Financial Risk Management

DEFIN546

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Unit 01: Portfolio and its Constituents

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Objective

The objective of first unit is to understand the portfolio and its various aspects which are essential to make a growing portfolio. Asset allocation plays a very important role to minimize the risks involved while creating a portfolio. Exposure to different asset classes brings stability to a portfolio of course at the cost of compromising the returns but at the same time it helps in reducing the overall risk.

Introduction

The way new investors are joining the investment arena it has become very much sensible to have a good understanding about creating a portfolio of different asset classes. Each asset class has its own pros and cons hence one needs to understand different asset classes from each important aspect to make a profitable portfolio.

1.1 Portfolio Meaning and its Definition

- A portfolio's meaning can be defined as a collection of financial assets and investment tools that are held by an individual, a financial institution or an investment firm. To develop a profitable portfolio, it is essential to become familiar with its fundamentals and the factors that influence it.
- A portfolio is a collection of financial investments like stocks, bonds, commodities, cash, and cash equivalents, including mutual funds and ETFs.
- It is a collection of a wide range of assets that are owned by investors.

- The said collection of financial assets may also be valuables ranging from gold, stocks, funds, derivatives, property, cash equivalents, bonds, etc

1.2 Components of a Portfolio

The major components of an investment portfolio are described below –

Stocks

Stocks refer to company shares and the investors' ownership of the same. Notably, the percentage of ownership depends on the number of company stocks held by an individual. The stockholders are entitled to a share of the company's profits, and they avail it in the form of dividends.

Investors can further generate higher returns on their investment in stock by selling the same at a higher price. Stocks are considered to be the reward generating component of an investment portfolio. However, they come with a significant risk factor.

Bonds

Bonds come with a maturity date and are considered less risky than stocks. On maturity, investors receive the principal investment amount along with interest. Bonds constitute the risk-cushioning aspect of an investment portfolio.

Alternatives

Besides stocks and bonds, investors can also add alternative investment instruments like oil, real estate, gold, etc.

1.3 A portfolio can be created in various forms:

Single asset class portfolio

Multi asset class portfolio

Single asset class portfolio

When exposure is taken into a specific asset class like equity markets is called single asset class portfolio. Keeping investments in a single asset may turn out to be either highly rewarding or very risky. During recessionary situations across the globe a single asset class like equity may prove to be quite risky. It happened in 2020 due to the breakout of COVID-19 pandemic. During the months of February-March 2020 global equity markets came down like a pack of cards as corona virus was spreading to different countries like fire.

In such ascenario where an event has a sudden impact on a specific asset class or on multiple asset classes serious losses are suffered by the investor and traders. Of course, those who were invested in single asset class will face the maximum heat.

A single asset class may be highly rewarding when there is a strong momentum in a that category due to rising interest of investors along with favourable macro-economic factors. (Above chart of Nifty50 and Dow Jones Index shows how global equity markets behaved due toCOVID-19)

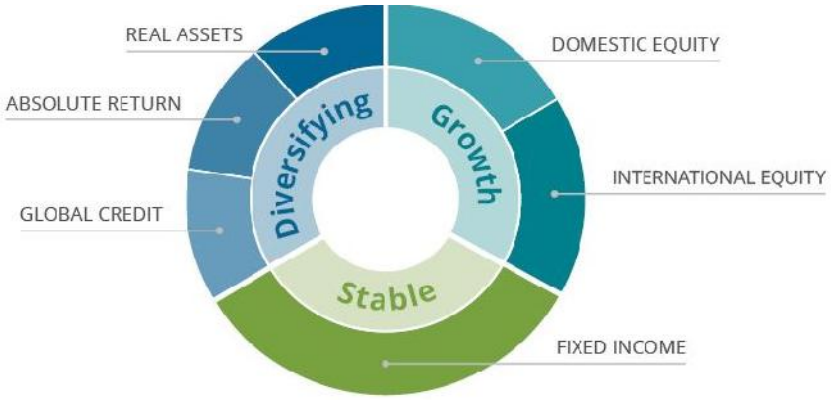
Above chart of crude oil shows how its prices suddenly moved down due to global pandemic of 2020-21 and the its subsequent recovery. Those who were under panic due to their positions in crude were losing its value, exited out of their investments with losses but some investors found that great fall in crude as a buying opportunity and made supernormal gains in very short tenure.

Multiple asset class portfolio

A multi-asset class, also known as a multiple-asset class or multi-asset fund, is a combination of asset classes (such as cash, equity, gold, real estate or bonds) used as an investment. A multi-asset class investment contains more than one asset class, thus creating a group or portfolio of assets. The weights and types of classes vary according to the individual investor. A multi-asset class investment, or investment strategy, always contains more than one asset class, which creates a group of assets that adds diversification to a portfolio. The weights given to each asset class and the types of asset classes are usually established based on an investor's personal preference.

Asset classes consist of a group of securities with varying degrees of risk. Risk factors, taxation, return rates, liquidity, tenures and market volatility differ according to asset classes. Hence, investors often rely on asset category diversification to earn maximum returns with minimal costs. Classification of asset classes has certainly made finance more manageable for the investor to comprehend.

There is usually very little correlation, and in some cases a negative correlation, between different asset classes.Financial advisors focus on asset class as a way to help investors diversify their portfolio.



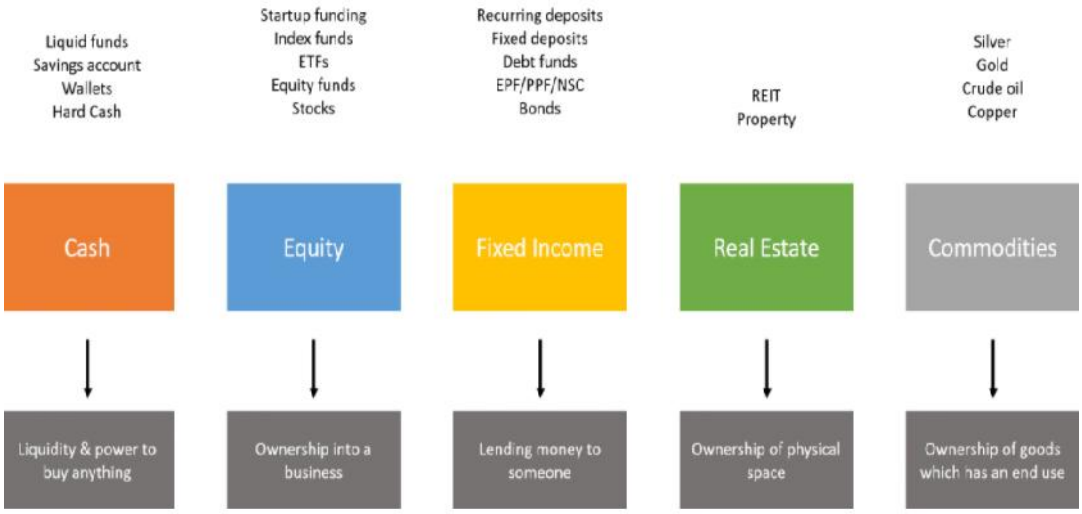
(A portfolio may consist of different asset classes with different characteristics)

1.4 Types of Asset Classes

In simple words, an asset class is a collection of various securities that exhibit similar traits as well as comparable responses to market fluctuations. For instance, consider all the gadgets that you use in your everyday life such as mobile phones, landlines, televisions, radios, cameras, etc. A lot of these gadgets have similar characteristics. A camera and a mobile phone could be used to click a picture; a laptop, MP3 player, or radio could be used to play music. However, they are unique in their individual capacities as well and serve different purposes.

Asset classes operate quite similarly. Each asset class is irreplaceable and no asset class is a perfect substitute for another. Moreover, taxation, risk, liquidity, tenure, market volatility, and returns vary with each asset class.

Types of Asset Classes



Cash and Cash Equivalents

Under this type of asset class, cash is one of the most important elements in a business. Cash can be used for short-term investments and lending, whereas it can also be borrowed on short-term for operational expenses.Cash equivalents, on similar lines, are short-term promised funds and are highly liquid. Cash equivalents usually have low-interest rates because of their short-term nature. **For example**, a commercial paper is issued by a corporate body as a means of lending short term funds.

A) Equity

- Equity is a share of ownership in a company that guarantees the proceeds from liquidation or sale of the company once all debts are paid.
- A company wants to raise $10mn from the public. It will issue equity shares to the buyers who will provide the capital in lieu of ownership (proportional) in the company. In the event of liquidation or sale, the shareholders will be eligible for the money left after all assets are liquidated/sold, and the debtors paid off.
- Equities represent a partial ownership stake in a real business. Shares can technically have different conditions attached, which provide shareholders with different risks and rewards, but these are generally grouped into two categories:
  a) **Common shares –** These are the dominant type of equity class and are what investors are generally referring to when they refer to 'shares' without any further clarification.
  b) **Preference shares –** An uncommon form of share which grants its owner a higher priority over common shares when collecting dividends, or cash upon liquidation of the business. Some preference shares entitle their holder to a fixed interest payment, which makes them feel more like a bond than a common share.

Rewards of equity investing

- A shareholder is entitled to their share of the profits, and total assets and liabilities of a company. In practice, each time a company declares distribution of profits to shareholders, each share will earn its holder a cash payment, which will be automated routed through to shareholders' stockbroker account.
- Dividends are paid at the discretion of management, and some companies don't pay dividends at all, opting to reinvest the cash invested back into the business to generate higher growth in revenues and profit. The idea behind this is that a larger and more profitable company will be in a position to pay even larger dividends in the future, so this can be a worthwhile trade-off.
- If a company's prospects and dividends have grown over time, the price per share on the stock market will have also likely increased. A shareholder can choose at any time to sell their shares and realise a gain or loss on that investment depending on how the price has moved whilst in the investor's portfolio.

Risks involved in equity investing:

Of all the groups that provide finance to a company, shareholders carry the most risk.

Firstly, in the event of a bankruptcy, all other parties (including employees, suppliers, the tax authority and lenders) must be repaid in full before any cash is distributed back to shareholders. In practice, this leads to a total loss in the event of a collapse, as struggling businesses usually have insufficient reserves to cover all of the amounts that they owe.

Secondly, an investor who buys shares will experience ups and downs in the form of volatility in the share price. The prices of shares do not move in a steady trend. They gyrate quite significantly in an apparently random fashion over the short term.

This is the impact of shareholders and potential buyers in the market continually reassessing the value of the company in light of the most recent news and economic data.

This price risk is most apparent during economic crises when the perceived value of businesses falls substantially in a short period. Investors holding a basket of shares have been known to experience up to 60% losses in the space of 12 months during these periods.

That being said, the stock market has always historically recovered from such stock market crashes, and therefore this is an asset class which provides a more predictable reward over the very long term, such as 5 or more years.

Liquidity in equity investing

Shares in companies which are publicly traded on the world's stock exchanges with the help of stockbrokers are a very liquid investment. Liquidity refers to the ability of an investor to convert their investment into cash in a short space of time.

Even during economic crises, investors can expect to find a buyer for the shares of major companies with relative ease during the trading hours of the stock exchange.

Once a trade is made, a share can be converted to cash within 2-3 days, which is the time it takes for the trade to be fully documented and for the cash to be exchanged between buyer and seller through an automated process known as a settlement.

Fixed income as an asset class

Bonds are a form of loan agreement, which can be traded between owners, known as bondholders.

Bonds therefore share similarities with a fixed term savings account with a few key differences which we'll cover in the following section.

You may have noticed above that cash is included in the fixed income asset class, as a bank account provides a fixed income in the form of an interest rate.

Other observers prefer to put cash in its own asset class due to its complete simplicity.

Rewards of fixed income investing:

Whoever owns a bond will be entitled to receive scheduled interest payments (known as coupons) and in most cases the full repayment of the lump sum amount (known as the 'principal amount') at the maturity date.

A bond has a market value, which fluctuates over time just like a share. A bond represents a series of semi-risky cash inflows which should occur over a fixed period of time. Due to changes in the creditworthiness of a company, the availability of interest rates elsewhere, or general economic conditions, the value that market participants will be prepared to pay for this series of cash flows will naturally change over time.

This means that a bondholder can receive income from the bond, but also experience a gain on the value of the bond itself over time.

It's important for you to understand that despite this fluctuation in market value which can occur during a bond's life, the nominal value of the coupon payments and final repayment will not change. Therefore, if a bond is held until maturity, and the company does not collapse, then the maximum return is effectively fixed. This rate is known as the Yield to Maturity, or YTM for short.

Risks involved in fixed income investing:

The key risk for a bondholder is credit risk. This is the risk that the business struggles and is unable to repay the coupon or principal of a bond. If the business eventually files for bankruptcy, it is unlikely that a bondholder will receive much compensation from the subsequent liquidation process, although they may receive a small fraction of the bonds face value.

Bonds typically have no 'security' or 'collateral' which can be specifically sold to repay the investors. They are a form of unsecured debt, which makes them more risky than secured loans, such as mortgages. Credit rating agencies often provide a credit score for each large bond issuer which helps to inform a potential investor about the financial stability of a company.

It is worth pointing out that bondholders need to be repaid in full before a shareholder receives a single penny. Bonds rank as a more senior claim in the order of liquidation.

Another key risk for bondholders is that the interest rates of other investments rise. This could be due to a shortage of money supply in the economy, a change in central bank rates, or new bonds being issued with a more attractive rate.

Rising interest rates are bad news for a bondholder, because the YTM on a bond is fixed. The market will place a lower value upon it if more attractive rates become available. For this reason, bond prices always move in the opposite direction to interest rates.

Liquidity in fixed income investing:

A bond can be easily sold to another party for cash, unlike a fixed term bank account which might commit you to keeping your money in there for a fixed period.

Real Estate as an asset class

Real Estate is an asset class which tends to split the investing community. Some investors love investing in property and access the asset class through various means. Other investors eschew property altogether and focus on equities and bonds.

A common criticism thrown at bricks and mortar is that many investors already feel over-exposed to property. Why? Because they usually spent far more money than they wanted on a single property – their own home!

If house prices rise, your investment portfolio should grow faster too, helping you to keep pace as the deposit bar is raised. Like the rest of this article, this is only a general observation and not a specific recommendation.

1.5 Rewards of Real Estate Investing

Property investments provide a return in two main forms:

- Rental income
- Capital appreciation

Rental income and capital appreciation are very different investment objectives. Rental income is earned by letting the property to a short-term tenant over a period of time.

Capital appreciation is only realised as a cash gain when a property is sold – typically after enhancing its value through development, extensions or redecoration.

Investing in land is seen as more speculative, because an unused parcel of land does not generate rental income.

1.6 Risks Involved in Real Estate Investing

Property ownership brings several risks:

As a landlord, you may be drawn into issues with troublesome tenants, damage (accidental or otherwise), void periods and the mountains of red tape and an unfriendly tax regime.

It can be difficult to 'diversify' yourself as a landlord, due to the fact that you may not be able to afford to own more than one investment property to begin with.

As an investor in property development companies, your investments could lose significant value in a downturn. A diversified Real Estate Investment Trust (REIT) lost two-thirds of its value during the financial crisis which began in 2007.

The common phrase 'as safe as houses' conveys a sense that the property asset class has a degree of security which others do not. This paints a misleading picture. During financial crises of 2008 real estate prices corrected like anything across the world and could not recover for many years.

1.7 Liquidity in Real Estate Investing

Property is very difficult to transfer between two parties, owing to the multitude of factors that make each property unique.

Banks, surveyors, conveyance solicitors and sometimes planning permission departments in councils will sometimes all need to be involved to simply let a single house change hand. This can lead to orderly house sales taking between 2 – 6 months to fully complete.

