# Course information 2015–16
# FN1024 Principles of banking and finance

This is designed as the foundation banking and finance course on which subsequent and more specialised finance courses are based.

## Prerequisite
None apply.

## Aims and objectives
The specific aims of this course are to:
- Provide institutional features of financial systems.
- Identify key issues and problems arising in banking and finance.
- Introduce the key economic concepts required to analyse these key issues and problems.
- Illustrate how these economic principles can be applied to address the key issues identified.
- Show how the institutional features address the key issues identified.

## Essential reading
For full details please refer to the reading list.

Mishkin, F. and S. Eakins *Financial Markets and Institutions.* (Addison Wesley)

Allen, F. and D. Gale *Comparing Financial Systems.* (MIT Press)

Brealey, R.A. and S.C. Myers *Principles of Corporate Finance.* (McGraw-Hill/Irwin)

## Assessment
This course is assessed by a three hour unseen written examination.

## Learning outcomes
At the end of the course and having completed the essential reading and activities students should:

- ☑ discuss why financial systems exist, and how they are structured

- ☑ explain why the relative importance of financial intermediaries and financial markets is different around the world, and how bank-based systems differ from market-based systems

- ☑ understand why financial intermediaries exist, and discuss the role of transaction costs and information asymmetry theories in providing an economic justification

- ☑ explain why banks need regulation, and illustrate the key reasons for and against the regulation of banking systems

- ☑ discuss the main types of risks faced by banks, and use the main techniques employed by banks to manage their risks

- ☑ explain how to value real assets and financial assets, and use the key capital budgeting techniques (Net Present Value and Internal Rate or Return)

- ☑ explain how to value financial assets (bonds and stocks)

- ☑ understand how risk affects the return of a risky asset, and hence how risk affects the value of the asset in equilibrium under the fundamental asset pricing paradigms (Capital Asset Pricing Model and Asset Pricing Theory)

- ☑ discuss whether stock prices reflect all available information, and evaluate the empirical evidence on informational efficiency in financial markets.

**Part 1 Financial Systems**

*1. Introduction to Financial Systems:* Role of financial systems (role of households, government, and firms in terms of savings and investments). Financial intermediaries, securities and markets. Taxonomy of financial institutions. Nature of financial claims (debt versus equity, bonds and notes, fixed and floating interest rates, common and preferred stocks). Structure of financial markets (direct and indirect finance, dealers and brokers, banks, mutual funds, pension funds, and insurance companies).

*2. Comparative Financial Systems:* Bank-based systems against market-based systems. Legal aspects.

**Part 2 Financial intermediaries**

*3. Role of Financial Intermediation:* Nature and process of financial intermediation. Theories of financial intermediation (transformation of assets, uncertainty, reduction in transaction costs, reduction of problems arising out of asymmetric information). Implications of financial intermediation (Hirshleifer model, effect on economic development).

*4. Regulation of Banks:* Regulation of banks (free banking, arguments for or against regulation, traditional regulation mechanisms, alternatives to traditional regulation).

*5. Risk Management in Banking:* Market risks: Liquidity risk, interest rate risk, foreign exchange risk. Credit risk: Screening and monitoring, credit rationing, collateral.

**Part 3 Principles of finance**

*6. Financial Securities: Risk and Return;* Portfolio analysis: mean-variance portfolio theory. The portfolio selection process: the correlation of securities returns (single-index model and multi-index models). Asset pricing models: capital asset pricing models (CAPM) and arbitrage pricing model (APT).

*7. Capital Budgeting;* Pricing of bonds and stocks. Net present value. Project appraisal.

*8. Financial Markets: Transmission of information;* Efficient markets. theory and empirical evidence. Concepts of weak, semi-strong, and strong efficiency. Concepts of excess returns. Micro-structures.

# Examiners' commentaries 2015

## FN1024 Principles of banking and finance – Zone A

## Important note

This commentary reflects the examination and assessment arrangements for this course in the academic year 2014–15. The format and structure of the examination may change in future years, and any such changes will be publicised on the virtual learning environment (VLE).

