

Introduction to the Portfolio Approach

- A portfolio approach means evaluating an individual investment based upon their contribution to the entire portfolio. Suppose I have FFC, NRL and UNIL in my portfolio and want to add FFBL in my portfolio. Now the isolated approach is to analyse the merits and de merits of FFBL stock but the portfolio approach is to analyze the risk and returns such as beta, yield etc of my portfolio before and after the addition of FFBL.

Diversification

- The diversification ratio for an equally weighted portfolio is given by, Diversification ratio = Risk of equally weighted portfolio of n securities/risk of single security selected at random. Need to understand diversification risk in detail.
- The benefits of risk reduction from diversification are best seen under normal market conditions and not financial crisis.

Portfolio Management Process

- There are three steps in the portfolio management process;
 1. The planning step. Here the portfolio manager understands the clients needs and constraints and develops an “Investment Policy Statement (IPS)” which comprises of the above mentioned needs and constraints. Constraints may include principal protection, liquidity, time horizon etc.
 2. The execution step. In the execution step, based upon IPS, asset allocation takes place which is the process of deciding what classes of assets will be in the portfolio for e.g equities, FII, etc. Asset allocation is followed by security selection which is the process of what securities will go in the asset classes decided. Finally the process of portfolio construction is executed which is the process of buying such securities through a broker or a dealer.
 3. The feedback step. In the feedback step, the portfolio is monitored and rebalanced at regular intervals. The frequency of performance monitoring is pre decided.

Types of Investors

- Type of investors are mentioned below

	Investment Horizon	Risk Tolerance	Income Needs	Liquidity Needs
Individual Investors	Depends on individual goals.	Depends on the ability and willingness to take risk.	Depends on rationale behind investment.	Depends on the individual.
Banks	Short	Low	Pay interest on deposits.	High, to meet the daily withdrawals.
DB pension plans	Long, depends on the employee profile.	High for longer investment horizon.	High for mature funds (payouts are closer), low for growing funds.	Low
Endowments and foundations	Long	High	Meet spending obligations.	Low
Insurance Companies (P&C)	Short	Low	Low	High
Insurance Companies (Life)	Long	Low (because of high liquidity needs).	Low	High
Mutual Funds	Varies by fund.	Varies by fund.	Varies by fund.	High, to meet redemptions.

Types of Pension Funds

- There are two types of pension plans; a) the defined contribution plan, b) Defined benefit plan.
- A defined contribution plan is the one where the employee defers a part of their salary in an investment plan and the employer can match that amount till a certain percentage. Since that fund is external, the investment risk is borne by the employee. One example is Pak Qatar Takaful in FFBL.
- A defined benefit plan is like gratuity paid at the end of the service of an employee. Since the employer is responsible for overseeing the funds and paying the employee at the end of service, the employer bears the investment risk.

Active vs Passive Asset Managers

- Active asset managers are those which attempt to outperform a pre defined performance benchmark, often the market return.
- Passive asset managers attempt to match the performance of a pre determined benchmark, often the market return.

Traditional vs Alternative Asset Managers

- Traditional asset managers focus on long only equity, FII, alternative investments. They charge a management fee which is based on Assets under management.
- Alternative asset managers focus on hedge funds, private equity, VC strategies. They charge a management fees plus a performance fees.

Ownership of Asset Management Companies

- Asset management companies are privately owned and structured as LLC or limited partnerships.
- There are also asset management divisions of big banks like JP Morgan, Lehman Brothers etc.

Asset Management Industry Trends

- Growth of passive investing because producing ex ante alpha is proving difficult for active asset managers in more efficiently priced markets.
- Use of “Big Data” in the investment process. Structured big data is from orderbooks, black box of the market. Unstructured data is from third party resources such as internet.
- Usage of statistical and machine learning techniques to analyze the data and find quantitative patterns which may affect the returns.
- Algorithmic trading is widely used to automate the process of asset management. This leads to young investors in the market, lower barrier to entry.

Mutual Funds

- A bunch of investors pool their money and then it gets invested.
- Advantages of mutual funds are
 - 1) Low investment minimums
 - 2) Diversified portfolio
 - 3) Standardized performance and tax reporting.
 - 4) No need to hire a separate fund manager.

Important Terms in Mutual Funds

- Net Asset Value or NAV, is the value of mutual fund. It is calculated on a daily basis and the NAV per share is calculated by $\text{NAV} / \text{number of outstanding shares}$.
- An open end fund is with no restrictions on when new shares can be issued or when funds can be withdrawn. The fund accepts new investment money and issues new shares and the redemption mechanism works the same way. The share price of open ended funds is near to NAV and are also called evergreen funds.
- Closed end funds don't accept new investment money and the redemption is to sell the existing shares in the secondary market sort of like issuing shares of a company. The share price may trade at a premium or a discount on the NAV depending on the demand of the share. They can be sold on margin and shorted also.
- No load funds don't charge a fees for entering the investment or redemption and only charge a management fees from assets under management
- Load fund charges a fees for investment or redemption or both in addition to the annual management fees.

Types of Mutual Funds

Money Market - Taxable

- Money market taxable funds invest in high quality, short term debt. These debts are corporate debts and federal government debt.

Money Market - Tax Free

- Money market taxable funds invest in high quality, short term debt. These debts are state and local government debt

Bond Mutual Funds

- They invest in a portfolio of bonds and preference shares.

Stock/Index Mutual Funds

- They invest in a portfolio of stocks or index funds.

Hybrid/Balance Funds

- They invest in both stocks and bonds.

Fund Categorization

Actively Managed Funds

- The fund manager tries to identify securities which will outperform the market. These funds have high fees relative to passively managed funds

Passively Managed Funds

- The manager purchases the same securities as a benchmark index. This helps ensure that the performance is similar to the benchmark index.

Separately Managed Account

- A separately managed account is an investment portfolio managed privately for an individual or institution.
- SMA's are managed exclusively for the benefit of a single entity.
- Unlike a mutual fund, the assets of an SMA are owned directly by the entity.
- The minimum requirement for an SMA is much higher than that of a mutual fund.

Exchange Traded Fund

- ETF's are a pooled investment vehicle like mutual funds and ETF's are based on an index.