High transaction costs, such as UK stamp duty and estate agents fees can be in excess of 5% of the property value, which further discourages trade.

Properties can be sold expediently to 'house buying companies' or through auctions, however this speed will come at the expense of not achieving the full market price. House buying companies

need to make a profit margin on the resale of the property, and auction bidders will discount the property to cover unidentified risks or issues which may need remediation.

Commodities as an asset class

A commodity is a standardised resource which is used in the economy. Examples of commodities include oil, gas, timber, gold and wool.

Commodities are sought after by manufacturers, who typically use them as raw materials in their production processes.

Like any good, the price of commodities is set by the market, as a function of supply and demand. Their prices will fluctuate due to changes in industrial demand, demographics, supply constraints or seasonality.

These price fluctuations attract speculators who see an opportunity to make a profit by buying low and selling high.

It would be highly inconvenient to take deliveries of large quantities of real commodities. This is why a wide range of financial instruments exist which allow investors to gain exposure to the price of commodities without needing to open a warehouse!

Rewards of commodity investing

- An investor takes a long position in a commodity if they think the price will rise. It's possible to also take a short position through contracts known as derivatives, to allow them to profit if the price falls.
- A key issue is that commodities have uncertain expected returns. Unlike equities or bonds, which are financially engineered to provide a reasonable return to investors, commodities are nothing more than an inanimate object.
- A lump of coal does not naturally 'grow' over time, and nor is there any guarantee that it will hold its value. Indeed, depending on technological progress, it's possible that certain commodities will become obsolete and almost worthless.
- On the other hand, supply constraints can justify an optimistic view on other commodities. Investors in precious metals, for example, have some protection in the knowledge that precious metals are generally finite, rare, and expensive to extract. This reduces the likelihood that the market could suddenly be flooded with precious metals.

Risks involved in commodity investing:

- An investor in commodities is exposed to a fall in the value of a commodity they own, or a fall in the value of a derivative contract which is linked to the price of a commodity.
- The gold price per troy ounce in 1980 was around £235. By 2005, 25 years later, it was still roughly the same price. Due to the effects of inflation, this equated to a significant loss for any investor who had invested in gold during that period.
- Since then, the gold price peaked at around £1,100 in 2011, before falling to £700 in 2015, and reaching a historical high of £1,500 in 2020.
- This long-term picture of gold paints a very inconsistent picture. Even over an extremely long-time horizon, there can be little assurance taken that gold will deliver a gain in real terms.
- Silver has had an even choppier time. It also languished over the 25-year period since 1985, before increasing tenfold in 2011, before crashing by 66%.

- As a significant part of an investment portfolio, a silver investment would have disappointed for a long period, then produced an extremely high return in the space of two years, before giving away most of those gains.
- Investors are also exposed to a security risk if they decide to invest in gold by purchasing gold bullion bars or coins. Insurance and security measures are essential to provide peace of mind.
- A final risk worth highlighting is the counterparty risk of entering into derivatives. Many investors use derivatives or invest into fund which in turn use derivatives. Derivatives are a contract between two parties, and therefore the risk of that counterparty defaulting on their obligations is always present.

Liquidity in commodity investing:

The liquidity of a commodity investment varies depending on the method used to invest.

Derivatives can be freely traded over the counter with the bank who issued them, or potentially other market participants.

Shares in collective commodity investment schemes such as Exchange Traded Funds or Exchange Traded Notes can be bought or sold quickly like equities.

Physical commodities are less liquid, as you will need to manually find a buyer and fulfil a sale. However, there is usually an active market for investment-grade commodities because they are standardised, e.g., gold bars, gold coins, which have a minimum level of purity.

1.8 Benefits of Multi-Asset Class Investments

There are several benefits that multi-asset class investments can provide to an investor, such as:

1. Seek to generate returns while managing risk

Multi-asset class investments offer investors exposure to a wide range of asset classes, sectors, investment strategies, and individual security exposure. This provides diversification to an investor's approach to investing, which mitigates some of the unsystematic risks inherent to the market.

2. Target specific and measurable investment objectives

Unlike balanced investments, multi-asset class investments are not measured against a benchmark. A multi-asset class is focused on a specific investment object, such as a target return.

3. Dynamic management

Multi-asset class investments are designed to navigate market shifts through tactical trades and exposures. It is flexible to respond to changes in the market and often tries to seek greater returns by using tactical allocations.

4. Potential to quickly adapt to underlying market conditions

Multi-asset class investments, which are often actively managed, can quickly change their exposure to a certain asset class, sector, or security more quickly than traditional investments. As such, it provides an investor with the ability to adapt to changing market conditions.

5. Provides access to top-class investment managers

Multi-asset class investments can provide an investor with access to some of the world's best investment opportunities and investment managers.

Drawbacks of Multi-Asset Class Investments

There are also some drawbacks to multi-asset class investments, including:

1. Negatively correlated assets

Some asset classes that are included in a multi-asset class investment are negatively correlated – meaning when one goes up, the other goes down. As a result, the investor may not always reach the maximum return that may be offered from other portfolios.

2. No say in investment strategy

Most investors do not possess enough capital to invest fully in the asset classes they want, so they invest with a portfolio manager. In such a situation, while an individual may want to place their money in a specific sector, the portfolio manager is not obligated to follow the same strategy.

Summary

Understanding different asset classes with their respective characteristics helps in creating profitable portfolios. At a given point of time, different asset classes behave differently. When equity markets are doing good, it might be possible that gold prices as an asset class are falling and interest rates on debt instrument are also moving southwards. Commodities may be in a very long cyclical up-move and taking the real estate prices upwards. Though cash is considered as king but king is not worthy of good returns if not exposed to different asset classes with inherent risks.

Keywords

- **Portfolio–**A collection of securities is called a portfolio.
- **Asset class -** An asset class is a collection of various securities that exhibit similar traits as well as comparable responses to market fluctuations.
- **Equity -** In finance and accounting, equity is the value attributable to the owners of a business**.**
- **Commodities -** Commodity investment, in layman language, is the type of investment in which the investor invests their money in one or more commodities in the marketplace to attain profits and good returns.
- **Fixed income securities -** A fixed-income security is a debt instrument issued by a government, corporation or other entity to finance and expand their operations. Fixed-income securities provide investors a return in the form of fixed periodic payments and eventual return of principal at maturity.
- **Real estate -** Real estate is real property that consists of land and improvements, which include buildings, fixtures, roads, structures, and utility systems. It is an important asset class for many long-term investors.

Self Assessment

1. Which type of portfolio would be considered as a proficient one?

A. a portfolio with lowest risk
B. a portfolio with highest risk
C. a portfolio with highest utility
D. a portfolio with least investment

2. Which asset class gives the ownership rights to the investor?

A. Bonds
B. Equity
C. Treasury bills
D. Preference shares

3. Which asset class offers the highest safety to the investor?

A. Real estate
B. Gold
C. Equity

D. Cash

4. Which portfolio will offer the high risk -reward ratio?
A. A portfolio containing majorly debt securities
B. A portfolio containing a mix of debt and equity securities in 50:50 proportion
C. A portfolio containing debt, gold, equity and real estate with 25% exposure in each asset class
D. A concentrated portfolio of mid-cap stocks.

5. Which among the following is not a benefit of equity investing?
A. Dividends
B. Voting rights
C. Capital appreciation
D. Regular income

6. Which asset class offers better liquidity relative to others from an investor's perspective?
A. Real estate
B. Bonds
C. Unlisted shares
D. Digital gold

7. Which asset class is associated with 'default risk'?
A. Investments in gold
B. Investments in debt instruments
C. Investments in stocks
D. Investments in commodities

8. An investor should focus on which asset class for long-term wealth creation?
A. Real estate
B. Bonds
C. Gold
D. Equity

9. An investor looking for regular income should focus on which asset class?
A. Commodities
B. Equities
C. Debentures
D. Gold

10. A speculator is one _____

A. who analyze the company performance
B. who invests his /her own capital
C. who is ready to take high risk for high returns
D. who considers safe investments for steady returns

11. Which among the following are financial assets? Choose the correct choices -
1) Real estate
2) Bonds
3) Stocks
4) Gold

A. Both 1) and 3)

B. Both 2) and 3)

C. Only 4)

D. Both 1 and 4)

12. On an average, investors are risk averse, it means_____.
A. they will assume more risk only if they are compensated by higher expected return.
B. they will always invest in the investment with the lowest possible return.
C. they will always invest in the investment with the lowest possible risk.
D. they avoid the stock market due to the high degree of risk.

13. Savings accounts are_____ but are not_____.
A. negotiable; liquid.
B. marketable; liquid.
C. liquid; personal.
D. liquid; marketable.

14. Which among the following is not a money market security?
A. Treasury bills
B. National savings certificate
C. Certificate of deposit
D. Commercial paper

15. Which statement is not true?
A. Investing in multi asset class portfolio is less risky
B. Multi asset class portfolio offers benefits of diversification
C. Managing a multi asset portfolio brings the challenges of taxation
D. Investing in multi asset classes is quite expensive

Answers for Self Assessment

1.	C	2.	B	3.	D	4.	D	5.	D
6.	D	7.	B	8.	D	9.	C	10.	C
11.	B	12.	C	13.	D	14.	B	15.	D

Review Questions

Q1 What do you understand by the term portfolio? What are the key components of a portfolio?

Q2. What important considerations one should keep in mind while constructing a multi asset-class portfolio?

Q3 If you have to create a diversified portfolio for one of your clients, which asset classes will be preferred by you? What weightage you will allocate to the asset classes?

Q4 What the benefits and disadvantages of investing in equities as an asset class?

Q5 What are benefits of creating a multi asset class portfolio? What caution one must practice before creating a multi asset class portfolio?

Q6 Elaborate the risks involved in real estate investing.

Q7 What are the risks involved in fixed income securities? How these risks can be avoided by an investor?

Q8 How one can mitigate the risk of equity investing?

Further Readings

https://corporatefinanceinstitute.com/resources/knowledge/trading-investing/multi-

asset-class/

https://groww.in/p/hybrid-funds/multi-asset-allocation-funds

https://www.franklintempletonindia.com/article/beginners-guide-chapter16-io04og32/benefits-of-investing-in-equity-mutual-funds

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Unit 02: Foundation of Risk Management

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Objective

- Understand risk management
- Identify the difference between absolute and relative risk
- Understand the risk management process
- Evaluate risk management process through various categories

Introduction

In the world of investments, it makes a sense to assess and measure the risk to understand how risky the returns from a portfolio or a specific asset class are. Here, we will try to understand some tools which help us to gauge the risk involved in different asset classes. Each asset class has its own factors that brings in the volatility in the prices. This price volatility is something from which investors are afraid of. Hence, it makes a sense to understand such risks from the perspective of risk and reward.

2.1 Risk Measurement and Absolute Versus Relative Risk

Risk Measurement

Risk management is a crucial process used to make investment decisions. The process involves identifying and analyzing the amount of risk involved in an investment, and either accepting that risk or mitigating it. Some common measures of risk include standard deviation, beta, value at risk (VaR) etc.

2.2 Risk Measurement Techniques

a. Standard Deviation

Standard deviation measures the dispersion of data from its expected value. The standard deviation is used in making an investment decision to measure the amount of historical volatility associated with an investment relative to its annual rate of return. It indicates how much the current return is deviating from its expected historical normal returns. For example, a stock that has high standard deviation experiences higher volatility, and therefore, a higher level of risk is associated with the stock.

- The standard deviation can help investors quantify how risky an investment is and determine their minimum required return on the investment.
- The portfolio standard deviation is the financial measure of investment risk and consistency in investment earnings.
- In other words, it measures the income variations in investments and the consistency of their returns.
- It's an indicator as to an investment's risk because it shows how stable its earning are.
- A high standard deviation in a portfolio indicates high risk because it shows that the earnings are highly unstable and volatile.
- Factors that can affect the portfolio risk can be a change in the interest rates, the inflation rate, the unemployment rate, and the exchange rates.
- A firm can't control any of these factors, but they can assume control over factors such as the bargaining power of its suppliers, research and development, and competition.

Portfolio Variance & Standard Deviation

In order to calculate the Portfolio Standard Deviation and use it to interpret investment risk, we need to understand a few other calculations.

Portfolio variance is the degree of dispersion of the returns of a portfolio whereas the sstandard deviation is the square root of the portfolio variance.Both express the volatility of stock returns. Knowing the standard deviation, we calculate the coefficient of variance (CV), which expresses the degree of variation of returns.

Let's take an example - Geeta works as an investment analyst in a prominent advisors' firm and she provides investment counseling to her clients. For a portfolio of two stocks, Geeta wants to calculate the portfolio variance and the standard deviation.

Knowing the monthly returns of each stock Geeta calculates the average return for each stock as follows:

Step 1 - Calculate the averages

Stock A: (3.40% + 4.28% + 3.95% + 5.80% + 5.50%) / 5 = 4.59% (Monthly average)

Stock B: (8.60% + 9.20% + 7.85% + 7.00% + 6.58%) / 5 = 7.85% (Monthly average)

Step 2 – Calculate the variance:

	A	B	C	D	E	F
1						
2		Monthly Returns (in %)		Variance (in %)		
3		Stock A	Stock B	Stock A	Stock B	
4		3.40	8.60	1.42	0.56	=(C4-7.85)^2
5		4.28	9.20	0.10	1.82	=(C5-7.85)^2
6	Avg Monthly Return	3.95	7.85	0.41	0.00	=(C6-7.85)^2
7		5.80	7.00	1.46	0.72	=(C7-7.85)^2
8		5.50	6.58	0.83	1.61	=(C8-7.85)^2
9		**4.59**	**7.85**	**4.21**	**4.72**	
10		AVERAGE(B4:B8)	AVERAGE(C4:C8)			
11						
12						Monthly variance

Stock A: (3.40% – 4.59%)² + (4.28% – 4.59%)² + (3.95% – 4.59%)² + (5.80% – 4.59%)² + (5.50% – 4.59%)² = 4.21%

Stock B: (8.60% – 7.85%)² + (9.20% – 7.85%)² + (7.85% – 7.85%)² + (7.00% – 7.85%)² + (6.58% – 7.85%)² = 4.72%

Step 3 – Calculate Standard Deviation:

The standard deviation for each stock is:

Stock A: Square root of 4.21% = 2.05%

Stock B: Square root of 4.72% = 2.17%

Step 4 – Calculate portfolio variance:

- If, the coefficient of variance (CV) for the two stocks is 0.80 and the portfolio weights for each stock are 65% for stock A and 35% for stock B. Geeta can calculate the variance and standard deviation as follows:

  Portfolio variance = (65%² x 2.05%²) + (35%² x 2.17%²) + (2 x 65% x 2.05 x 35% x 2.17% x 0.80) = 0.0004 = 0.04%

- Therefore, portfolio standard deviation is the square root of 0.04% = 2.0%

Geeta can now compare this with other portfolios to see if it is performing as consistently and if she wants to continuing investing in this fund.

b. Sharpe Ratio

It is often assumed that high returns mean better performance. While this may be true in some cases, the real picture of a portfolio's performance can be gauged only when the returns it generates are assessed with respect to the risk it assumes.

- The Sharpe's ratio uses standard deviation to measure a mutual fund's risk adjusted returns.
- It will tell you how well your mutual fund portfolio has performed in excess of the risk-free return (if you would have invested in government securities instead, which are almost risk-free).
- This essentially gives you an idea if your returns are due to smart investment decisions or excessive risk.
- Higher the Sharpe's ratio, better the risk adjusted return of your mutual fund portfolio.

