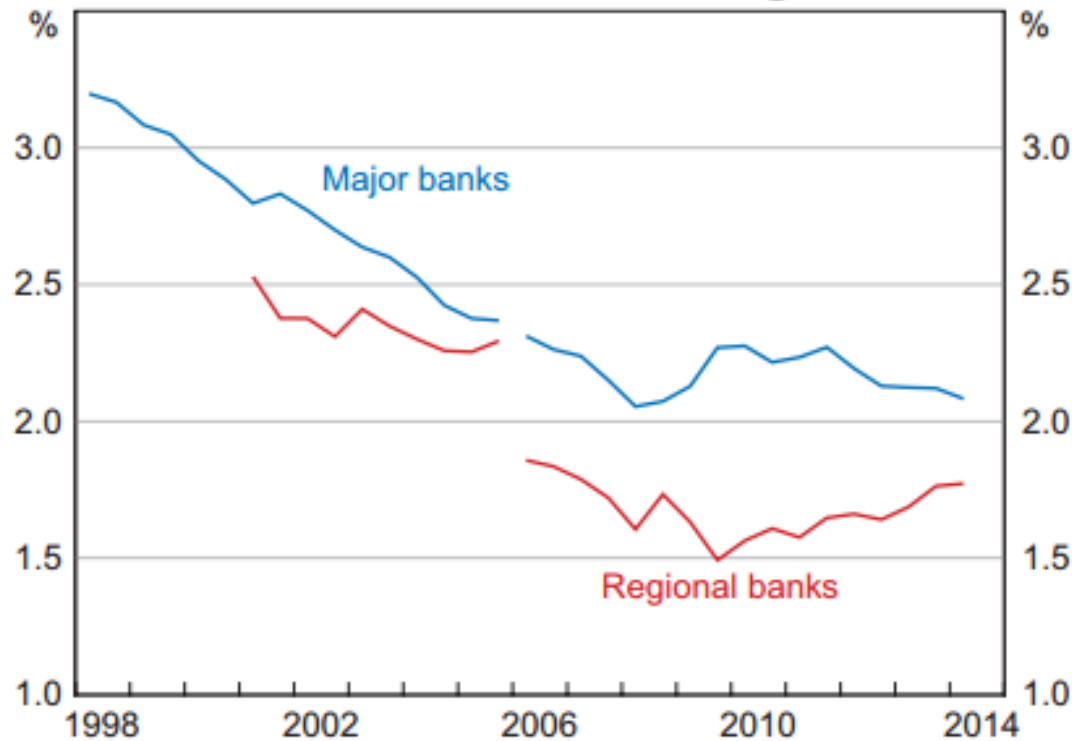
**Concept check: define elasticity*

(W7 LC Q1)

2. Fixed Fees & Commissions
3. Returns on investment products.



Graph 2.15
Banks' Net Interest Margin*

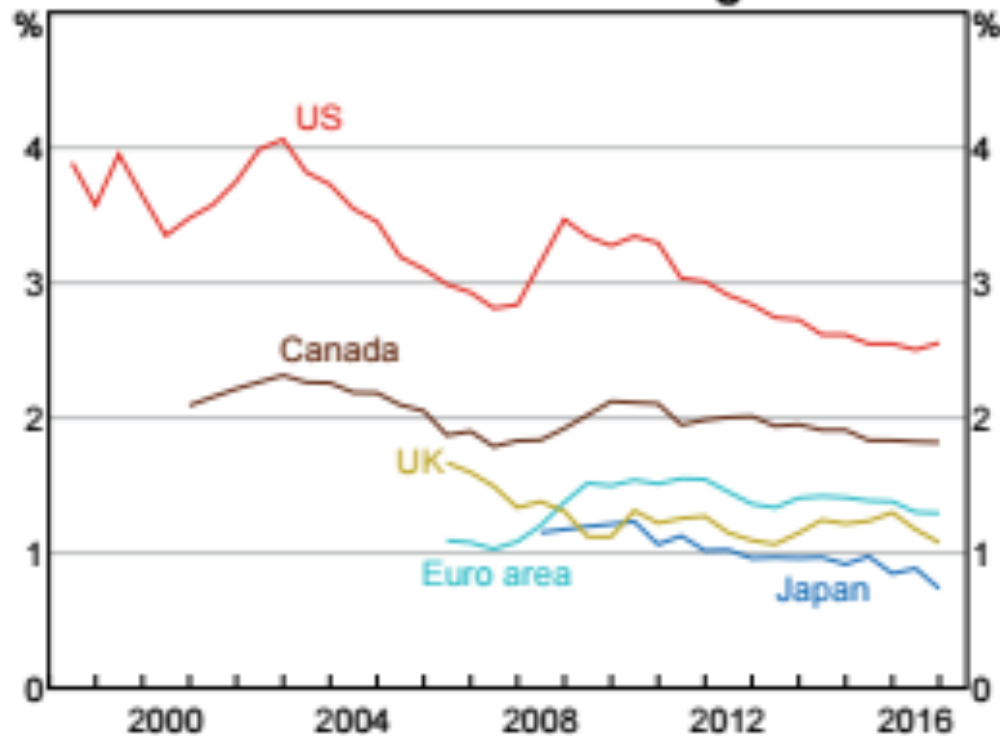


* Data from 2006 are on an IFRS basis, while prior years are on an AGAAP basis; includes St. George and, from 2009, Bankwest
Sources: Banks' Annual and Interim Reports; RBA

Source: <http://www.rba.gov.au/publications/fsr/2014/sep/pdf/aus-fin-sys.pdf>



Graph 1.4
Banks' Net Interest Margins*



* Weighted average across selected large banks headquartered in each jurisdiction

Sources: RBA; S&P Global Market Intelligence

(W7 LC Q2)

Source: <http://www.rba.gov.au/publications/fsr/2014/sep/pdf/aus-fin-sys.pdf>



Bank risk can be defined as uncertainty arising from cash flows of the banks assets and liabilities.

It is important to know the **primary risks** that commercial banks face ...

1. Credit risk
 2. Interest rate risk.
 3. Liquidity risk
- **Credit risk** arises from the possibility of default in the bank loan book; causing a loss of a portion or all of loan principal and interest earnings. Measured by $\sigma_{\text{default rate}}$.



- **Interest rate** risk arises from unforeseen changes in the interest rate margin due to volatility in asset earnings and cost of funds. Measured by σ_{IRM}
- **Liquidity risk** the possibility of not being able to meet required payments to depositors and creditors. Measured using the *liquidity gap*; difference cash inflow and outflows.

(W7 LC Q3)

Other relevant risks discussed in your self-study reading were...

- Operational risk
- Market risk (measured through VAR)



As discussed in Topic 2, bank failure has the most wide spread repercussions upon the economy and so banking experiences the most extensive regulation of all industries. This regulation deeply affects the management and profitability of banks.

Two important areas of bank regulation aim to minimise bank failure ...

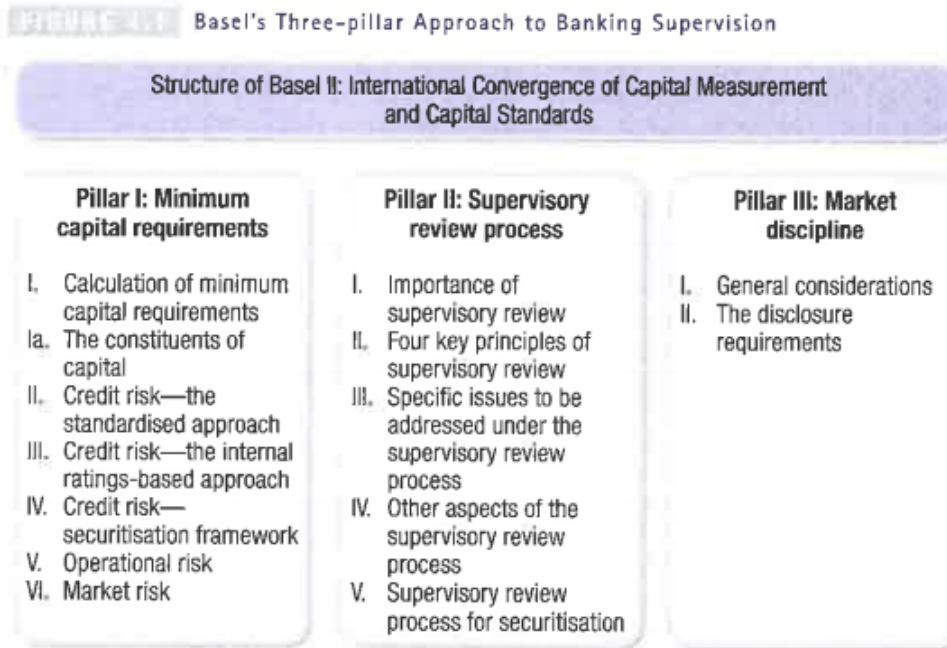
1. Liquidity
2. Capital

The objective of such regulation is to allow for sufficient liquid assets and capital adequacy to ...

- meet deposit withdrawals and daily requirements and maintain public and private sector confidence in the bank's ability to do so.
- buffer against bank losses that arise from risk taking.



While capital and liquidity requirements are mandated by APRA, much guidance is provided by the Basel Committee of Bank Supervision (BCBS) which sets out the BASEL accords; a set of international banking regulations that aims to minimise credit risk. BASEL III is the latest set of regulations. See *the BASEL II requirements below from Fig 4.1 pg. 96 of the self-study reading*.



Source: Based on Basel Committee on Banking Supervision (2006). © Bank for International Settlements (BIS) (<www.bis.org>).

(W7 LC Q4)



Liquidity Regulation:

- Liquidity refers to the availability of sufficient funds to meet day-to-day requirements. Liquidity management of banks aims to ensure that banks have sufficient funds to meet their obligations.
- Large banks must have a liquidity management strategy. Whilst their choice of strategy is flexible, APRA maintains tight reporting controls. Smaller banks must maintain a minimum liquidity requirement of 9% of their total liabilities as liquid assets.
- The management of bank liquidity involves:
 - **Asset management:** maintaining sufficient cash and non-cash assets that can be quickly converted to cash.
 - **Liability management:** Acquiring liquidity quickly and easily through debt while ensuring diversification in creditor obligations.



Bank capital performs several important roles:

1. It provides a financial cushion or buffer against asset losses.
2. It helps maintain investor and public confidence.
3. It provides some protection to depositors.
4. It serves as a source of funds for asset expansion.

APRA is the primary regulator for ADIs and applies domestic and international capital adequacy regulation.



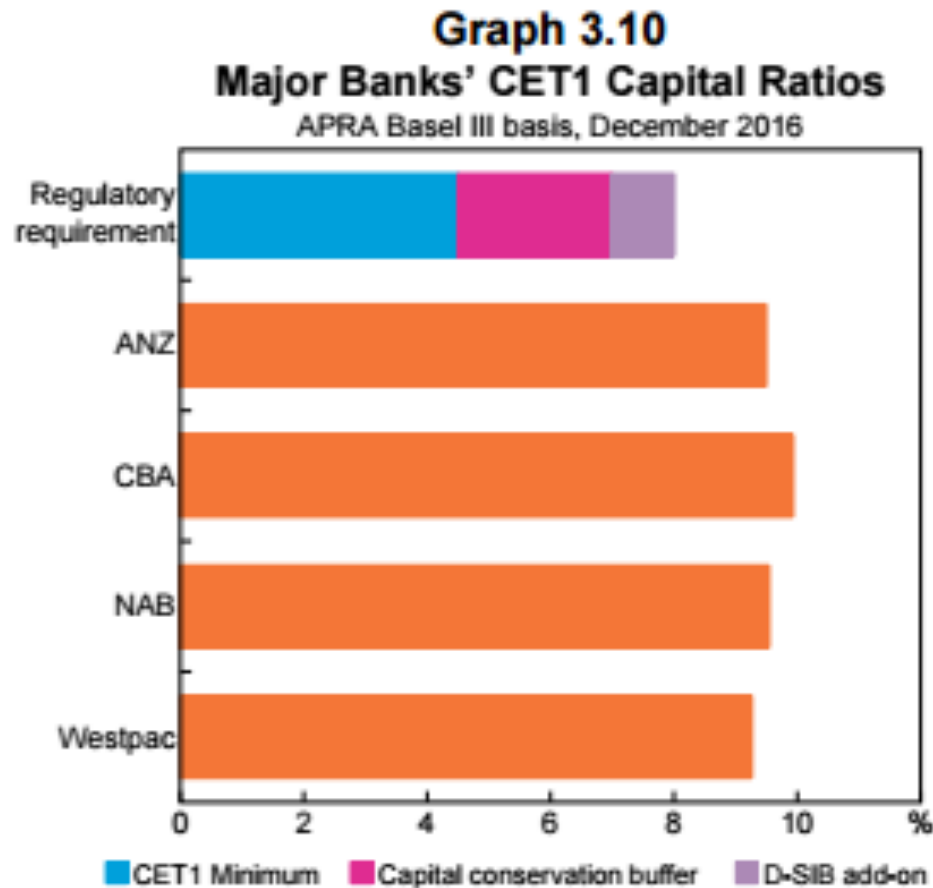
Capital Adequacy Regulation:

- Capital Adequacy Ratio (CAR): Ratio of capital to risk-adjusted assets must be at least 8%.
- What constitutes capital is defined by prudential statements. These statements divide capital into:
 - Tier 1 Capital
 - Consisting of paid up ordinary shares, reserves, retained earnings
 - Tier 1 capital must account for at least 6% of total risk-adjusted assets. Different assets have different risk weights for calculating how much capital must be held against them.
 - Tier 2 Capital
 - reserve of securities, provision for doubtful debts
 - cannot be greater than 100% of Tier 1 capital.

Subject link: Asset risk-weights are taught in BFC3170



Current state of Four Pillar CAR:



Sources: APRA; Banks' financial disclosures; RBA

Ignore CET, D-SIB acronyms which are not within the scope of the subject.



It is important to appreciate the impact of bank regulation on the operation and profitability of banks under the following conditions ...

- Tightening of regulation where banks have to hold more reserves to strengthen liquidity and capital adequacy relative to risk taking.
- Relaxing of regulation where banks need less reserves but weaken their liquidity and capital adequacy relative to risk.

(W7 LC Q5)



Whilst banks are the dominant type of ADI with the top 4 capturing 78.5% of total ADI assets in 2014, it is important to be familiar with non-bank financial institutions (NBFIs)

1. Credit unions.
2. Building societies.
3. Finance companies.

Our discussion of NBFIs focus on credit unions and building societies which are ADIs. Finance companies are not ADIs and tend to be arms of large conglomerates and multinationals which provide short-term consumer credit such as store credit, personal, car loans and home loans. e.g. *GE Money* or *Latitude Finance*. In the home loan market, Finance companies and other non-4 Pillar banks often compete strongly with the 4 Pillar banks.



A key difference between banks and NBFIs is that most NBFIs (excluding finance companies) operate under a *mutual* or *customer-owned* structure:

- There are no shareholders, just members. Regulated by APRA.
- Any profits/surplus belong to members but are kept as retained earnings and not paid out as dividends.
- The surplus represents the major source of capital for NBFIs.
- The objective is not-for-profit lending to provide personal and community-based financial service.
- As of 2016, NBFIs service over 4.6 mil customers and have over A\$85 billion under management.

NBFIs *operate primarily in the retail deposit taking and loan market* and market themselves as viable alternatives to commercial banks.

<http://www.customerownedbanking.asn.au/>



BFC1001

Pre-load: Financial Institutions

Please join the active LC session upon entering class.



Key Topic Aspects ...

- Role in the Economy
- Sources & Uses of Funds
- Bank Profitability & Risk
- Impact of Regulation
- Non-Bank Financial Institutions



Motivation for studying Financial Institutions

Financial institutions are an essential part of financial system and the economy.

- Through intermediation; they allow capital to be efficiently transferred from surplus to deficit units.
- They provide the infrastructure for the system of payments.
- Collectively, financial institutions provide the transmission mechanism for monetary policy; increasing or decreasing the cost of credit in the economy that affects consumer spending and corporate investment, thereby providing a primary means for promoting or dampening inflation and economic growth.

Since the inception of money, there have existed financial institutions to manage and store money. Without financial institutions, the economy would be unable to develop as consumption, financing and investment would be severely impaired and limited to their immediate geography.



Financial institutions provide intermediation and the system of payments in the domestic and global economy; allowing safe and efficient...

- Storage and management of money for individuals and institutions allowing consumption and trade.
- Denomination exchange
- Cheque & Bank draft deposit and clearing.
- Dissemination and distribution of payroll.
- Payments of large sums of money without need for physical cash.
- Electronic transfers & payments. E.g. EFTPOS, BPAY, Credit & Debit Cards.
- Currency exchange & International payments across borders
- Trade credit, e.g. Letters of Credit, Overdrafts, Bank Accepted Bills

As an indispensable part of the economy, a core foundation of finance is to develop an appreciation of financial institutions.



