1 Introduction

Study: Financial Market, Financial Institution, Financial Management.

1.1 Financial Market

Financial Market: Markets where the funds flow from lenders to the borrowers. It's the *channel* funds from servers to investors and can *promote* economic efficiency.

1.1.1 The Bond Market and Interest Rate

A **security (financial instrument)** is a claim on the issuer's future income or assets. it includes **Bond** and **Stock**.

Bond is a debt security that promises to make payments periodically for a specified period of time.

Stock: Common stock represents a share of ownership.

Interest Rate: Cost of borrowing or the price paid for rental of funds. When it increases, It can affect consumption, saving and investment.

1.1.2 The Foreign Exchange Market

Definition: where funds are converted from one currency into another.

Foreign Exchange Rate: the price of one currency in terms of another currency. It mainly influence the imports and exports. There three methods of quotations :

Direct: 100 $FOREX = e_x$ *Domestic Currency*

Indirect: 100 *Domestic Currency* $= e_y$ $FOREX$

USD 1 $USD = e_z$ *Domestic Currency*

(de)appreciate: the influence of market;

(de)valuate: the influence of government

US Dollar Index(USDX): To evaluate the value of Dollar by exchange rate with other countries.

1.1.3 Factors of Foreign Exchange Rate

The Exchange rate is something rated to the Demand & Supply of foreign currency. For e - Q(foreign currency) graph, it satisfies the normal demand and supply curve. All the exchange rate is discussed in direct quotations.

Balance of Payment(BOP):*surplus* (FOREX ↑, e ↓),*deficit*(FOREX ↓, e ↓).

Economic Performance can be apparent in some time point(end of the year). Good performance will lure foreign cash(e ↓).

Interest rate will also affect(i ↑, e ↓, for it can lure foreign investment).

Price will affect as well(p ↑, e ↑).

1.2 Banking and Financial Institutions

Functions:

a. They make financial markets work

b. Financial intermediary for funds flowing from savers to investors

c. Important effects on the performance of the economy as a whole

Examples:

Insurance Company;
Banks;
Securities Firm;
Trust Company;
Credit Union;
Financial Company;
Financial Leasing Company;
Credit Rating Agency;
Exchanger;
Funds Management;

All examples can be divided to two types: *banks-institution* and *non-banks-institution*. Banks are the largest financial intermediaries in our economy, including Central Bank; Commercial Bank; Policy Bank(non-profitable); Specialized Bank. There is a trend of *disintermediation*.

1.2.1 Financial Innovation

Anything new in Finance.

New financial product, financial institution, financial services and more appear, such as e-finance and financial derivatives.

1.3 Money and Money policy

Definition: Money is defined as anything that is *generally* accepted in payment for goods or services or in the repayment of debts. It is linked to changes in economic variables that affect all of us and are important to the health of the economy.

Money affect *business cycle* (including four stages: *recession,depression recovery* and *boom*.

Money growth rate will have a severe decrease and rapid growth. The recession will cause the money decreasing, for example, people are don't intend to consume. After a big recession, government will get in and add the amount of money in the market to boost economy. This phenomena can be used to predict the performance.

1.3.1 Relationship between Money and Inflation

The aggregate price level: the average price of goods and services in an economy.

Inflation: A continue rise in the price level which affects all economic players.

The rise of money supply will lead to the rise of inflation.

1.3.2 Money and Interest Rates

Interest Rates are the price of money. The increase of money supply will lead to the decrease of interest rate, something like demand and supply.

1.3.3 Monetary and Fiscal Policy

Monetary policy is the management of the money supply and interest rates. (Central bank)

Fiscal Policy is government spending and taxation, which is set by department of Treasure. (fiscal revenue and expense, the department of treasury)

Both policies make government be able to manage and manipulate markets. Government raise money from taxation, profit of state-owned company, fee, etc. Government spends on procurement, investment, transfer payment,interest payment, etc.

The effect on aggregate demanding($C+I+G+NX$): Money policy influences C, I, NX, has a indirect effect to AD. Fiscal policy will have a direct effect on G and AD.

Interest rate change(↑, as example) will affect exchange market, stock market(↓, as it's more difficult to raise money), national bond market, commercial market(↓, as it will lower the need for consumption).