The downside risk of investing is something that must be duly considered. While investors often associate high returns with a high degree of volatility, this is not always the case. This is why any good analysis of a portfolio must view its returns in the light of its risk factor. The Sharpe Ratio assesses the returns generated by a portfolio against each unit of risk undertaken.

Mathematically, the Sharpe Ratio is the difference between the portfolio's returns and the return earned on a risk-free investment, divided by the standard deviation of the portfolio. The standard deviation is the risk factor of the portfolio and is indicative of the volatility of the fund. A lower standard deviation implies little fluctuation in returns.

So, the higher the Sharpe Ratio, the better, since a high Sharpe Ratio represents a higher return generated per unit of risk.

The Sharpe ratio measures performance as adjusted by the associated risks. This is done by removing the rate of return on a risk-free investment, such as a U.S. Treasury Bond, from the experienced rate of return.

This is then divided by the associated investment's standard deviation and serves as an indicator of whether an investment's return is due to wise investing or due to the assumption of excess risk.

Interpreting Sharp ratio

- In isolation, however, the Sharpe Ratio of a portfolio or fund has little use.
- It must only be used as a comparative tool to evaluate the performance of a number of portfolios or funds.

- In the case of mutual funds, one might compare the Sharpe ratio of a fund with that of its benchmark index.
- If the only information available is that the Sharpe ratio of a fund is 1.2, no meaningful inference can be drawn as nothing is known about peer group performance.
- The numerator – which increases the value of Sharpe ratio – is the extra return you earn over the risk-free rate of return. Ideally, one would want the extra return to be as high as possible.
- The denominator – which decreases the value of Sharpe ratio – is the risk (standard deviation) you take to earn the extra return. Ideally, one would want the risk to be as low as possible.
- Now you know why a higher Sharpe ratio is desirable.
- If the Sharpe ratio of fund A is greater than that of fund B, does it mean that fund A is always *better than* fund B?

Calculating sharp ratio:

Sharpe ratio = (Returns on investment – Risk-free returns) /Standard deviation of the returns

$$\text{Sharp Ratio} = \frac{Rp - Rf}{\sigma p}$$

Rp = Return on portfolio

Rf = Risk free rate of return

σp = Standard Deviation of the Portfolio's Excess Return

A variation of the Sharpe ratio is the Sortino ratio, which removes the effects of upward price movements on standard deviation to focus on the distribution of returns that are below the target or required return. The Sortino ratio also replaces the risk-free rate with the required return in the numerator of the formula, making the formula the return of the portfolio less the required return, divided by the distribution of returns below the target or required return.

Another variation of the Sharpe ratio is the Treynor Ratio that uses a portfolio's beta or correlation the portfolio has with the rest of the market. Beta is a measure of an investment's volatility and risk as compared to the overall market. The goal of the Treynor ratio is to determine whether an investor is being compensated for taking additional risk above the inherent risk of the market. The Treynor ratio formula is the return of the portfolio less the risk-free rate, divided by the portfolio's beta.

Example:

Mutual Fund A returned 12% over the past year and had a standard deviation of 10%, Mutual Fund B returns 10% and had a standard deviation of 7%, and the risk-free rate over the time period was 3%. The Sharpe ratios would be calculated as follows:

- Mutual Fund A: (12% - 3%) / 10% = **0.9**
- Mutual Fund B: (10% - 3%) / 7% = **1**

Even though Mutual Fund A had a higher return (12%), Mutual Fund B had a higher risk-adjusted return i.e., 1, meaning that it gained more per unit of total risk than Mutual Fund A.

c. Beta

The beta (β) of an investment security (i.e. a stock) is a measurement of its volatility of returns relative to the entire market. A company with a higher beta has greater risk and also greater expected returns.

Beta is another common measure of risk. Beta measures the amount of systematic risk an individual security or an industrial sector has relative to the whole stock market. The market has a beta of 1, and it can be used to gauge the risk of a security. If a security's beta is equal to 1, the security's price moves in time step with the market. A security with a beta greater than 1 indicates that it is more volatile than the market.

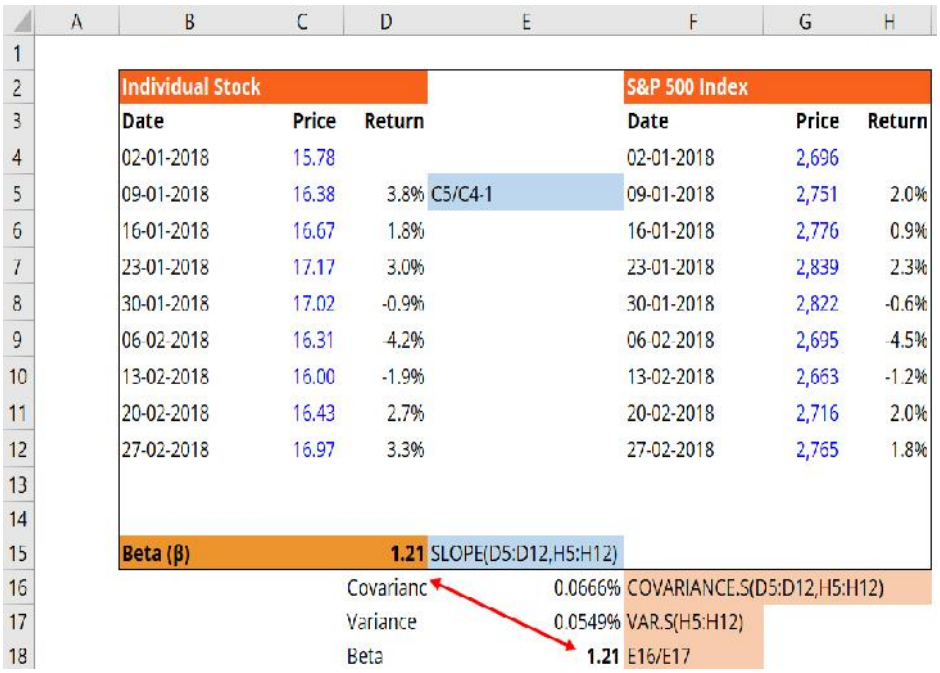
Conversely, if a security's beta is less than 1, it indicates that the security is less volatile than the market. For example, suppose a security's beta is 1.5. In theory, the security is 50 percent more volatile than the market.

Steps to calculate β in Excel:

1. Obtain the weekly prices of the stock
2. Obtain the weekly prices of the market index (i.e. S&P 500 Index)
3. Calculate the weekly returns of the stock
4. Calculate the weekly returns of the market index
5. Use the Slope function and select the weekly returns of the market and the stock, each as their own series
6. The output from the Slope function is the β

	B	C	D	E	F	G	H
2	Individual Stock				S&P 500 Index		
3	Date	Price	Return		Date	Price	Return
4	02-01-2018	15.78			02-01-2018	2,696	
5	09-01-2018	16.38	3.8%	C5/C4-1	09-01-2018	2,751	2.0%
6	16-01-2018	16.67	1.8%		16-01-2018	2,776	0.9%
7	23-01-2018	17.17	3.0%		23-01-2018	2,839	2.3%
8	30-01-2018	17.02	-0.9%		30-01-2018	2,822	-0.6%
9	06-02-2018	16.31	-4.2%		06-02-2018	2,695	-4.5%
10	13-02-2018	16.00	-1.9%		13-02-2018	2,663	-1.2%
11	20-02-2018	16.43	2.7%		20-02-2018	2,716	2.0%
12	27-02-2018	16.97	3.3%		27-02-2018	2,765	1.8%
15	Beta (β)		1.21	SLOPE(D5:D12,H5:H12)			

$$\text{Beta} = \frac{\text{Covariance}}{\text{Variance}}$$



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	Beta (β)		1.21	SLOPE(D5:D12,H5:H12)			
		Covarianc		0.0666%	COVARIANCE.S(D5:D12,H5:H12)		
		Variance		0.0549%	VAR.S(H5:H12)		
		Beta		1.21	E16/E17		

d. Value at Risk (VaR)

What is the maximum I can lose on this investment? This is a question that almost every investor who has invested or is considering investing in a risky asset asks at some point in time. Value at Risk tries to provide an answer, at least within a reasonable estimate.

- Value at risk (VaR) is a statistic used to try and quantify the level of financial risk within a firm or portfolio over a specified time frame.
- VaR provides an estimate of the maximum loss from a given position or portfolio over a period of time, and one can calculate it across various confidence levels.
- Estimating the risk of a portfolio is important to long-term capital growth and risk management, particularly within larger firms or institutions.

VaR is typically framed as something like this:

- "We have a portfolio VaR of 250,000 USD over the next month at 95% confidence "
- This means that, with 95% confidence, we can say that the portfolio's loss will not exceed 250,000 USD in a month

Value at Risk (VaR) is a statistical measure used to assess the level of risk associated with a portfolio or company. The VaR measures the maximum potential loss with a degree of confidence for a specified period. For example, suppose a portfolio of investments has a one-year 10 percent VaR of $5 million. Therefore, the portfolio has a 10 percent chance of losing more than $5 million over a one-year period.

Features of Value at Risk:

- VaR is probability based and allows the users to interpret possible losses for various confidence levels.
- It is a consistent measurement of financial risk as it uses the possible dollar loss metric enabling the analysts to make direct comparisons across different portfolios, assets or even business lines.
- VaR is calculated based on a common time horizon, and thus, allows for possible losses to be quantified for a particular period.

Calculating Value at Risk (VaR):

- The methods used for calculating VaRactually hold the key to the reliability of the estimate.
- Various methods can be used to calculate the possible value at risk on the same time horizon, depending on the availability of the data.

a. Historical Simulation Method

- It requires large amount of data
- It uses only Historical data for risk measurement which may not hold true for future conditions.
- The historical method doesn't need any complicated statistical concepts to use.
- One needs good data though and lots of it since the bigger the data set you are working with the more accurate your analysis will be.

Let's take an example -

Geeta decides to use the last 10 years of monthly returns on the NSE. She wants to establish what the biggest monthly losses at a 95% confidence level would be.

To accomplish this, she uses these steps:

1. Look up the data. Geeta goes to her financial database and finds the last 10 years' worth of monthly returns on the NSE; that's 120 data points.
2. Next, she needs to rank the monthly returns from lowest to highest.

3. The ten worst monthly returns are as follows:

-14.06%, -11.72%, -7.92%, -6.57%, -6.21%, -6.03%, -5.50%, -5.30%, -4.31%, -4.28%

4. Geeta then needs to figure out what number of items in the data set matches her desired confidence level.

5. To find a 95% confidence level for the biggest monthly loss, take 100% - 95% = 5%.

6. Geeta then multiplies 5% times 120 data points to get 6.

7. Now count right 6 data points on your worst monthly returns list and you get -6.03%.

-14.06%, -11.72%, -7.92%, -6.57%, -6.21%, **-6.03%**, -5.50%, -5.30%, -4.31%, -4.28%

- The other 95% of data points will have returns greater than -6.03%, so that is Geeta's answer!
- Geeta shows the results that with 95% confidence, the worst monthly loss she will suffer from this investment is -6.03%.
- She is still worried about the 5% chance that she will lose more.
- So Geeta decides using the same methodology to calculate a 99% confidence level. She multiplies 1% times 120 to get 1.2
- She moves over one place and lands at -11.72%.

The final summary of the Value at Risk (VaR) values:

Confidence level	Maximum monthly loss
95%	-6.03%

99%	-11.72%

e. R-squared

R-squared is a statistical measure that represents the percentage of a fund portfolio or a security's movements that can be explained by movements in a benchmark index. For fixed-income securities and bond funds, the benchmark is the U.S. Treasury Bill. The S&P 500 Index is the benchmark for equities and equity funds.

R-squared values range from 0 to 100. According to Morningstar, a mutual fund with an R-squared value between 85 and 100 has a performance record that is closely correlated to the index. A fund rated 70 or less typically does not perform like the index.

Mutual fund investors should avoid actively managed funds with high R-squared ratios, which are generally criticized by analysts as being "closet" index funds. In such cases, it makes little sense to pay higher fees for professional management when you can get the same or better results from an index fund.

R-squared of a is a statistical tool that investors can use to compare a fund to a given benchmark. A higher R-squared value means the fund moves with the benchmark.

This allows investors to monitor investments and maintain a more diversified portfolio

Interpreting R-Square

If you already hold an S&P 500 mutual fund or another fund with a high R^2 compared to the S&P 500, you will want to find a fund with a lower correlation (lower R^2).

Holding both types of funds will help you build a portfolio of diversified mutual funds.

In general, R-squared values are divided into three tiers:

- 1–40%: low correlation to the benchmark
- 40%–70%: average correlation to the benchmark
- 70%–100%: high correlation to the benchmark

R-Squared measures the relationship between a portfolio and its benchmark. It can be thought of as a percentage from 1 to 100.

R-squared is not a measure of the performance of a portfolio. A great portfolio can have a very low R-squared. It is simply a measure of the correlation of the portfolio's returns to the benchmark's returns.

Significance of R-Square:

- If you want a portfolio that moves like the benchmark, you'd want a portfolio with a high R-squared.
- If you want a portfolio that doesn't move at all like the benchmark, you'd want a low R-squared.
- Index funds will have an R-squared very close to 100.
- R-squared can be used to ascertain the significance of a particular beta or alpha.
- Generally, a higher R-squared will indicate a more useful beta figure.
- If the R-squared is lower, then the beta is less relevant to the fund's performance

An example:

1) BNP Paribas Mid Cap Fund:

Risk & Volatility Measures ⓘ

Trailing	Fund	Category	Index
Alpha	2.43	1.91	6.08
Beta	0.98	0.93	0.78
R^2	93.95	94.18	23.45
Sharpe Ratio	0.55	0.54	0.47
Standard Deviation	26.01	24.65	25.85

Fund as of Jun 30, 2021 | Category: Mid-Cap as of Jun 30, 2021 | Index: S&P BSE Midcap TR INR as of Jun 30, 2021 | Calculation Benchmark: S&P BSE Midcap TR INR

2.3 Categories of Risks

Beyond the particular measures, risk management is divided into two broad categories: systematic and unsystematic risk.

a) **Systematic Risk:** Systematic risk is associated with the market. This risk affects the overall market of the security. It is unpredictable and undiversifiable; however, the risk can be mitigated through hedging. For example, political upheaval is a systematic risk that can affect multiple financial markets, such as the bond, stock, and currency markets. An investor can hedge against this sort of risk by buying put options in the market itself.

b) **Unsystematic Risk:** The second category of risk, unsystematic risk, is associated with a company or sector. It is also known as diversifiable risk and can be mitigated through asset diversification. This risk is only inherent to a specific stock or industry. If an investor buys an oil stock, he assumes the risk associated with both the oil industry and the company itself.

For example, suppose an investor is invested in an oil company, and he believes the falling price of oil affects the company. The investor may look to take the opposite side of, or hedge, his position by buying a put option on crude oil or on the company, or he may look to mitigate the risk through diversification by buying stock in retail or airline companies. He mitigates some of the risk if he takes these routes to protect his exposure to the oil industry. If he is not concerned with risk management, the company's stock and oil price could drop significantly, and he could lose his entire investment, severely impacting his portfolio.

2.4 Absolute and Relative Risk / Return

Absolute risk / return: Portfolio managers who measure their performance in terms of an absolute return usually aim to develop a portfolio that is diversified across different asset classes, geography, and economic cycles. Such portfolio managers pay special attention to the correlation between the different components of their portfolio. The goal is to not be subject to wild swings that happen because of a market event.

An absolute return fund is positioned to earn positive returns by employing techniques that are different from a traditional mutual fund. Absolute return fund managers use short selling, futures, options, derivatives, arbitrage, leverage, and unconventional assets. The returns are looked at on their own terms, separate from other performance measures, with only profits or losses considered.