	<u>Main regulator</u>
1. Authorised Deposit-taking Institutions (ADI)	APRA
▪ Commercial Banks	
▪ Building Societies	
▪ Credit Unions	
1. Non-ADI Financial Institutions	ASIC
▪ Investment/Merchant Banks	
▪ Finance companies	(Preload 7: LC Questions 1 & 2)
▪ Securitisers	
1. Insurers & Fund Managers	APRA
▪ General & Life Insurance Companies	
▪ Superannuation Funds	
▪ Friendly societies	
▪ Public unit & Cash Management trusts	ASIC

<http://www.rba.gov.au/fin-stability/fin-inst/main-types-of-financial-institutions.html>



Banks manage the most amount of money in Australia (over A\$2.7 trillion), making them the most important ADI and financial institution.

There are essentially 2 different types of banks and banking...

- Commercial banks (Retail banking)
- Investment/Merchant banks (Wholesale banking)

(Preload 7: LC Questions 3 & 4)

The essence of banking is to accept deposits from savers who store their money with the bank in return for a return (interest). These form bank liabilities. Then, combined with other sources of funds, this capital is lent out by the bank to borrowers at a higher return than paid for the capital. These are bank assets.

- Commercial banks do this for individuals, households and SMEs
- Investment banks (IBs) take on higher risk activities; providing capital raising and risk management services and instruments for large businesses, public corporations and financial institutions (wholesale market).
 - E.g. IPOs, M&As, Large Debt Issuances, Capital Underwriting services.



Self-study:

- *Be able to define IPOs, M&As, Underwriting.*
- *Be able to provide examples of IBs*
- *Be able to provide examples of commercial banks.*
- *Appreciate how financial institutions, particularly banks have featured in past topics; e.g. in the flow of funds and financial regulation.*
- *Appreciate why our best B&F students typically go on to work in investment banking.*



A long standing policy since 1990 of the Australian government which does not allow mergers or acquisitions among the four major commercial banks.

The rationale was to ...

- Ensure sufficient competition within the banking industry for the benefit of the general public.
- Prevent an undue concentration of banking risk

The four major banks disagree ...

- Disallowing mergers and acquisitions impedes their ability to reach a size that enables them compete internationally.



Australian deposits up to \$250,000 are protected under the Financial Claims Scheme, operated by APRA. This provides explicit *Deposit Insurance*.

Financial Claims Scheme

For detailed information on the Financial Claims Scheme go to the FCS website:
www.fcs.gov.au

The Financial Claims Scheme (FCS) is an Australian Government scheme that protects depositors of authorised deposit-taking institutions (banks, building societies and credit unions) and policyholders of general insurance companies from potential loss due to the failure of these institutions. If the FCS is activated by the Australian Government APRA would be responsible for administering the Scheme.

Authorised deposit-taking institutions (ADIs)

For banks, building societies and credit unions incorporated in Australia, the FCS provides protection to depositors up to \$250,000 per account-holder per ADI. The Scheme seeks to provide depositors with timely access to their protected deposits in the unlikely event of the failure of their ADI.

General insurers

For general insurers, the Scheme provides compensation to eligible policyholders with valid claims against a failed general insurer. Under the FCS, most policyholders with the affected general insurer are covered for valid claims up to \$5,000. For any valid claims of \$5,000 and over, the policyholder or claimant must be eligible under certain criteria.

<http://www.apra.gov.au/CrossIndustry/FCS/Pages/default.aspx>



Bank Liabilities = Source of Funds

- Retail liabilities: savings accounts, transaction accounts, term deposits
- Wholesale liabilities: Bank Accepted Bills, Certificates of Deposit, Debt issuances

Bank Assets = Uses of Funds

- Primarily loans and investment assets
- Retail assets: home loans, personal loans, car loans, credit cards, insurance
- Wholesale assets: overdrafts, leases, trade finance, term loans.



We now move on to discuss Intermediation Vs Direct Financing.

- Firstly, any questions about definitions and material covered in the Pre-load or your Self-study?

Key benefits of Financial Intermediation

*Answer to self-study question:
Key benefits of Intermediation?*

- **Asset transformation** – turning deposits into loans
- **Credit risk transformation & diversification** – low risk deposits turned into higher risk loans and different types of loans.
- **Liquidity transformation** – short-term debt (deposits) used to fund long-term assets (loans)
- **Economies of scale** – the larger banks are, the cheaper intermediation becomes.



Liquidity Transformation

- Short-term liabilities ➡ Long-term assets
- This is a primary source of liquidity risk for banks
- By managing and bearing this risk, banks *create liquidity* for surplus & deficit units (lenders & borrowers).

Asset & Credit Risk Transformation

- Collecting and pooling small value, low risk deposits ➡ Larger value, higher risk loans.
- This is a primary source of credit risk for banks
- In doing this, banks enable the *transfer of capital* from surplus to deficit units in the economy.

For providing these services, banks earn a return by charging fees and earning an interest spread (difference in interest paid between assets & liabilities).



TABLE 4.2 All Banks—Assets and Liabilities and Shareholders' Funds

	DEC-05 \$m	%	DEC-09 \$m	%
Assets				
Notes, coins and cash with RBA	8 573	0.59	13 807	0.54
Bills receivable	69 760	4.81	38 673	1.50
Loans and advances				
—Residential	531 848	36.65	910 128	35.39
—Personal	84 129	5.80	104 738	4.07
—Commercial	369 501	25.46	646 040	25.12
Other assets	290 732	20.04	631 442	24.56
Non-resident assets	73 765	5.08	118 792	4.62
Amount due from overseas operations	22 772	1.57	107 891	4.20
Total assets	1 451 079	100.00	2 571 511	100.00
Liabilities and shareholders' funds				
Deposits	760 826	52.43	1 364 798	53.07
Bills payable	69 759	4.81	38 666	1.50
Other borrowings	71 467	4.93	165 629	6.44
Other liabilities	88 955	6.13	185 760	7.22
Non-resident liabilities	302 217	20.83	483 729	18.81
Amount due to overseas operations	66 165	4.56	153 873	5.98
Total liabilities	1 359 389	93.68	2 392 456	93.04
Shareholders' funds	91 690	6.32	179 056	6.96
Total liabilities and shareholders' funds	1 451 079	100.00	2 571 511	100.00



Next...Self-study for Topic 7



BFC1001

Interactive Study: Debt & Markets (Debt Securities)

Please join the active LC session upon entering class.



Key Topic Aspects ...

1. Finance using debt securities.
2. The short-term money market & how to value discount securities.
3. The bond market & how to value bonds.
4. Understanding the relationship between YTM and bond Prices



Money market securities are issued by borrowers at a discount to face value (the nominal value of the security) and carry no income payment other than the repayment of FV at maturity.

The value and implied price can be established as follows ...

We start with $PV = FV / (1 + i)^n$

becomes $\rightarrow$

$$P = \frac{F}{1 + y \frac{n}{365}}$$

Where ... P = Implied price of the discount security

F = Face Value at maturity (nominal or dollar value of the security given by the issuer)

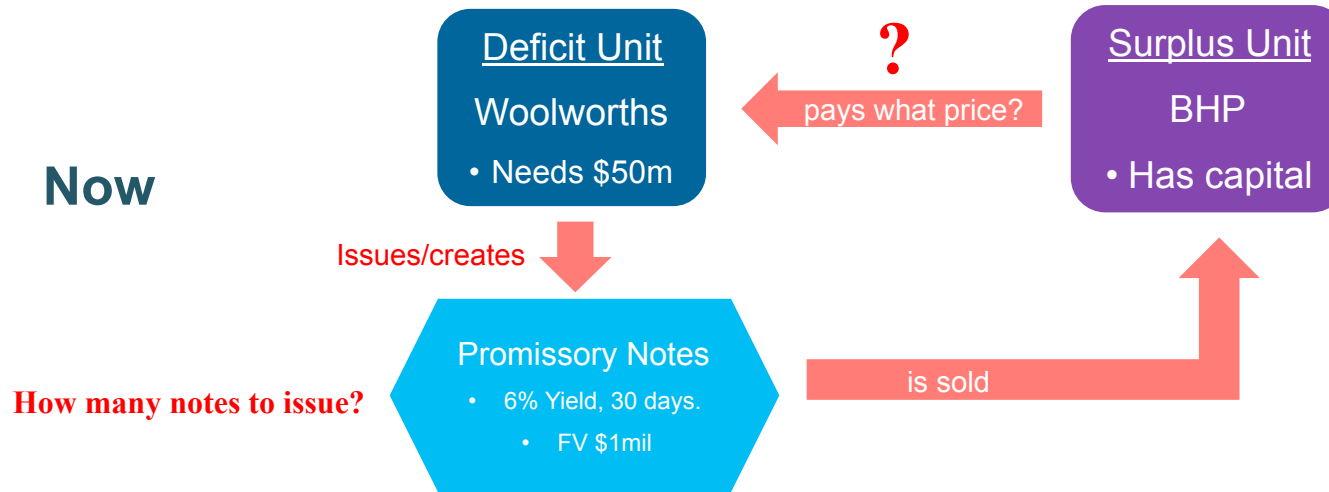
y = yield of the security

n = number of days till maturity.

From Preload Slide 12

To understand this formula, we need to understand how finance is raised through discount securities. Let us continue on from the Pre-load example of Woolworths having to raise \$50mil of short-term funding for 30 days.

(W8: LC Q1)



? Ans: BHP will pay a lower price than a FV of \$1mil, such that over 30 days, the price paid now provides a 6% yield p.a., when BHP receives the FV \$1mil back in 30 days.

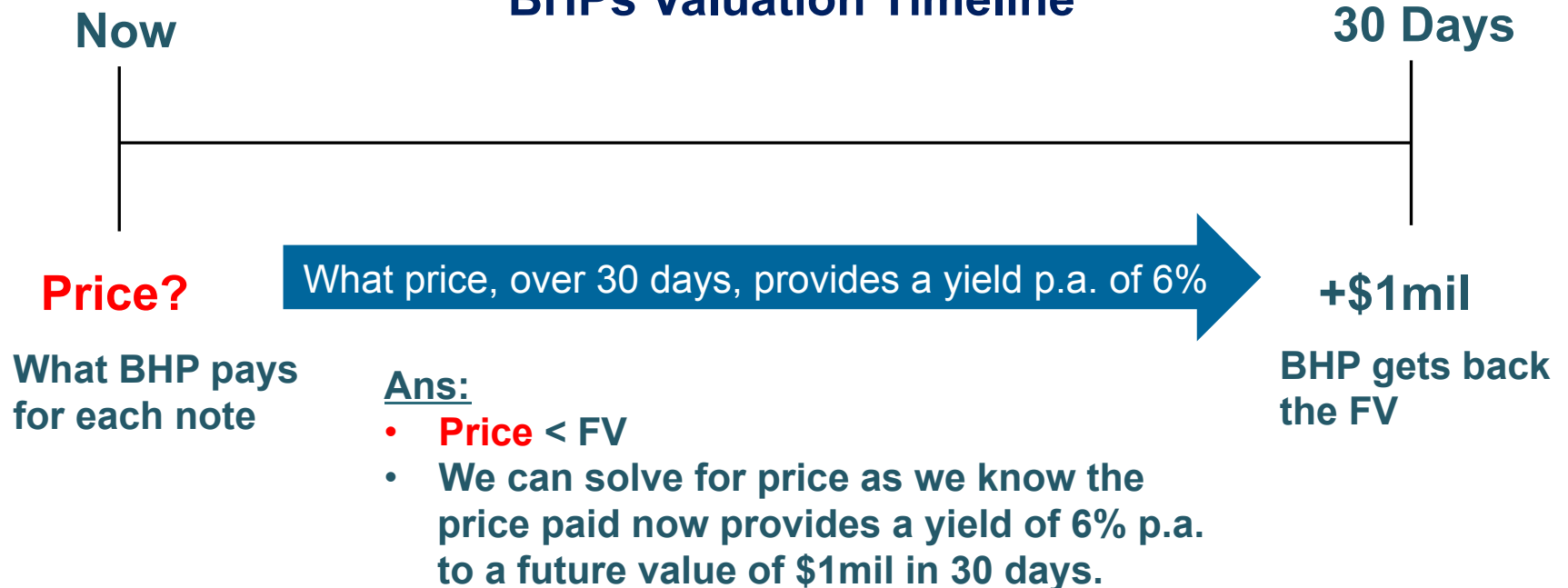


Rule of Discount Securities: At maturity, issuer pays the FV of the discount security to the security holder.

(Drawing a timeline can help if the cash flows are not clear)



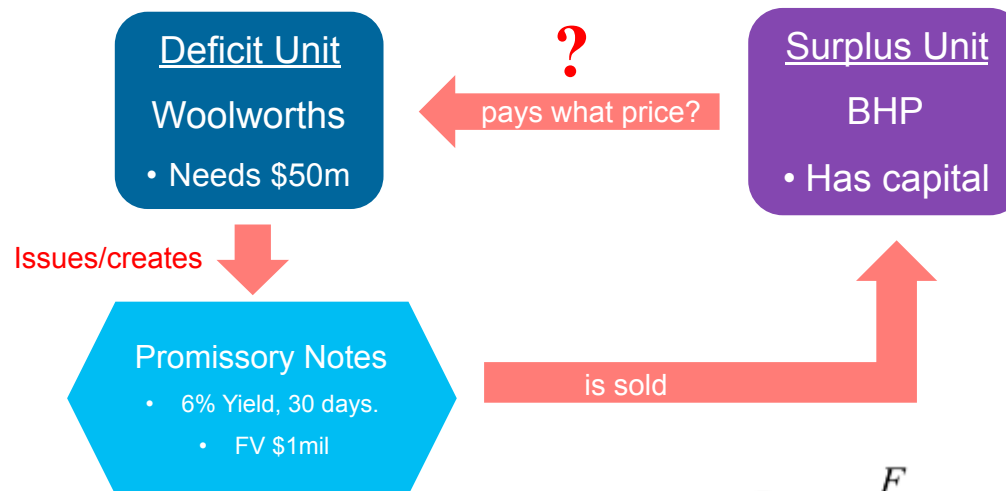
BHPs Valuation Timeline



$$PV = FV / (1 + i)^n, \text{ Price} = \text{Face Value} / (1 + i)^n$$



Now



? Ans: BHP will pay a price now, a lower price than a FV of \$1mil, such that over 30 days, price paid now provides a 6% yield, p.a.

$$P = \frac{F}{1 + y \frac{n}{365}}$$

$PV = FV / (1 + i)^n = \$1 \text{ mil} / (1 + ?\% \times ? / 365)^1 = \$______ /$
promissory note.

Needing to raise \$50mil, Woolworths will have to issue/sell **\$50mil/? = _____**, rounded up to **_____ promissory notes** as securities are traded in whole units.



Bond investors are paid a periodic coupon, which is a percentage of the face value (coupon rate), over the life of the bond and lastly receive the face value back at maturity.

- The value and thus implied price of the bond is the present value of these two cash flows.
- Bond value = PV of coupons + PV of FV

From Preload Slide 16

Lets do an example ... (W8: LC Q2)

As a senior finance manager for Woolworths, you are responsible for capital funding of new stores. Woolworths will need \$200mil to set up a new store in the Melbourne CBD. You decide to finance this investment project with a bond issue. Woolworth bonds have a Face Value of \$1mil each, pay an annual coupon of 7% and have a term of 5 years. The current yield-to-maturity (YTM or i) that prospective buyers require of Woolworth bonds is 5%. What is the implied price of each bond?

Before starting our solution, let us understand YTM clearly



- YTM = the % return on the price paid, that the bond buyer needs to earn, assuming the security is held to maturity.
- YTM = the bond buyer's required rate of return of the bond.

Each prospective bond buyer has their own YTM, affected by ...

Asset & Issuer Characteristics	Investor Attributes
Amount of expected cash flows. Determined by ... • Coupon rate • Face Value	Investor's assessment of the riskiness of asset CF. The investors opinion of the... • Default risk premium • Liquidity risk premium • Maturity risk premium • Inflation risk premium • Opportunity Cost of Capital (R_f & Yields of other assets) See pg. 64 textbook
Timing of expected cash flows. • Frequency of coupon payment (semi-annual or annual payment) • Maturity of Bond	
Riskiness of expected cash flows. • Determined by credit rating of the issuing company • Quality of any specific assets backing the security. E.g. mortgage backed securities.	Investor's willingness to bear risk. • Investors <i>risk averseness</i>. $\uparrow$ risk averseness = $\uparrow$ fear of risk = $\uparrow$ return required for risk = $\uparrow$ YTM. And vice versa.