2 Financial Market

2.1 Function of Financial Markets

Perform the essential function of channeling funds from lenders to borrowers. It can also promote *economic efficiency* by producing a efficient allocation of capital. It will also directly improve the well-being of consumers by allowing them to time purchases better (allow consumers to use the money in the future to purchase by loans or something else).

2.1.1 Channel of Financing

Direct Finance: Borrowers borrow funds directly from lenders in financial markets by selling them securities. More specifically, the relationship between lender and borrower is direct and clear.

Indirect Finance: Involves a financial intermediary that stands between the lender-savers. The relationship between intial lender and final borrower is indirect. (Banks)

The graph of flow of funds can be referred to ppt.

2.2 Structure of Financial Market

2.2.1 Debt and Equity Markets

Debt instrument is a *contractual agreement* by the borrower to pay the holder of the instrument fixed dollar amount(interest and principal payments) at regular intervals until a specified date(the *Maturity Date*, when a final payment is made, includes: *bonds*, *mortgage*.

It has different terms includes:

short-term($M < 1yr$): T-Bill

intermediate term($1yr < M < 10yr$): T-Note

long-term ($M > 10yr$): T-Bond

Equity instrument is claim to share in the net income(income after expenses and taxes) and the asset of a business, includes: *common stock*, *preferred stock*.

The difference between common stock and preferred stock: Preferred stock has priority in dividends receiving and liquidation during the corruption. Common stock owner has *voting right* based on the share owned while limited in priority stock owner. And the common stock has priority to buy new shares to avoid dilution. From the crisis perspective, common stock holder has bigger crisis than preferred stock.

Priority stock has two type: accumulative and non-accumulative. Accumulative has a right to claim the unpaid dividends in the later year while non-accumulative can just claim current dividends. Accumulative stock is more analogous to long-term bond.

The main disadvantage of owning a corporation's equities rather than its debt is that an equity holder is a *residual claimant*.

2.2.2 Primary and Secondary Markets

Primary markets are those where new security issues sold to initial buyers. Investment Banks will *underwrite* securities in primary markets.

Second markets are markets where securities previously issued are bought and sold between investors. Broker(agency) and dealers work in secondary markets.

2.2.3 Exchanges and Over-the-Counter(OTC) Markets

Exchanges markets: Trades conducted in central locations(eg. New York Stock Exchange, NASDAQ) **OTC markets**: Dealers at different locations buy and sell(eg. OTCBB).

2.2.4 Money and Capital Markets

Money Markets deal with short-term debt instruments.

Capital markets deal with longer-term debt and equity instruments.

2.2.5 Money Markets Instruments

Treasury Bills[TB]: Short-term; A solution to the government deficit; IT has the lowest rate in the markets, so called gilt-edged / risk-free bond, as it's guaranteed by the taxation of the government. They are usually sold at discount by auction to generate interest.

Negotiable Bank Certificates of Deposit (large dominations) [CD]: Large domination; Transferable in second market which can receive the interest before maturity; Of low risk as it's published by guaranteed banks and they absorbs funds quickly. For bank it's of large dominations and can't be taken out before maturity.

Commercial paper: a unsecured promissory note with a fixed maturity less tha 270 days and is published by well-known cooperation; During selling on credits, or in the credit term, there is no interest and will form accounts receivable/ payable; When exceeding the credit term, they will change to note receivable/ payable with interest. Notes include Promissory note and draft.

Draft is an order, issued by the creditor for the debtor to pay fo a payee. Promissory note is a promise issued by debtor to pay back to the creditor. *Acceptance* is needed in the draft to promise to pay the debt;*Trader's acceptance* will be in the promissory from the debtor. Bank can also be the issuer by charging the debtor to stamp this trader's acceptance and it will be called *bank acceptance* which has more liquidity as bank has better reputation. *Endorsement* is transferring notes to other to retrieve money before maturity with guaranteeing the debt will be paid. *Discount* is transferring notes to a bank before maturity subtracting the interest. In summary, they are different on their characteristic, issuer, acceptance; If the debt is paid out, it's called *Honor*.