Absolute return managers have a short time horizon. Most of these managers will not rely on long-lasting market trends. Rather they'll look to trade the short-term price swings, both from the long as well as the short side.

Absolute return focuses on the returns generated by a portfolio rather than comparing with a benchmark or the competing portfolios. If a diversified portfolio has delivered 20% returns in a year, then this return will be compared with the historical performance of that portfolio only. No comparison will be done with the competing portfolios or the broader indices like Nifty or Dow jones.

Relative risk / return: Relative return is important because it is a way to measure the performance of actively managed funds, which should earn a return greater than the market. Specifically, the relative return is a way to gauge a fund manager's performance. **For example**, an investor can always buy an index fund that has a low management expense ratio and will guarantee the market return.

While looking at relative risk and return the performance of a portfolio is compared relative to either a benchmark or relative to the competing portfolios in that segment. A good example of relative performance is the mutual fund industry where portfolio performance is measured relative to a benchmark as well as with the other mutual fund portfolios with similar investment objectives.

2.5 Risk Management Process

Risk analysis is a qualitative problem-solving approach that uses various tools of assessment to work out and rank risks for the purpose of assessing and resolving them.

The process is –

1) Identify existing risks

- Risk identification mainly involves brainstorming
- A business gathers its employees together so that they can review all the various sources of risk.
- Arrange all the identified risks in order of priority.

2) **Assess the risks**

- What caused such a risk and how could it influence the business?
- Prior to figuring out how best to handle risks, a business should locatethe cause of the risks

3) Develop an appropriate response

- What measures can be taken to prevent the identified risk from recurring
- What is the best thing to do if it does recur?

4) Develop preventive mechanisms for identified risks

- Effective ideas are developed into a number of tasks and then into contingency plans that can be deployed in the future.

2.6 Evaluation of Risk Management Process

The purpose of measuring risk is to find out what would be the most likely maximum loss inthe portfolio value or investment.

- However, if losses have exceeded expectations, then one cannot just say the risk measurement process is flawed each time this happens.
- There are cases when such occurrences might happen and they may not be due to flaws in the model but due to bad luck purely. Blaming the risk measurement model may not entirely be the right thing in this case.

- A general classification has then been created for the risks that are being measured in the risk management process. Broadly there are three classifications of the different types of risk:
    - Known Knowns
    - Known Unknowns
    - Unknown Unknowns

A) Known Knowns

- These are risks that have been correctly identified and properly measured.
- It however does not mean that any losses other than this can occur due to flawed models or just random nature (i.e., bad luck).
- The variation in losses other than the known losses however should not happen too frequently otherwise it would be indicative of something unusual

B) Known Unknowns

- These are risks that have not been accurately measured by a risk management system but are expected to be there.
- These arise due to expected imperfections in the risk measurement model like human error while doing the measurement.
- These are normal risks associated with the measurement model.
- Liquidity risk forms another way of measuring known unknowns. This is normally classified into accounting liquidity risk and market liquidity risk.
- Market liquidity risk is the risk that the price of an asset that may vary too much if an order has been placed to trade large quantities of the asset. This normally happens when the asset does not trade very frequently

C) Unknown Unknowns

- These are risks that arise due to events or causes of losses that cannot be modeled or the existence of such factors cannot even be determined properly.
- These include political events affect normal operations that are not predicted, defaults on obligations by the opposite party involved in the transaction and also some types of liquidity risks that cannot be measured properly.
- If we look back India would be a good example of this and the assassination of former Prime Minister Rajiv Gandhi, Demonetization, GST Act and COVID-19 are just some of the examples of incidents that have caused turmoil in people's lives.

Summary

Risk management plays an important role while managing portfolios and taking new investment decisions. There are various tools through which risk measurement can be done and appropriate decisions can be taken. Portfolio return is usually given a high weightage than the quantum of risk to generate that return. Its of utmost importance for any fund manager or for an investor to assess and measure the risk involved in generating the portfolio return. There are portfolio managers taking very low risk to generate relatively higher returns compare to some who are taking higher risk to generate higher returns. Of course, returns to a portfolio are the result of risk taken by the portfolio manager but when we have to compare lot many publicly available portfolios then it makes a sense to compare them on their risk adjusted performance rather than pure return basis.

Keywords

- **Absolute risk** - The risk of a large fall in capital value (or absolute performance) of an investment portfolio.
- **Relative risk**–Risk to a portfolio performance in comparison to the broader market or the similar portfolios.
- **Standard deviation** - The standard deviation is a statistic that measures the dispersion of a dataset relative to its mean and is calculated as the square root of the variance.
- **Sharp ratio** - The Sharpe ratio is a measure of risk-adjusted return. It describes how much excess return you receive for the volatility of holding a riskier asset.
- **Beta** - Beta is a measure of the volatility—or systematic risk—of a security or portfolio compared to the market as a whole.
- **R- square** - R-squared is a statistical measure that explains how much a stock or portfolio's movement can be attributed to a benchmark index. As you consider investing in different stocks, being aware of the R-squared value can help you weed out redundant holdings and build a truly diversified portfolio.
- **Value at risk (VaR)** - Value at risk (VaR) is a statistic that quantifies the extent of possible financial losses within a firm, portfolio, or position over a specific time frame.

Self Assessment

1. For an industry, which type of risk will be a specific risk?

A. Equity risk
B. Interest rate risk
C. Political risk
D. Diversifiable risk

2. If there is a low covariance between the securities of a portfolio, what does it indicates?

A. Fall in the price of one security will lead to rise in other security prices
B. Increase in the price of one security will lead to the increase in the prices of other securities
C. Security returns depend on the weight of the security in the portfolio
D. Security returns are independent to each other

3. Which among the following is not a measure of risk?

A. Standard deviation
B. Beta
C. Sharp ratio
D. Dividend pay-out

4. Which among the following does not affect the interest rates?

A. Economic growth
B. Higher credit demand
C. Political instability
D. Rise in inflation

5. Volatility risk of an asset can be measured by

A. Variance
B. Correlation
C. Covariance
D. Standard deviation

6. If the Beta of the stocks in a portfolio is >1, it indicates...
A. Safety of returns
B. Guaranteed returns
C. Surety of losses
D. Stocks are risky

7. What would be the weighted mean return of the portfolio if the weight of stocks is 10%, bonds 6% and of cash at 12% respectively and the returns are 60% for stocks, 30% for bonds and 10% for the cash?
A. 0.06
B. 0.07
C. 0.09
D. 0.1

8. Measuring portfolio performance on relative basis helps in
A. Improve the performance
B. Managing the risk
C. Diversification
D. Comparing the performance with a benchmark or peer group portfolios

9. Damage to the agriculture crops by an unidentified insect will fall under which category of risks?
A. Known known
B. Known unknowns
C. Unknown unknowns
D. Unknown knowns

10. Rising interest rates in the economy is a known known risk and it can have serious impact on
A. Household savings
B. Forex reserves of the country
C. Capex plans of the industry
D. Employment

11. Relative performance of a portfolio should be compared against
A. An appropriate benchmark
B. Peer group portfolios
C. Gold
D. Different asset classes

12. An investor is looking for a portfolio whose Beta is equal to 1, should invest in

A. Individual securities

B. A benchmark Index

C. A mix of different asset classes

D. Central banks treasury bills

13. Risk premium refers to

A. High risk securities having higher return potential

B. Expectation of higher return for assuming higher risk over risk free securities

C. Risk premium charged by government bonds

D. Difference between high risk and low risk securities

14. Which of the following statement is not true?

A. The standard deviation can help investors quantify how risky an investment is and determine their minimum required return on the investment.

B. The portfolio standard deviation is the financial measure of investment risk and consistency in investment earnings.

C. In other words, it measures the income variations in investments and the consistency of their returns.

D. It's an indicator as to an investment's safety because it shows how stable its earning are.

15. Which of the following statement is correct?

A. Higher the Sharpe's ratio, better the risk adjusted return of your mutual fund portfolio.

B. Lower the Sharpe's ratio, better the risk adjusted return of your mutual fund portfolio.

C. Higher the Sharpe's ratio, poorer would be the risk adjusted return of your mutual fund portfolio.

D. Lower the Sharpe's ratio, poorer would be the risk adjusted return of your mutual fund portfolio.

Answers for Self Assessment

1.	D	2.	D	3.	D	4.	C	5.	D
6.	D	7.	C	8.	D	9.	B	10.	C
11.	A	12.	B	13.	D	14.	D	15.	A

Review Questions

Q1 What is the significance of risk measurement? Why it is important measure the risk before investing or creating a portfolio?

Q2 What are the important tools through which risk measurement can be done. Explain all the risk measurement tools with brief examples.

Q3 Write a short note on 'known unknown' risks.

Q4 What is the concept of value at risk (VaR). How it is calculated using historical simulation method?

Q5 From the perspective of Beta, what kind stocks (high, medium or low beta) should be there in an aggressive investors' portfolio? Write down the steps to calculate beta.

Q6 From the given details, select the best risk adjusted portfolio using Sharpe ratio.

Portfolio A) Last 1-year returns are 22%, portfolio standard deviation 11% and the risk-free rate is 4%

Portfolio B) Last 1-year returns are 18%, portfolio standard deviation 7% and the risk-free rate is 4%

Q7 Elaborate the evaluation of risk management process.

Q8 What do you understand by relative vs absolute risk? What is the difference between relative and absolute risk?

Further Readings

https://corporatefinanceinstitute.com/resources/knowledge/finance/risk-adjusted-return-ratios/

https://magmacapitalfunds.com/what-is-risk-adjusted-return-and-how-is-it-measured/

https://www.wallstreetmojo.com/risk-adjusted-returns/

https://www.alphai.com/articles/risk-adjusted-returns-explained/

https://corporatefinanceinstitute.com/resources/knowledge/trading-investing/value-at-risk-var/

http://people.stern.nyu.edu/adamodar/pdfiles/papers/VAR.pdf

Unit 03: Portfolio and Risk Attributes

CONTENTS

Objectives

- Understand portfolio construction
- Understand and calculate risk adjusted returns
- Understand risk adjusted performance and how to measure it

Introduction

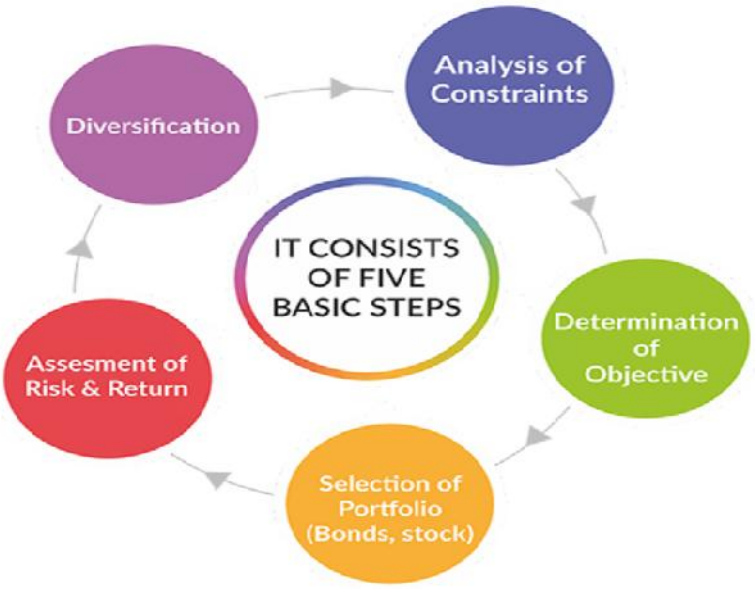
The digitalisation of the financial market and change in regulations are transforming the portfolio management industry.Portfolio practitioners have to adapt their portfolio construction and asset allocation techniques to changes in the market structure, their regulatory or balance sheet constraints and the new rise in information and transparency with the development of big data and machine learning.Portfolio construction is the process of understanding how different asset classes, funds and weightings impact each other, their performance and risk and how decisions ladder up to an investor's objectives. There are different asset classes to choose from and each asset class has their own risks, liquidity, return potential, taxation etc., which affect the portfolio creation. Investors have their preferences for the risk they can take for the expected returns. Thus, portfolio creation poses a lot of challenges to the portfolio managers as well as to the investors to choose the best portfolio for themselves.

3.1 Portfolio Construction

Portfolio construction is a process of selecting securities optimally by taking minimum risk to achieve maximum returns. The portfolio consists of various securities such as bonds, stocks, and money market instruments.

Portfolio construction steps consists of

Step 1



Let's discuss the above given steps in detail:

(1) Analysis of constraints: It involves analysis of constraints of the investor within which the objectives will be formulated. The constraints may be decided on the basis of:

Income needs – Investors need for current income (to meet living expenses) and constant income (to offset the effect of inflation)

Liquidity needs –Investor's preference for liquid assets

Safety of Principal – Safety of principal value at the time of liquidation

Time Horizon – Life cycle stage and investment planning period of the investor

Tax Consideration – Tax benefits of investing in a particular asset

Temperament – Risk bearing capacity of the investor

(2) Determination of objectives: It involves formulation of objectives within the given framework of constraints. Constraints reflect the risk bearing capacity and income requirements of the investor. Some common objectives of investors are:

Current Income

Growth in Income

Capital Appreciation

Preservation of Capital

All objectives cannot be achieved simultaneously, hence if an investor`s objective is capital appreciation, he must be ready to invest it securities that have high risk in order to get high returns.

(3) Selection of Portfolio: The optimum asset mix for an investor depends upon his investment objectives.

Investment Objectives	Asset Mix
Current Income	60% in debt and 40% in equity
Growth in Income	60% in equity and 40% in debt
Capital Appreciation	90% in equity and 10% in debt
Safety of Principal	90% in debt instruments with focus on short term debt instruments and 10% on equity

(4) Risk & Return Analysis: It involves analysis of risk and returns involved in following a particular course of action. Major risk categories that an investor can tolerate are determined and efforts are made to minimize these risks to get expected returns.

(5) Diversification: It involves assigning relative portfolio weights to different securities on the basis of which the portfolio is diversified. Diversification is done on the basis of investors need of income and his risk bearing capacity. Industries that correspond to specific goals of the investor are selected, out of which few companies from each industry are chosen on the basis of its growth, profits, dividend, R&D, expected earnings, goodwill etc. Finally, the number of different stocks required to give adequate portfolio diversification are selected and the number of shares of each stock to be purchased are determined depending upon the size of portfolio.

3.2 Managing Risk and getting the Investment Mix Right

Portfolio Construction is all about investing in a range of funds that work together to create an investment solution for investors. Building a portfolio involves understanding the way various types of investments work, and combining them to address your personal investment objectives and factors such as attitude to risk the investment and the expected life of the investment.
When building an investment portfolio there are two very important considerations.

- The first is asset allocation, which is concerned with how an investment is spread across different asset types and regions.
- The second is fund selection, which is concerned with the choice of fund managers and funds to represent each of the chosen asset classes and sectors.

Both of these considerations are important, although academic studies have consistently shown that in the medium to long term, asset allocation usually has a much larger impact on the variability of a portfolio's return.

To help in choosing a suitable asset allocation we have created a Risk Profiler that helps identify your attitude to risk and therefore better identify a combination of investments to build a portfolio.

With such a vast number of investment funds to choose from, spanning the full range of asset classes and world markets it is easy to become confused when choosing which investments to make. It is even more difficult to choose the right combination of investment to potentially meet your investment goals.

