Chpt4. TVM-Single Payments

Time Value of money	*Individuals prefer to receive a dollar today to receiving that same dollar promised in a year's time.*
Interest	*The cost of funds to a borrower or part of the return for a lender or investor*
Mortgage	*recover money by selling property*
Term Loan	*bank loan with maturity due date*

4.1 Simple Interest & Future Value

Future Value	*amount received later*; cash value of investment at future date: $FV=P(1+rn)$
Simple Interest	*Interest calculated on the original amount*: $I=(P)(r)(n)$
Money Markets	*short-term debt markets*: companies can borrow/ invest in the short-term.
Formula	$FV = P(1 + rn)$

4.2 Simple Interest & Present Value

Present Value	*amount today*: needed cash today, to yield a particular value at future.
Discounts	*to find the present value of future amount*: inverse for compounding interest.
Formula	$PV = FV/(1+rn)$

Working out/ Calculating how much the money we expect to receive in the future is worth today.

4.3 Compound Interest & FV

Compounded Interest	*Interest is stacking*: It is then added to the principal
Compounding	*Process of finding future amounts where interest is paid on interest already earned.*
Opportunity Cost	*best market yield achieve through alternative course of action*: Market Yield is often benchmarked for opportunity costs
Formula	$FV = PV(1+r)^{n}$

Working out/ calculating future value through interest for each period (plus any interest), then added to the principal.

4.4 PV of a single payment

Discounting	*The process of finding current amounts by the process of present value.*
Formula	$PV = FV / (1+r)^{n}$
Formula2	$PV = FV \times (1+r)^{-n}$

4.5 Compounding frequency

Coupon	*Interest paid, based on a percentage of a bond's face value.*
Zero-coupon Bond	*single-payment*: no interest payment during its lifetime since interest is included with the repayment of principal at maturity.
Maturity	*Deadline*:The date when security will be payed.
Formula	$FV = PV \times (1 + r/m)^{m \times n}$
Formula2	$PV = FV / (1 + r/m)^{m \times n}$

When compounding period per year is increased by *semi-annually, quarterly, monthly or daily.*

PV formula can be used to calculate the current value of a zero-coupon bond.

4.6 Continuous compounding/ discounting

Formula	$FV = PV\ (PV \times e^{r \times n})$
or	$FV = PVe^{rn}$

When compounding frequency is increased to a very large number of (infinity).

Where e is constant, e = 2.718

4.7 Nominal & Effective Interest Rates

Nominal Rate	*contractual rate, ignores compounding. includes inflation*: quoted rate
Effective Rate	*actual rate, accounts compounding. includes adjustments*: adjustments to nominal rate for the frequency of compounding.
Annual Percentage Rate (APR)	*contractual rate, ignores compounding. when short-term rates are annualized*
Rate of Return	*rate of profit/ loss from investment*
Formula	$r_e = (1 + r/m)^{m} - 1$

4.8 Unknown Interest Rate

Formula	$r = (FV/PV)^{1/n} - 1$

FV and PV is given, but find interest rate.

Chpt. 6 Risk and Return

Risk-free assets	*assets that do not have risk*: e.g. Treasury Bills and Government Bonds.

6.1 Two components of a return.

Nominal Interest Rates	**Borrower's POV**: costs they incur in order to use the funds of investors.
Nominal Returns	**Investors (Lender)'s POV**: Compensates the investor for deferring consumption.

These terms are made up of two components,

Real Interest Rate	*Rate with no inflation or uncertainty*
Inflation	*Increase level of prices from supply and demand.*

The real interest rate

The interest rate adjusted for inflation, showing the true cost of borrowing or the real yield of an investment.
Real Interest Rate = Nominal IR + Expected Inflation

Expected Inflation

Inflation may be due to government policies, oil price rises, world events, etc.
Investors require compensation for expected future inflation over the period of the loan or investment, and that historical rates of inflation are irrelevant.
Consumer Price Index (CPI) measures changes in the general level of prices each quarter.

6.2 Nominal Interest Rate

Fisher Equation by Irving Fisher

Formula: Nominal Interest Rate	`NiR = [(1 + Real interest rate) x (1 + % Expected inflat ion)] - 1`
Formula: Real interest rate	`RiR = (1 + NiR / 1 + % Expected Inflation) - 1`
Risk Premium	*Additional return investors require for investing in risky assets*

6.3 Shaped of Yield Curves

Yield Curves	*Depicted in graphical form* which presents the relationship between time to maturity and percentage yield, know as **Term structure of interest rates**.
Normal yield curve	*upward-sloping curve*: short-term yields are low, will rise with longer maturities.
Inverse yield curve	*downward-sloping*: short-term yields are high, yields on long-term maturities fall over time.
Flat yield curve	*straight line*: little change in interest rates across time periods.
Humped yield curve	Short-term securities are higher, longer-term bonds are lower.

6.4 Risky Assets

Risk	*The possibility of loss:* the uncertainty of receiving the expected returns because a borrower may not be able to repay the principal on fixed-interest securities when required.
Formula: Nominal Return	Nominal Return = Risk-free return + Risk Premium

5 Risk components

Business Risk	*Fluctuations in cash inflows, notably sales.*
Financial Risk	*Amount of debt used to fund a firm's operations:* high debt levels may threaten the firm's ability to pay dividends.
Liquidity Risk	*The risk an investor holding equity in a company may be unable to sell them to another investor:* chances of selling investments without losing a lot of money.

6.4 Risky Assets (cont)

Exchange rate risk	*The chances of losing money from changes in offshore currencies relative to the local currency:* Adverse movements in exchange rates can erode the level of return the investor expects to receive.
Country Risk	*Uncertainty of return from investments in another country:* level of risk differs from country to country.

The greater the risk, the higher the premium to compensate.

6.5 Measuring historical risk and return

Ex Ante	*before the event*
Ex Post	*after the event*
Holding Period	*the length of time an investment is owned*
Holding Period Yield (HPY)	*investment's percentage return over the period it was owned.*

6.6 Standard deviation as a measure of risk

Variance	*measures how far each return is from the mean (average) of all returns.*
Standard Deviation	*measures the variability of a set of values*

6.7 Standard deviation as a measure of risk

Variance	*measures how far each return is from the mean (average) of all returns.*
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6.8 Risk averse investors' investment rules

Investment rule 1: If two investment choices have the same expected returns, select the one with the lower expected risk.
Investment rule 2: If two investment choices have similar risk profiles, select the one with the higher expected return.
An investor's tolerance for and attitude towards risk matters.
In a world fraught with uncertainty and risk, diversification is the key.

6.9 The benefit of diversification

Diversification	*The practice of spreading wealth over a variety of different assets.*
	Diversification works to reduce risk (variability), because it is unlikely that all investment assets will perform in exactly the same way.
Diversify	*Place funds in a range of assets in order to spread risk:* objective of investments.
Unsystematic Risk	*Risk that can be minimized by diversification*
Systematic Risk	*Non-diversifiable risk:* pertaining to uncertainty surrounding future economic conditions that affects all companies. e.g. war, international incidents, and inflation.
	The higher the systematic risk, the higher the return investors will be compensated.

Some investments will perform well when others are performing poorly, so that the returns on assets will not move in the same direction at the same time.

6.10 CAPM

Capital Asset Pricing Model (CAPM)	*calculates the required rate of return of risk assets.*
Market Risk Premium (MRP)	*extra return investors require to compensate them for investing in the market portfolio.*