Federal Funds: a form of inter-bank offering as are borrowed between financial institution; short-term concentrating on overnight borrowings; large amount for immediate spending; interest rate is liberalized for inter-bank offering expect for Federal Funds;

Repurchase agreement[RP]: After A sells a low-risk bond to B, RP is the scene that A buys back the bond at a higher price later. In fact, it's a loan for A with bond. For A this is a *positive repo* and B is *negative(reverse)* repo. For a, the bond still belongs to A when A is in need of funds. For B is safer to give the loan in this way with bonds as pledge. For normal *pledged repo*, the pledged bonds can't be pledged again. While *outright repo* allow for a shorter term of transition by another repurchase agreement with shorter term;

2.2.6 Capital Market Instruments

Capital market instruments are for long-term.

Bonds: T-Note & T-Bond with large amount and low risk;

Government agency securities: by the agency of government or sponsored by government

State and local government bonds

Cooperate bonds: with a relative hight risk, which introduces credit rating; It includes converted bonds, which can convert the bonds to stock at a price.

Corporate stocks:

commercial loans, consumer loans, commercial and farm mortgages, residential mortgage.

2.3 Internationalization of

2.3.1 foreign exchange

Euro-currencies: foreign currencies deposited in banks outside the home country.

Euro-dollar: dollars deposited in foreign banks outside the US.

Euro is actually refers to offshore.

2.3.2 World Bonds Market

Foreign bonds: sold in a foreign country and denominated in that country's currency.

Euro-bond: bond denominated in a currency other than that of the country in which it is sold.

2.3.3 World Stock Markets

Stock price indices: composite indices and component indices.

2.4 Financial Intermediaries

2.4.1 Types of Financial Intermediaries

Depository institutions: commercial banks, saving banks, credit union, as the only institutions that the main source of liabilities is deposits;

Contractual savings institutions: life insurance companies(Policy), fire and casualty insurance companies, pension funds(Contribution); As there is a contract between the institution and consumers;

Investment intermediaries: Finance companies, mutual funds, money market mutual funds; They are related to the capital market;

2.5 Regulations of financial system

Security and Exchange Commission(SEC): Bond and other exchanges are supervised by SEC;

Commodities Futures Trading Commission(CFTC): Futures market exchange;

Office of the Controller of the Currency(OCC): Belongs to treasury and is responsible for bank registration

Federal Deposit Insurance Corporation (FDIC): To guarantee the deposit deposit institutions under some limitations.

Fed reserve system: all the deposit institution;

The content of supervision: To increase information for investors to avoid insider trading and reduce adverse selection and moral hazard problems; To ensure the soundness of financial intermediaries, e.g. restrictions on entry, disclosure, limits on competition, restrictions on interest rate; To improve monetary control by monetary policy.

3 Money

Money:anything that is generally accepted in payment for goods or services or in the repayment of debts

Currency: cash; consisting of dollar bills and coins and is one of type of money.

Wealth: the total collection of pieces of property that serve to store value. Wealth includes non-monetary part and monetary part which includes money.

Income: flow of earnings per unit of time; money belongs to the concept of stocks

3.1 Functions of money

Medium of Exchange: pays for goods and service with transaction; Without medium, barter economy will appear and bring high transaction costs(double coincidence of wants); So the money is a lubricant;

Unit of Account: the price;

Store of Value: used to save purchasing power to divide the process of buying and selling with high liquidity;

Liquidity: the relative ease and speed with which an assets can be converted into a medium of exchange.

Criteria of money: Standardized, Accepted, Divisible, Easy to carry, Not Deteriorate quickly

3.2 Evolution of Payments System

3.2.1 Commodity Money

An object that clearly has value to everyone is a likely candidate to serve aas money, and a natural choice is a precious metal such as gold or silver.

Precious metals' Advantage: quality uniform; easy to shape; easy to divide; durable

Representative: usually bank note and it's based on precious metals

3.2.2 Credit Money

Fiat Money: Paper currency decreed by governments as legal tender.

Check: An *instruction* from you to your bank to transfer money from your account to someone else account when she deposits the check; Who receives the check can deposit it in his bank account. This bank will collects money by contacting the bank where the check's original account resides.