- Portfolio construction is the process which involves combining expected return and risk.
- Risk and expected return on two assets –

	Average	Volatility	Correlation
Equities	**11.20%**	**19.35%**	
Long-term bonds	**5.60%**	**8.10%**	**0.13**

- Here, investor is faced with a typical trade off, which is to choose between these two alternatives. Neither dominates the other

3.3 Asset Allocation

Asset allocation is an investment strategy that aims to balance risk and reward by dividing an investment portfolio among different types of asset classes such as equity, fixed income, cash and cash equivalents, real estate, etc. The theory is that asset allocation helps the investor to lessen the impact of risk their portfolio is exposed to as each asset class has a different correlation to one another.

Importance of Asset Allocation

Different asset class move in different directions. All types of asset classes hardly perform in tandem. One might assume that it is best to invest in mutual funds that is performing really well at a particular time with an aim to time the market. However, it is quite challenging for any individual to predict in which direction any asset class would move at any given point of time. For instance, when equities may be up, gold investment might go down and vice versa. So, it makes sense to allocate investments in a mix of asset classes. This is done so that if one set of asset classes or funds underperforms, the other asset classes will balance the underperformance. Investing one's portfolio in just one asset class or mutual fund scheme can be extremely risky. However, if an investor's wealth is spread across asset classes, they tend to make better returns.

Factors that can affect asset allocation

The process of determining the right mix of assets for your portfolio is a very personal one. When making investment decisions, an investor's asset allocation decision is influenced by various factors such as personal financial goals and objectives, risk appetite, and investment horizon. Let's understand these factors.

1. **Time of horizon**: Time horizon is the number of months or years an investor is expecting to invest to achieve a particular goal. Different investment horizons entail different risk tolerance. For instance, a long-term investment horizon might prompt an investor to invest in a higher risk portfolio as the slow economic cycles and high volatilities in the market tend to ride out with time.

2. **Risk tolerance**: Risk tolerance refers to an investor's willingness and ability to lose some or all of their original investment in anticipation of greater potential returns. Aggressive investors, or investors with high risk profile are likely to risk most of their investments to get better returns. On the other hand, conservative investors, or risk-averse investors are likely to invest in securities that preserve their original investments.
3. **Risk vs returns**: When it comes to investing, risk and returns are inseparably intertwined. The phrase "no pain, no gain" closely sums up the relationship between risk and reward. All investments hold some level of risk. The reward for undertaking risk results in higher potential for better returns.

What are the different asset classes/categories?

Historically, there were 3 primary asset classes. However, most financial experts agree that there are 4 broad categories of asset classes. These are:

1. Fixed income: It is one of the most popular and oldest forms of investment options. It includes corporate debt securities, money market instruments, corporate and government bonds, etc. Such instruments invest in debt securities that pay investors fixed interest payments until maturity of the scheme.
2. Equity or stock are shares of ownership owned by publicly traded companies. Over the last decade, equity has gained immense popularity. Equity funds are further sub-categorized into small-cap funds, mid-cap funds, large-cap funds, large and mid-cap funds, multi-cap funds, contra funds dividend, value funds, yield funds, sectoral funds, focused funds, and Equity-linked Savings Schemes (ELSS).
3. Cash and cash equivalents: Also known as money-market instruments, these asset classes are securities that are best suited for short-term investment goals. The primary advantage of these instruments is their liquidity. Cash equivalents, such as treasury bills, commercial

papers, money market funds, etc., are highly liquid instruments that can be generally redeemed within 90 days. Thus, capital invested in cash and cash equivalents is easily accessible to investors.

4. Real estate: This type of asset class focuses on plots, apartments, villas, commercial buildings, industrial areas, etc. The tangibility of these investments is a crucial characteristic that makes it different from other securities that exist only in virtual or dematerialized forms.

How asset allocation works

Let's understand the working of asset allocation with the help of an example. Imagine a store that specialises in selling winter apparels like jackets, boots, scarves, gloves, etc. It also sells winter gears such as ice skates and skies. As a result, it does significant business around the winter season. However, come summer, the store tends to do zero business. Now the store decides to expand its range of products. They open a section where they sell all kinds of apparels which could be worn in warmer seasons as well. They even begin to sell other accessories such as regular roller-skates, skateboard, etc. Now, the store generates business in both winter and summer. What's more, the store further decides to open several departments that sell books, groceries, furniture, electronics, etc. Now, once a tiny, little window store is a huge departmental store that does great business all-year around. Earlier, the entire business of the store depended on winter and the hope that they do not face any competition around that time. However, with a departmental store that sells all kinds of products all-year-around, the business now continues to run come rain or shine with much lower risk. Asset allocation works on a similar concept wherein the risks are minimized with the help of diversification of investments across asset classes.

3.4 Common Asset Classes and their Historical Performance

Before we go into discussing the various strategies of asset allocation, let's talk a bit about the various asset classes and their past performance.

Among the wide range of asset classes, where one can invest in, the most common ones that are used to create a diversified investment portfolio include Domestic Equity, International Equity, Debt, Cash, and Gold. The following is a tabular representation of how these 5 key asset classes have performed over the past few years:

Performance of Top Asset Classes (2013-2020)								
Rank	2013	2014	2015	2016	2017	2018	2019	2020
Best	US EQUITY	INDIA EQUITY	DEBT	DEBT	INDIA EQUITY	CASH	US EQUITY	GOLD
2nd	CASH	DEBT	CASH	US EQUITY	US EQUITY	GOLD	GOLD	DEBT
3rd	DEBT	US EQUITY	US EQUITY	GOLD	GOLD	DEBT	DEBT	CASH
4th	INDIA EQUITY	CASH	INDIA EQUITY	CASH	CASH	US EQUITY	INDIA EQUITY	US EQUITY
5th	GOLD	GOLD	GOLD	INDIA EQUITY	DEBT	INDIA EQUITY	CASH	INDIA EQUITY

Strategy for Asset allocation

In asset allocation, there are no hard and fast rules on how an investor should invest, and different financial advisors follow a varied approach. Following are some of the top mutual fund asset allocation strategies used to influence investment decisions:

1. **Life cycle funds asset allocation**: Also known as target date asset allocation strategy, this strategy tries to maximise the returns on investment (ROI) of an investor based on factors such as the investor's age, their investment goals, and risk profile. However, critics point out that this kind of portfolio structure is complex due to standardization issues.

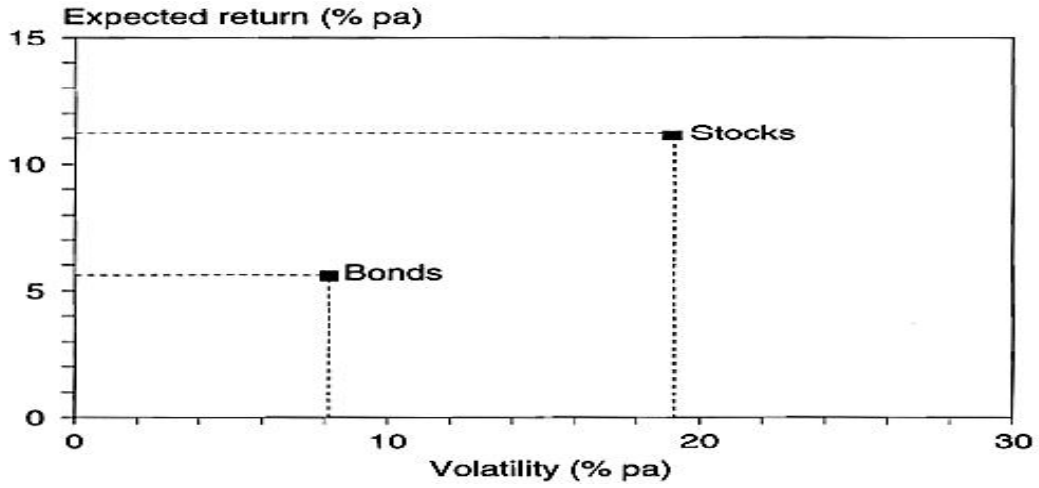
2. **Age based asset allocation**: This asset allocation strategy takes the age of the investor into account. Under this strategy, financial advisors recommend subtracting an investor's age from 100 to determine the percentage of funds that should be invested in equity mutual funds. The rest should be invested in other asset classes such as debt. For example, if you are 30 years old, then 70% of your investments should be in equity funds and the rest (30%) in other asset classes.
3. **Constant weight asset allocation**: Also known as strategic asset allocation strategy, this strategy is based on the buy-and-hold policy. Under this strategy, if one asset class, for instance, stocks lose value, investors are recommended to buy more of it and vice versa. The goal is to ensure that the proportions of the asset classes do not deviate more than 5% of the original mix.
4. **Tactical asset allocation**: This strategy addresses the challenges that might arise from a strategic asset allocation strategy over the long run. Hence, this strategy aims at maximizing short-term investment strategies. This flexibility adds a market-timing component to the investment portfolio, allowing an investor to join in economic conditions that are more favorable for one asset class.
5. **Insured asset allocation**: Under this strategy, base asset value is established under which the portfolio should not be dropped. If the portfolio should ever drop, the investor is recommended to take the necessary action to avert the risk such as investments in risk-free assets like treasury bills (T-bills). This strategy is ideal for those investors who are averse to risk. For example, an investor looking for a minimum standard of living during their retirement period might find this strategy ideally suitable for their investment goals.
6. **Dynamic asset allocation**: This is one of the most popular investment strategies. Under this strategy, an investor constantly adjusts the mix of assets based on the highs and lows of the market and also gains and losses in the economy. Under this strategy, you purchase assets that show signs of continued market gains and vice versa.

With asset allocation, the concept of 'one size fits all' does not apply. Every individual's financial condition is different and requires a unique and different approach. In fact, an investor should regularly check their financial strategies and ensure that it align with their financial goals, risk profile and investment horizon. Remember, portfolios that have superior product selection and consistent asset allocation tend to outperform the market. If you are unsure about the optimal asset allocation to achieve your goals, you might consider seeking the services of an expert.

3.5 Risk Adjusted Performance Measurement

It's very important to know how performance can be adjusted for risk.

Risk adjusted returns give us an idea whether returns are delivered in an asset / portfolio due to taking higher risk or due to the expertise of the investor / portfolio manager.



Risk-Adjusted Return

Returns are the reward for taking risk: when there will be no risk, there will be no profits either.

A risk-adjusted return is a calculation of the profit or potential profit from an investment that takes into account the degree of risk that must be accepted in order to achieve it. The risk is measured in comparison to that of a virtually risk-free investment— usually central bank treasury bills/ U.S. Treasuries etc.Depending on the method used, the risk calculation is expressed as a number or a rating. Risk-adjusted returns are applied to individual stocks, investment funds, and entire portfolios.

Some of the important risk adjusted return tools are:

1) Sharp ratio:

The Sharpe ratio calculates how well an investor is compensated for the risk they've taken in an investment.

When comparing two different investments against the same benchmark, the asset with the higher Sharpe ratio provides a higher return for the same amount of risk or the same return for a lower risk than the other asset.

Developed by American economist William F. Sharpe, the Sharpe ratio is one of the most common ratios used to calculate the risk-adjusted return.

Sharpe ratios greater than 1 are preferable; the higher the ratio, the better the risk to return scenario for investors.

$$\text{Sharp Ratio} = \frac{Rp - Rf}{\sigma p}$$

Rp = Return on portfolio

Rf = Risk free rate of return

σp = Standard Deviation of the Portfolio's Excess Return

Example: Mutual Fund A returned 12% over the past year and had a standard deviation of 10%, Mutual Fund B returns 10% and had a standard deviation of 7%, and the risk-free rate over the time period was 3%. The Sharpe ratios would be calculated as follows:

- Mutual Fund A: (12% - 3%) / 10% = 0.9
- Mutual Fund B: (10% - 3%) / 7% = 1
- Even though Mutual Fund A had a higher return (12%), Mutual Fund B had a higher risk-adjusted return i.e.,1, meaning that it gained more per unit of total risk than Mutual Fund A.

Calculating Sharpe Ratio:

From the given information calculate the Sharpe ratio of the portfolio(s) and decide which one is better?

A) Average annual return on portfolio 15%
Risk free return (364-day T Bills) 5%
Volatility (standard deviation) of portfolio 12%

B) Average annual return on portfolio 22%
Risk free return (364-day T Bills) 5%
Volatility 16%

A) (.15-.05)/.12 = 0.83

B) (.22-.05)/.16 = 1.06

2) Treynor ratio:

The Treynor Ratio is a portfolio performance measure that adjusts for systematic risk.

In contrast to the Sharpe Ratio, which adjusts return with the standard deviation of the portfolio, the Treynor Ratio uses the Portfolio Beta, which is a measure of systematic risk.

These ratios are concerned with the risk and return performance of a portfolio and are a quotient of return divided by risk.

$$Treynor\ Ratio = \frac{Portfolio\ Return - Risk\ Free\ Rate}{Portfolio\ Beta}$$

$$T = \frac{(r_p - r_f)}{\beta_p}$$

T = Treynor ratio
rp = Portfolio return
rf = Risk free rate
$^{\beta}$p = Beta of the portfolio

The Treynor ratio is calculated the same way as the Sharpe ratio, but uses the investment's beta in the denominator.
As is the case with the Sharpe, a higher Treynor ratio is better.

Taking an example and assuming that each of the funds has a beta of 0.75, the calculations are as follows:

- Mutual Fund A: (12% - 3%) / 0.75 = 0.12
- Mutual Fund B: (10% - 3%) / 0.75 = 0.09
- Here, Mutual Fund A has a higher Treynor ratio, meaning that the fund is earning more return per unit of systematic risk than Fund B.

3) Jensen's alpha:

Jensen's Alpha is used to describe the active return on an investment.

It measures the performance of an investment against a market index benchmark that represents the market movement as a whole.

The alpha shows the performance of the investment after its risk is considered.

$$\dot{\alpha}jensen = Rp-[Rf +_{\beta}(Rm-Rf)]$$

Where:

- Rp = Expected Portfolio Return
- Rf = Risk-free Rate
- Beta(p) = Portfolio Beta
- Rm = Market Return

Interpretation (Jensen's Alpha)

- Alpha < 0 means the investment was too risky for the expected return.
- Alpha = 0 means the return earned is sufficient for the risk taken.
- Alpha > 0 means the return earned is greater than the assumed risk.

Example:

Assume a portfolio realized a return of 17% in the previous year. The market index returned 12.5%. The beta is 1.4 and the risk-free rate is 4%.

Jensen's Alpha = 17- [4+1.4*(12.5-4)]

= 17-[4+ 11.9]

=17-(15.9) = **1.1%**

An alpha of 1.1% means the investor receives a high return for the risk assumed over the year.

When you compare the performance of two investments or check returns of your portfolio, you should not only consider the returns generated by the investments but also the amount of risk taken to earn these returns. Risk-adjusted return can help you measure the same. It is a concept that is used to measure an investment's return by examining how much risk is taken in obtaining the return. Risk-adjusted returns are useful for comparing various individual securities and mutual funds, as well as a portfolio.

Accounting for risk while investing is important because:

1. It is a measure of fund management: Measuring risk is a logical and objective method of establishing the skills of your fund manager, advisor or financial consultant. Ideally a fund manager aims to take least risk and deliver superior returns.
2. Helps gauge investment quality: You can separate riskier investments from those that are less risky and know exactly what you are investing in without any ambiguity

Risk is also an opportunity When it comes to investments, just like in life, the higher risk you take, the more the chances that you'll make more returns. So don't simply ignore an investment option which strikes you as risky. Instead, evaluate how much risk you are actually willing to take, and if you are considering said risky product, then also evaluate how much of your portfolio should be invested at such risk levels. Investing should be based on data and facts, and how much risk you are taking to get the returns you aim for. Assessing the risk-return link will give you an idea about the level of possibility of actually making money on a given investment or suffering a loss. This will help you make informed choices and reduce the element of chance from your portfolio.