How ETF's Work

- A fund manager creates an ETF by selecting the assets the ETF will hold.
- An institutional investor then deposits these securities with the fund sponsor (held through a custodian) and in return receives creation units for the deposited securities.
- These creation units typically represent 50,000 to 100,000 ETF shares.
- The institutional investor sells the ETF creation units to the general public and investors buy shares from other investors. ETF trading works in the way of closed ended fund.
- The institutional investor can redeem the original securities by returning the ETF creation units.

Similarities Between ETF's and Mutual Funds

- ETF's combine the features of an open ended and closed ended fund.
- ETF's trade like closed end mutual funds, can be shorted or bought on margin.
- ETF unit prices are close to the net asset value like open ended funds. Read the redemption procedure of ETF's
- Expenses for ETF's are low relative to mutual funds.

- No capital gains distribution in an ETF, minimum required investment is also less than mutual funds.

Characteristics of Hedge Funds

- Short Selling - Directly short sell or synthetically using options, futures and cds
- Absolute return seeking - Seek an absolute positive return in all market environments.
- Leverage - Financial leverage such as bank borrowing and implicit leverage using derivatives.
- Low correlation - Low return correlations with traditional equity or fixed asset classes.
- Fee structures - Two distinct fees are charged - management fee and performance fees.

Private Equity and VC Funds

- Privately held and actively managed equity positions.
- A private equity or VC fund makes an investment in a company and then is actively involved in the management of the company.
- The equity held is private and not traded on public markets.
- Goal is to exit the investment in a few years.
- The general partner is the fund manager.
- Funds investors are called limited partners.
- Revenue from this type of fund comes from,
 1. Management fees
 2. Transaction fees
 3. Carried interest - GP's share of profits, mostly 20%
 4. Investment income - Profit generated on the capital given to the fund by the GP

=====End of Reading 1=====

Return

- Return can originate in two form
 1. Periodic income return such as dividend and interest payments
 2. Capital gains returns
- Holding period return is given as, $(P_T - P_0 + I_T)/P_0$. Where P_T = Price at the end of the period, P_0 = Price at the beginning of the period and I_T = Income earned during the period.
- Arithmetic mean return is the simple average of returns.
- Geometric mean returns is the compounded rate of return earned on an investment. See geo mean calculation

Money Weighted Return

- To find the MWR or IRR, you need to first compute the cashflows from an investor perspective. Refer to the example below.

	Year 1	Year 2	Year 3
Balance from previous year	0	33.00	31.35
New investment by investor	30.00	0	3.65
Withdrawal by investor	0	0	0
Net balance at start of year	30.00	33.00	35.00
Investment return for year	10%	-5%	15%
Investment gain (loss)	3.00	(1.65)	5.25
Balance at end of year	33.00	31.35	40.25

- So from an investor perspective, he is putting money in the investment at year 1 so the $CF(0) = -30$.
- For year 2, the investor didn't put and withdraw any money so $CF(1) = 0$
- For year 3, the investor put 3.65 in the investment so the $CF(2) = -3.65$
- For the end of year 3 we assume that the investor pulled out all the money so the $CF(3) = 40.25$.
- We plug these cashflows in the financial calculator and find the IRR

Time Weighted Return (Inflows and Outflows at the end of year)

- Time weighted return is simple put the value of \$1 put in an investment at $t = 0$ and it is used to find the compounded growth rate of that \$1 over a time period. Refer to the example below.

Time	Outflow	Inflow
0	\$20.00 to purchase the first share	
1	\$22.50 to purchase the second share	\$0.50 dividend received on first share
		\$1.00 dividends (\$0.50 x 2 shares); \$47.00 from selling 2 shares @ \$23.50 per share

- At $t = 0$ you bought a stock for \$20 and at $t = 1$, the stock had gained \$2.5 in share price and gave a dividend of 0.5\$ so now your \$20 investment has become \$23. You earned a 15% return
- Now at $t = 1$, you purchased another share worth \$22.50 and now your value of the portfolio is \$45. You earned \$2 in capital gains and \$1 in dividend income so your value of the portfolio is now \$48 and you earned a 6.67% return during the 2nd year(from $t=1$ to $t=2$).
- Now to find the compounded growth rate of your dollar invested, you take the geo mean of the returns.
- Geo mean = $(1.15 \times 1.067)^{1/2}$. 0.5 in the power because the holding period was 2 years and we want to find the yearly compounded growth rate.

Time Weighted Return (Inflows and Outflows During the Year)

- Lets say your portfolio has quarterly returns of 10%, 20%, -10% and 30%.
- The TWRR will be simply the $\$1 \times 1.10 \times 1.20 \times 0.90 \times 1.30$

IRR/MWR vs TWRR

- MWR depends on the timing and amount of cash flows. For example, you invested heavily before a good growth period so your IRR will be good for that period, however, TWRR doesn't depend on the timing and amount of cashflow because it is a compounded growth rate.

- If the investment manager has no control over the investable cashflows, then TWRR is a KPI and if the investment manager has control over the investable cashflows, IRR is a KPI

Annualized Return

- To annualize the returns, simply raise the return to the power of 365/return period.
- For example if the 40 day return is 10%, then the annualized return will be $(1.10)^{365/40}$. The logic behind is that we raise the return to the number of 40 day periods in a year.

Portfolio Return

- To find the portfolio return we find the weights of investment in a portfolio and multiply those weights with their respective return.
- Once we get weighted returns, we sum them up to find the portfolio return.

Gross Return

- Gross return is the return before deducting management fees and taxes]
- Gross returns measures the investment manager skill

Net Return

- Net return accounts for all managerial and administrative expenses. This is the return the investor gets

Pre Tax Nominal Return

- This is the default return stated unless otherwise stated. This is the return that investor gets but it is not taxed yet.

After Tax Nominal Return

- After tax nominal return is the $(\text{Return \%}) \times (1 - \text{Tax Rate \%})$

Real Return

- Real return is after tax nominal return adjusted for inflation. To find real return, use the equation below
- $(1 + i) = (1 + r)(1 + \text{inflation \%})$
- Where i = After tax nominal return, r = real return

Leveraged Return

- Leveraged return is basically using borrowed money to invest. Interest % on the borrowing is subtracted from the pre tax nominal to get the actual pre tax nominal return.