### Information about the subject guide and the Essential reading references

Unless otherwise stated, all cross-references will be to the latest version of the subject guide (2011). You should always attempt to use the most recent edition of any Essential reading textbook, even if the commentary and/or online reading list and/or subject guide refers to an earlier edition. If different editions of Essential reading are listed, please check the VLE for reading supplements – if none are available, please use the contents list and index of the new edition to find the relevant section.

## Comments on specific questions

Candidates should answer FOUR of the following EIGHT questions: ONE from Section A, ONE from Section B and TWO further questions from either section. All questions carry equal marks.

### Section A

Answer ONE question and no more than TWO further questions from this section.

### Question 1

**Discuss the causes of the 2007/8 global financial crisis and consider whether the regulations put in place since 2008 will prevent a further crisis on this scale.**

**(25 marks)**

**Reading for this question**

See subject guide, Chapter 3, section headed 'The global financial crisis 2007–09'.

**Approaching the question**

This question requires two responses, first to discuss the causes of the global financial crisis 2007–08 and second to discuss whether the regulations put in place since 2008 will be effective in preventing a further global financial crisis. The points that can be considered in answering this question are numerous and therefore it is not possible to cover all possible points here. However there are certain points which are key in developing a good answer and these include:

The key causes of the crisis:

1. Long period of moderation – changed risk appetite.

2. Increase in demand for and supply of credit – linked to (1).

3. Relaxation of credit supply conditions especially sub-prime lending in US.

4. Bubble in US (and other European) housing markets linked to growth in credit.

5. Financial innovations – credit risk models (gave banks the belief they could manage risk) plus securitisation (magnified the risk and led to a global spread of sub-prime risk).

6. Inadequate capital/liquidity held by banks.

The key regulations put in place since 2008:

1. Basel 3 – increase in quantity and quality of capital + greater internal liquidity

2. macroprudential policy tools

3. countercyclical capital (also Basel 3)

4. more capital for trading of securities or banning trading (Volker rule)

5. solutions to too big to fail problem.

A good answer will discuss the importance of the different causes and discuss the potential effectiveness of the regulations put in place. A description of causes and regulations is very unlikely to achieve a good mark.

For example, in answering whether the new regulations will be effective in preventing further crises it could be argued that some gaps in regulation have been closed but not all. Based on past behaviour it is likely that banks will seek out new risks not captured by new regulations.

**Question 2**

a. **Discuss the role of conflicting requirements of lenders and borrowers and transaction costs in explaining financial intermediation.** **(10 marks)**

**Reading for this question**

See subject guide, Chapter 3, pp.68–73.

**Approaching the question**

This part requires a discussion of two of the explanations for financial intermediation.

Conflicting requirements of lenders and borrowers requires intermediaries to hold the long term/high risk claims of final borrowers but to fund these claims by issuing claims to lenders which are short term/low risk. This exposes banks to credit and liquidity risk. Banks are better able to manage these risks compared to individual lenders. This can be demonstrated more clearly with a diagram.

Transaction costs include search costs, verification costs, monitoring costs and enforcement costs. Financial intermediaries have expertise and economies of scale that enable them to reduce costs for both lenders and borrowers.

Better answers will explain how transaction costs help to explain why most finance is intermediated but does not explain why banks are better at selecting good risks. To explain this requires an explanation based on asymmetric information.

b. **Examine the role of delegated monitoring (Diamond model) in explaining financial intermediation.** **(15 marks)**

**Reading for this question**

See subject guide, Chapter 3, pp.82–83.

**Approaching the question**

The Diamond model provides an explanation of why lenders delegate the monitoring of ultimate borrowers to a specialist lender. An answer would need to set out the model and the conditions under which such a model works (i.e. many lenders to one borrower and the delegated bank has a pooled and diversified portfolio of loans and therefore reduces risk for the ultimate lender).

A better answer would provide a full explanation of the model, including the algebra. A diagram is also useful in conveying the key features of the model.

## Question 3

a. **Explain free (unregulated) banking and discuss the advantages and disadvantages in relation to the stability of the banking system.** **(13 marks)**

**Reading for this question**

See subject guide, Chapter 4, pp.90–96.