Summary

The main objective for portfolio construction is to build a suite of investments, from a range of asset classes, that balances the needs for cash, protection from market downturns and consistency in returns with your long-term growth objectives.It is the role of the Portfolio Constructor and/or Investment Manager, to determine which are the best investments to fill your asset allocations with. For diversification benefits, a range of investments are combined to provide the optimum risk verses return result for you. This usually comprises a range of managed funds and/or direct investments. Again, to diversify, this may be a combination of some low-risk funds, such as fixed interest and cash funds, and some higher risk share funds. Along with risk its also required to see how the inventors are compensated with the associated returns. Risk adjusted returns is another aspect to look at the portfolio and the related risks.

Keywords

- **Portfolio -** A portfolio is a collection of financial investments like stocks, bonds, commodities, cash, and cash equivalents.
- **Asset class -** An asset class is a group of similar investment vehicles. Different classes, or types, of investment assets – such as fixed-income investments – are grouped together based on having a similar financial structure. They are typically traded in the same financial markets and subject to the same rules and regulations.
- **Asset allocation -** Asset allocation is an investment strategy that aims to balance risk and reward by dividing an investment portfolio among different types of asset classes such as equity, fixed income, cash and cash equivalents, real estate, etc.
- **Risk adjusted return -** A risk-adjusted return is a calculation of the profit or potential profit from an investment that takes into account the degree of risk that must be accepted

in order to achieve it. The risk is measured in comparison to that of a virtually risk-free investment—usually treasury bonds.

- **Sharp ratio -** Sharpe ratio is the measure of risk-adjusted return of a financial portfolio. A portfolio with a higher Sharpe ratio is considered superior relative to its peers. The measure was named after William F Sharpe, a Nobel laureate and professor of finance, emeritus at Stanford University.
- **Treynor ratio -** The Treynor Ratio is a portfolio performance measure that adjusts for systematic risk. In contrast to the Sharpe Ratio, which adjusts return with the standard deviation of the portfolio, the Treynor Ratio uses the Portfolio Beta, which is a measure of systematic risk.
- These ratios are concerned with the risk and return performance of a portfolio and are a quotient of return divided by risk.
- **Jensen's alpha -** The Jensen ratio measures how much of the portfolio's rate of return is attributable to the manager's ability to deliver above-average returns, adjusted for market risk. The higher the ratio, the better the risk-adjusted returns. A portfolio with a consistently positive excess return will have a positive alpha while a portfolio with a consistently negative excess return will have a negative alpha.

Self Assessment

Q1. Asset allocation regarding a portfolio refers to:
A. Investing an incremental amount in same asset class
B. Investing in different asset classes according to an investor's risk appetite
C. Investing in one asset class but different securities / assets of similar nature
D. Investing in those asset classes which are performing well

Q2. What is the prime objective of diversification in a portfolio?

A. Getting higher returns
B. Beating inflation
C. Avoiding concentration risk
D. Risk reduction by investing in different asset classes

Q3. Which among the following is not a consideration while constructing a portfolio?
A. Tax aspects
B. Time horizon
C. Consistent returns
D. Liquidity

Q4. A portfolio delivered a return of 15% in the previous year. The broader market index returned 12.5% during the same tenure. The beta of the portfolio is 1.4 and the risk-free rate is 3%. Jensen's alpha for the portfolio would be:
A. 1.3%
B. 2.3%
C. -1.3%
D. -2.3%

Q5. Treynor ratio use _____ as denominator in its formula?
A. Risk free rate
B. Portfolio return
C. Benchmark return
D. Portfolio beta

Q6. What does an alpha of >0 signifies?
A. The investment was too risky for the expected return.
B. The return earned is sufficient for the risk taken.
C. The return earned is greater than the assumed risk.
D. The return earned is less than the assumed risk.

Q7. Calculate the Treynor ratio if portfolio return is 20%, beta of portfolio is 0.80 and risk-free rate is 3.5%.
A. 0.2062
B. 0.2937
C. -5.4857
D. -0.4036

Q8. Why a sharp ratio greater than 1 for a portfolio is preferable?
A. It offers higher returns for a portfolio
B. It reflects lower risk in a portfolio
C. It reflects better returns compare to a benchmark
D. It reflects better risk adjusted returns

Q9. Which combination of securities / asset classes can offer better returns to an investor?
A. A diversified portfolio
B. A portfolio containing asset classes / securities with positive correlation
C. A portfolio concentrated in only in real estate
D. A portfolio containing asset classes / securities with negative correlation

Q10. What type of portfolio you will recommend to a young investor ready to take risk for high returns?
A. A portfolio consisting equity of small and mid-cap companies
B. A portfolio concentrated in debt instruments and cash
C. A portfolio containing gold, bonds, real estate and equity
D. A portfolio consisting equity of large-cap companies

Q11. Which of the following would be the best option to measure the relative performance of a portfolio?

A. An appropriate benchmark
B. Portfolio performance in the peer group
C. Gold
D. Different asset classes

Q12. One of the root causes of asset allocation is

A. Different asset class move in different directions
B. One asset class led to the fall in other asset classes
C. There is almost similar risk in different asset classes
D. Its not wise to invest in risky asset classes

Q13. Under 'age-based' asset allocation in equities

A. Financial advisors recommend subtracting an investor's age from 100 to determine the percentage of equity exposure
B. Younger investors can take higher equity exposure
C. As one age, equity exposure should be reduced
D. All of the above

Q14. Which of the following statement(s) is correct?

1) Past performance of an asset class guarantees the similar future performance
2) Past performance is no guarantee of future returns
3) Higher risk always led to the higher returns

A. Statement 1) and 3) are correct
B. Only statement 2) is correct
C. Only statement 1) is correct
D. Only statement 3) is correct

Q15. Which of the following asset class is the least risky?

A. Gold
B. Equity
C. Real estate
D. Treasury bills

Answers for Self Assessment

1.	B	2.	D	3.	C	4.	C	5.	D
6.	C	7.	A	8.	D	9.	D	10.	A
11.	A	12.	A	13.	D	14.	B	15.	D

Review Questions

Q1 What are the important steps one should take while creating a portfolio?

Q2 Why it is important to have a correct investment mix? What would be the risk in case an investment mix is not in order?

Q3 What is the significance of doing a proper asset allocation? What factors can affect the asset allocation?

Q4 What are the various asset classes available to an investor? Elaborate the asset allocation strategies that can be applied to get a reasonably good return by an investor.

Q5 What are benefits of diversification. What are different ways to diversify a portfolio?

Q6 Why its important to look at the risk adjusted returns before taking an investment decision?

Q7 Taking your own data calculate Treynor ratio and Jensen's alpha. What is the difference between the two ratios from the perspective of risk adjusted return?

Further Readings

https://corporatefinanceinstitute.com/resources/knowledge/finance/risk-adjusted-return-ratios/

https://www.investopedia.com/terms/r/riskadjustedreturn.asp

https://economictimes.indiatimes.com/definition/sharpe-ratio

https://www.investopedia.com/articles/07/sharpe_ratio.asp

https://corporatefinanceinstitute.com/resources/knowledge/finance/treynor-ratio/

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Unit 04: Risk Models

CONTENTS

Objective

After studying this unit, you should be able

- Understand the concept of Value at Risk
- Calculate the VaR using Historical Simulation
- Understand Financial Risks and their causes

Introduction

Value at risk (VaR) is a statistic that quantifies the extent of possible financial losses within a firm, portfolio, or position over a specific time frame. This metric is most commonly used by investment and commercial banks to determine the extent and probabilities of potential losses in their institutional portfolios.

Risk managers use VaR to measure and control the level of risk exposure. One can apply VaR calculations to specific positions or whole portfolios or use them to measure firm-wide risk exposure.

4.1 The concept of value at risk (VaR)

The most popular and traditional measure of risk is volatility. The main problem with volatility, however, is that it does not care about the direction of an investment's movement: stock can be volatile because it suddenly jumps higher. Of course, investors aren't distressed by gains.

Have you ever wondered how do portfolio managers compare the risk associated with two different asset classes? Or how do they calculate the risk of a portfolio comprising of different asset classes? For example, risk of a fixed income security is measured by Duration and Convexity whereas the risk of an equity share is measured by Standard Deviation and Variance. This is where the role of Value at Risk (VAR) comes into play. It's one of the most widely accepted measure of market risk for all the portfolio managers. Now let us delve deeper into the concept of Value at Risk and see how it is calculated.

VAR is a probability-based measure of loss potential. It is an estimate of the minimum loss that is expected to be exceeded in a specified time period with a given level of probability. Let's explain this in an easier manner. You just have to remember three things when it comes to Value at Risk (VAR)-

- Minimum Loss
- Specified Time Period
- Probability of exceeding that loss

For example, a 3% VAR of$50 over the next 1 week would mean that a minimum loss that would occur within the next 1 week is $50 and the probability of this loss is 3%. Just to make the things clearer, we can also restate the above statement as, there is 97% chance that our loss will not exceed $50 within the next 1 week.Value at Risk (VAR) can also be stated as a percentage of the portfolio i.e. a specific percentage of the portfolio is the VAR of the portfolio. For example, if its 5% VAR of 2% over the next 1 day and the portfolio value is $10,000, then it is equivalent to 5% VAR of $200 (2% of $10,000) over the next 1 day.

For investors, the risk is about the odds of losing money, and VAR is based on that common-sense fact. By assuming investors care about the odds of a really big loss, VAR answers the question, "What is my worst-case scenario?" or "How much could I lose in a really bad month?"

Now let's get specific. A VAR statistic has three components: a time period, a confidence level and a loss amount (or loss percentage). Keep these three parts in mind as we give some examples of variations of the question that VAR answers:

- What is the most I can—with a 95% or 99% level of confidence—expect to lose in dollars over the next month?
- What is the maximum percentage I can—with 95% or 99% confidence—expect to lose over the next year?

You can see how the "VAR question" has three elements: a relatively high level of confidence (typically either 95% or 99%), a time period (a day, a month or a year) and an estimate of investment loss (expressed either in dollar or percentage terms).

- Value at risk (VaR) is a statistic used to try and quantify the level of financial risk within a firm or portfolio over a specified time frame.
- VaR provides an estimate of the maximum loss from a given position or portfolio over a period of time, and one can calculate it across various confidence levels.
- Estimating the risk of a portfolio is important to long-term capital growth and risk management, particularly within larger firms or institutions.

VaR is typically framed as something like this:

- "We have a portfolio VaR of 250,000 USD over the next month at 95% confidence "
- This means that, with 95% confidence, we can say that the portfolio's loss will not exceed 250,000 USD in a month

4.2 Features of Value at Risk

VaR is probability based and allows the users to interpret possible losses for various confidence levels.

It is a consistent measurement of financial risk as it uses the possible dollar loss metric enabling the analysts to make direct comparisons across different portfolios, assets or even business lines.

VaR is calculated based on a common time horizon, and thus, allows for possible losses to bequantified for a particular period.

4.3 Calculating Value at Risk (VaR)

The methods used for calculating VaR actually hold the key to the reliability of the estimate.

Various methods can be used to calculate the possible value at risk on the same time horizon, depending on the availability of the data.

Historical Simulation Method

- It requires large amount of data
- It uses only Historical data for risk measurement which may not hold true for future conditions.
- The historical method doesn't need any complicated statistical concepts to use.
- One needs good data though and lots of it since the bigger the data set you are working with the more accurate your analysis will be.

Calculating VaR using historical simulation

Geeta decides to use the last 10 years of monthly returns on the NSE. She wants to establish what the biggest monthly losses at a 95% confidence level would be.

To accomplish this, she uses these steps:

1. Look up the data. Geeta goes to her financial database and finds the last 10 years' worth of monthly returns on the NSE; that's 120 data points.
2. Next, she needs to rank the monthly returns from lowest to highest.
3. The ten worst monthly returns are as follows:

-14.06%, -11.72%, -7.92%, -6.57%, -6.21%, -6.03%, -5.50%, -5.30%, -4.31%, -4.28%

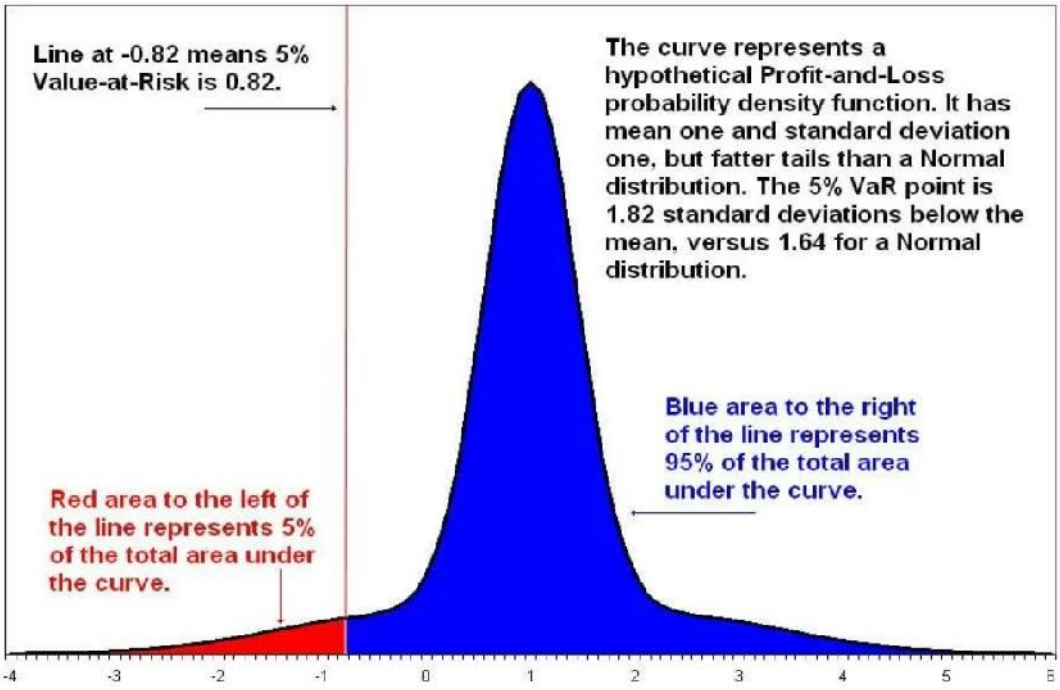
- Geeta then needs to figure out what number of items in the data set matches her desired confidence level.
- To find a 95% confidence level for the biggest monthly loss, take 100% - 95% = 5%.
- Geeta then multiplies 5% times 120 data points to get 6.
- Now count right 6 data points on your worst monthly returns list and you get -6.03%.
- -14.06%, -11.72%, -7.92%, -6.57%, -6.21%, **-6.03%**, -5.50%, -5.30%, -4.31%, -4.28%
- The other 95% of data points will have returns greater than -6.03%, so that is Geeta's answer!
- Geeta shows the results that with 95% confidence, the worst monthly loss she will suffer from this investment is -6.03%.
- She is still worried about the 5% chance that she will lose more.
- So Geeta decides using the same methodology to calculate a 99% confidence level. She multiplies 1% times 120 to get 1.2
- She moves over one place and lands at -11.72%

The final summary of the Value at Risk (VaR) values –

Confidence level	Maximum monthly loss
95%	-6.03%
99%	-11.72%

Parametric method

- The parametric method, also known as the variance-covariance method, is a risk management technique for calculating the VaR of a portfolio of assets that first identifies the mean, or expected value, and standard deviation of an investment portfolio.
- The parametric method looks at the price movements of investments over a look-back period and uses probability theory to compute a portfolio's maximum loss.
- Assuming stock price returns and volatility follow a normal distribution, the maximum loss within the specified confidence level is calculated.