The above builds on Fig 7-1, pg. 268 textbook Self-study reading



So, returning to our LC question, based on the coupon rate of 7% received over the life of the bond and the Face Value (FV) received at maturity, the price paid for the each Woolworth bond is that which allows these future cash flows to provide a 5% p.a. yield. Such is the implication of a 5% YTM.

- Different buyers have different YTMs: Each investor can assess risk differently, which provides for different risk premiums. Investors also have different risk averseness.

The Coupon rate is effectively the interest paid on the bond and is set by the bond issuer based on the issuers opinion/assessment of ...

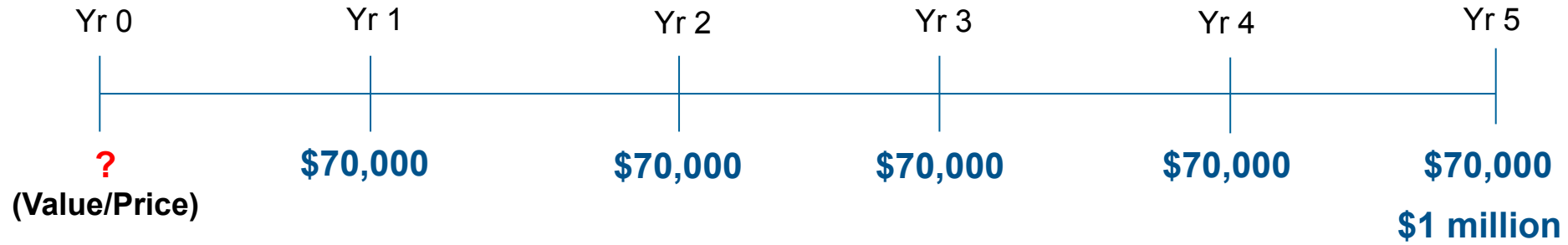
Asset Characteristics	Issuer Attributes
Amount of expected cash flows. Determined by ... • Coupon rate • Face Value	Issuers assessment of the riskiness of the asset CF. The issuers opinion of ... • Default risk premium • Liquidity risk premium • Maturity risk premium • Inflation risk premium • Opportunity Cost of Capital (R_f & Yields of other assets)
Timing of expected cash flows. • Frequency of coupon payment (semi-annual or annual payment) • Maturity of Bond	
Riskiness of expected cash flows. • Determined by credit rating of the issuing company • Quality of any specific assets backing the security. E.g. mortgage backed securities.	The issuer is not able to assess a prospective buyer's risk averseness.



Timeline diagram showing cash flows from Year 0 to Year 5. Year 0 has a red question mark. Years 1 through 5 have blue cash flows of \$70,000. A blue label '\$1 million' is at the bottom right.

$$PV = \frac{C}{i} \left[1 - \frac{1}{(1+i)^n} \right] + \frac{F_n}{(1+i)^n}$$

Note: The fixed-coupon bonds that are taught in BFC1001 have the coupons valued only as ordinary annuities, never as annuity dues.



$$PV = \frac{C}{i} \left[1 - \frac{1}{(1+i)^n} \right] + \frac{F_n}{(1+i)^n}$$

$C = 7\% \times \$1\text{mil} = \$70,000$, $n = 5$, $F_n = \$1\text{mil}$, $YTM = 5\%$

$$PV = 70000 / 0.05 [1 - 1 / (1.05)^5] + \$1\text{mil} / (1.05)^5 = \$303,063.37 + \$783,514.85$$

$$= \$1,086,578.22$$

The value and thus implied price of each Woolworth bond is \$1,086,578.22.

**Concept check: most bonds have semi-annual payments; how would that affect the C , n and i in calculation above? We have done numerous exercises with ordinary annuities involving various frequencies of payment per annum.*



Conclusions:

- **Coupon rate is set by the bond issuer.**
- **YTM is set by the bond buyer.**
- **Therefore, as the Coupon rate and YTM are set by different stakeholders using their respective and different judgements of the bond risks, the Coupon rate and YTM are often different.**
- **The coupon rate is fixed at bond issue and does not change.**
- **Over the life of the bond, YTM can be subject to change. For example ...**
 - If the official cash rate goes up, how does YTM change?
 - If the credit rating of the bond issuer goes up or down, how does YTM change?
 - If the bond buyer's risk averseness decreases, how does YTM change?



- **When YTM = Coupon Rate:**

the bond buyer requires a yield equal to what the interest earned provides (coupon rate). So, the bond price will be the same as the face value (which is what the coupon is calculated on).

- **When YTM > Coupon Rate:**

the bond buyer requires a yield greater than what the interest earned provides. So, a lower price will be paid than the face value, in order to earn the greater yield. Such a bond is defined as a Discount Bond.

- **When YTM < Coupon Rate:**

the bond buyer requires a yield smaller than what the interest earned provides. So, a higher price will be paid than the face value, in order to earn the smaller yield. Such a bond is defined as a Premium Bond.

(W8: LC Q3)



Why would a bond buyer be willing to earn a lower yield than what the interest earned provides on the face value (i.e. the coupon rate?).

- The debt security market is an auction market.
- When $YTM < \text{Coupon Rate}$, a Higher price is paid $> \text{Face Value}$. From the bond issuer's perspective, as the face value is what is repaid at bond maturity, receiving a bond price higher than the capital repaid is very attractive. It means the effective cost of the bond, i.e. the coupon rate, is lower; at the lower YTM of the bond buyer.
- Amongst multiple buyers/bidders for the same bond, the bond seller will sell to the highest bidder first, i.e. the buyer who offers to pay the most for the bond.
- So why would bond buyers be willing to earn a lower yield than the coupon?
- Because the process for buying bonds is a competitive auction market. If you want to buy a bond more than another investor, you will pay more for it. Which means, on the fixed coupon, you would be willing to accept earning a lower yield. However a price too high should not be paid, that lowers yield beneath an acceptable limit.
- Highly desirable and sought after debt securities trade at a significant premium to face value. Undesirable or overly risky debt trades at a significant discount to face value.

In the following PBL, we shall demonstrate how debt securities are traded in this manner, by role playing bidders in the primary auction market of debt securities.



Critical Thinking Concepts:

- When YTM $\uparrow$, what happens to the Bond Price? Price $\downarrow$
 - Why? The future cash flows of the bond are fixed. Coupon is fixed and the Face value is fixed. So for these future cash flows to earn a higher return, a lower price must be paid.
- When YTM $\downarrow$, what happens to the Bond Price? Price $\uparrow$
 - Why? The future cash flows of the bond are fixed. Coupon is fixed and the Face value is fixed. So for these future cash flows to earn a lower return, a higher price must be paid.

(W8: LC Q4 & 5)

- The same is true of discount securities.

It is important that we are able to understand and articulate the inverse relationship between Yields and Prices of debt securities.

Next, we shall begin our PBL auction market role play.



Woolworths Promissory Note Auction Board. Round 1.

Bidder	Yield	Capital Bid
NAB		
CBA		
Westpac		
ANZ		
Macquarie		
Telstra		
UniSuper		
BHP		

At the close of Round 1, top bids totalling \$50mil will be the current winners. But the auction is not over as in Round 2, bidders can revise their bids and resubmit to be more competitive if so desired!



Woolworths Promissory Note Auction Board. Round 2.

Bidder	Yield	Capital Bid
NAB		
CBA		
Westpac		
ANZ		
Macquarie		
Telstra		
UniSuper		
BHP		

And the winners are



Bidder	Yield	Capital Bid
NAB		
CBA		
Westpac		
ANZ		
Macquarie		
Telstra		
UniSuper		
BHP		

At the close of Round 1, top bids totalling \$60mil will be the current winners. But the auction is not over as in Round 2, bidders can revise their bids and resubmit to be more competitive if so desired!



Woolworths Promissory Note Auction Board. Round 2.

Bidder	Yield	Capital Bid
NAB		
CBA		
Westpac		
ANZ		
Macquarie		
Telstra		
UniSuper		
BHP		

And the winners are



This is take-home reading to be done after PBL completion to help consolidate what students have learnt about the debt security auction process.

To demonstrate how debt securities are used to raise capital in practice, we can review the real process of how the Australian Office of Finance Management (AOFM) manages the tender for Commonwealth Government Securities.

This helps emphasize the important relationship between yield, risk and price of debt securities.

AOFM will hold Tender 847 for the issue of Treasury Notes on Thursday 18 Feb 2016 to raise A\$500 million.

<http://aofm.gov.au/outright-tender/tender-847/>



The following hypothetical bids are submitted by potential buyers...

- Bid 1: A\$100M at 1.8% Yield
- Bid 2: A\$150M at 1.85% Yield
- Bid 3: A\$200M at 1.9% Yield
- Bid 4: A\$100M at 1.95% Yield
- Bid 5: A\$200M at 1.7% Yield

Bids are accepted based on the following procedure ...

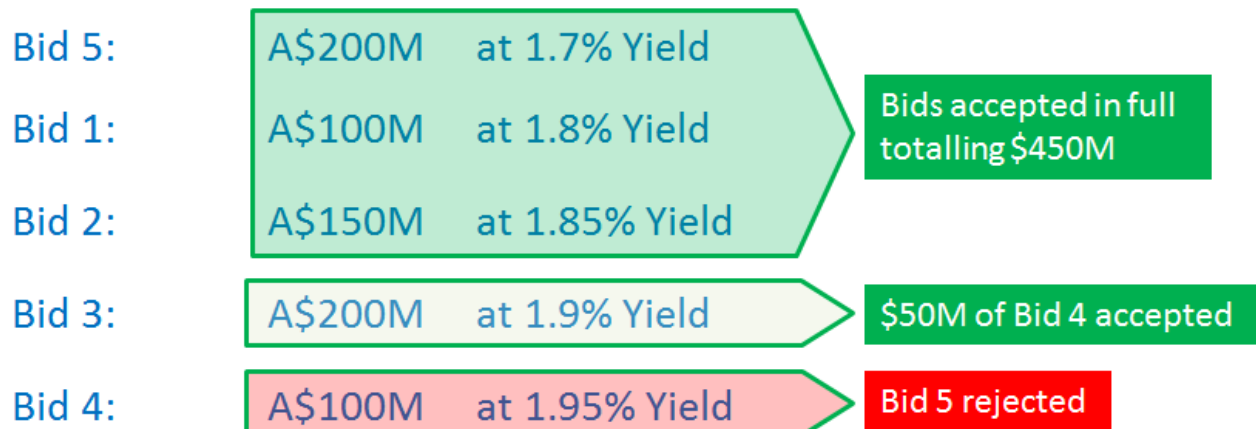
4.9. ALLOTMENT OF TENDER STOCK

Acceptance of bids will be made in ascending order of Yield bid, that is, from the lowest Yield bid to the highest Yield accepted. Allotments will be made at the Yields bid.

Source <http://aofm.gov.au/files/2015/08/Treasury-Bond-Information-Memo-August-2015.pdf>



The Tender results are as follows ...



The following questions may arise ...

Why does AOFM accept the lowest yield bid first?

As the borrower, AOFM would want to pay the lowest interest or yield to the buyer, thereby raising the most amount of capital. Bid 5 pays the highest price.

Why would a buyer bid such a low yield of 1.7%?

The buyer bidding 1.7% desires the Treasury Notes so much that he/she is willing to accept the lowest yield of all bids and pay the highest price for the FV



BFC1001

Pre-load:

Debt & Markets (Debt Securities)

Please join the active LC session upon entering class.



Motivation for studying Money & Markets

Money & Markets is an important topic about the debt market and debt securities in particular.

The debt market is fundamental to our knowledge of finance as it is one of two ways to raise capital; the other being through equity finance.

Debt securities can provide the most flexible and cheapest form of finance.

- Flexible: very large amounts of capital can be raised quickly and easily for short maturities (days) or long-dated terms (years).
- Cost of debt: For an issuer, debt is the cheaper form of finance compared to raising equity share capital.

(Preload 8: LC Question 1)



Key Topic Aspects ...

1. Finance using debt securities.
2. The short-term money market & how to value discount securities.
3. The bond market & how to value bonds.
4. Understanding the relationship between YTM and bond Prices



When financing through debt securities, corporates and governments are in effect borrowing money ...

- This is done by issuing (creating) then selling debt securities.
- Upon sale, the issuer receives capital from the buyer and agrees to pay the buyer or subsequent holder a return over the life of the security.
- At the end of the life of the security (upon maturity), the issuer returns the capital to the holder of the security.

Such debt securities are liabilities to the issuer. The same securities are assets to the investors who buy them.

Financing through debt securities is typically a form of *direct* finance. As borrowers and lenders usually deal directly with each other. The most commonly understood form of debt, borrowing money from a bank, is a form of *indirect* finance. *See Figure 2.1, pg. 48 of the textbook.*



Deficit Unit

- is called the *Issuer, Originator, Seller* of the debt security.
- is borrowing money to raise capital = price received.
- Debt security is a *liability*.

Deficit Unit

Company A

- Needs capital

Surplus Unit

Company B

- Has capital

Surplus Unit

- is called the *Buyer or Holder* of the debt security.
- is lending money as an investment.
- Debt security is an *asset*.

Primary Market:

Creation/Origination then sale of securities.

Issues/creates

Debt security

pays a price

is sold

Now

Over
security
life

Deficit Unit

Company A

provides a return

Surplus Unit

Company B

Debt security

- held till maturity

Upon debt
security
maturity

Deficit Unit

Company A

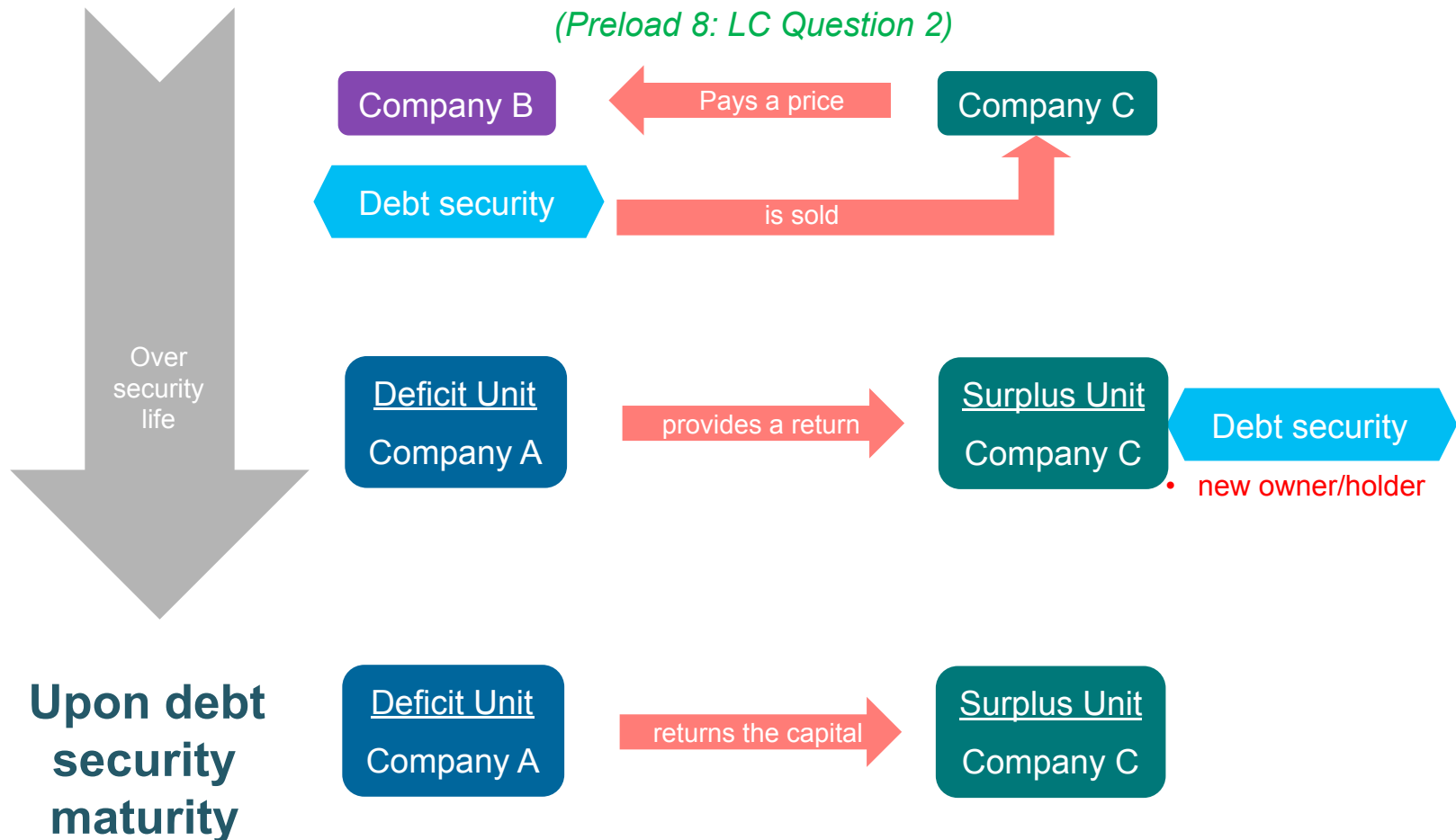
returns the capital

Surplus Unit

Company B



Alternatively, after it's creation and initial sale, the security could be sold to another holder, and on sold multiple times till maturity. This is known as the secondary market.