Investment Assumptions

- We assume that the returns are normally distributed. If this assumption doesn't hold, we look to skewness and kurtosis.
- The second assumption is that markets are informationally and operationally efficient.
- If markets are not operationally efficient then,
 1. High transaction costs
 2. High bid ask spreads

3. High impact costs

Skewness

- Normal distribution has a normal skew
- Positively skewed data means that tail is on the right side of the central value
- Negatively skewed data means that the tail is on the left side of the central value

Kurtosis

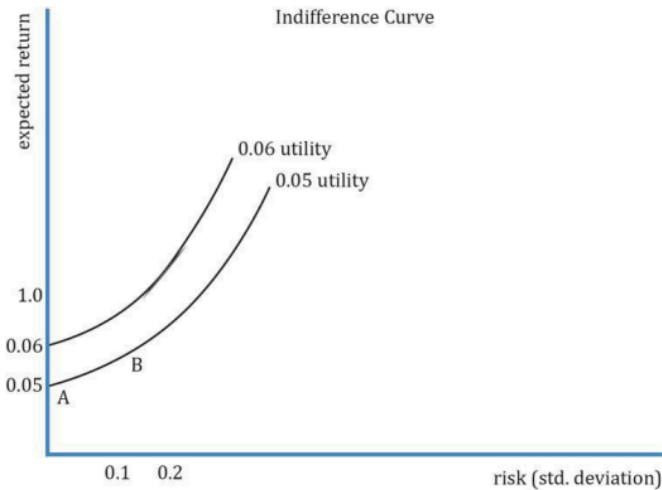
- The degree to which the peak is concentrated is called kurtosis
- Mesokurtic, $K = 3$ is a normal distribution
- Leptokurtic, $K > 3$ is more peaked and has fatter tails. Fatter tails means there is more probability of being on the extreme ends of the probability distribution and hence High risk/ high reward
- Platykurtic, $K < 3$, less peaked than a normal distribution and thinner tails. Safe investments like T bills.

Risk Aversion

- Risk aversion is the behaviour of the investor seeking less risk to more risk.
- High risk aversion = low risk tolerance
- A risk neutral investor doesn't care about risk.
- A risk seeking investor seeks more risk

Utility Theory & Indifference Curve

- We can measure the utility of an investment to a particular investor using the formula, utility of investment = $E(r) - (0.5A * \sigma^2)$
- Where $E(r)$ = Expected return, A = measure of risk aversion of investor (Higher the A , higher the risk aversion), σ^2 = Variance of the investment
- See the below question
- An investor as $A = 2$ and owns a 5% risk free rate asset. What is his utility?
- Utility = $0.05 - (0.5)(2) * 0^2$, Utility = 0.05
- For the same amount of utility what should the expected return be if $\sigma = 10\%$, 20%, 30%
- $0.05 = x - (0.5)(2)*0.10^2$, $x = 0.05$
- Once you do the above exercise for multiple σ values, plot the values as (Risk/ σ , Expected return) on an (x,y) plane.
- The curve which connects all the points is called an indifference curve and basically what it means that an investor will be equally happy if he is given a certain return for his level of risk.



Indifference Curve (Risk Neutral)

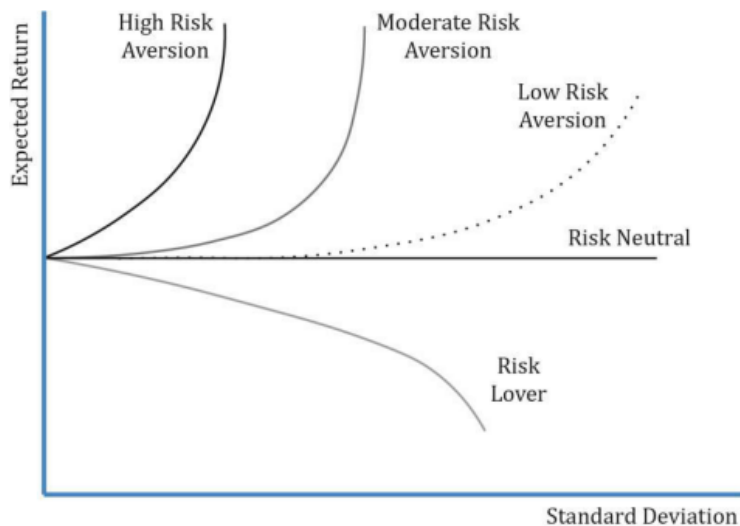
- For a risk neutral investor, the indifference curve is a flat line because he is risk agnostic and doesn't care about risk

Indifference Curve (Risk Averse)

- The indifference curve for a risk averse investor will be an exponential curve because he demands to be compensated for additional reward for the additional risk

Indifference Curve (Risk Lover)

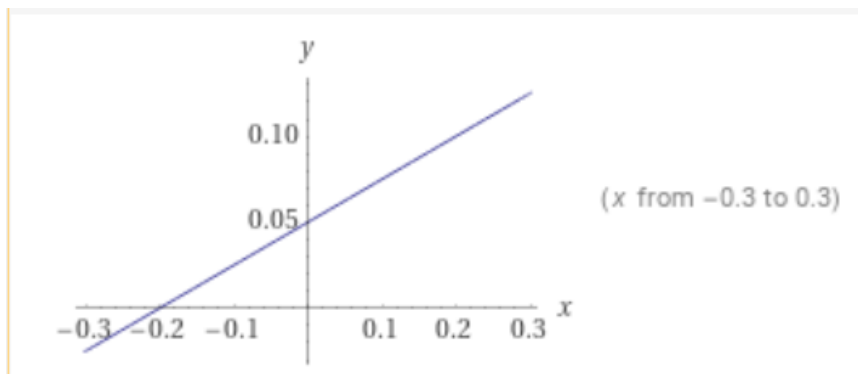
- The indifference curve for a risk love will also be exponential but downside exponential