**Approaching the question**

Free (unregulated) banking refers to a situation where banks are not regulated by a central bank or similar authority. In effect, the market will regulate. This will lead to banks disseminating more information to potential lenders and holding more capital (signal of safety).

**Advantages** – low cost, low moral hazard, more competition.

**Problems** – instability (contagion) – hence systemic risk.

Better answers would explain what the market regulating the banks means. A better answer would also weigh up the advantages and disadvantages of a free banking system – in doing so, would identify the weight given to particular issues by policy makers.

b. **Discuss the moral hazard problems caused by the provision of 'safety net' arrangements for banks and examine solutions.** **(12 marks)**

**Reading for this question**

See subject guide, Chapter 4, pp.98–99.

**Approaching the question**

This part requires a specific discussion of the moral hazard problems caused by the safety net arrangements for banking created by the central bank/regulator. The safety net refers to:

i. Lender of last resort – provision of liquidity to individual banks or the system of banks in times of shortage.

ii. Deposit insurance – to provide compensation to depositors in the event of the failure of bank.

iii. Direct funding (bailing out) of troubled banks – this came more to the fore in the aftermath of the 2007–08 crisis as governments/central banks provided capital injections to insolvent/near insolvent banks.

Each of these safety net arrangements needs explaining with particular emphasis on the moral hazard created. The solutions to the problem are

related to the particular nature of the safety net arrangement (e.g. deposit insurance, co-insurance, lender of last resort, penal rates of interest etc.). Better answers may relate the too big to fail problem with the third aspect of the safety net arrangements.

**Question 4**

a. **Explain the difference between valuation efficiency, informational efficiency and allocative efficiency.** **(8 marks)**

**Reading for this question**

See subject guide, Chapter 9, pp.184–85.

**Approaching the question**

This part requires an answer that distinguishes between three types of efficiency in the context of financial markets.

When security prices fully reflect all available information a market is referred to as informational efficient. Informational efficiency is a more specific form of the general valuation efficiency, which refers to whether the prices of the securities traded on a market reflect the true fundamental (also termed intrinsic or fair) value of the securities. Informational efficiency is a more specific form of efficiency than valuation efficiency, because it assumes that expectations are optimal forecasts using all available information, but not that market prices reflect the fair value.

Valuation efficiency and informational efficiency are conditions for the achievement of the most general efficiency condition of financial markets: allocative efficiency. This refers to whether a market allocates productive resources to the most productive investments in performing its main function of channelling funds from saver-lenders to spender/borrowers This requires asset prices to reflect accurately the discounted stream of future cash flows the asset is expected to generate over its existence.

Better answers would examine the relationships between the three types of efficiency – as in the outline points above – rather than simply describing each type of efficiency separately.

b. **Explain the joint-hypothesis problem encountered when testing for informational efficiency of a market.** **(7 marks)**

**Reading for this question**

See subject guide, Chapter 9, p.188.

**Approaching the question**

This part refers to a problem encountered when empirically testing the EMH – the joint-hypothesis problem. The problem arises from the need to use a model to identify equilibrium returns in order to calculate whether excess returns exist. The choice of the model used to adjust actual returns in the excess return calculation may be wrong. This implies that excess returns may be incorrectly quantified, and then used in the test of the efficient market hypothesis. This implies that the efficient market hypothesis would become untestable because of the joint hypothesis problem. The test of whether a market is efficient becomes a joint test of:

i. informational efficiency

ii. accuracy of the equilibrium expected returns.

It is not possible to test just (i) – the hypothesis of interest.

c. **Explain the 'January effect' in stock markets and discuss the evidence for this effect.** **(10 marks)**

**Reading for this question**

See subject guide, Chapter 9, p.193–94.

**Approaching the question**

This part requires an explanation of one of the anomalies found in observation of actual financial market returns – the January effect. The question also requires reference to the findings in the key empirical studies of this effect.

A calendar effect represents a pattern in stock returns related to either the day of the week, the week of the month or the month of the year. One famous empirical finding is the so-called January effect, which shows that stock returns (particularly for small stocks) are greater in January than in any other month of the year. The January effect seems to indicate a trading rule: buy small stocks at the end of December and sell them at the end of January. If the January effect exists then it may be possible to make an excess return. This predictability is inconsistent with the weak form version of informational efficiency.