The Debt Securities Market (or credit market) is the largest capital market in the world, comprising 55% of global financial assets; over US\$163 trillion¹ in assets outstanding.

The Debt Securities Market can be split into a ...

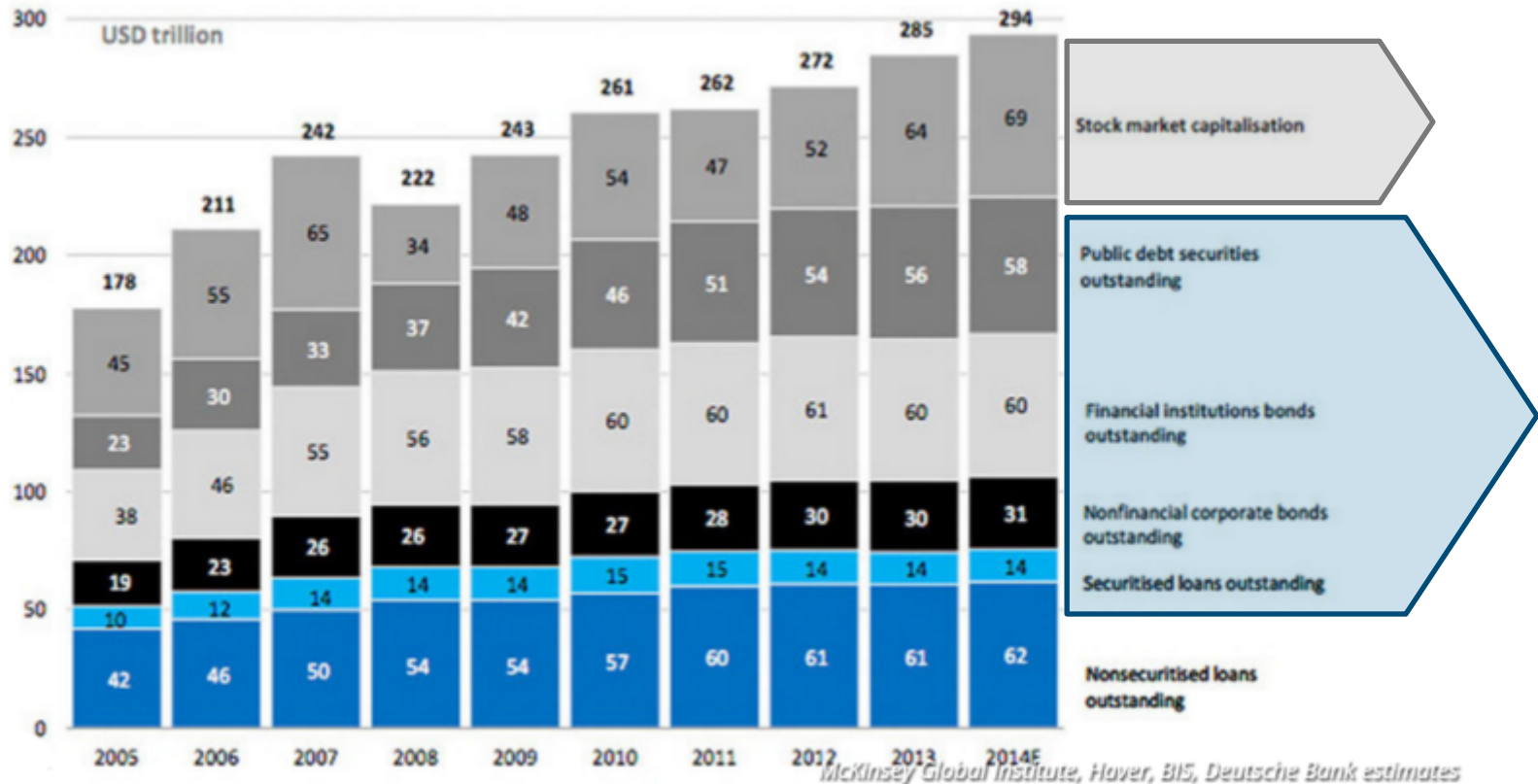
- short-term market: called the *Money Market* (MM)
- long-term market: called the *Bond Market/Fixed-Interest Market*

Both markets are wholesale markets; where the buyers and sellers are financial institutions, non-financial institutions and governments that trade in millions and billions of debt securities.

¹ <http://www.marketwatch.com/story/global-stock-market-cap-has-doubled-since-qes-start-2015-02-12>



Global financial assets



Source <http://www.marketwatch.com/story/global-stock-market-cap-has-doubled-since-qes-start-2015-02-12>



The primary distinctions between the MM & Bond market are ...

- MM securities are called *discount securities* and have a short maturity < 1 year.
- Bond market securities are called *bonds* and have maturity > 1 year.
- Bonds make periodic (usually semi-annual) interest payments called *Coupons* to the current holder prior to maturity. (except zero coupon bonds, taught in later subjects)
- Discount securities do not pay a coupon. Rather the yield/return is earned by the buyer paying a price that is a *discount* on the face value during purchase and later receiving the full face value (debt principal) upon maturity.
- Bonds are traded *over-the-counter* (OTC) and on public exchanges.
- Discount securities are traded OTC.
- However, borrowing in the MM and Bond market is cheaper than the equivalent borrowing from a bank...Why?

(Preload 8: LC Question 3)



The prime role of the money market is the **provision of short-term liquidity** for the economy.

- When capital is needed by corporates and governments, it can be obtained quickly, easily and at relatively low cost through short-term borrowing.

Short-term liquidity provided by the Money Market is essential to:

- Trade: The exchange of goods and services. Buyers can obtain the capital to pay sellers from short term discount securities.
- Working capital management: current assets such as inventory can be financed through current liabilities such as discount securities.

(Preload 8: LC Question 4)



The characteristics of discount securities which promote liquidity and allow for the effective transfer of capital from surplus to deficit units are ...

- Low default risk & transaction costs
- Large denominations with standardised attributes (e.g. standard Face Value, risk, discount rate)
- Short-term, standardised maturities (often 30, 90 or 180 days)
- High marketability & a deep pool of buyers and sellers

Examples of discount securities and their issuers ...

- Treasury notes (Federal gov.)
- Commercial paper (State gov. & large corp.)
- Negotiable Certificates of Deposit & Bank Accepted Bills (Banks)
- Promissory notes (Institutions at least as credit worthy as banks)
- Repurchase Agreements (Federal & state gov.)



Money market securities are issued by borrowers at a discount to face value (the nominal value of the security) and carry no income payment other than the repayment of FV at maturity.

The value and implied price can be established as follows ...

We start with

$$PV = FV / (1 + i)^n$$

becomes

$$P = \frac{F}{1 + y \frac{n}{365}}$$

Where ... P = Implied price of the discount security

F = Face Value at maturity (nominal or dollar value of the security given by the issuer)

y = yield of the security p.a. (yield is earned by the security buyer)

n = number of days till maturity.

In our Workshop, we shall apply this formula in a continuation of our Woolworths LC example.



Self-study:

- *Understand why debt is cheaper than equity.*
- *Appreciate the difference between OTC market and the public market.*
- *Be able to provide examples of discount securities.*
- *Appreciate the differences between the MM and Bond Market.*
- *Be able to define and understand what the Face Value of a debt security is.*
- *At the beginning of a discount security, what does the buyer pay?*
- *At the end of the discount security, what does the buyer get back?*



The Bond market is where medium to long-dated debt securities over a year in maturity are issued and traded.

Bonds are medium to long-term debt securities that pay regular interest on the face value. Like all debt securities, a price is paid by the buyer of a bond and the buyer receives the face value on bond maturity.

Bonds allow corporates and governments to *maturity match*; by funding long-term assets with long-term liabilities. This helps synchronize cash inflow (earnings) to cash outflow (capital cost) and reduces liquidity risk.



MM securities are commonly used to manage working capital and provide short-term liquidity, while bonds are primarily used to fund non-current assets or capital investment.

While it is possible to use MM securities to finance non-current assets or projects, such a strategy faces heightened liquidity risk.

In the event of a **credit crisis** (where banks stop lending & the MM has no liquidity), companies will have to repay the short-term debt securities instead of *rolling it over*. As the capital is locked away in non-current assets and cannot be liquidated, the company will face insolvency.

- The last time a world-wide credit crisis occurred was during the GFC.



Bond investors are paid a periodic coupon, which is a percentage of the face value (coupon rate), over the life of the bond and lastly receive the face value back at maturity.

- The value and thus implied price of the bond is the present value of these two cash flows.
- Bond value = PV of coupons + PV of FV

$$PV = \frac{C}{i} \left[1 - \frac{1}{(1+i)^n} \right] + \frac{F_n}{(1+i)^n}$$

PV of an ordinary annuity

PV of a single FV

where ...

PV = Bond value & it's implied price

C = Coupon Payment in \$ (fixed payment by the bond issuer)

i = Yield To Maturity (yield is % earned by the bond buyer)

n = number of payments

F_n = Face Value of the bond



Self-study:

- *Our introduction and valuation of bonds is limited to simple, fixed coupon bonds.*
- *The valuation and application of other more complex bonds including floating-rate bonds and zero coupon bonds are introduced in later finance subjects*
- *Understand the different cash flows that arise from MM securities and Bonds.*
- *Ensure you clearly understand the bond characteristics, i.e. FV, term or maturity, coupon*
- *Attempt to understand Yield to Maturity and how it is different from the coupon payment*
- *Be able to provide examples of bonds. Self study reading ...Textbook Chp 7 pg. 261 – 262.*



Next...Self-study for Topic 8



BFC1001

Interactive Study: Stocks & Markets (Equity Securities)

Please join the active LC session upon entering class.



Key Topic Aspects ...

1. Finance using equity securities.
2. Types & characteristics of shares.
3. The share market & how to value shares.
4. Introducing Asset Pricing



Continuing from our Preload, let us further understand the risk of residual claim.

Possible reasons why no dividend/no fixed dividend is paid:

- Business earnings are poor and uncertain.

There is little if **no residual cash flow** available to shareholders after paying all creditors, liabilities and obligations.

- Business earnings are good and there is ample residual cash flow.

Rather than pay a dividend, **residual cash flow is reinvested** by purchasing productive assets that will increase future earnings growth.

- Business earnings are currently good but uncertain in the future.

Management is **unwilling to commit** to a fixed, high dividend payment now given the uncertainty of sustaining it into the future.

Large, established (*Blue chip*) companies tend to aim for stable, progressive dividend payments while young, growth companies tend not to pay dividends but rather reinvest residual cash flow to maximise growth in future earnings. The style of dividend payments is called the company's *dividend policy*.



The following stock valuation terminology is commonly encountered in share market literature ...

- *Capital Gain* = $P_{\downarrow t} - P_{\downarrow 0} / P_{\downarrow 0}$
- *Dividend Yield* = $Dividend / share / Share Price$
- *Market Capitalisation* = $Share price \times Num. of Shares Outstanding$
- *EPS*
Outstanding = $Total Company Earnings / Num. of Shares$
- *Earnings Yield* = $Earnings / share / Share Price$
- *Net Asset Backing*
Number of Shares = $Shareholders Funds - Intangible Assets /$



The following stock settlement terminology is commonly encountered in share market literature ...

- *Seasoned Equity Offering*

Where new shares are issued to the general public after an IPO.

- *Share Placement/Private Placement*

Issue of shares privately to institutional investors; during/after an IPO.

- *Rights Issue*

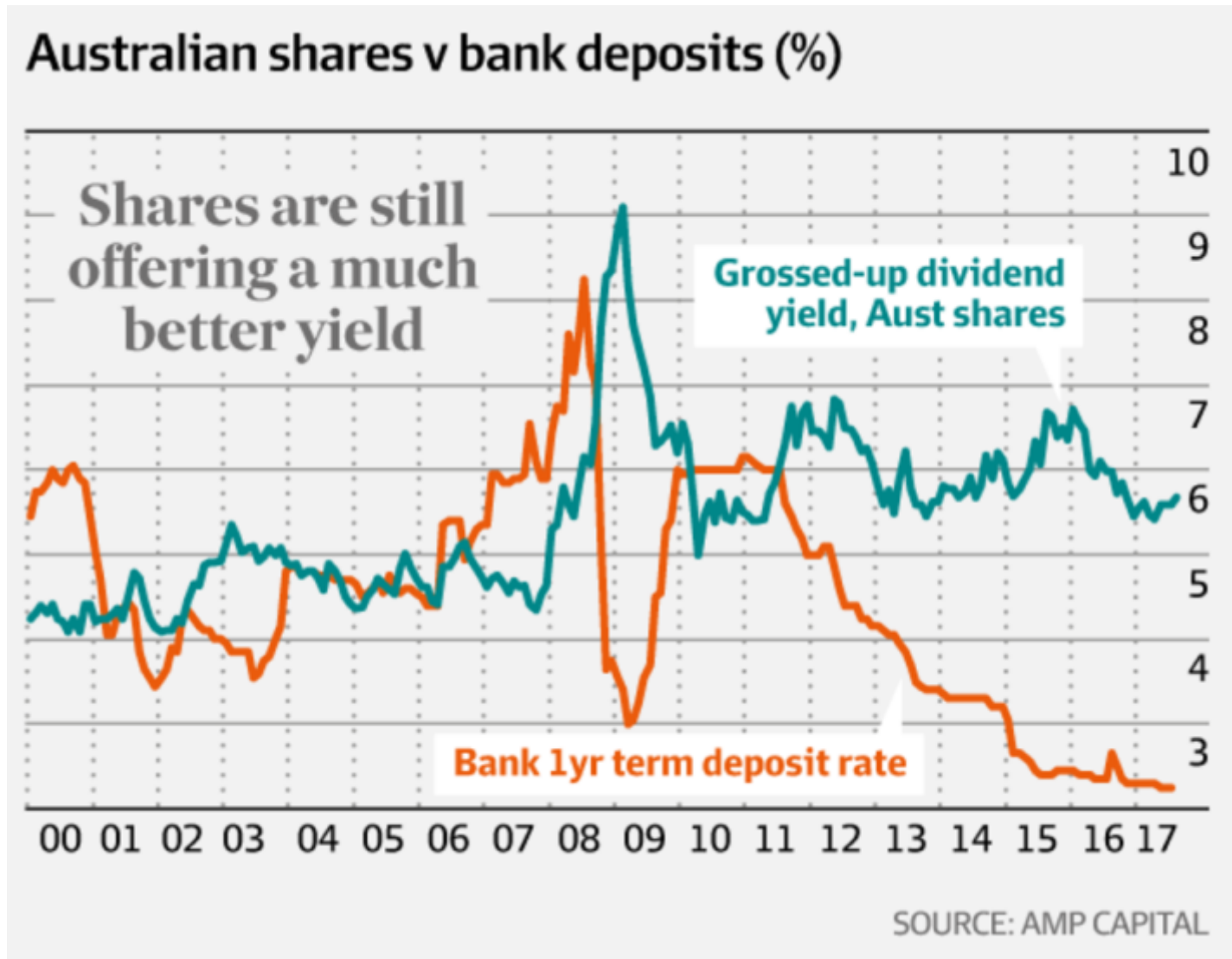
Where new shares are issued only to existing shareholders

e.g. <http://www.asx.com.au/asxpdf/20170516/pdf/43j8xckfft7sbr.pdf>

- *Share Buyback*

Where existing shares are bought back by the company, funded by asset sales or debt raisings, removing such shares from the market.