Application of Utility Theory to Portfolio Selection

- The equation of portfolio risk/standard deviation (2 asset portfolio) = $(w_1 \cdot \sigma_1^2 + w_2 \cdot \sigma_2^2 + 2 \cdot w_1 \cdot w_2 \cdot \text{correlation between 2 assets} \cdot \sigma_1 \cdot \sigma_2)$ OR $2 \cdot w_1 \cdot w_2 \cdot \text{Covariance}(X, Y))^{0.5}$. Correlation $(x, y) = \text{Covariance}(x, y) / (\sigma_1 \cdot \sigma_2)$

- A capital allocation line is a line where you can see the expected returns and associated risk of your portfolio.
- Let's do a full fledged question below.
- For example you have 2 assets, one is a risk free 5% bond and a stock with expected return of 10% and sigma of 20%. The objective is to find the optimal portfolio selection
- First we derive the equation of the capital allocation.
- Let's assume that if we are invested 100% in the risk free asset, on the cartesian plane (Risk, Expected reward), our coordinated will be (0,0.05)
- Similarly if we are invested 100% in the stock, on the cartesian plane (Risk, Expected Return) our coordinates will be (0.20,0.10).
- Our slop is simple Delta Y/Delta X which comes out to be, 0.05/0.20 or 0.25.
- Our linear equation is now, Expected Return = 0.25*sigma + 0.05. We plot this on wolfram. See below



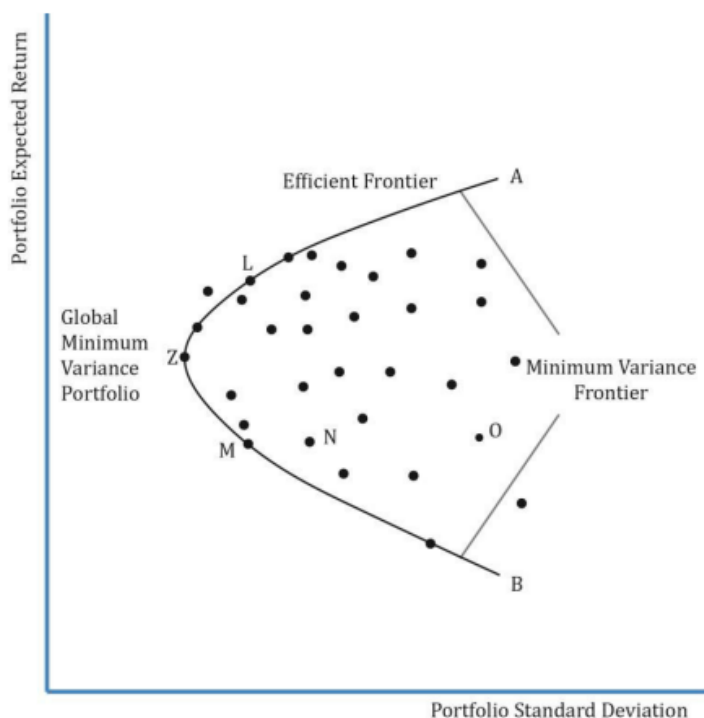
- Ignore the negative values in the above plot.
- Now each investor has a risk aversion number and based upon that an indifference curve is made.
- Now the higher the gradient of an indifference curve, higher the return/risk and happier the investor is.
- We plot the indifference curves for different investors by first calculating the utility for risk free rate. Now keeping the utility constant, we calculate the expected return for for different simgas/risks. This is the utility curve of one investor.
- We can plot multiple indifference curves and where the curves intersect with the capital allocation line, that is our optimal portfolio

Portfolio Risk

- Covariance is a measure of how two variables move together and the values range from negative infinity to positive infinity. Covariance gives the direction but not the magnitude.
- Correlation is a standardised measure which ranges from -1 to +1. It gives the direction and the magnitude aswell.
- Covariance (X,Y) = Correlation (X,Y)*sigma(x)*sigma(y)
- For a 2 or more asset portfolio, the correlation part will be multiple combinations between the assets of the portfolio. For example in a 3 asset portfolio, the combinations in the correlation part will be (1,3),(2,3),(1,2)

Minimum Variance Frontier

- In a given set of assets, there are multiple portfolios which can be created and each portfolio will have some degree of risk for some degree of return. The set of possible portfolios is called the investment opportunity set
- There will be portfolios which will give the same amount of return for different degrees of risks.
- The curve connecting the multiple returns with the lowest risk is called the Minimum Variance Frontier.
- The Global Minimum Variance Portfolio is the portfolio with the minimum risk. It is not possible to hold a portfolio with a bucket of assets which has risk less than the global minimum variance portfolio.
- The Efficient Frontier is the set of portfolios above the global variance portfolio which yield the highest return for a given degree of risk. The efficient frontier has only risky assets and no risk free assets.
- Portfolio's below the point Z are inefficient as L and M have the same risk but L provides a higher return



Optimal Investor Portfolio

- The optimal investor portfolio is the one where the capital allocation line is tangential to the capital allocation line

===== End of Reading 2 =====

Portfolio of Risk Free and Risky Assets

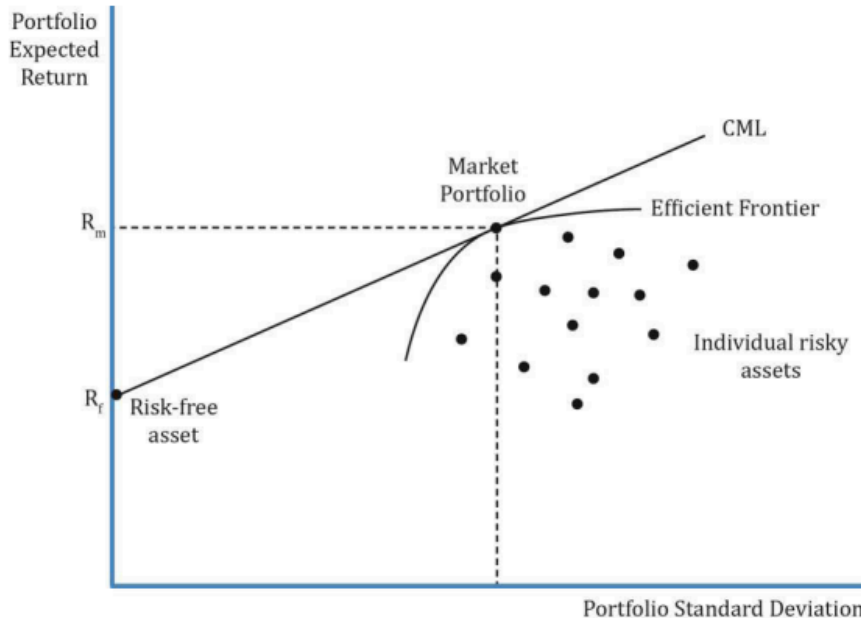
- When a risk free asset is combined with a risky asset, it results in higher risk adjusted returns because the risk free asset has zero correlation with the risky asset

Homogeneity of Expectations

- All investors have the same economic expectations for an asset

Capital Market Theory

- Capital Market theory states that the point where capital allocation line is tangential to the efficient frontier, that is where the point market portfolio is formed.