E-money: Debit card(no overdrawing); Credit card(allow overdrawing with overdraw line); stored-value card/z-purse (allow offline as data is in the chip);e-cash;

3.3 Measuring Money

In America:

M_0: cash / currency;

M_1: M_0 + Traveler's check + demand deposits + other checkable deposits (USA); They are real-purchasing power that they can directly pay for goods and services; Narrow money;

M_2: M_1 + quasi-money (small-denomination time deposits + savings deposits and money market deposit accounts + money market mutual fund shares); They can't be used directly to pay for goods;

In China: the deposits in China is especially for individuals

M_0: cash in circulation;

M_1: M_0 + demand deposits of *enterprises*; Individual demand deposits are excluded as China doesn't allow check for individuals.

M_2: M_1 + time deposits of enterprises + saving deposits + other deposits

4 Interest Rate

4.1 Measuring Interest Rates

: The proportion of a sum of money that is paid over a specified period of time: simple interest and compound interest

$$I_S = P \times i \times n, \quad S_S = P \times (1 + ni)$$
$$I_C = S_C - P, \quad S_C = P(1 + i)^n$$

Discounting the future:

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

Annuity: ordinary annuity, annuity due, differed annuity and perpetual annuity

4.1.1 Four types of Credit Market Instrument

Simple Loan: Lender will repay $P + I$ in the maturity date; Example on money market short-term instruments

Fixed Payment Loan(fully amortized loan): Lender will repay same amount in periods, which is actually the form of annuity. The start of repayments contain mainly interest and the end of repayments contain mainly principal. e.g. mortgage

Coupon Bond: : Lender will repay same amount of interest in periods, and will finally pay out interest and principal in the last period; This is used in capital market instruments;

Discount Bond(Zero-Coupon Bound) : Borrower will lend at $(P - I)$ and get paid of P

note: For mortgage, you can either repay in fixed payment per month or fixed principal with varying interest. The latter one will pay less interest as the amount of principal decreases quickly, while faced more pressure at the starting period

4.1.2 How to calculate interest rate

Theses are abstracted annual interests.

Yield to Maturity: the interest rate that equates the present value of cash flow payments received from a debt instrument with its value today. This is the same concept with IRR; When coupon bond is sold at par, the real interest rate is equal to coupon bond no matter what the term is as every year the lender pay out all the interest without any principal. The interest rate is negatively related to current price of the bound; The lower of actual price you buy the coupon bond, the more yield to maturity.

$$P = \sum_{t=1}^{n} \frac{CF_t}{(1+i)^t}$$

For discount bond:

$$i = \frac{F - P}{P}$$

current Yield (an approximation for coupon bound):

$$i = \frac{C}{P}$$

For coupon bound is not sold on face price:

$$YTM = \frac{c + \frac{P_s - P_b}{\text{year}}}{P_b} = i_c + \frac{P_s - P_b}{\text{year} \times P_b}$$

Discount yield (for discount bound):

$$i = \frac{F - P}{F} \times \frac{360}{\text{days to maturity}}$$

$\frac{1}{F}$ will understate the interest rate; $\frac{1}{\text{days}}$ is to evaluate the per day interest; So for annual interest rate as $360 < 365$ this will also understate the interest rate.

Consol or perpetuity: it's a perpetual bond with no maturity date and no repayment of principal that makes fixed coupon payments of C forever.

4.2 Rate of return

The payments to the owner plus the change in value expressed as a fraction of the purchase price.

$$\text{Ret} = \frac{C}{P_t}(\text{current yield}) + \frac{P_{t+1} - P_t}{P_t \cdot \text{year}}(\text{rate of capital gain})$$

P_{t+1} is the present value of future cash flow bought by this bond.

The return on a bond is equal to the yield to maturity in the circumstances of one-year coupon bond. Bonds whose term to maturity is longer than the holding period are subject to interest-rate risk, as market interest-rate increases will lead to loss in return; The more distant a bond's maturity, the lower the rate of return that occurs as a result of an increase in the interest rate. Even

if a bond has a substantial initial interest rate, its return can bee negative if market interest rates rise. There is no interest-rate risk for any bond whose time to maturity matches the holding period;

4.3 Real interest rate and Nominal Interest rate

$$i_r = i_n - \pi^e$$

5 Behavior of interest rate

Factors of Determining the Quantity Demanded of an Asset:

Wealth(+); Expected Return(+)(deposit; equity; bond); Risk(-); Liquidity(+);

5.1 Theory of Asset Demand

i is determined by Supply and Demand for Bonds.