This method is the popular because the only variables you need to do the calculation are the mean and standard deviation of the portfolio.

The biggest assumption that mangers using Parametric VAR are making is that the returns from their portfolios are normally distributed.

This allows the manager to use the calculated standard deviation to compute a standard normal z score to determine risk position with a degree of confidence right off of a standard normal table.

This is an important assumption because it allows the manager to use the normal distribution as a proxy for what expected returns might look like.

An example of a parametric VAR calculation is as follows:

Standard Deviation ($ terms): $50,000

Mean ($ terms): $35,000

Z Score for 95% confidence: 1.65

Calculated VAR for the period with 95% confidence is:

35,000 - 50,000 (1.65) = -$47,500

Calculating VaR with a single security as portfolio:

Consider a portfolio that includes only one security, stock ABC. Suppose $500,000 is invested in stock ABC.

The standard deviation over 252 days, or one trading year, of stock ABC, is 7%.

Following the normal distribution, the one-sided 95% confidence level has a z-score of 1.645.

The value at risk in this portfolio is

$57,575 = ($500000*1.645*.07).

Therefore, with 95% confidence, the maximum loss will not exceed $57,575 in a given trading year.

Calculating VaR with two security portfolios:

Suppose a risk manager wants to calculate the value at risk using the parametric method for a one-day time horizon.

The weight of the first asset is 40%, and the weight of the second asset is 60%. The standard deviation is 4% for the first and 7% for the second asset. The correlation coefficient between the two is 25%. The z-score is -1.645. The portfolio value is $50 million.

The parametric value at risk over a one-day period, with a 95% confidence level, is:

$3.99 million =

($50,000,000*1.645)*√(0.4^2*0.04^2)+(0.6^2*0.07^2)+[2(0.4*0.6*0.25*0.04*0.07*)]

$$VaR = \sqrt{w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2\sigma_1\sigma_2\rho_{1,2}} \; *Z\,value*i$$

Strengths and weakness of parametric approach of VaR calculation:

- The strengths of this method as demonstrated above are the simplicity of the calculations and the fact that the data for the inputs is very easy to obtain.
- The biggest weakness of this method is the assumption of normality.
- Without actually plotting data on a histogram to ensure such an assumption, you are exposing yourself to an enormous underestimate of possible standard deviation moves away from your historical mean.

4.4 Types of Financial Risks

Let's discuss the various types of risks:

Financial risks

Financial risk is the possibility of losing money on an investment or business venture.

Financial risk is a type of danger that can result in the loss of capital to interested parties.

For governments, this can mean they are unable to control monetary policy and default on bonds or other debt issues.

Corporations also face the possibility of default on debt they undertake

Some common and distinct financial risks include:

- credit risk,
- liquidity risk,
- operational risk,
- foreign investment risk,
- equity risk, and
- currency risk are all common forms of financial risk.

Credit risks

- Credit risk is also known as default risk—is the danger associated with borrowing money.
- Should the borrower become unable to repay the loan, they will default.
- Investors affected by credit risk suffer from decreased income from loan repayments, as well as lost principal and interest.
- Creditors may also experience a rise in costs for collection of the debt.

Liquidity risks

- Liquidity risk comes in two flavors for investors to fear.
- The first involves securities and assets that cannot be purchased or sold quickly enough to cut losses in a volatile market.
- Known as market liquidity risk this is a situation where there are few buyers but many sellers.
- The second risk is funding or cash flow liquidity risk.
- Funding liquidity risk is the possibility that a corporation will not have the capital to pay its debt, forcing it to default, and harming stakeholders

Operational risks

- Operational risk is the prospect of loss resulting from inadequate or failed procedures, systems or policies.
- Employee errors
- Systems failures
- Fraud or other criminal activity
- Any event that disrupts business processes

Foreign Investment Risks

- Foreign Investment Risk is the risk of investing in foreign countries.
- If the Country as a whole is at risk of falling GDP, high inflation, or civil unrest, the investment will lose money.
- This can include investing in equities in foreign companies or simply making any investment with an entity that is not based in the home country.
- There can be currency risks, political risk or interest rate risks that may affect investments in foreign countries.

Equity risks

- Equity risk is "the financial risk involved in holding equity in a particular investment."
- Equity risk often refers to equity in companies through the purchase of stocks.

Currency risks

Currency risk, or exchange rate risk, refers to the exposure faced by investors or companies that operate across different countries, in regard to unpredictable gains or losses due to changes in the value of one currency in relation to another currency.

4.5 Pros and Cons of Financial Risk

Financial risk, in itself, is not inherently good or bad but only exists to different degrees. Of course, "risk" by its very nature has a negative connotation, and financial risk is no exception. A risk can spread from one business to affect an entire sector, market, or even the world. Risk can stem from uncontrollable outside sources or forces, and it is often difficult to overcome.

While it isn't exactly a positive attribute, understanding the possibility of financial risk can lead to better, more informed business or investment decisions. Assessing the degree of financial risk associated with a security or asset helps determine or set that investment's value. Risk is the flip side of the reward.

One could argue that no progress or growth can occur, be it in a business or a portfolio, without assuming some risk. Finally, while financial risk usually cannot be controlled, exposure to it can be limited or managed.

4.6 Tools to Control Financial Risk

- Fundamental analysis, the process of measuring a security's intrinsic value by evaluating all aspects of the underlying business including the firm's assets and its earnings.
- Technical analysis, the process of evaluating securities through statistics and looks at historical returns, trade volume, share prices, and other performance data.
- Quantitative analysis, the evaluation of the historical performance of a company using specific financial ratio calculations.

Summary

When you're evaluating your investments, it's essential to understand the level of risk that each asset is faced with over a specific period. Traditionally, volatility was the primary method that firms used to assess risk, but VaR, or value at risk, has become more widely used over recent years.

Value at risk (VaR) is a financial metric that you can use to estimate the maximum risk of an investment over a specific period. In other words, the value at risk formula helps you to measure the total amount of potential losses that could happen in an investment portfolio, as well as the

probability of that loss. Generally speaking, value at risk is used by investment or commercial banks to control the level of risk that their firm is exposed to via its investments.

Keywords

- Value at Risk (VaR) - Value at risk (VaR) is a financial metric that you can use to estimate the maximum risk of an investment over a specific period.
- Historical simulation - With the historical method, you'll essentially re-organise real historical returns by ranking them from worst to best.
- Parametric method - referred to as the variance-covariance method, the parametric method assumes a normal distribution of returns.
- Financial risk - Financial risk is the possibility of losing money on an investment or business venture.
- Credit risk - Credit risk is also known as default risk—is the danger associated with borrowing money.
- Operational risk - Operational risk is the prospect of loss resulting from inadequate or failed procedures, systems or policies.
- Foreign investment risk - Foreign Investment Risk is the risk of investing in foreign countries.
- Equity risk - Equity risk often refers to equity in companies through the purchase of stocks.
- Currency risk - Currency risk, or exchange rate risk, refers to the exposure faced by investors or companies that operate across different countries

Self Assessment

Q1. Which of the following statement is true if it says 99.9% Value at Risk?

A. There is 1 chance in 10 that the loss will be greater than the value of risk
B. There is 1 chance in 100 that the loss will be greater than the value of risk
C. There is 1 chance in 1000 that the loss will be greater than the value of risk
D. None of the above

Q2. Value at risk tools is useful because _____

A. They can accurately forecast profits
B. They quantify the risk for large losses
C. They forecast the probability for bankruptcy
D. They tell how much guaranteed profit you will get

Q3. The level of significance can be viewed as the amount of risk that an analyst will accept when making a decision

A. True
B. False

Q4. By taking a level of significance of 5% it is the same as saying

A. We are 5% confident the results have not occurred by chance
B. We are 95% confident that the results have not occurred by chance
C. We are 95% confident that the results have occurred by chance
D. None of Above

Q5. If Rs 50 lac is invested in the stock of Tata Coffee which has a standard deviation of 12% based on last 1 year's stock price data and the Z score at 95% confidence level is 1.645, what would be the VaR (Value at Risk) of this investment?

A. 987,000
B. 897,000
C. 789,000
D. 978,000

Q6. Which type of risk is specific to the industry?

A. Systematic risk
B. Diversifiable risk
C. Currency risk
D. Equity risk

Q7. Which of the following is not a source of financial risk?

A. Exchange rates
B. Marketing mix
C. Credit risk
D. Interest rates

Q8. Interest rate risk is not faced by_____

A. Ordinary share holders
B. Borrowers
C. Lenders
D. Debenture holders

Q9. When a bank borrower fails to meet its payment obligations as agreed upon with the bank, will be called_____

A. Market risk
B. Operational risk
C. Liquidity risk
D. Credit risk

Q10. When there is a financial loss to a bank arising from legal suits filed against the bank for applying a law wrongly, will be called_____

A. Systematic risk
B. Equity risk
C. Market risk

D. Legal risk

Q11. When a bank is not able to have enough cash to carry out its day to day operations, it is called_____

A. Operational risk

B. Liquidity risk

C. Credit risk

D. Market risk

Q12. The risk arises when the technology system may get malfunction is classified as_____

A. System risk

B. Technology risk

C. Support risk

D. Operational risk

Q13. Which among the following is not a part of foreign investment risk?

A. Falling GDP

B. High inflation

C. Civil unrest

D. Abundance of raw material

Q14 Liquidity risk_____

A. is the risk that investment bankers normally face
B. is higher in Nifty 50 stocks
C. is the risk associated with secondary market transactions?
D. increases whenever interest rates increase.

Q15 When there is a financial loss to bank arising from legal suits filed against the bank or by a bank for applying a law wrongly, it is called

A. Systematic risk
B. Equity risk
C. Market risk
D. Legal Risk

Answers for Self Assessment

1.	C	2.	B	3.	A	4.	B	5.	A
6.	B	7.	B	8.	A	9.	D	10.	D
11.	B	12.	D	13.	D	14.	D	15.	D

Review Questions

Q1 what is the concept of value at risk? What are the methods of calculating value at risk?

Q2 Taking your own examplecalculatesVaR using historical simulation method for a portfolio.

Q3 Businesses are exposed to different type of financial risks. Elaborate these types of financial risks.

Q4 How financial risks can affect the growth prospects of an organization? Is it possible to find out new opportunities due to the financial risks an organization is facing? Throw some light on pros and cons of financial risks.

Q5 As businesses are going global the inherent risk is also on the rise. What steps can be taken to minimize the foreign investment risk which may arise due to changing trade policies or due .to change in government or the government policies.

Q6 operational risks are normally arise due to the internal factors of a business enterprise. What could be the reasons due to which a business unit may face risks that arise due to internal factors?

Q7 Global equity markets have become quite volatile after the COVID-19 pandemic. Though policy makers are taking the appropriate steps to minimize the problem but the mutation of the virus is an ongoing scare that keeps on hounding the traders and investors with volatility. Being an institutional equity head what steps you will advise to manage such an equity risk?

Q8 What steps you will recommend to a bank who is facing liquidity imbalance. It is causing delayed payments to the depositors and the borrowers are returning the EMIs at will to worsen the liquidity problem.

Further Readings

- https://corporatefinanceinstitute.com/resources/knowledge/finance/risk/
- https://www.investopedia.com/ask/answers/062415/what-are-major-categories-financial-risk-company.asp
- http://people.stern.nyu.edu/adamodar/pdfiles/valrisk/ch7.pdf

Unit 05: Firm Wide Risk Management

CONTENTS

Objectives

After studying this unit, you should be able

- Understand risk interactions
- Impact of risk interaction on business performance
- Understand risk aggregation
- Analyzing risks for which economic capital is required
- Relationship between risk and returns generated by a trader
- Understand risk adjusted performance and how to calculate it

Introduction

Business organizations these days are operating in a very dynamic environment and they need to adapt themselves according to the changing environment around them. In doing so, multiple risks keep on threatening their operations and one risk factor may lead to a new risk or a chain of multiple risks. This kind of risk interaction among different risks should be managed in an efficient manner for the wellbeing of any enterprise. While doing so, risks are aggregated in different buckets for risk management and understanding the cause of such risks to be avoided in future.

5.1 Risk Interactions

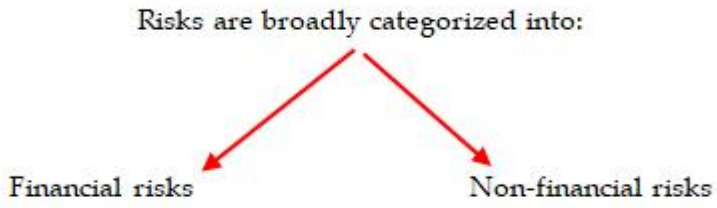
Risks are broadly categorized into financial risks and non-financial risks. Even though most risk results in monetary consequences, financial risks refer to risks arising from events in financial markets. Many risks are interrelated particularly during unexpected market moves; risks work like a chain reaction. For example, market risk impacts credit risk, credit risk gives rise to settlement risk, and so on. Similarly, legal risk often arises from market or credit risk when the losing parties look for loopholes in contracts.

Counterparty risk is another such risk that depends on other risks. For example, the credit risk of the losing party in an option contract may vary directly with the loss on the position increases.

Many risks are interrelated. Particularly, during unexpected market moves, risks work like a chain reaction. For example, market risk impacts credit risk, credit risk gives rise to settlement risk, and so on. Similarly, legal risk often arises from market or credit risk when the losing parties look for loopholes in contracts. Counterparty risk is another such risk that depends on other risks. For example, the credit risk of the losing party in an option contract may vary directly with the loss on the position increases. The risk may be low when the loss is low, but as soon as the position turns negative, the risk would increase. Failure to consider this eventuality in the expected value of a position can wreak havoc on a party to the contract. Such a risk is referred to as "wrong-way risk."

Similarly, devastating interaction of risk can occur between market risk and liquidity and solvency risks. It is because when it comes to risk interactions, there is a compounding effect, i.e., the combined risk compounds the individual risks in a non-linear manner. Further, since most risk models and systems do not account for risk interactions directly, the ultimate risk volume may not be visible.

Types of risks and their interaction



Even though most risk results in monetary consequences, financial risks refer to risks arising from events in financial markets.

There are three types of risks commonly categorized as financial risks:

- Market risk,
- Credit risk, and
- Liquidity risk.

Market risk

Market risk is the risk that arises from movements in

interest rates,

stock prices,

exchange rates, and

commodity prices.

The term market risk, also known as systematic risk, refers to the uncertainty associated with any investment decision. The different types of market risks include interest rate risk, commodity risk, currency risk, country risk. Professional analysts use methods like Value at Risk (VaR) modeling, and the beta coefficient to identify potential losses via statistical risk management.

5.2 Different Types of Market Risk

A. Interest Rate Risk

Interest rate risk arises from unanticipated fluctuations in the interest rates due to monetary policy measures undertaken by the central bank. The yields offered on securities across all markets must get equalized in the long run by adjustment of market demand and supply of the instrument.

Hence, an increase in the rates would cause a fall in the security price. It is primarily associated with fixed-income securities.

For example: Consider a situation where a sovereign bond offers a fixed coupon payment of 6% p.a. on the principal value. Now, if the market interest rate rises to 8%, the demand for the 6% bond will decline after a fall in the prices, causing the Yield (Fixed – Coupon Payment / Market Price of Bond) to rise until it is equal to 8%. Similarly, a decline in the market interest rate will lead to an unanticipated gain in the security's price.

B. Stock price volatility

If the price of a stock fluctuates rapidly in a short period, hitting new highs and lows, it is said to have high volatility. If the stock price moves higher or lower more slowly, or stays relatively stable, it is said to have low volatility.

What drives stock price volatility?