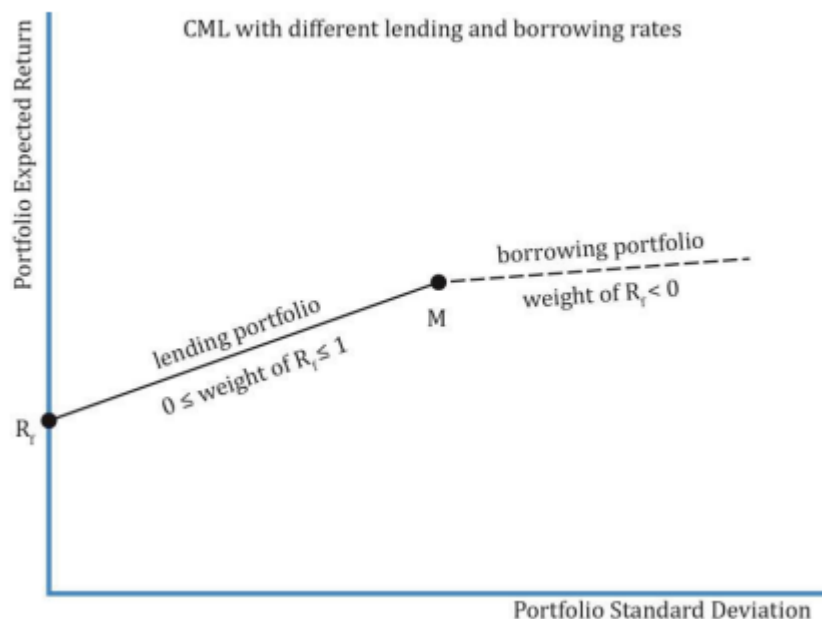


- This is the optimal risky portfolio when all the investors have the same expectations
- The equation for CML is

$$R_p = R_f + \left(\frac{R_m - R_f}{\sigma_m} \right) * \sigma_p$$

Leveraged Portfolios

- Portfolios with the owners equity aswell as borrowed money
- When the borrowing rate is equal to the lending rate, the line is uninked an a linear line
- When the borrowing rate is not equal to the lending rate, the line is kinked. See the example below.
- Suppose your market return is 15%, your market deviation is 20%, your borrowing rate is 12% and your lending rate is 10%. Now if you were investing from your own equity, your gradient of the CML will be $(15\% - 10\%) / 20\%$ which is 0.25, which means that per unit of risk, you earn 0.25 return But if you borrowed money to invest after a point, your gradient will be $(15\% - 12\%) / 20\%$ which is 0.15, which means that per unit of risk, you earn 0.15 return.



Calculations of a Leveraged Portfolio (IMPORTANT)

- X invests 150k in a market with return of 16% and standard deviation of 30%. 100k is his own money and 50k is borrowed money. Find his expected return and risk if
 1. The borrowing rate = lending rate = 10%
 2. The borrowing rate = 12% and the lending rate = 10%
- To solve via (1), we first assign weights. Since we have borrowed 50k which is half our equity, we can say that our weight in risk free assets is -0.5. We have invested 150k in the market which is 1.5 times our equity so our weight in market is 1.5. Now to find the return we simple, $(-0.5 \cdot 0.10) + (1.5 \cdot 0.16)$. To find the risk, we use the formula for the portfolio variance and since standard deviation of risk free asset is 0%, the equation is simplified to $(1.5 \cdot 0.30)$
- To solve via (2) we first find the portfolio return for the leveraged part. We do this by,

Systematic Risk

- Non diversifiable risk.
- Risk that affects the entire economy
- Investors get a return for systematic risk

Non Systematic Risk

- Risk that affects only a particular assets or industry
- It is diversifiable risk

Pricing of Risk

- It is the risk of pricing an asset with an appropriate discount rate.
- You can price an asset wrongly if you don't have the right discount rate

Return Generating Models

- Return generating models provide an estimate of the expected return of a security given certain input parameters.

- There are two types of return generating models
 1. Multi Factor Models
 2. Single Factor Models

Multi Factor Models

- Three most commonly used multi factor models are
 1. Macroeconomic
 2. Fundamental
 3. Statistical
- Macroeconomic models use macroeconomic factors such as inflation, interest rates etc
- Fundamental models use company or industry specific ratios such as P/B or P/E etc
- In statistical models, there is no observable economic or fundamental connection between the input and security returns. Factors are identified that explain variance or covariance in returns

Single Factor Models

- Only one factor is considered.

Assumptions of CAPM

- Investors are risk averse
- Markets are frictionless, they have no transaction costs and no taxes. No costs and restrictions on short selling. This is not in line with reality
- All investors hold for a single period
- Investors have homogenous expectations
- Investments are infinitely divisible
- Investors are price takers

Security Market Line

- It has expected returns on y axis and beta on the x axis
- The SML intersects with the y axis at the risk free rate
- Slope of the line is the rate of change of expected return wrt beta.
- So the slope is the market risk premium. Per unit of risk with relation to the market, what is your expected return

Difference Between CML and SML

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CML	SML
Only applies to efficient portfolios	Applies to any security
Is graphed (x,y) as portfolio standard deviation vs portfolio expected return	Is graphed (x,y) as beta vs expected returns
Slope is the sharpe ratio	Slope is the market risk premium

CAPM Applications

- The expected return from CAPM is used to discount the future cashflows
- The expected return from CAPM is used to determine the economical feasibility in capital budgeting

Limitations of CAPM

Theoretical Limitations

Single Factor Model

- Only systematic or market risk is priced.
- This assumption is restrictive as no other type of risk is considered.