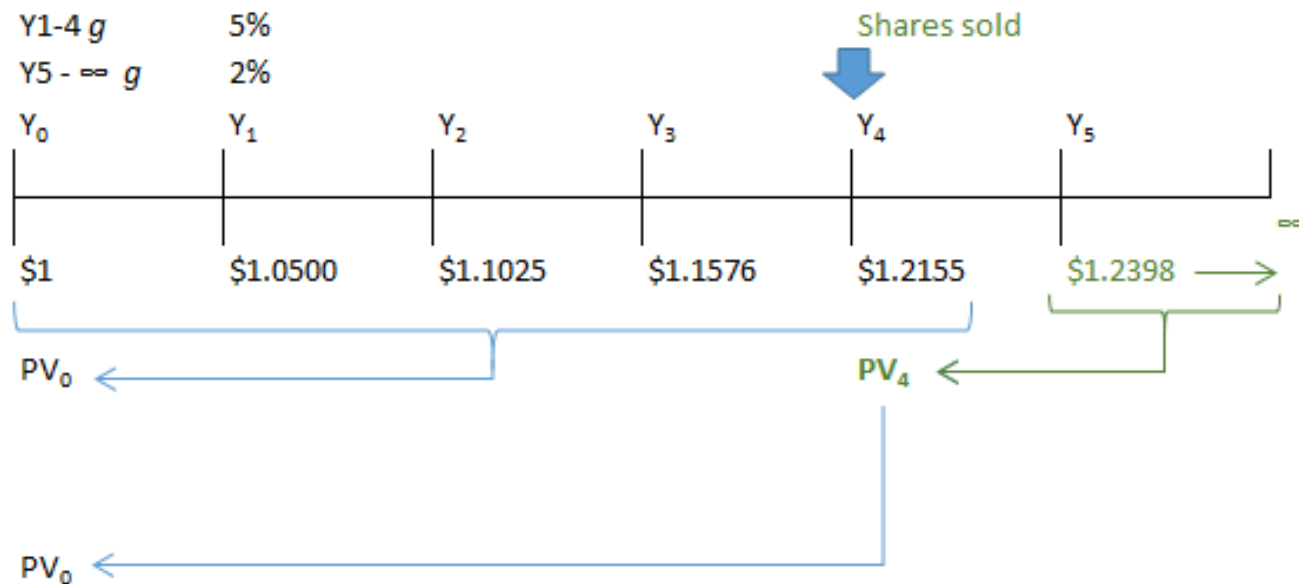
e.g. <https://www.businessinsider.com.au/rio-tinto-announces-2-5-billion-buyback-shares-rise-2017-9>





Dividend Discount Modelling with a deferred perpetuity: (W9: LC Q1)

Monash Co. is expected to pay a dividend of \$1 this year. (note: any dividend paid from when the share is purchased till the start of Y_1 is considered to be a Y_0 CF) It is expected to grow at 5% p.a. for 4 years. You intend to sell the share at the end of year 4 as the growth rate of dividends from year 5 onto perpetuity falls to 2% p.a. What is the maximum price you would pay for Monash Co. today if the expected return on Monash Co. shares is 12% p.a.?





Critical Thinking: Cheap or Expensive?

It is common for investors without a financial education to characterise a share as being *cheap* or *expensive* based purely on the share price.

Which share is cheaper?

Share A: \$0.10

Share B: \$100

With a financial education, we understand that the price by itself, is not a measure of whether a share is cheap or expensive.

- We compare the price paid, to what we receive in return for the price paid.
- i.e. the price paid is compared with the value of the share.

Which share is cheaper? (W9: LC Q2)

Share A: \$0.10 price, \$0.05 value

Share B: \$100 price, \$200 value



Critical Thinking: Cheap or Expensive?

How is the value today of a share obtained?

- Through the present valuation of future cash flows (dividends).
- But what if the share doesn't pay a dividend?

Given the uncertainty of dividend policy, the PE ratio is one of the most widely used share valuation methods, not Dividend Discount Modelling.

$$P/E \text{ Ratio} = \text{Share Price} / \text{Earnings} / \text{share}$$

Which share is cheaper?

Share A: \$0.10 price, \$0.05 EPS

Share B: \$100 price, \$200 EPS

$$PE \text{ Ratio} = 0.1 / 0.05 = 2$$

$$PE \text{ Ratio} = 100 / 200 = 0.5$$



Critical Thinking: Cheap or Expensive?

A useful way of defining the PE ratio to aid our comprehension is as follows:

- With a PE ratio of 2, investors are paying \$2 of market price for every \$1 of earnings for Share A.
- With a PE ratio of 0.5, investors are paying \$0.5 of market price for every \$1 of earnings for Share B.

Conclusion: The PE ratio compares share price by a common unit value.

- ↑ PE ratio, the more expensive the share.
- ↓ PE ratio, the cheaper the share.

Using the PE ratio for valuation, we do not need to forecast dividends to obtain the value of the share; earnings per share is used as the estimate of value.



PE Ratio Valuation:

(W9: LC Q3)

Given the following information about two companies, without calculating the PE ratio, identify which is more expensive? Calculate out the PE ratio of both companies to validate your earlier conclusion.

	Monash Co.	Melbourne Co.
Current Share Price	\$0.02	\$0.01
Total Company Earnings	\$1,000	\$0
Num. of Shares Outstanding	100,000	100,000



β in CAPM is defined as a measure of the systematic risk of the share.

- Systematic risk is uncertainty which comes from factors that affect the entire share market. For example, inflation, interest rates and taxes affect all companies and would be systematic risk factors.
- Unsystematic risk factors are those which do not affect all companies but a subset of the market. For example, the iron ore price would have an important impact on BHP's share price but would not affect Woolworths's share price.

The size of beta provides an indication of volatility of share returns relative to the market

- $\beta = 1$, the share has the same volatility as the market
- $\beta > 1$, the share has the greater volatility than the market
- $\beta < 1$, the share has the less volatility than the market

(Subject link: The above is all that is required of your understanding of Beta. It will be developed further in Corporate Finance)

Critical Thinking in Asset Pricing

An asset pricing model such as CAPM provides the $E(R)$ of a stock. It may be unclear how an $E(R)$, a % return, allows the asset's price to be determined; which is what an Asset Pricing Model is meant to do.

Ans: The $E(R)$ is used as a discount rate in valuation, the discount rate affects the value of stock, which in turn affects the price investors are willing to pay. Holding all else equal ...

- $\uparrow$ Expected Return (same as a $\uparrow$ yield), $\downarrow$ Value, $\downarrow$ Price.
- $\downarrow$ Expected Return (same as a $\downarrow$ yield), $\uparrow$ Value, $\uparrow$ Price.

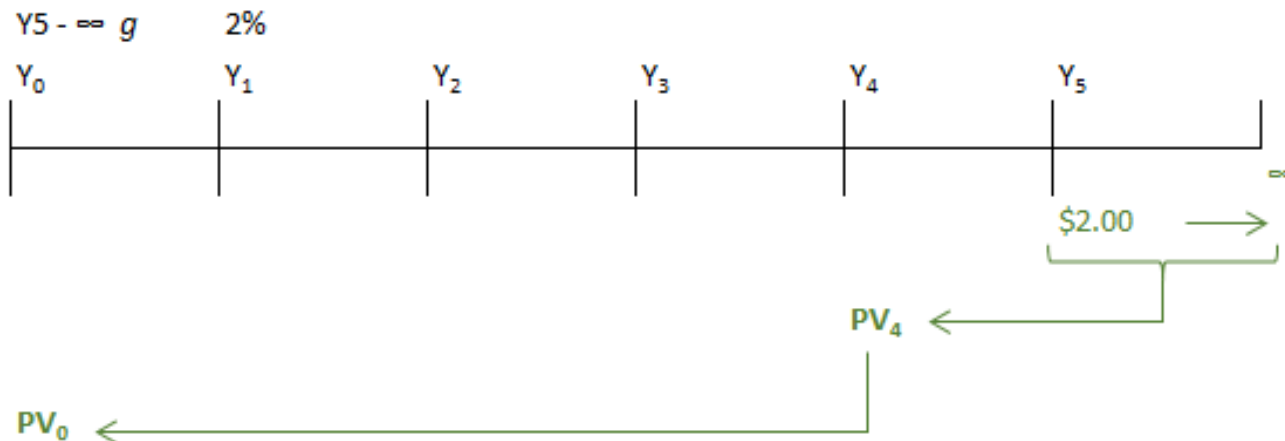




DDM with CAPM:

(W9: LC Q4)

Monash Co. does not currently pay any dividends. In Year 5, it is expected to pay a \$2 dividend which then grows at 5% p.a into perpetuity. In Year 5, government bonds are expected to yield 3%, the long-term return of the ASX is 10% and the β of Monash is 1. What is the value of Monash Co. today?





BFC1001

Pre-load: Stocks & Markets (Equity Securities)

Please join the active LC session upon entering class.



Motivation for studying Stocks & Markets

As one of the two means of raising capital, the stock market plays a pivotal role in the medium-long term growth of public companies.

To raise funds, a company can offer investors the opportunity to contribute equity, by joining the company ownership through the purchase of shares.

As companies grow larger, additional equity is sought to finance the purchase of fixed assets and projects that add value to the shareholder.

While the debt market provides critical short-term liquidity and long-term funding, equity capital is used for long-term funding.



Key Topic Aspects ...

1. Finance using equity securities.
2. Types & characteristics of shares.
3. The share market & how to value shares.
4. Introducing Asset Pricing



When a private company wishes to raise equity capital through stocks, it undertakes an *Initial Public Offering (IPO)* in the primary market.

As most companies are not familiar with how to access the stock market and regulations involved, an *underwriter* will often be engaged to manage the IPO. Underwriters are financial institutions who are experts at raising capital and most of them are investment banks. Upon IPO, the company is considered public; because members of the public are welcome to partake in ownership through its listing on the stock exchange.

(Preload 9 LC1)

Should equity capital be needed after IPO, more shares can be issued and sold to the public in a *Share Placement* or just to existing shareholders in a *Rights Issue*. Shares are considered a form of direct finance.



When an investor purchases shares, they join the ownership of the company in return for the capital provided: *e.g. If an investor owns 1 out of 100 shares, the investor owns 1% of the company.*

There are two main types of shares:

- Ordinary or common shares
- Preference shares

Ordinary shares have three important characteristics:

1. Limited Liability

The most a shareholder can lose is their investment in the firm. So if the company incurs losses that exceed total equity, the further loss cannot be claimed against the private wealth of shareholders.



2. *Voting Rights*

Ordinary shareholders can vote in the Annual General Meeting for executives who sit on the Board of Directors. A shareholder who owns 51% of all voting shares effectively controls the management of the company.

3. *Residual Claim*

Given the pecking order of payments, creditors and other obligations must be paid first. Ordinary shareholders are then entitled to any residual (left-over) cash flow from normal business operations or in the event of company liquidation.



Critical Thinking: Risk of Residual Claim

The residual claim characteristic greatly affects the cash flows received by ordinary share investors. Unlike creditors who must be paid their contracted return (*coupon* or *yield*) or the company will be in default, shareholders accept a risk of residual claim.

As we have discussed before, investors benefit from *Income* and *Capital gain*.

- The income paid for holding shares is called *Dividends*.
- Investors can also make a capital gain by trading shares.

Due to residual claim risk, company management will not mandate a fixed dividend policy for shareholders. **The implication is that management does not have to pay ordinary shareholders a fixed dividend or any dividend; because it is uncertain whether there will be sufficient residual cash flow to commit to a dividend payment.**



Preference shares, also known as *Hybrid* securities, have characteristics of both equity and debt.

Preference shares have three important characteristics that make them different from ordinary shares ...

1. *Fixed dividend paid before Ordinary Shares*

Preference shareholders do not bear the risk of residual claim and like creditors, receive a fixed return before ordinary shareholders.

2. *No Voting Rights*

Preference shareholders do not have any voting rights.

3. *Residual claim before Ordinary Shares in the event of liquidation*

Preference shareholders are paid before ordinary shareholders during liquidation.

(Preload 9 LC2)



Let's explore the Australian Share Market at ...

<http://www.asx.com.au/>

** Subject link: Statistics, where the performance of a sample represents the performance of the wider population*

A Share Index is a collection of stocks that provides a representative sample* of the share market. The returns of a share index serves as:

- Indication of overall share market performance.
- Market Benchmark to which individual shares or funds aspire to beat.

Share indexes can be for ...

1. The overall share market: e.g. All Ords, ASX200, Dow Jones etc.
 - Overall share market index returns are used as a common measure of R_m , (the return of the market) in CAPM.
2. Sectors of the share market: <http://www.asx.com.au/products/sector-indices.htm>



How do share investors attempt to determine the price at which to buy or sell shares? Through ...

- Technical Analysis (short-term investment)
- Fundamental Analysis (medium–long term investment)

You learn about technical analysis in later finance subjects. Fundamental analysis is the focus of BFC1001.

Fundamental Analysis presents 2 types of share valuation

- Absolute valuation using dividends.
- Relative valuation using PE ratios



Revisiting Value vs Price ...

When $\text{Value} > \text{Price}$, the stock is *under-priced*.

- Attractive to buyers.
- Unattractive to sellers

When $\text{Value} < \text{Price}$, the stock is *over-priced*.

- Unattractive to buyers.
- Attractive to sellers

(Preload 9 LC3)

The value of a share is an important factor that affects demand and supply of the share and ultimately the market price it is traded at. A reason why models equate valuation to P instead of V is that the model provides the value and thus the implied price the investor may pay.



Like debt securities, shares value can be estimated by the present value of future cash flows. As a potential future cash flow is dividends, the perpetuity valuations; *Dividend Discount Model* (DDM) and *Constant Growth Model* (CGM) can be used ...

$$P_0 = D_1 / r \qquad P_0 = D_1 / (r - g)$$

where ... r is the discount rate,
 g is the constant growth rate of dividends.

It is important to note that while financial literature tends to equate DDM and CGM to Price (P_0 , *the price today*), the actual market price of a share is not obtained through valuation models but through demand and supply of the share.

Share dividends are always valued as ordinary perpetuities but what if the share does not pay a dividend or pay dividends regularly?



Due to the uncertainty of dividend payments, relative share valuations using the P/E ratio or *Price to Earnings Ratio* is one of the most widely used valuation methods in industry. It is used to decipher whether shares are *cheap* or *expensive*, when compared with each other or when compared to an index.

$$P/E \text{ Ratio} = \text{Share Price} / EPS$$

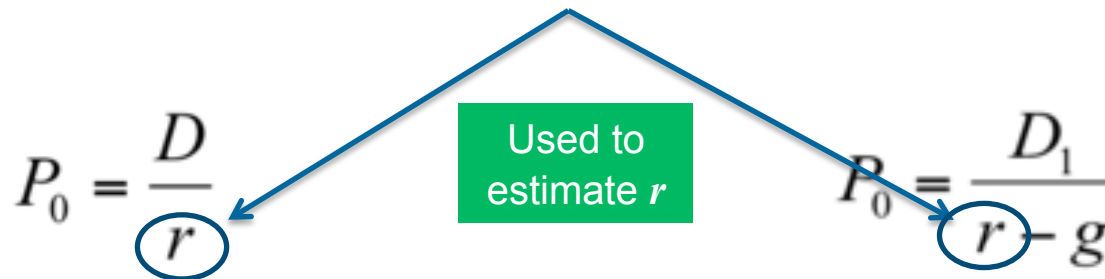
where...

$EPS = \text{Earnings/share} = \text{Total Company Earnings} / \text{Number of Shares Outstanding}$

Understanding how the PE ratio is used for valuation is a particularly important critical thinking technique that is discussed in the Workshop.

Asset Pricing and associated models are an important part of stock valuation because they provide the *Expected Return* or $E(R)$ of stocks that can be used as the discount rate for share valuation. The $E(R)$ of a share can be thought of as the total yield the share buyer desires to earn.

The simplest asset pricing model is the *Capital Asset Pricing Model* (CAPM) ...

$$E(R) = R_{\downarrow f} + \beta(R_{\downarrow m} - R_{\downarrow f})$$


The diagram illustrates the application of the CAPM formula. A central green box labeled "Used to estimate r " has two arrows pointing from it. One arrow points to the r in the formula $P_0 = \frac{D}{r}$ on the left. The other arrow points to the r in the formula $P_0 = \frac{D_1}{r - g}$ on the right. In both formulas, the r is circled in blue.

(Preload 9 LC4)

CAPM provides a estimate of the share yield; which allows the price paid to be determined from future dividends earning that yield.



$$E(R) = R_f + \beta(R_m - R_f)$$

where... R_f is the risk-free rate

β is Beta of the share

R_m is the return of the market.

- R_f is estimated by government debt securities such as Treasury bonds and bills
- R_m is estimated by the return of an appropriate share index. This is why you learn about share indexes in Slide 12.
- β is the measure of sensitivity to systematic risk of the share.

** Subject link: In Corporate finance, Equities & Investments and beyond, you will learn more about Beta, systematic and unsystematic risk as part of Modern Portfolio Theory.*



Self-study:

- *Be able to define equity and appreciate that stocks & shares are interchangeable*
- *Appreciate the differences between preference & ordinary shares, particularly the difference in risk.*
- *Ordinary share and common shares are used interchangeably.*
- *Understand and be able to articulate the purpose of a share index.*
- *Know which form of share analysis is suitable given the time-horizon of investment.*
- *Know how to proxy the Return of the Market R_m and R_f .*
- *The self study reading focuses on Absolute Share valuation but does not discuss Relative Valuation.*
- *Preload and Interactive Study notes suffice as your source learning material regarding the PE ratio.*
- *Your textbook pg. 328 states that CAPM is used to provide either the $E(R)$ or $RRoR$. For consistency with BFC2140, we introduce CAPM as providing $E(R)$.*



We shall have a look at how the *Market Price* of stocks is determined through supply and demand.