Better answers would discuss possible explanations for the effect (e.g. tax loss selling, window dressing and the empirical evidence).

## Section B

Answer one question and no more than two further questions from this section.

### Question 5

a. **Consider the two following mutually exclusive projects (A and B):**

**Cash flows**

| Project | $C_0$ | $C_1$ | $C_2$ |
|---------|-------|-------|-------|
| A | −1900 | 1600 | 700 |
| B | −500 | 0 | 700 |

**Assuming an opportunity cost of capital of 10 per cent, what is the NPV of the two projects? Which project would you accept?** **(5 marks)**

**Reading for this question**

See subject guide, Chapter 7, pp.142–43.

**Approaching the question**

NPV A $= -1900 + 1600/(1.1) + 700/(1.1)^2 = 133.06$

NPV B $= -500 + 700/(1.1)^2 = 78.51$

Accept project A as projects are mutually exclusive therefore select project with highest NPV.

b. **Explain what is meant by the 'opportunity cost of capital' in the context of the NPV method.** **(4 marks)**

**Reading for this question**

See subject guide, Chapter 7, p.142.

**Approaching the question**

This is the return foregone from investing in the capital project rather than other assets in financial markets. As such, we normally use a market-determined rate of return (on alternative assets) as the opportunity cost of capital. The opportunity cost will reflect the risk of the project being

appraised (i.e. the return used) as the opportunity cost must be the return on assets with the same level of risk. The opportunity cost can be used to determine the rate of discount in the NPV method.

c. **Explain the additivity property of the NPV method.** **(5 marks)**

**Reading for this question**

See subject guide, Chapter 7, p.143.

**Approaching the question**

Assume that a firm has only two projects (X and Y); the NPV of projects X and Y is equal to the NPV of project X plus the NPV of project Y. (Note that the additivity property holds because present values are all measured in today's money.) This can be written as:

NPV (X +Y) = NPV (X) + NPV (Y)

The additivity property implies that the value of the firm is simply the sum of the values of the separate projects.

d. **Calculate the IRR of each project.** **(6 marks)**

**Reading for this question**

See subject guide, Chapter 7, pp.144–46.

**Approaching the question**

The IRR is the discount rate that gives an NPV = 0. This can be found using trial and error and linear interpolation. We already know that the NPV of A when the discount rate is 10% is 133.06. Similarly the NPV of B is 78.51. To use linear interpolation, we find a discount rate for each project that gives a negative NPV – try 20%.

When i = 20%, NPV A = –80.55 and NPV B = –13.89

Using linear interpolation (see subject guide, Chapter 7):

IRR A = 10 + [133.06 / (133.06 + 80.55)] (20–10) = 16.23

IRR B = 10 + [78.51 / (78.51 + 13.89)] (20+10) = 18.49

Answers that are reasonably close to the answers provided here are acceptable. Remember these numbers are estimates as we are using linear interpolation when the relationship between NPV and discount rate is non-linear.

e. **Based on your calculations in part (a) and (d) explain which project you would accept and why.** **(5 marks)**

**Reading for this question**

See subject guide, Chapter 7, pp.144–46.

**Approaching the question**

The two methods give different results as sometimes happens when comparing projects that are mutually exclusive. This is because the two methods are based on different criteria – NPV is based on absolute returns and IRR is based on % returns. When there is a conflict of ranking using NPV and IRR we normally go with NPV as this is consistent with maximising the value of the firm.

## Question 6

   a. **Briefly explain each of the following terms:**

     i. **market risk premium**

     ii. **feasible region**

     iii. **security market line**

     iv. **market portfolio**              **(8 marks)**

   **Reading for this question**

   See subject guide, Chapter 8, pp.166–76.