Single Period Model

- All the investors hold assets for a single period.

Practical Limitations

- Market portfolio - A market portfolio must comprise all assets including non investable assets
- Proxy for a market portfolio - A market can have different proxies.
- Estimation of beta risk - A miscalculation of beta can lead to a miscalculated expected return
- CAPM doesn't predict returns accurately
- Homogeneity in investor expectations - CAPM assumed that all the investors have the same expectations for securities.

Practical Models

- The Fama French three factor model does a better job than CAPM. It takes in the input values of relative size, relative book to market value and the beta of the asset
- The Fama French four factor model also adds momentum

Sharpe Ratio

- It is the excess return over the risk free return per unit of the portfolio's risk.
- Higher the number, the better
- Sharpe ratio is also the gradient of the capital allocation line
- $\text{Sharpe ratio} = \frac{\text{Portfolio return} - \text{risk free return}}{\text{portfolio std deviation}}$
- Ex ante sharpe ratio is the future expected sharpe ratio
- Ex pose sharpe ratio is the historical sharpe ratio
- One limitation of sharpe ratio is that the return is per unit of risk and not systematic risk

Treynor Ratio

- It is the excess return over the risk free rate per unit systematic portfolio risk.
Systematic portfolio risk is the beta of the portfolio
- Systematic portfolio risk can't be negative

M Squared

- It is the risk adjusted return of a portfolio

- If $M^2 > 0$, then the portfolio has positive risk adjusted returns and vice versa
- If $M^2 = 0$ then the portfolio has the same risk adjusted return as the market
- The difference between the risk adjusted performance of the portfolio and the performance of the market is called M^2 alpha

Jensen's Alpha

- Difference between the actual return on the portfolio and the expected/required return calculated by the portfolio using the capm model
- Uses systematic risk

Security Selection

- An asset which is above the SML is undervalued
- An asset below the SML is overvalued.

===== End of Reading 3 =====

Investment Policy Statement

- A document outlining the investors objectives and situation
- Reviews on a regular basis

Risk Objectives

- A clients risk tolerance is dependent on two factors
 1. Ability
 2. Willingness

Ability

- Take risk based on wealth, time horizon, expected income
- Relatively easier to determine

Willingness

- It is subjective
- Depends on the clients psychology

Quantitative Risk Objectives

Absolute Risk Objective

- Portfolio shouldn't suffer more than x% loss in a 12 month period

Relative Risk Objective

- Risk objective is expressed relative to a benchmark.
- The return should be within 4% of the S&P 500 index return

Return Objective

- The return objective can be stated before, or after fees

Absolute Return Objective

- Portfolio should achieve 10% return in the next 12 months.
- No index is used to measure the performance.

Relative Return Objective

- A relative return objective is relative to a benchmark
- A 3% return greater than 12 month libor or the return equal to the S&P 500 index.

Responsible Investing

- Responsible investing takes into ESG factors.
- The six main ESG approaches are

Negative Screening

- Excluding certain sectors or companies from a fund on the basis of ESG criteria

Positive Screening

- Including certain sectors or companies in a fund on the basis of ESG criteria

ESG Integration

- Refers to the practice of including ESG criteria in the investment process

Thematic Investing

- Picks investing based on a theme such as energy efficiency or climate change

Impact Investing

- Investments made with intention to generate positive measurable social and environment impact alongside a financial return

Portfolio Construction

- Portfolio construction consists of three steps
 1. Strategic asset allocation
 2. Tactical asset allocation
 3. Security selection

Strategic Asset Allocation

- Allot certain percentage of the portfolio to different IPS permissible asset classes to achieve the clients long term goal
- The criteria to define an asset class is
 1. All asset class must be homogenous and not correlated to other asset classes.
 2. Correlation of assets within asset class must be high
 3. Risk and return expectations of assets within an asset class must be familiar
 4. All the asset classes combined should account for the universe of all investable assets

Important Terms

- Risk budgeting - Process of deciding on the amount of risk to assume in a portfolio and subdividing that risk over the sources of investment return

===== End of Reading 4 =====

Categorization of Behavioral Biases

- Behavioral bias is categorized into two biases
 1. Cognitive Bias
 2. Emotional Bias

Cognitive Bias

- Occurs as a reason for faulty reasoning
- Stem from statistical, information processing or memory errors
- Can be corrected easily
- Can be corrected through better information, education and advice
- For example, if I am scared of flying but once I get the numbers that it is most likely to die in a car crash rather than a plane crash, i might be able to overcome my fear of flying

Emotional Bias

- Stems from impulse or intuition
- Influenced by feelings and emotions
- Is spontaneous
- Less easy to correct as compared to cognitive bias

Sub Categories of Cognitive Bias

Belief Perseverance Bias

- Conservatism bias - Maintain prior views and refuse to process new information
- Confirmation bias - Look and only process the information which aligns with the existing views
- Representativeness bias - Classify new information based on past experiences. Didn't get fully
- Illusion of control bias - False belief that we can control or influence outcomes
- Hindsight bias - See past events as having been predictable

Information Processing Biases

- Anchoring and adjustment bias - Incorrect use of previous experiences to solve a different problem than before
- Mental accounting bias - Treat one sum of money different from other
- Framing bias - Answer question differently based on how it is asked
- Availability bias - A shortcut approach which is influenced by how easily the outcome comes to mind

Belief Perseverance Bias

- It is the bias to cling to ones previous beliefs irrationally or illogically
- The types of belief perseverance biases discussed in the reading

1. Conservatism
2. Confirmation
3. Representativeness
4. Illusion of control
5. Hindsight

Conservatism

- Not processing the new information to update the belief and/or probabilities.
- Initial beliefs are overweighted
- New information is underweighted

Consequences

- Maintain or be slow to update the view or a forecast
- May hold security longer than required

Confirmation Bias

- Only information which aligns with the initial beliefs is sought and processed.
- Other information is ignored