Here is a screenshot of an online brokerage tool showing the *Buyers* (who generate demand) and *Sellers* (who generate supply) for National Australia Bank.

NAB \$25.620 ↓ -\$0.54 (-2.06%) Add to Watchlist Add to Alert								
NATIONAL AUST. BANK FPO								
Share Quote Discuss in Community Company Announcement								
Bid (\$)	Offer (\$)	High (\$)	Low (\$)	Volume	Trades	Value (\$)	Open (\$)	Previous Close (\$)
25.600	25.750	26.020	25.490	6,904,166	12,746	177,359,604	25.900	26.160
Market Depth View: Price Detail Order Detail								
Buyers				Sellers				
No.	Volume	Price (\$)		Price (\$)	Volume	No.		
1	250	25.600		25.750	900	1		
2	350	25.550		25.790	2,000	1		
2	1,701	25.540		25.800	7,510	3		
1	5,000	25.530		25.950	597	1		
1	5,000	25.520		25.980	165	1		
1	5,000	25.510		25.990	1,050	1		
4	2,558	25.500		26.000	9,641	7		
3	7,056	25.490		26.040	402	1		
2	1,300	25.480		26.100	9,459	3		
1	1,000	25.470		26.140	500	1		
895 buyers for 641,301 units				413 sellers for 506,947 units				



Next...Self-study for Topic 9



BFC1001

Interactive Study: Risk & Financial Protection

Please join the active LC session upon entering class.



Key Topic Aspects ...

- Understand the concept of Risk Management
- Apply Risk Management by Hedging & Speculating using...
 - Forwards
 - Futures
 - Options



Futures contracts are standardised, exchanged-traded (instead of OTC) versions of forward contracts and are used to manage risk in the same way (hedging & speculation). Futures, like forwards can be written on any commodity (real or financial). Futures contracts in Australia are traded on the Australian Securities Exchange (ASX).

<http://www.asx.com.au/prices/asx-futures.htm>

Being listed and trading on an exchange has a number of disadvantage and advantages ...

Advantages

1. The futures market is far more liquid; larger trades can be conducted more quickly as all buyers and sellers of futures congregate at the exchange (ASX), trading in standardised contracts.
2. Counter-party credit risk is mostly eliminated as trades are settled through the intermediary of the clearing house (ASX).



Disadvantages

1. Futures trade as standard contracts, are limited in flexibility as they lack the customizability of forwards.
2. Buyers & Sellers of futures are exposed to margin calls required by the clearing house to minimise the risk of default. Forward contracts typically do not involve margin calls.

Futures & Derivatives terminology:

- Counter-part Credit risk: Risk that counter-parties will not settle their obligations.
- Clearing house: the agency use to settle securities transactions between buyers and sellers. For futures and shares it is the ASX.
- Margin call: requirement by the clearing house/broker that the investor deposit further cash or securities to cover potential losses.



The presence of margin calls is important as it helps eliminate counter-party risk in futures transactions. The process of applying margin calls is termed *Marking to Market*.

It is important to understand how margin calls are applied in clearing house operations.

- A Margin Call is not <https://www.youtube.com/watch?v=Y2DqFRsPrns>
- Students may wish to watch the movie *Margin Call* for a dramatised anecdote of what precipitated the GFC.

Let us review the following Khan Academy video to understand how margin calls work to reduce counter-party risk.

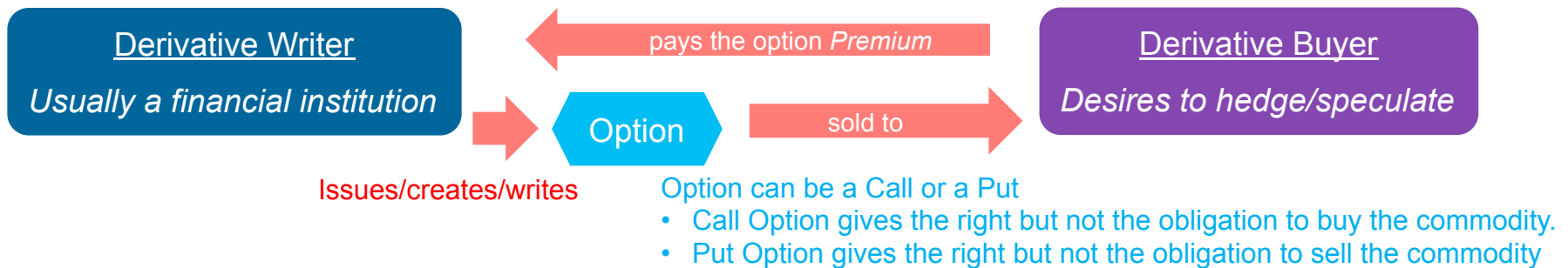
- <https://www.youtube.com/watch?v=1t42z5U2uoc>

(W10: LC Q1 & 2)



An Option contract is the **right but not the obligation** to buy (*Call option*) or sell (*Put option*) a commodity.

- It is fundamentally different from forwards and futures because options provide a choice to the holder of whether to buy or sell the commodity. Futures and forwards require settlement of the contract and do not allow the choice of not settling.
- The buyer of the option also expressly pays an upfront price to the option writer unlike the cost of a forward and future's contract; which is built into the forward/future commodity price. Note: in futures and forward contracts, no upfront price is usually paid to the writer of the derivative.¹



¹Pricing of Forwards, Futures & Options is outside the scope of this subject and is covered in BFC2751



Important option terminology & characteristics ...

- **Exercise/Strike Price**: The agreed upon price at which the commodity is bought or sold. Equivalent to the Forward or Futures Price.
- **Option Premium**: The price the option buyer pays for the contract.
- **Option Expiry**: The date the option expires. After this date, the holder of the option loses the right to buy or sell the commodity.
- **American Option**: Allows for exercise at time up to the option expiry.
- **European Option**: Allows for exercise only at option expiry.
- **Long**: Financial slang for buying; e.g. a **Long Call**; you are buying a call option.
- **Short**: Financial slang for selling; e.g. a **Short Put**; you are writing a put option.
- The terms **Long** and **Short** are also used extensively to describe trading in other financial instruments such as shares, bonds and currency etc.
- **Spot Price**: The current price of the commodity.



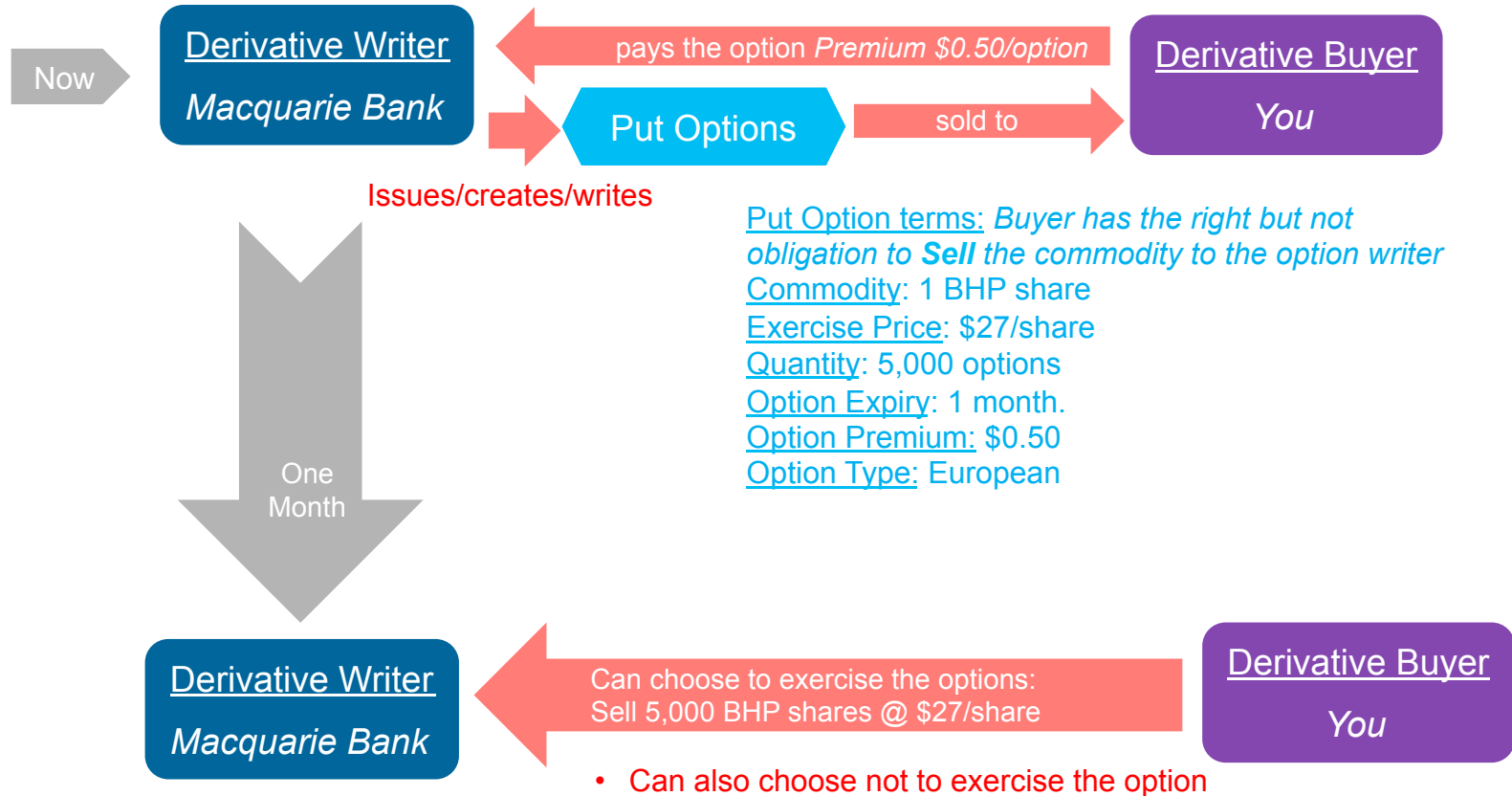
Option contracts allow risk management in the same manner as forwards and futures but with added flexibility.

Let us return to our 5,000 BHP share holding bought at \$27/share. In 1 month, you'll need to sell your shares to pay for tuition but are concerned that the price of BHP could fall, causing a capital loss.

To hedge the price risk:

*Buy 5,000 European **Put options** from Macquarie bank for 1 month; where each option gives you the right but not the obligation to **sell** 1 BHP share at \$27/share (exercise price). The price of each option is \$0.50. Down-side price risk has been mostly eliminated but up-side risk is preserved.*

(W10: LC Q3)



Both writer and derivative buyer are subject to **Counter-party Credit risk**.

- Buyer could default buy not selling shares at the agreed upon terms.
- Writer could default buy not buying shares at the agreed upon terms.



*In 1 month's time, BHP falls to \$20/share. The option is termed **In the money**. You would buy 5,000 BHP shares from the stock market at \$20/share, then exercise your Put option and sell the 5,000 shares to Macquarie at \$27/share. Your gain of \$7/share - \$0.50 option premium = \$6.50 is sufficient to almost completely offset the loss in your underlying 5,000 BHP shares which have fallen to \$20/share from \$27. In this case, the loss is limited to the option premium paid.*

*However, if BHP instead rises to \$30/share. The option is termed **Out of the money**. It is no longer profitable to exercise the Put option as you would have to buy 5,000 BHP shares from the market at \$30 but sell it to Macquarie at \$27. So the option is left to expire. Still, you have the underlying holding of 5,000 BHP shares bought at \$27 which is now worth \$30 in the market. The up-side capital gain is persevered, less the option premium.*



Settling Option Hedging Cash Flows: BHP ↓ \$20

Underlying Position CF		Long Put Position CF	
Bought 5,000 BHP shares from the market @ \$27	-\$135,000	Option premium: $\$0.50 \times 5,000$	-\$2,500
In 1 mth, Sell 5,000 BHP to the market @ \$20	+\$100,000	In 1 mth, Exercise Option: Sell 5,000 BHP shares to Macquarie @ \$27.	+\$135,000
		In 1 mth, Buy 5,000 BHP shares from the market @ \$20	-\$100,000
Underlying Profit /Loss	-\$35,000	Long Put Profit /Loss	+\$32,500
Hedging Result: -\$2,500 instead of -\$35,000 from not Hedging.			



Settling Option Hedging Cash Flows: BHP ↑ \$30

Underlying Position CF		Long Put Position CF	
Bought 5,000 BHP shares from the market @ \$27	-\$135,000	Option premium: $\$0.50 \times 5,000$	-\$2,500
In 1 mth, Sell 5,000 BHP to the market @ \$30	+\$150,000	In 1 mth, Option is <i>Out of the Money</i> and allowed to lapse without exercise.	
Underlying Profit /Loss	+\$15,000	Long Put Profit /Loss	-\$2,500
Hedging Result: +\$12,500 instead of +\$15,000 from not Hedging.			



To speculate with price risk:

*Buy 5,000 **Call options** from Macquarie bank where each option gives you the right but not the obligation to **buy** 1 BHP shares at \$27/share (strike price) at an option price of \$0.5/option. Down-side price risk is kept to the underlying holding of 5,000 BHP shares but up-side risk is available to both the underlying holding and option holding.*

*In 1 month's time, BHP falls to \$20/share. The options are **Out of the money** as it is not profitable to exercise the Put options; which would see BHP shares bought at \$27 but then sold in the market for \$20. So the options are left to expire and the down-side loss is incurred with the underlying holding of 5,000 BHP shares falling from \$27 to \$20/share + option premium paid.*



However, if BHP instead rises to \$30/share. The options are **In the money**. You would exercise the options, buy 5,000 BHP shares from Macquarie at \$27/share. Then the total holding of 10,000 BHP shares can be sold in the market at a significant capital gain of \$30/share – \$0.50 option premium. The up-side capital gain is amplified beyond the underlying asset holding less the option premium.

Settling Option Speculation Cash Flows: BHP ↓ \$20

Underlying Position CF		Long Call Position CF	
Bought 5,000 BHP shares from the market @ \$27	-\$135,000	Option premium: $\$0.50 \times 5,000$	-\$2,500
In 1 mth, Sell 5,000 BHP to the market @ \$20	+\$100,000	In 1 mth, Option is <i>Out of the Money</i> and allowed to lapse without exercise.	
Underlying Profit /Loss	-\$35,000	Long Call Profit /Loss	-\$2,500
Speculation Result: -\$37,500 instead of -\$35,000 from not Speculating.			



Settling Option Speculation Cash Flows: BHP ↑ \$30

Underlying Position CF		Long Call Position CF	
Bought 5,000 BHP shares from the market @ \$27	-\$135,000	Option premium: $\$0.50 \times 5,000$	-\$2,500
In 1 mth, Sell 5,000 BHP to the market @ \$30	+\$150,000	In 1 mth, Exercise Option: Buy 5,000 BHP shares from Macquarie @ \$27.	-\$135,000
		In 1 mth, Sell 5,000 BHP shares to the market @ \$30	+\$150,000
Underlying Profit /Loss	+\$15,000	Long Call Profit /Loss	+\$12,500
Speculation Result: +\$27,500 instead of +\$15,000 from not Speculating.			

(W10: LC Q4 & 5)



BFC1001

Pre-load: Risk & Financial Protection

Please join the active LC session upon entering class.



Motivation for studying Risk & Financial Protection

Risk and Financial Protection introduces the basics of derivative securities or derivatives.

Derivatives are financial contracts or instruments which derive their value from an underlying asset: stocks, bonds, indexes, commodities or currency.

Derivatives are an important tool for risk management; which involves two primary activities ...

1. Hedging: the reduction of risk exposure.
2. Speculation: the increase of risk exposure.

Risk management is widely used by investors and issuers of capital; it is important to understand how derivatives serve to increase or reduce risk.



Key Topic Aspects ...

- Understand the concept of Risk Management
- Apply Risk Management by Hedging & Speculating using...
 - Forwards
 - Futures
 - Options



Risk has been defined as **uncertainty** in the timing and magnitude of cash flows, arising from assets or liabilities.

Contrary to social norms and popular belief, **risk is not a bad thing**; it has a potential *up-side (advantages)* and *down-side (disadvantages)*.

- Up-side: e.g. Greater cash flow earned more quickly than expected.
- Down-side: e.g. Less cash flow earned less frequently than expected.

Most assets and liabilities have risk in their cash flow. Investors and capital issuers wish to manage risk for two main reasons:

1. To have risk exposure match or be closer to their risk averseness.
2. Based on expectations of future likelihoods of up-side or down-side potential in risk, investors may wish to increase or decrease the amount of risk taken.