Demand side: as the price goes down, the more demand from investors to buy the bonds. Factors: Wealth(+), Expected return in a future term (-), Expected inflation(-), risk(-), liquidity(+);

Supply side: as the price goes up, the more supply from issuers to sell the bonds. Factors: Profitability of investments(+), Expected inflation(+), Government deficit(+)

The equilibrium of the demand and supply will define a interest rate. Fisher effect means the changes in $\pi^e(\uparrow)$ at $i_n(\uparrow)$.

5.2 Loanable Funds theory

$$L^s = S + \Delta M + DH(\text{dishoarding})$$

$$L^d = I + H(\text{hoarding})$$

market equilibrium :

$$S + \Delta M = I + \Delta H$$

The relationship wih theory of asset demand: the demand for bonds is the supply for loanable funds, and the supply for bonds is the demand for loanable fonds;

5.3 The Liquidity Preference Framework

$$W = B + M \quad \Rightarrow \quad B^S + M^s = B^d + M^d \quad \Rightarrow \quad M^s - M^d = B^d - M^s$$

So we analysis money market; i is negatively related to M^d:

$$i \uparrow \quad \Rightarrow \quad B^d \quad \Rightarrow \quad M^d \downarrow$$

i determines the balance between the bond and money as wealth is fixed. In this theory, the M^s is constant as it's a external factor. Now we can find the equilibrium in money market. Factors: B^s(-), Income(+), Price level(+) (maintain purchasing power)

More specifically, the impacts of money supply are following.

Liquidity effect: $M^s \uparrow$, $i \downarrow$

Income effect: $M^s \uparrow$, Income$\uparrow$, $M^d \uparrow$, $i \uparrow$

Price level effect: $M^s \uparrow$, Price Level$\uparrow$, $i \uparrow$

Expected inflation effect: $M^s \uparrow$, Fisher effect, $i \uparrow$

6 The risk and Term Structure of Interest Rate

6.1 Risk structure of Interest Rates

$$i = RR + IP + (DRP + LP) + MRP$$

RR: risk free rate
IP: Inflation premium
DRP: Default risk premium
LP: Liquidity premium
MRP: Maturity

Default risk: occurs when the issuer of the bond is unable or unwilling to make interest payment or pay off the face value;

Default-free bonds: Bonds with on default risk; U.S. TBs are considered default-free

Risk premium: the spread between the interest rates on bonds with default risk and the interest rates on TBs. (People are willing to choose TB when they share same i). The risk will be indicated by agencies: Over BBB(Baa): Investment grade; Below BBB(Baa): Speculative grade;

Liquidity premium: the ease with which asset cam be converted into cash. Similar to risk premium ass people willing to buy TB as it has high liquidity, this will create spread;

Municipal bond is a special case as it has a higher bond but has a lower i. This is because there is no tax on it, which will bring extra interest compered to taxed bond.

6.2 MRP and Yield Curve

Yield curve: a plot of the yield on specific bonds with differing terms to maturity but the same risk, liquidity and tax consideration for specific date. It's normal to have upward slope with same tendency. When short-term interest rate is too high, the yield curve may inverse and have downward slope. There are some explanations here.

6.2.1 Expectations Theory

The interest rate on a long-term bond will equal an average of the short-term interest rates that people expect to occur over the life of the long-term bond. There is an assumption that types of bonds are substitution free. Prove with two year:

$$(1+R)^2 = (1+r)(1+r^e)$$
$$R^2 + 2R = rr^e + r^e + r$$
$$R^2, rr^e \approx 0$$
$$R = \frac{r + r^e}{2}$$
$$R = \frac{r + r^{e_1} + r^{e_2} + \cdots + r^{e_{n-1}}}{n}$$

This can explain Yield curve will inverse when short-term interest is high and curves have same tendency, while can't explain that it's normal to have upward slope.