Consequences

- Only positive information is considered and negative information is ignored
- Portfolios are under diversified
- A disproportionate amount of investment is held in the employee's company's stock due to the confirmation bias of the company's favourable prospects

Representativeness Bias

- New information is classified on past experiences and classifications
- Two types of representativeness bias are
 1. Base rate neglect
 2. Sample size neglect

Base Rate Neglect

- Relied on stereotypes when making investment decisions
- Due diligence is not done properly

Sample Size Neglect

- It is assumed that small sample sizes are representative of population
- For example, putting too much emphasis on the short term results when considering a potential investment

Consequences

- Adopt a view or forecast very quickly on new information or a small sample

Illusion of Control Bias

- It is occurred when investor incorrectly believes that he can control the outcome of the market

Consequences

- Excessive trading which leads to lower realized returns
- Inadequate diversification because an investor invests more in the employeeing company

Hindsight Bias

- Past events been having predictable and reasonable to expect
- Poorly reasoned decisions with positive outcome are deemed as brilliant
- Well reasoned decisions with negative outcomes are deemed as failure

Consequences

- Overestimate the degree of predicting an investment outcome which leads to a false sense of achievement
- Unfair assessment of a money manager or security performance

Information Processing Errors

- Information being processed and used illogically and irrationally.

Anchoring and Adjustment Bias

- Using an anchor/belief to make decisions
- Closely related to conservatism bias.

Consequences

- Sticking to the original values/beliefs/anchors even when new information says otherwise

Mental Accounting Bias

- An investor creates layers/levels of money which are used to different risk level investments.
- For example, an investor creates 3 layers of money and invests each layer in the ascending order of risk

Consequences

- Money is placed in buckets or layers without considering the correlation amongst the assets.
- Opportunity to reduce risk by combining assets with low correlations

Framing Bias

- A question is answered differently depending on how the question is asked.
- For example, a headline says that 1 in 4 start ups succeed. This gives a positive outlook but when another headline reads that 3 in 4 startups fail, this gives a negative outlook.

Consequences

- Willingness to accept risk is based upon how the question is presented
- Have a narrow frame while evaluating an investment

Availability Bias

- When people take a “rule of thumb” approach to estimate the probability of an outcome based on how easily the outcome comes to mind
- There are 4 stages to the availability bias
 1. Retrievability
 2. Categorization
 3. Narrow Range of Experience
 4. Resonance

Retrievability

- If an answer or idea comes to mind more quickly than others, it will be considered correct.

Categorization

- Categorizing the data set depending on the personal liking
- For example, if an investment manager knows the cement industry by heart and is asked to state the pros of the cement industry against the fertilizer industry, he will list most pros which will lead others to believe that cement industry is more profitable than the fertilizer industry

Narrow Range of Experience

- Using the short/narrow experience to make an estimate

Resonance

- The conclusions or decisions people take are closely related to how it resonates with their own experience

Consequences of Availability Bias

- Choosing an investment product based on advertising rather than appropriate analysis
- Failure to diversify
- Failure to achieve an appropriate asset allocation

Emotional Bias

Loss Aversion Bias

- People gain a higher utility in avoiding a \$ value loss rather than gaining that same \$ value gain.

Consequences

- Holding positions in a loss position for a longer time in hopes of recovering the loss
- Selling investments in a gain earlier to avoid a loss
- Limits the upside potential by selling winners and holding losers.

Overconfidence Bias

- Unwaranted faith in ones judgment, reasoning.
- There are two types of overconfidence bias
 1. Prediction overconfidence - Happens when confidence intervals assigned are too narrow. Overconfident that the variation in returns will lower than fundamentals
 2. Certainty Overconfidence - Probabilities for outcomes are too high because of a high level of certainty due to owns reasoning.
- Self attribution bias is a bias when people take credit for success (Self enhancing) and blame exogenous factors such as bad luck for their failure (Self protecting)

Consequences

- Underestimate risks and overestimate expected returns
- Hold poorly diverssified portfolios

Self Control Bias

- Failure to act in the long term interest becasue of a lack of self discipline.

Consequences

- Save insufficiently for the future.
- Accepting excessive risk upon the relaziation of low savings
- Borrow excessively to finance current consumption

Status Quo Basis

- Failure to bring change.
- Leave things as is

Consequences

- Mantain portfolios with risk characteristics that are inapproraite for their circumstances
- Failure to explore other opportunities.

Endowment Bias

- People value assets higher when they hold rights to it for example a house due to sentimental value
- Endowment bias can be combined with status quo basis. An example would be to reluctance to sell family securities.

Consequences

- Fail to sell off certain assets and replace them
- Mantain an inapproriate asset allocation
- Continue to hold assets with which they are familiar

Regret Aversion Bias

- Avoid decision making in the fear that the decision will turn out poorly.

Consequences

- Be too conservative in their investment choices because of poor outcomes on risky investment in past
- Engage in herding behaviour

Market Anomalies

- They are persistent deviations from the efficient market hypothesis
- Persistent abnormal returns are predictable in direction
- There are types of market anomalies

Momentum

- Correlation of the short term future prices is high with the current prices
- The recency effect is giving undue weight to the most recent information
- The hindsight bias can be explained by a short example. For example FFC did very well a year ago and the investors who didn't own FFC can remedy it by purchasing the asset today and driving its price up

Bubbles and Crashes

- Unusual positive or negative asset returns
- A continuous increase in price is fueled by a further increase in price and vice versa.
- It is due to not understanding the risks in and pricing of assets which leads to bubbles and then crashes

Behavioural Biases Associated with Bubbles & Crashes

- Overconfidence. Can be explained via confirmation bias and self attribution bias
- Regret aversion in a bubble leads to a further increase
- Anchoring bias when the bubble winds occurs as the investor is not ready to accept new information and sticks to their belief of a rising returns

Value

- Value stocks outperform growth stocks over the long run
- The halo effect simply states that investors extrapolate the recent performance to depict the future performance
- The home bias states that domestic securities are favoured over national securities in global portfolios