Let us explore managing the up and down-side of risk ...

You own 5,000 shares in BHP, purchased at \$27/share. This exposes you to Price risk. If the BHP stock price rises, you make a capital gain but if the price falls, you make a capital loss.

As your wealth in BHP is subject to uncertainty, you are interested to discover information about the future potential for up-side or down-side in BHP's business.

- *Scenario 1: You expect the iron-ore price to enter a bear (falling) market.*

The expectation of falling iron-ore prices means a future fall in BHP earnings, that will cause BHP's stock price to fall.

*As you are facing a high likelihood of a capital loss, it would be wise to **reduce your risk** exposure to BHP stock.*

One way to achieve that without derivatives is to sell your BHP stock.



- Scenario 2: You expect the iron-ore price to enter a bull (rising) market.

The expectation of rising iron-ore prices means a future rise in BHP earnings that will cause BHP's stock price to increase.

*As you are facing a high likelihood of a capital gain, it would be wise to **increase your risk** exposure to BHP stock.*

*One way to achieve that without derivatives is to buy **more** BHP stock.*

We can conclude that: **based on future expectations of gain or loss, risk is managed to maximise the gain or minimise the loss.**

In the scenarios above, we can buy more or sell our underlying position in BHP. However, there are often assets and liabilities for which the underlying position cannot be changed. Derivatives can be employed to manage the risk.

** Concept Check: Underlying position is the asset or liability that creates the risk to be hedged or speculated on.*



Hedging is the use of financial instruments, derivatives in particular, to manage the down-side of risk.

Derivatives are a synthetic financial instruments which are priced off a underlying asset. It's price is *derived* from another financial instrument or real asset.

There are three types of derivatives that you need to be familiar with:

1. Forward contracts
2. Futures contracts
3. Options contracts



Hedging with derivatives is a three-step process:

1. Identifying what is at risk. It is usually a cash inflow or outflow associated with a financial asset or business.
2. Identify how a loss is made.
3. Take a derivative position that...
 - a. Fixes the cash inflow or outflow at risk
 - b. Earns a profit when a loss is made in the underlying asset.

Lets get some practice at apply the first two steps to different businesses and financial positions.

(Preload 10 LC1,2 & 3)



A forward contract is a binding, non-standardised, OTC agreement between two parties (buyer and a seller) to trade an asset or commodity, at a **fixed price (forward price)**, at a **set quantity** and at a **fixed time** in the future. Forward contracts can be written for any type of commodity; e.g. iron, coal, electricity, shares, currency, bonds, interest rates etc.

For example, let us return to our 5,000 BHP share holding bought at \$27/share. In 1 month, you'll need to sell your shares to pay for your university tuition.

(Preload 10 LC4)

To hedge the price risk:

*You enter into a forward contract with Macquarie Bank to **sell** 5,000 BHP shares at a Forward Price of \$26/share in 1 months time. Price risk has been eliminated because irrespective of how BHP shares have moved, you are certain to receive \$26/share, so long as you settle the forward contract.*



In our BHP share example ...



Forward terms: Holder of the forward to sell the commodity to the writer

Commodity: BHP shares

Forward Price: \$26/share

Quantity: 5,000

Maturity: 1 month.

Note: The Derivative Buyer (You) can choose to *Buy* or *Sell* a commodity to/from the writer.

- If *You* are buying the commodity, the writer is selling it to you.
- If *You* are selling the commodity, the writer is buying it from you.

Both writer and derivative buyer are subject to **Counter-party Credit risk**.

- *Buyer* could default buy not selling shares at the agreed upon terms.
- *Writer* could default buy not buying shares at the agreed upon terms.



One month later, the price of BHP has fallen to \$20/share. However, you settle the forward contract, sell your shares to Macquarie at \$26/share and are **protected** from a \$6 fall in price.

An important skill in risk management is to identify and show how the derivative position has impacted your underlying position. Whilst it is straight forward that the net cash flow from our position \$-5,000, from having bought BHP at \$27 and sold it at \$26, settling both the underlying and derivative position allows you to demonstrate the impact of **hedging/ speculating Vs not managing the risk**.

Settling Hedging Cash Flows:

Underlying Position CF		Forward Position CF	
Bought 5,000 BHP shares from the market @ \$27	-\$135,000	In 1 mth, Sell 5,000 BHP shares to Macquarie @ \$26	+\$130,000
In 1 mth, Sell 5,000 BHP to the market @ \$20	+\$100,000	In 1 mth, Buy 5,000 BHP shares from the market @ \$20	-\$100,000
Underlying Profit /Loss	-\$35,000	Forward Profit /Loss	+30,000

Hedging Result: -\$5,000 instead of -\$35,000 from not hedging.



*One month later, the price of BHP has fallen to \$20/share. However, you settle the forward contract, sell your shares to Macquarie at \$26/share and are **protected** from a \$6 fall in price.*

Lets assume another scenario, that in 1 month, you expect the price of BHP to rise sharply from currently levels but you don't have enough money now to buy more BHP shares now.

To speculate with price risk:

*You enter into a forward contract with Macquarie Bank to **buy** 5,000 BHP shares at a Forward Price of \$28/share in 1 months time. Price risk has been increased, because in 1 months time, you will be exposed to price uncertainty of 10,000 BHP shares instead of your current holding of 5,000 shares.*



One month later, the price of BHP has increased to \$35/share. You settle the forward contract, buy 5,000 BHP shares from Macquarie at \$28/share. Next, you can sell 10,000 BHP shares in the stock market at \$35/share and make a significant capital gain.

However, if the price had fallen to \$20/share, you would be facing a much larger capital loss with 10,000 shares bought at \$27 and \$28 than if you had not entered into the forward contract. You would have to sell your shares at a significant loss to recover the capital to pay for tuition.

**Construct time lines if the above cash flows are unclear.*

**Note, a Forward contract that fixes interest rates on a benchmark rate is called a Forward Rate Agreement.*

*Settling Speculation Cash Flows: BHP ↑ \$35*

Underlying Position CF		Forward Position CF	
Bought 5,000 BHP shares from the market @ \$27	-\$135,000	In 1 mth, Buy 5,000 BHP shares from Macquarie @ \$28	-\$140,000
In 1 mth, Sell 5,000 BHP to the market @ \$35	+\$175,000	In 1 mth, Sell 5,000 BHP shares to the market @ \$35	+\$175,000
Underlying Profit /Loss	+\$40,000	Forward Profit /Loss	+\$35,000
Speculation Result: +\$75,000 instead of +\$40,000 from not speculating.			

Settling Speculation Cash Flows: BHP ↓ \$20

Underlying Position CF		Forward Position CF	
Bought 5,000 BHP shares from the market @ \$27	-\$135,000	In 1 mth, Buy 5,000 BHP shares from Macquarie @ \$28	-\$140,000
In 1 mth, Sell 5,000 BHP to the market @ \$20	+\$100,000	In 1 mth, Sell 5,000 BHP shares to the market @ \$20	+\$100,000
Underlying Profit /Loss	-\$35,000	Forward Profit /Loss	-\$40,000
Speculation Result: -\$75,000 instead of -\$35,000 from not speculating.			



Next...Self-study for Topic 10



BFC1001

Interactive Study: Finance & Globalisation

Please join the active LC session upon entering class.



Key Topic Aspects ...

- Appreciate how the currency of countries is valued, the characteristics and terminology of foreign exchange.
- Understand how appreciation and depreciation between domestic and foreign currency affects international earnings and payments.
- Introduce international money and finance markets.



What influences the price of a currency and causes it to appreciate or depreciate compared to another currency?

Essentially, it is the overall changes in supply and demand for one currency in relation to another.

- Given $\uparrow$ net demand (demand $>$ supply), the currency appreciates.
- While $\uparrow$ net supply (demand $<$ supply) causes depreciation & vice versa

Factors affecting supply and demand of a currency include:

1. International trade

- Importers provide a source of supply of domestic currency when they sell domestic currency to purchase foreign currency to pay for foreign imports priced in foreign currency.

(Formal theories of FX value such as IRP and PPP are taught in International Finance)



- Exporters can generate demand for domestic currency when foreign buyers purchase domestic currency to pay the exporter's produces which are priced in domestic currency.

2. *Central Bank operations*

- When a central bank changes the official cash rate, it affects the yield/return of domestic deposits held in the domestic currency.
- Holding all else equal, $\uparrow$ domestic interest rates tends to cause greater demand for the domestic currency while $\downarrow$ interest rates tends to cause less demand.
- When a foreign central bank $\uparrow$ foreign interest rates, this causes less demand for the domestic currency while if foreign interest rates $\downarrow$, this creates more demand for the domestic currency.

(W11 LC 1 & 2)



- Central banks can also choose to directly intervene in currency markets, by buying or selling the domestic currency to affect its value if the bank deems the currency to be inappropriately priced.

3. *Short-term Speculation*

- Traders speculating in currency markets for profit generate significant short-term demand and supply of currency.

4. *Capital investment flows*

- Global investors shift capital from countries with poor performing assets and economies to countries that provide superior assets in growing economies.
- Such foreign investment creates significant changes in the supply and demand for a currency.

(W11 LC3)



It is important to appreciate how foreign exchange risk can affect the cash flow of assets and liabilities.

Foreign exchange risk can be defined as uncertainty in the value of foreign currency payments and earnings; arising from unexpected appreciation or depreciation of the foreign currency, in relation to the domestic currency or vice versa.

Let us consider the following scenario ...

*An Australian investor has purchased USD \$100,000 worth of Apple Inc. shares and is paid a dividend yield of 2%. The Australian investor is exposed to foreign exchange risk as the dividend income of \$2,000 is earned in a foreign currency, USD. The investors intends to exchanged USD for AUD in 1 months time, so that the dividend can be spent in Australia. **What is the FX up-side and down-side risk facing the investors foreign currency income?***

(W11 LC4)



Up-side risk:

If the USD strengthens, **appreciates** against the AUD in 1 month, the USD \$2,000 dividend will be able to buy more AUD; to the **investor gains**.

Down-side risk:

If the USD weakens, **depreciates** against the AUD in 1 month, the USD \$2,000 dividend will be able to buy less AUD; to the **investor loses**.

Let us consider another scenario ...

A large Australian company wishes to raise short-term capital and decides to do so in the US STMM because interest rates in the US are lower than in Australia. It issues a 90-day USD \$1,000,000 FV Corporate Note which is promptly bought by a US investor. The Australian company decides not to re-finance the Note and will have a USD \$1,000,000 liability pay in 90 days using it's AUD earnings. What currency movements would be beneficial to the Australian company?

(W11 LC5)



Our understanding of foreign exchange is eminently applicable to real life.

Let us return to our scenario where you at Melbourne airport, about to fly to Japan. You have AUD \$1,000 with which to buy ¥.

*The FX Dealer quotes **spot** Yen/AUD1: 80 / 85*

How do you use the dealer's quote to exchange your AUD for ¥?

Firstly, let us understand the components of the quote ...



Spot rate is appropriate as you want to settle your trade immediately and take delivery of ¥ now

Bid price:
The price (¥80) at which the dealer will buy the commodity, AUD \$1

*The FX Dealer quotes **spot** Yen/AUD1: 80 / 85*

As dealer is in Australia, the quote is an indirect one with the domestic currency being in terms of the foreign currency.

Ask price:
The price (¥85) at which the dealer will sell the commodity, AUD \$1



- You have **AUD to sell** for ¥, the **Dealer will buy** your AUD.
- The Dealers **Bid price** is used: **¥ 80 = AUD \$1**
- You sell AUD \$1,000
- The Dealers pays you ¥ 80,000

Bid price:
The price (¥80) at which
the dealer will buy the
commodity, AUD \$1

The FX Dealer quotes *spot* Yen/AUD1: **80 / 85**

You take immediate delivery of ¥80,000 to spend on your holiday in Japan.



Let us review the different ways in which FX is quoted...

- One-way quotes that provide an indication of currency value...

Currencies ▾

Symbol	Company	Last Price	Change	% Change
EURUSD=X	EUR/USD	1.1204	0.0104	0.94%
JPY=X	USD/JPY	111.16	-0.419	-0.38%
GBPUSD=X	GBP/USD	1.3028	0.0089	0.68%

- Two-way quotes that facilitate actual transaction...

CURRENCY TABLE

Currency	Last	Day High	Day Low	% Change	Bid	Ask
EUR/USD	1.1204	1.1204	1.1204	+0.00%	1.1204	1.1210
GBP/USD	▼ 1.3033	1.3033	1.3033	▼ -0.01%	1.3033	1.3038
USD/JPY	▼ 111.20	111.20	111.20	▼ +0.00%	111.20	111.32

(Above 2 methods of quoting have been applied extensively in Pre-load LC and the Self study quiz)



- Bank FX quotes using the usual deal bid-ask perspective; e.g. Westpac...

	I want to buy			I want to sell		
	Global Currency Card	Cash	Telegraphic Transfers or Drafts	Cash	Telegraphic Transfers	Cheques
Reset table	Close	Close	Close	Close	Close	Close
USA Dollars USD Close row	0.6996	0.6996	0.7004	0.7808	0.7793	0.7808
Europe Euro EUR Close row	0.6287	0.6283	0.6291	0.7001	0.6996	0.7011
United Kingdom Pounds GBP Close row	0.5402	0.5387	0.5401	0.5989	0.5980	0.5995

- Bank FX quotes using the term currency perspective; e.g. ANZ & CBA...

Currency 	Code	Bank buys			Bank sells	
		Intl Money Transfer (IMT)	Cash, Travel Money Card & Travellers Chqs	Foreign Cheques	Intl Money Transfer (IMT) & Drafts	Cash, Travel Money Card & Travellers Chqs
		Learn more >	Learn more >	Learn more >	Learn more >	Order now >
 US Dollar	USD	0.7816	0.7813	0.7820	0.7026	0.7041
 Great British Pound	GBP	0.5999	0.6028	0.6026	0.5376	0.5391
 Argentine Peso	ARS	-	-	-	-	10.3967



Understanding Bank FX quotes that use the term currency perspective:

Currency	Code	Bank buys			Bank sells	
		Intl Money Transfer (IMT)	Cash, Travel Money Card & Travellers Chqs	Foreign Cheques	Intl Money Transfer (IMT) & Drafts	Cash, Travel Money Card & Travellers Chqs
		Learn more >	Learn more >	Learn more >	Learn more >	Order now >
 US Dollar	USD	0.7816	0.7813	0.7820	0.7026	0.7041
 Great British Pound	GBP	0.5999	0.6028	0.6026	0.5376	0.5391
 Argentine Peso	ARS	-	-	-	-	10.3967

Lets take the above CBA quote for the USD ...

1. Identify the commodity and term currency: Commodity = AUD, Term = USD
2. Identify what the dealer (bank) is doing with the commodity currency.



The dealer is buying USD by selling AUD. So the dealer **Ask** for the AUD commodity is **0.7813**, which fits the condition that the commodity ask is the higher in a 2-way quote, the dealer's commodity bid being 0.7041.



BFC1001

Pre-load: Finance & Globalisation

Please join the active LC session upon entering class.



Why study Finance & Globalisation?

Finance and Globalisation introduces the basics of foreign currency markets and international trade.

When buyers and sellers in different countries trade commodities, assets and liabilities, payment and cash flows using a foreign currency is likely to be involved.

It is important to understand how the domestic currency of one country is valued and exchanged for the currency of others.

International trade, finance and investment creates exposure to foreign exchange risk and it is important to know how this risk can affect the value of foreign earnings and payments.



Key Topic Aspects ...

- Appreciate how the currency of countries is valued, the characteristics and terminology of foreign exchange.
- Understand how appreciation and depreciation between domestic and foreign currency affects international earnings and payments.
- Introduce international money and finance markets.



The value of a country's currency is expressed by how much of another country's currency it can buy; the more it can buy, the *stronger* the currency and vice versa.

Let us consider the following examples of the Australian dollar (AUD) ...

e.g. AUD \$1 can buy USD \$1.10 in July 2011, i.e. AUD \$1 = USD \$1.10

AUD \$1 can buy USD \$0.71 in Jan 2016, i.e. AUD \$1 = USD \$0.71

The Australian dollar has weakened against the US dollar.

The **Exchange Rate** is the price of one currency expressed in terms of another currency.



Historical AUD in terms of USD



Source, <https://au.finance.yahoo.com/echarts?s=AUDUSD%3DX#symbol=AUDUSD=X;range=5y>



When an exchange rate is expressed, e.g. $AUD \$1 = USD \$0.71$, to better understand which is the currency being priced, the currencies are classified as a **commodity** currency and a **term** currency.

- The **commodity** is the currency in one whole unit (or denomination).
- The **term** is the currency for which an amount is exchanged for one unit of the **commodity**.

e.g. $AUD \$1 = USD \$0.71$, the AUD is the commodity being priced in terms of USD.