   **Approaching the question**

   This question requires a brief explanation of each of the four concepts. Better answers would use a diagram to illustrate each concept.

     i. The market risk premium is the expected return on the market portfolio less the risk free rate.

     ii. The feasible region is the region in expected return- standard deviation space that contains all feasible portfolios. These portfolios will be both efficient and inefficient.

     iii. The security market line – the line of the CAPM equation. It is a line that cuts the expected return axis at the risk free rate and contains the market portfolio and all risky securities.

     iv. The market portfolio – the optimal risky portfolio made up of all risky securities in proportion to their relative market capitalisations.

   b. **Explain why, under the CAPM framework, the standard deviation of an asset's returns is not an appropriate measure of risk.**     **(4 marks)**

   **Reading for this question**

   See subject guide, Chapter 8, pp.166–76.

   **Approaching the question**

   In the CAPM, investors are assumed to have diversified away all idiosyncratic risk. The only risk an investor is rewarded for in the CAPM is market risk. The standard deviation is a measure of total risk (which includes idiosyncratic risk).

   c. **Explain the effects of diversification on risk.**     **(5 marks)**

   **Reading for this question**

   See subject guide, Chapter 8, pp.169–70.

   **Approaching the question**

   Diversification involves combining securities into a portfolio – the effects of combining securities that are less than perfectly positively correlated will be to obtain offsetting of price changes thus reducing risk. The lower the correlation (below +1) the better the risk reduction. Diversification only reduces unsystematic risk.

   A good answer would demonstrate diversification using a diagram.

   d. **Explain what Beta represents in the CAPM framework. Give examples to illustrate your answer.**     **(4 marks)**

   **Reading for this question**

   See subject guide, Chapter 8, pp.172–73.

   **Approaching the question**

   Beta measures the relationship between the return on a security and the return on the market portfolio. It is a measure of market risk sensitivity for

a security. A beta greater than one is a risky security (returns amplified). Beta less than one is a defensive security. A stock with a beta equal to one would mimic the market.

A good answer would provide examples of types of stocks with high and low betas.

e. **If a security plots above the security market line, in the context of the CAPM, explain what is likely to happen to that security to bring the security back onto the security market line.** **(4 marks)**

**Reading for this question**

See subject guide, Chapter 8, p.175.

**Approaching the question**

A security plotting above the SML indicates an undervalued security (expected return greater than that predicted by the CAPM for the level of risk). Investors will buy this security – this will push up the price, reducing return until the security sits on the SML. Such an action – buying undervalued stocks thus pushing the price back to equilibrium is an example of arbitrage.

A better answer would use a diagram to illustrate the concept of an undervalued security and the effect of arbitrage.

**Question 7**

**Consider the following two financial assets:**

1. **A US stock that is expected to pay a dividend of $50 next year, $60 in year 2 with dividend growth expected to be 3% per annum thereafter;**

2. **A US corporate bond an with a annual coupon rate of 5%, par (face) value of $1000, and maturity in 3 years time.**

a. **If the required return on similar US equities is 10% and on similar US bonds is 5%, calculate the value of the US stock and the US bond.**
   **(6 marks)**

**Price of equity = $50/1.1 + 60/(1.1)^2 + [60(1.03)/(0.1-0.03)]/(1.1)^2 = \$824.68$**

**Price of bond = $50/1.05 + 50/(1.05)^2 + 1050/(1.05)^3 = 1000$**

**Note: 4 marks allocated to calculating the equity price and 2 marks to the bond price.**

b. **Using the data given above and assuming an annual discount rate, calculate the duration of the US bond.** **(3 marks)**

| t | CF | DF | CF*DF | CF*DF*t |
|---|------|--------|----------|-----------|
| 1 | 50 | 0.9523 | 47.6190 | 47.6190 |
| 2 | 50 | 0.9070 | 45.3514 | 90.7029 |
| 3 | 1050 | 0.8638 | 907.029 | 2721.088 |
| | | | 1000 | 2859.4104 |

**Bond duration = 2859.4104/1000 = 2.8594 years**

c. **Briefly describe the factors that affect Macaulay duration.** **(4 marks)**

**Reading for this question**

See subject guide, Chapter 6, pp.128–29.

**Approaching the question**

There are three important factors affecting duration:

i. Macaulay duration increases with the maturity of a bond.

ii. Macaulay duration decreases as market interest rate increases: higher rates discount later cash flows more heavily, and the weights of those later cash flows decline when compared to earlier cash flows.

iii. Macaulay duration decreases as the coupon interest rate increases: the larger the coupons, the more quickly cash flows are received by investors and the higher the weights of those cash flows.