===== End of Reading 6 =====

Risk Management Process

- Risk is defined as the exposure to uncertainty
- Risk driver is the underlying risk
- Risk position is the description or quantification of the risky action taken
- Risk exposure is the extent to which an entity is sensitive to the underlying risk
- Risk management is not about minimizing risk but actively managing the risks to achieve goals
- Ideally risk exposure should roughly be equal to risk tolerance

Risk Management Framework

Risk Governance

- A good risk governance ensures that the risk tolerance level is set for an organization and provides risk oversight

Risk Identification & Measurement

- The quantitative and qualitative assessment of all sources of risk to an organization

Risk Infrastructure

- Refers to the people and systems required to track risk exposures and to perform risk analysis

Defined Policies and Processes

- Limits, requirements, constraints, and guidelines to ensure that an organization's risky activities are within its risk tolerance levels

Risk Monitoring, Mitigation, Management

- Identifying, measuring and continuously monitoring risk exposure of an organization
- If risk exposure is not aligned with the pre defined risk tolerance, then necessary action is taken to restore balance between the two

Communications

- A feedback loop with the governance to communicate the critical risk issues to the entire organizations

Strategic Analysis or Integration

- Use risk management to increase the overall value of the business

Enterprise View of Risk Tolerance

- The governing body drives the risk framework in the following ways.
 1. It determines the goals of the organization
 2. Responsible for providing risk oversight to ensure that value is maximised
 3. It determines the risk tolerance levels which are acceptable, risks to mitigate and which risks are unacceptable
- Elements of a good risk governance are
 1. Provide a forum where the management can discuss the risk framework and key issues which come up in execution
 2. Appoint a Chief Risk Officer to build and implement the risk framework for the enterprise
 3. Form a risk governance committee to oversee the implementation of framework at a much closer level

Risk Tolerance

- It is the extent of losses an organization is willing to experience

- The risk tolerance decision depends on two factors
 1. Inside view - What shortfalls within the organization will cause it to fail certain goals
 2. Outside view - What uncertain forces is the organization exposed to?
- Some factors that help a board determine its risk appetite are follows
 1. Company's areas of expertise and goals
 2. Ability to respond dynamically to adverse events, higher the ability, higher the risk tolerance.
 3. The amount of loss a company can bear without impacting its status quo as a going concern
 4. The company's position in the industry and against the competitors
 5. The regulatory landscape the company operates in
 6. Scenario analysis, macro analyses etc.

Risk Budgeting

- Helps determine how and where risks are taken
- Risk budgeting drives hedging strategies and not the other way around
- Risk budgeting allocates assets to a portfolio by the risk characteristics of the asset. For example, 40% of the portfolio risk should come from fixed income investments, 20% should come from equities and 40% should come from interest rates.

Financial Risks

- Risks which originate from the financial markets such as changes in interest rates or prices
- There are three primary types of financial risks

Market Risk

- Change in fundamental economic conditions, events in the industry or economy give rise to market risk
- The risk also arises from movements in stock prices, interest rates etc.

Credit Risk

- A counterparty will not pay timely the amount owed.

Liquidity Risk

- The risk that an asset will not be sold without a significant haircut due to market of the asset being illiquid.

Non Financial Risk

- Risks which arise from sources outside the financial markets
- Risks which arise within organization and external factors

Operational Risk

- The internal risks within an organization are called the operational risk
- Examples of operational risk is inadequate or unskilled labour, programming error, faulty systems etc

Solvency Risk

- When an entity doesn't survive because it runs out of cash to meet its debt obligations

Settlement Risk

- This is default risk just before the settlement is done

Legal Risk

- Any risk related to the law is legal risk

Regulatory, Accounting, and Tax risk

- The three are collectively known as compliance risk
- This risk arises when an entity fails to comply with the regulatory environment

Model Risk

- Risk of a valuation from improperly using a model.
- Using the DDM to value a company whose growth is not constant

Tail Risk

- This risk arises when more events occur in the tail of the distribution

Sovereign or Political Risk

- This risk arises when political actions negatively impact a company

Basic Drivers of Risk

Global Macro-Economics

- Economic policies adopted by foreign government and central banks have a significant impact on domestic companies

Domestic Macro-Economics

- Economic activity in a country is affected by the taxes, regulations, laws etc o the country

Industry

- Governments policies expose industries to risk. One example would be to give tax exemptions to an industry and levy heavy taxes on the other

Individual Companies

- A lawsuit in a company the investor has invested in

Metric

- Risk exposure is measured in quantitative measures.

Probability

- Measure of relative frequency with which an outcome is expected to occur
- It doesn't measure the \$ value of loss but the likelihood of the loss in % terms.

Standard Deviation

- Measure of dispersion in a probability distribution.
- The underlying assumption is that returns are normally distributed.
- Are measures of total risk, that is, systematic and unsystematic risk combined

Beta or Duration

- Sensitivity of a security's returns to the returns on the market portfolio

Derivative Measures

- Delta is the change in the derivative pricing relative to the change in the underlying price change
- Gamma measures the sensitivity of the derivative the changes in delta
- Vega measures the sensitivity of the derivative to change in volatility
- Rho measures the sensitivity of the derivatives to changes in the interest rates.

Value at Risk

- Measures and quantifies the risk of loss in a portfolio over a specific time period.
- A VaR of \$3 million in one day 5% of the time. This means that there is a 5% probability that the maximum you can lose in a day is \$3 million

Conditional VaR or CVaR

- Weighted average of all loss outcomes in the statistical distribution that exceed the VaR loss.
- It is a measure of expected loss

Expected Loss Given Default

- This is equivalent to CVaR for a debt security.

Scenario Analysis

- Measures the impact of simultaneous changes

Method to Prevent, Avoid and Accept Risk

Risk Prevention and Avoidance

- Avoid it altogether
- The downside is that you miss out the upside of equities and other asset classes

Risk Acceptance

Self Insurance

- Simply bearing the because it is caused due to external means.
- It simply means that set aside capital to bear the loss

Diversification

- Diversify the risk

Method to Transfer, Shift and Modifying Risk

Risk Transfer

- Passing on the risk to another party. Simply buy an insurance

Risk Shifting

- Risk is shifted by changing the distribution of outcomes by forward commitments or contingent claims

===== **End of Reading 6** =====