(Preload 11 LC1,2 & 3)

Exchange rates can be quoted in 2 ways ...

1. **Directly**: the domestic currency is used as the term.
2. **Indirectly**: the foreign currency is used as the term.



For example ...

*AUD \$1 = USD \$0.71 in Australia is a **Indirect** quote as AUD is the domestic currency and the foreign currency, USD, is the term.*

*AUD \$1.41 = USD \$1 in Australia is a **Direct** quote as AUD is the domestic currency being used as the term and the foreign currency, USD, is the commodity.*

Spot rate: *The exchange rate quoted for immediate settlement (to trade right now) of the commodity currency.*

(Preload 11 LC4 & 5)



Whether quoting directly or indirectly, a complete exchange rate is provided by the FX dealer as a 2-way price ...

- **Bid**: What the quoting party will buy the commodity at.
- **Ask**: What the quoting party will sell the commodity at.
- **Bid-Ask Spread**: The difference between bid and ask prices.

**Critical thinking: Why is the bid always the lower price and why is the ask always the higher price?*

For example at Melbourne Airport ...

*A Foreign Exchange (FX) Dealer quotes **spot** Yen/AUD1: 80 / 85*

You are flying to Japan and need to buy ¥, how do you use the dealer's quote to exchange your AUD for ¥?

(Preload 11 LC6 & 7)



The FX market; where currencies are exchanged for others is a 24hr, 7day a week, decentralised, global market.

Currency can be exchanged at any time, using a variety of market participants from large commercial banks to small kiosk brokers.

Currency can be physically traded at FX dealer locations or electronically traded anywhere you are using a computing device or mobile phone.

- This is in contrast to the stock exchange where all buyers and sellers congregate in one location within trading hours.



Eurocurrency is a currency deposited in a bank or traded **outside its country of origin**. It is not to be mistaken for the Euro €, the currency of the European Monetary Union.

To illustrate:

- **Euro-Aussie** is AUD deposited and traded outside of Australia; e.g. you take AUD \$1,000 to the US while on holiday. There, you exchange the AUD into USD. The AUD you have exchanged is termed Euro-Aussie.
- A **Euro-dollar deposit** is a **USD** denominated deposit issued **outside the US**; for example, a US\$ denominated deposit in Citibank, London.
- A **Euro-Yen** deposit is a **Yen deposit** held **outside Japan**, for example, a Euro-Yen denominated deposit in Midland Bank, Kuwait.
- The eurocurrency markets are **used by banks** around the world as a source of overnight borrowing. The relevant interest rate is called **LIBOR**, London Interbank Offered Rate. LIBOR is typically 10 to 20 bps higher than the US Federal Reserve cash rate.



Next...Self-study for Topic 10



BFC1001

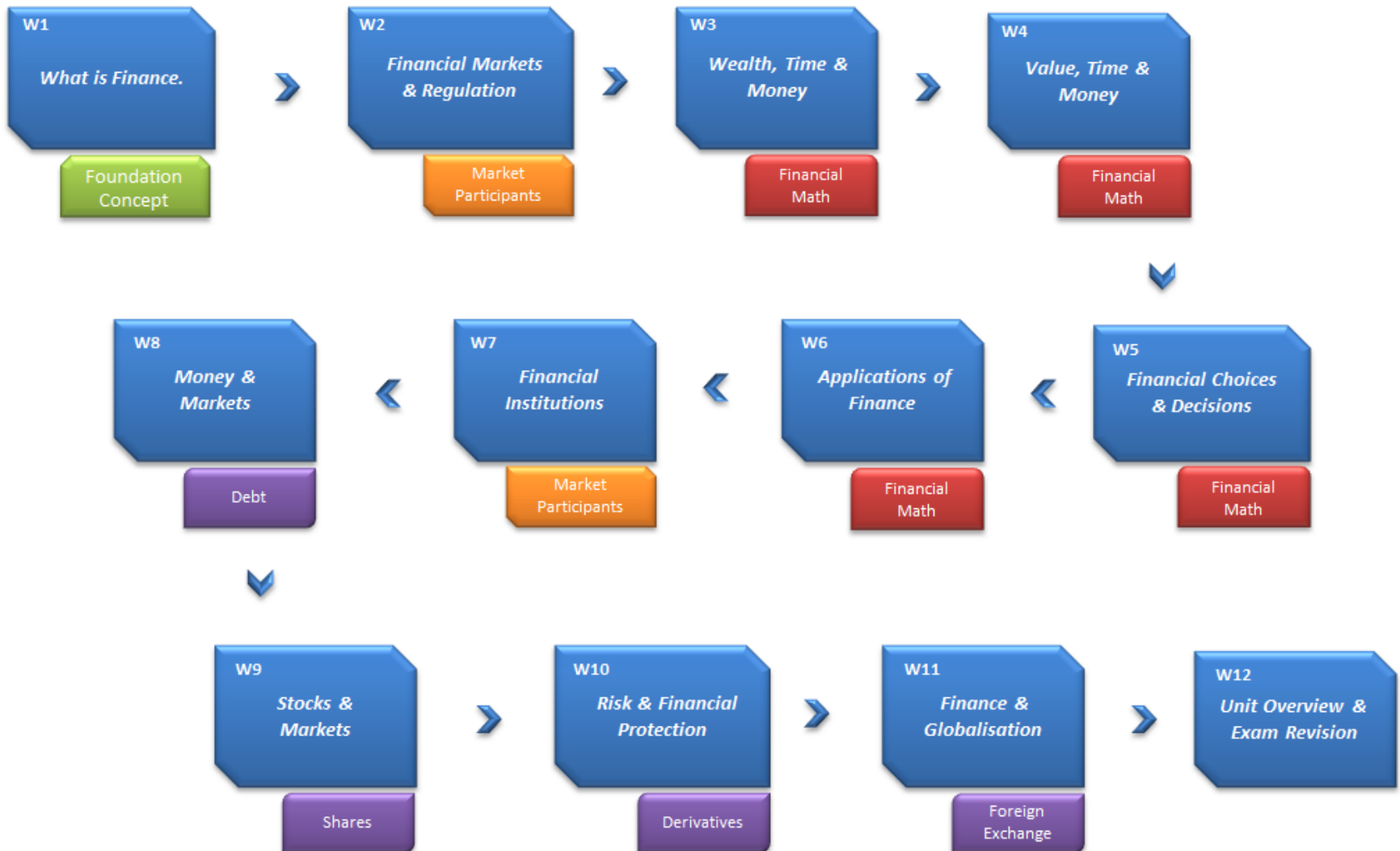
Week 12

Unit Overview & Exam Information



Program

1. Unit Overview & Summary of Critical Thinking Concepts that contribute to your core competence as a finance professional (15min)
2. Financial Literacy Feedback and Report (5min)
3. SETU Evaluations for the Unit and Staff (15min)
4. Exam Information & Overview (20min)





1. *Relationship between finance & investment*
 - *$E(R) > \text{Required rate of Return.}$*
2. *Time Value of Money, Value vs Market Price.*
3. *Relationship b/w risk, return, value and price...ability to explain why?*
 - *Explains why Higher risk = Higher return and vice versa*
 - *Relationship between Yield and Price*
4. *How to properly evaluate investments*
 - *Risk-adjusted returns, NPV and IRR decision.*



5. *Inverse relationship between YTM & Prices of debt securities*
6. *Shareholders: Risk of Residual Claim*
 - *Explains why equity is always more expensive than debt*
7. *How to evaluation whether a share is “cheap/expensive”; not by share price alone but by what value is received for the price paid.*
8. *Appreciating risk control*
 - *Hedging vs Speculation*
 - *Ability to recognise up-side & downside risk in business exposure.*
9. *Understanding and Using Exchange Rates*



It has been an important objective of the subject to improve your financial literacy.

To this effect, we have conducted *before* and *after* Financial Literacy Surveys.

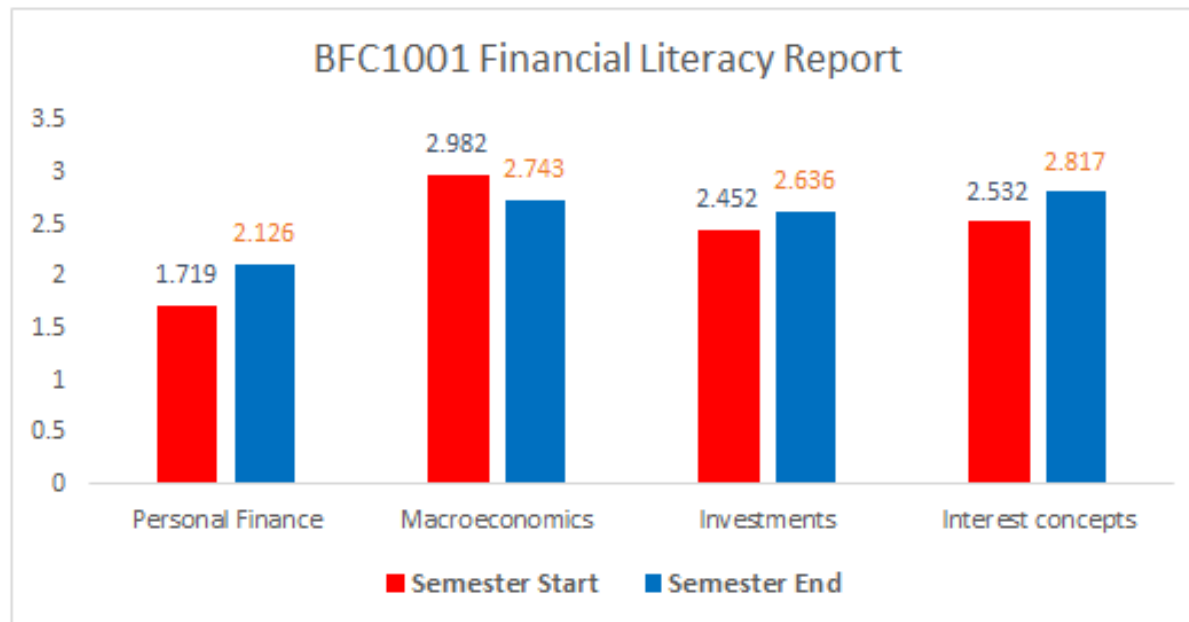
We are glad to feedback to you a significant improvement in the cohorts financial literacy!

Here are the summary of results...



BFC1001 Financial Literacy Report

Topics	Semester Start	Semester End	Improvement
Personal Finance	1.719	2.126	↑ 23.7%
Macroeconomics	2.982	2.743	-8.0%
Investments	2.452	2.636	↑ 7.5%
Interest concepts	2.532	2.817	↑ 11.3%





Now it's time for unit and teaching evaluations. These can be found at the top right hand corner of your BFC1001 Moodle site. Please complete the evaluations for ...

- The unit (Unit Evaluations)
- Your lecturers: Jason Tze Choo & your Stream Leader (Ali, Sarah, Vince or Mikhail)
- Your tutor: Your workshop TA (Cheryl, Apeksha, Anh, Sarah or Polly)

The screenshot shows a Moodle task list titled "STUDENT EVALUATION OF TEACHING AND UNITS (SETU) - TASK LIST". It contains two evaluation items:

Please help us improve – item(s)	
BFC1001 CLAYTON DAY ON S1-01	Status: Open - End date: 04/06/2017
BFX3355 CLAYTON DAY ON S1-01	Status: Open - End date: 04/06/2017

At the bottom of the list, it says "Summary (2)" followed by several small icons.



BFC1001 Exam

- **EXAM DURATION:** 2 hours writing time plus 10 minutes reading time
- **CALCULATOR:** HP 10BII+ only
- The examination is closed book. Nothing except stationary and the calculator is allowed at your seat.
- A formula sheet is provided in the examination. It is the same as formula sheet provided in the *Additional Resources* Moodle Section.
- It is a hurdle requirement to pass the exam in order to pass the subject.



Question	Topic	Marks
Section A:		
10 MCQ	All topics (each question = 2 marks)	20
Section B:		
1	Capital Budgeting	16
2	Financial Institutions & Applications of Finance	15
3	Stocks & Equity Markets	11
4	Money & Debt Markets	12
5	International Finance & Foreign Exchange	11
6	Risk & Financial Protection	15
		Total: 100
You must pass the exam to pass the subject		



- Exam questions: Approximately 60% Calculation, 40% Theory
- The exam format and structure is the same as the test.
- All topics are interrelated and are assessable.
- All Pre-load Notes, Self-study Quizzes, Interactive Study Notes, PBL questions, LC questions and Self-study Reading are assessable.
- Perform calculation working up to 4 decimal places, provide your answer up to 2 decimal places. Students who get a wrong answer due to not following these rounding directions will be penalised accordingly.
- Always show any appropriate math formula in your working and show the substitutions of values into the formula before providing an answer. Students not showing the correct formula and substitutions will be penalised accordingly.



- Any question responses which do not answer the exam question asked will receive no marks.
- Attempt all questions. Budget your writing time appropriately; as a guide, spend 120 min/100 marks = 1.2 min/mark answering questions. You also have 10min reading time.
- Attempt to answer questions sequentially in your script book and write as legibly as possible. Answers which appear to be crossed out by students will not be counted. A slash through your answers also constitutes *crossing out* your answer.
- Only financial math methodology and topic curriculum of this subject are valid for answering this subject's exam questions. Student's applying any methodology or curriculum not of this subject, e.g. from Actuarial subjects, Corporate Finance or Corporate Finance II will void their answers.



Your study material for each topic should be a printed compilation of ...

1. Pre-load Notes
2. Self-study Quizzes
3. Interactive Study Notes
4. PBL questions

... in that order.

Students should also include their own study notes and Topic LC questions in their compiled study material.

When revising topics, have a clear understanding of critical thinking concepts. Pay particular attention to PBL and Take-home PBL questions to learn how to answer open-ended descriptive questions, e.g. *how does the flow of funds help the economy grow* and how to set out timelines and your financial math working for calculation questions.



As the majority of the exam is calculation questions, becoming skilled at financial math is strongly encouraged. How is this achieved?

- a) Understand the financial math concepts
- b) Practice, practice, practice to develop *muscle memory* or more accurately *math memory*.

The combination of understanding and practice will result in formidable financial math skill that will serve you well throughout your degree

When revision is complete, attempt the practice exams.

- Note: Your practice exams are from prior semesters, S2 2016 & S1 2017, which may have a different curriculum and are 3hr exams.
- The length of questions are for a 3hr exam which is different to the question length in a 2hr exam.
- Irrespective of the sample solutions for the practice exams, for calculation questions in the S2 2017 exam, students are to follow the instructions set out in Slide 11.
- The S2 2017 exam will follow the format and structure set out in Slides 9 & 10.



Rather than have just consultation, staff will be holding *Revision Workshops* open to all BFC1001 students.

- *The workshops are an open forum, free-form consultation with staff.*
- *Students are free to come and go to multiple workshops as they please. Upon entering a workshop, just take an empty seat and wait to be called upon for your question.*
- *Questions will be handled in a round-robin format, with each student in attendance asking one question in turn.*
- *Allows you to ask your questions but you also benefit from the discussion of other student questions with staff.*
- *No more queuing up and waiting to see staff individually as per normal semester consultation.*

Students may see Apeksha, Anh and Polly only in the first ½ hr only of the consult or revision workshop to review your within-semester test or to collect feedback about your team assignment.



BFC1001 SWOTVAC Consultation Schedule					
	Monday	Tuesday	Wednesday	Thursday	Friday
9am	Apeksha W1004				
10am		Anh W1004	Ali S108	Mikhail S109	
11am					
12pm			Polly W1004		Sarah S109
1pm					
2pm			Jason S109	Mikhail S109	Jason S109
3pm					
4pm					
5pm					

Consultations with Teaching Assistants in Yellow
Revision Workshops with Stream Leaders in Orange

Note: After Week 12, **normal semester consultation times are over**. The only scheduled staff consultation time after Week 12 is the Revision Workshops.

(Students emailing the central subject email about any information already contained in these slides will receive an automatic reply to review these slides.)



Sample exams have been posed in Moodle:

Note: Q6b in the S1 2017 exam is not in this semester's curriculum and is not examinable.



Exam Information



BFC1001 SWOTVAC CONSULTATION SCHEDULE 36.3KB Image (PNG)



BFC1001 Exam Information 654KB PDF document

Practice Exams



Practice Exam: BFC1001 S2 2016 Exam 1.3MB PDF document



Practice Exam: BFC1001 S1 2017 Exam_Q6b not examinable 469.1KB PDF document



Practice Exam solutions: BFC1001 S2 2016 Exam 1.4MB PDF document



Practice Exam solutions: BFC1001 S1 2017 Exam_Q6b is not examinable 657.2KB PDF document