**d. Explain the concept of the yield curve for bonds and distinguish between the main theories of the term structure of interest rates.** **(12 marks)**

### Reading for this question

See subject guide, Chapter 2, pp.30–31.

### Approaching the question

Bonds with identical risk may have different yields (interest rates) because of the difference in the time remaining to maturity. A yield curve plots the yields (interest rates) of bonds with different maturity but the same risk. Usually the yield curve is constructed from government securities. These are often referred to as the benchmark yield curve, as they are the basis for evaluating other yields of similar maturity bonds. The yield curve can be: upward (the long-term rates are above the short-term rates); flat (short- and long-term interest rates are the same); and inverted (long-term interest rates are below short-term interest rates).

There are a number of theories that attempt to explain the shape of the yield curve:

i. expectations theory

ii. liquidity preference theory

iii. market segmentation theory.

Each of these needs to be explained highlighting how they explain the different shapes of the yield curve. Better answers will aim to identify which theory provides the best explanation of why we commonly observe an upward sloping yield curve.

## Question 8

**a. Distinguish between re-financing risk and re-investment risk. Give examples of each.** **(8 marks)**

### Reading for this question

See subject guide, Chapter 6, pp.117–18.

### Approaching the question

Re-financing risk is the risk that the cost of re-borrowing funds will be higher than the returns earned on asset investments, in the presence of longer-term assets relative to liabilities.

Re-investment risk is the risk that returns on funds to be reinvested will be lower than the cost of funds, when the bank holds shorter-term assets relative to liabilities.

Examples of each are required. Better answers would demonstrate that a bank is more likely to face re-financing risk as the maturity of its funding is lower than the maturity of its assets.

b. **Consider the following extracts from the balance sheet of Bancomutual (values in £millions and duration in years):**

|  | Value | Duration |
|---|---|---|
| Loans (short term) | 1500 | 0.8 |
| Loans (long term) | 3200 | 3.7 |
| Mortgages | 4200 | 7.8 |
| T-bonds | 1000 | 0.9 |
|  |  |  |
| Deposits | 8500 | 1.3 |

**Calculate the duration gap for Bancomutual.** **(5 marks)**

**Approaching the question**

Duration of assets = (1500/9900)*0.8 + (3200/9900)*3.7 + (4200/9900)*7.8 + (1000/9900)*0.9 = 4.7171 years          [2 marks]

Duration of liabilities = 1.3 years          [1 mark]

Duration gap = Dur A – (L/A)* Dur L = 4.7171 – (8500/9900)*1.3 = 3.6010 years          [2 marks]

c. **Explain the relationship between the market value of equity and a change in interest rates.** **(4 marks)**

**Approaching the question**

For a positive duration gap, if interest rates increase, the market value of assets will fall by more than the market value of liabilities (as (i) there is an inverse relationship between market values and interest rates and (ii) the duration of assets is greater than duration of liabilities (due to a positive gap) therefore assets are more sensitive than liabilities to a change in interest rates.

Hence for a positive duration gap, the effect of an increase in interest rates will be to reduce assets by more than liabilities and hence reduce net wealth (assets minus liabilities).

d. **What is the change in the market value of equity of Bancomutual, as a percentage of assets, if interest rates decrease from 5.5% to 4.5%?**

**(3 marks)**

**Approaching the question**

Change in net wealth/A = – Dur gap * –1/ (1+0.055) = 3.4132%.

The effect is to increase net wealth as a proportion of assets by 3.4132%.

e. **Critically discuss the main problems associated with duration gap analysis.**

**(5 marks)**

**Reading for this question**

See subject guide, Chapter 6, p.130.

**Approaching the question**

The main problem is that when calculating modified duration (as in part (d) of this question), a linear relationship between market values of assets/liabilities and interest rates is assumed when the underlying relationship is, in fact non-linear. Therefore this calculation only gives reasonable estimates for small changes in interest rates.

Better answers will illustrate the effect of the non-linearity on the calculation of the change in net wealth using a diagram.