Some things that can drive volatility include:

1. Political and economic factors

Governments play a major role in regulating industries and can impact an economy when they make decisions on trade agreements, legislation and policy. Everything from speeches to elections can cause reactions among investors, which influences stock prices.

Economic data also plays a role, as when the economy is doing well, investors tend to react positively. Monthly jobs reports, inflation data, consumer spending figures and quarterly GDP calculations can all impact market performance. In contrast, if these miss market expectations, markets may become more volatile.

2. Industry and sector factors

Specific events can cause volatility within a particular industry and sector. In the oil sector, for example, a major weather event in an important oil-producing area can cause oil prices to increase. As a result, the stock price of oil distribution-related companies may rise, as they would be expected to benefit, while those that have high oil costs within their business may fall.

Similarly, more government regulation in a specific industry could result in stock prices falling, due to increased compliance and employee costs that may impact future earnings growth.

3. Company performance

Volatility isn't always market-wide and can relate to an individual company.

Positive news, such as a strong earnings report or a new product that is wowing consumers, can make investors feel good about the business. If many investors look to buy it, this increased demand can help to raise the stock price.

In contrast, a product recall, data breach or bad executive behaviour can all hurt a stock price, as investors sell off their stocks. Depending on how large the company is, this positive or negative performance can also have an impact on the broader market.

C. Exchange rate risk

Exchange Rate Risk is defined as the risk of loss that the company bears when the transaction is denominated in a currency other than the money in which the company operates. It is a risk that occurs due to a change in the relative values of currencies. The risk which the company runs is that there may be an adverse currency fluctuation on the date when the transaction is completed, and currencies are exchanged. Foreign exchange risk also occurs when a company has subsidiaries operating in different countries. The subsidiaries prepare their financial statements in the currency, which is different from the currency in which the parent company reports its financial statements.

Import and export businesses involve a large number of foreign exchange risks as the import/ export of goods and services include transactions in different currencies and exchange of currencies at a later date and time. Exchange rate risk also affects international investors and institutions, which make overseas investments in global markets.

5.3 Types of foreign exchange risks

1. Transaction Risk

Transaction risk occurs when a company buys products or services in a different currency or has receivables in another currency than their operating currency. Since the payables or receivables are denominated in a foreign currency, the exchange rate at the initiation of a transaction and on the date of settlement may have changed due to the volatile nature of the forex market. This can cause a gain or loss for the company depending on the direction of the movement of exchange rates and thus poses a risk to the company.


Example of Transaction Risk

A company X operating in the United States of America, buys raw material from company Y in Germany. The operational currency for Company X and Y is USD and EUR, respectively. The company buys raw material for EUR 100 Mn and needs to pay company Y 3 months down the line. At the initiation of a transaction, suppose USD/ EUR rate is 0.80; thus, if the company X had paid for the material upfront, it would have bought EUR 100 Mn for USD/ EUR 0.80 * EUR 100 Mn = USD 80 Mn.

Now suppose, after three months, USD depreciates to USD/ EUR 0.85, then the company would have to pay USD 85 Mn to buy the EUR 100 Mn to pay the company Y in Germany. Thus, company X has to pay USD 5 Mn extra due to the volatility of the USD-EUR pair. Had the dollar appreciated against the Euro, company X would have paid less to buy the EUR 100 Mn.

2. Translation Risk

Translation risk occurs when a company's financial statement reporting is affected by the exchange rate volatility. A large multinational generally has a presence in many countries, and each subsidiary reports its financial statements in the currency of the country in which they operate. The parent company typically reports the consolidated financials, which involves translating foreign currencies of different subsidiaries to the domestic currency. And this can have a significant impact on the company's balance sheet and income statement and can ultimately affect the stock price of the company.


Example of Translation Risk

Company X operating in the United States of America, has subsidiaries in India, Germany, and Japan. To report the consolidated financials, company X needs to translate INR, EUR, and YEN, respectively, into USD. So, if the INR, EUR, and YEN fluctuate in the forex market relative to USD, it can impact the reported earnings and balance sheet of company X. This can ultimately affect the share price of company X.

3. Economic Risk

A company faces economic risk when the volatility in the exchange rate market can cause changes in the market value of the company. It represents the effects of exchange rates movement on revenues and expenses of a company, which ultimately affects the future operating cash flows of the company and its present value.


Example of Economic Risk

Change in the exchange rate of a pair of currency can cause changes in the demand for a product that a company produces. Since the exchange rate movement is affecting the market and revenue of the company, it can affect its present value.

D. Commodity price risk

Commodities are the most volatile asset class; stocks, bonds, and currencies tend to have lower variance and more liquidity than commodities. It is not unusual for the price of a raw material to halve, double, triple, or more over a very short period of time.

The main reason why commodities are a risky proposition is that they trade on futures markets that offer a high degree of leverage. A commodity trader normally only has to post 5% to 15% of the contract value in futures margin value to control investment in the total contract value.

 For example, if the price of crude oil is trading at $82 a barrel, and the crude oil futures contract is for 1,000 barrels, the total value of the futures contract is $82,000. A trader might only have to post about $5,100 to control $82,000 worth of crude oil. For every $1 that crude oil moves, that trader could potentially earn or lose $1,000 per contract held.

Factors affecting commodity prices:

1. Politics

An increase or decrease in commodity prices can occur due to political factors. In the USA, for example, manufacturers import steel and aluminum from foreign countries. In 2018, President Trump imposed tariffs on the imports. The tariffs' goal was to increase the prices of aluminum, and steel in the USA compared to other countries. China did not take this lightly. They later imposed their tariffs on agricultural products from the US. The low demand for agricultural produce from China meant the crops had to be bought by other countries. As a result, the crop prices in the US market reduced in 2019.

2. Weather conditions

Change in seasons and weather conditions largely affect the prices of commodities. Farmer's harvest plenty of farm produce towards the end of summer, making prices fall in October. The fluctuation of prices during the major seasons' causes crashes in the stock market. Seasons like drought and floods temporarily lead to a hike in the prices of commodities.

3. Transportation and storage costs

The type of commodity will determine its storage mechanism. The commodities that have a physical form need storage spaces before distribution. The cost of storage always affects the overall price of a commodity.

4. Technology

Technology has an intense impact on commodity prices. Improvements in technology can cause the prices of a commodity to drop. Take an example of aluminum. It was a valuable metal until new procedures were developed to isolate it. Its value then dropped, and its price in the market decreased.

5. Production costs

Capital, labour patterns, raw materials, and production tools have a great influence on the commodity's final price. If the cost of production is high, the commodity price will also be high. However, if the production cost is low, the commodity price will be low. Using hedging futures to control the prices of a commodity Futures markets protect consumers and producers against price fluctuations. A producer faces the risk of prices going down, while consumers face the risk of prices hiking. Hedging protects both parties against financial loss. Futures contracts have periods, and consumers and producers get to choose according to the risks they face. Investors, traders, speculators, and other people in the market can use the futures markets.

Credit risk

Credit risk (also called default risk or counterparty risk) is the risk of loss if one party fails to pay an amount owed on an obligation, such as a -

- bond,
- loan, or
- derivative, to another party.

The default risk on a debt that arises from a borrower who fails to make the required payments is called Credit Risk. Any lender would include this as a first resort which includes principal and interest along with disruption to cash flows and the collection cost. The loss may be partial or even complete in many cases. Higher borrowing costs are always associated with higher credit risk levels

in an efficient market. Due to this reason, the cost of borrowing can be used to conclude credit risk based on the assessment by the participants of the market.

Few cases in which losses can arise when a consumer fails to make the payment or when a company is unable to repay an asset secured debt. They also arise when a consumer is unable to pay an invoice when it is due or when a business does not pay salaries to its employees on time.

The risks are calculated on the borrower's ability to repay the loan. To assess the credit risk the lenders, look at the five C's of the borrower. The five C's are credit history, capacity to repay, capital, the loans condition, and associated collateral. Some companies have a dedicated department only for assessing the credit risk of its current and potential consumers.

Due to the help of technology businesses can now analyse the data quickly and assess customers credit risk profile. If an investor is evaluating to buy a bond, he will review the credit rating of the bond before the purchase is made. If the rating is low then the issuer is considered to have a high credit risk of default and alternatively, if it has a high rating then it is considered to be a safe investment.

Types of credit risks:

1. Credit Default Risk

The risk of loss which arises from the debtor being unlikely to repay the amount in full or when the debtor is more than 90 days past is the due date of credit payment, it gives rise to credit default risk. The Credit default risk impacts all the sensitive transactions which are based on credit like loans, derivatives or securities. Credit default risk is also checked by banks before approving any credit cards or personal loan.

2. Concentration Risk

This is the type of credit risk which is associated with exposure of any single or group with the potential to produce large losses to threaten the core operations of a bank. It may arise in the single form of single name concentration even industry concentration.

3. Country Risk

The risk which arises from a sovereign state when it freezes the payments for foreign currency overnight defaults or its obligation which is termed as sovereign risk. Country risk is exclusively associated with the performance of macroeconomics of a country and is also closely related to the political stability in the country. Sudden instability, which tends to happen during the elections, results in high country risk.

Liquidity Risk

Liquidity risk, is more common in case of institutions. Liquidity risk is the risk that in certain market conditions, a seller must make a significant price concession to sell its financial asset.

In the context of banks Liquidity is a bank's ability to meet its cash and collateral obligations without sustaining unacceptable losses. Liquidity risk refers to how a bank's inability to meet its obligations (whether real or perceived) threatens its financial position or existence. Institutions manage their liquidity risk through effective asset liability management (ALM).

In the context of capital markets Liquidity refers to the ease with which an asset (equity shares, debentures, etc.) can be traded in the stock market in exchange for currency. Consequently, liquidity risk depicts the risks associated with such trades, as the successful conversion of stock into money depends on various parameters such as book value of a company, bid-ask spreads for shares in the market, etc.

Prior to the global financial crisis, financial institutions of all shapes and sizes took liquidity and balance sheet management for granted. But during the crisis, many institutions struggled to maintain adequate liquidity and appropriate balance sheet structure, which led to both bank failures and the need for central banks to inject liquidity into national financial systems to keep the economy afloat. As the dust from the crisis began to settle, one thing became clear: Banks and capital markets firms need to do a better job managing their liquidity and balance sheets. And self-preservation isn't the only motive for doing so. The consequences of poor asset-liability

management can reach far beyond the walls of any one financial institution. It can affect the entire financial ecosystem and even the global economy.

Types of Liquidity Risk

Liquidity risk of an investment can be of two types –

Funding liquidity risk

Such risks are associated with the intrinsic values of a company, as it indicates their ability to meet its short-term debt obligations through operating cash flows. Inability to meet its current liabilities (defaulting on loans) can lead to a poor market reputation of such organisations, which can cause a massive fall in their share prices, as investors lose faith regarding their credibility and future performance. Surging amounts of debt with reduced current assets might require a company to liquidate (sell) its current asset base to fulfil its obligations, affecting its future revenue earning capacity significantly.

Measures of Funding Liquidity –

Individuals should measure the funding liquidity risk of companies before investing, so as to develop a thorough idea regarding the future performance and earnings through the following parameters –

Current ratio

Also known as the working capital ratio, the current ratio depicts the current liabilities of a company with respect to its current assets, thereby indicating its repayment capability.

Current Ratio (CR) = Current Assets/ Current Liabilities

A high CR implies that a company has enough revenue to pay off its existing short-term debts without having to liquidate its capital assets. A low CR, on the other hand, acts as a negative indicator regarding the future performance of respective companies.

However, it should be noted that extremely high values of CR represent a misallocation of resources with respect to production, causing a company to lose out on higher sales potential. Hence, having a current ratio equal to or slightly higher than the industry average is recommended.

Quick ratio

It is a popular ratio used by investors for ideal liquidity risk management to ensure minimal funding risk exposure of the corpus invested.

Quick Ratio (QR) = (cash/ cash equivalents marketable securities net accounts receivable) / Current liabilities

QR takes into account all liquid assets of a company, which can be easily converted to monetary terms to repay all current liabilities. While a high QR indicates a strong financial base of a company, it might also indicate inefficient management in some cases.

Interest coverage ratio

The interest coverage ratio reflects the ability of a company to meet its interest obligations on outstanding loans (both short and long term) through its earnings before interest and taxes for a specified period of time.

Interest Coverage Ratio (ICR) = earnings (before interest and taxes) / total interest expense

The ICR indicates not only short-term funding liquidity risk associated with a company but also its long-term solvency implications. A low ICR means that the total earnings of a business over a specified time go into meeting its interest liability only, leaving a small amount to repay the principal value on outstanding debts. Thus, in the event of bankruptcy, equity shareholders are unlikely to get back the entire funds invested, as the majority of liquidated capital asset value will go into repaying debts of the business.

Market liquidity risk

Such types of liquidity risks cater to the systematic risk component associated with market investments, accruing to the volatility of stock markets. Market forces play an important role in

determining such trading liquidity risk, as corresponding fluctuations in share prices affect the trading patterns of respective securities listed on stock exchanges.

Such types of liquidity risks cater to the systematic risk component associated with market investments, accruing to the volatility of stock markets. Market forces play an important role in determining such trading liquidity risk, as corresponding fluctuations in share prices affect the trading patterns of respective securities listed on stock exchanges.

A high market liquidity risk indicates that selling stipulated securities might be challenging, accruing to low demand for the same. Such reduced demand can arise due to multiple reasons, such as –

- Highly volatile stocks readily susceptible to price fluctuations
- Ongoing economic crisis/ recession
- A discredited reputation of a company due to certain events
- Global economic scenario

During such times, the stock prices of a company often plummet, causing shareholders to panic. This is in tandem to falling demand, as individuals are uncertain about the future performance of the company. As a rush for sell orders on such securities are placed, with no corresponding buy orders, a low trade volume is observed as an adequate number of market participants are not present to facilitate the exchange of shares.

The price of respective shares is driven down further due to excess supply in a market. Individuals willing to exit their position in such conditions end up realising substantial losses on their investment.

Stocks of small and mid-cap companies have high market liquidity risk, as stated above. This is because buyers are uncertain of their potential growth in the future and hence, are unwilling to purchase such securities in fear of incurring losses in the long term. At the same time, a panic amongst existing shareholders is noticed in the face of a stock market downturn because such companies often lack the financial backing to recuperate from these downturns.

Many other forms of investment, such as real estate, also have high associated trading liquidity risk, as the process of purchase and sale of such assets involve a significant time lapse. Such time required for processing trade increases during times of high uncertainty in an economy.

5.4 Non-Financial Risks

Non-financial risks may arise from internal or external sources. They may have monetary consequences. Some of the non –financial risks are:

Settlement risk

Settlement risk is the risk that the counterparty would fail to make a payment just before default. Even though this is related to default risk, it is more concerned with the payment process.

Legal risk

Legal risk is the risk of being sued or the risk of a contract clause not being upheld by the courts.

Compliance risk

Compliance risk, a combination of regulatory risk, accounting risk, and tax risk, stems from the matter of conforming to policies, laws, rules, and regulations.

Operational risk

Operational risk arises due to the failure of failed people, systems, policies, etc. It is a combination of most of the internal risks. Employees may make mistakes or commit fraud or can go rogue by taking extremely speculative positions. Events such as floods, earthquakes, or hurricanes can cause significant damage and disruption. Cyber risk is a major operational risk arising from insufficient IT safeguards. Terrorism is also a major operational risk.

Solvency risk

Solvency risk is the risk that an organization may fail for the want of cash, even though it has an otherwise good financial position.

5.5 Risk Aggregation

It relates to the process of summing and showing the interaction between single or individual risks, to see the bigger picture. Risk Aggregation denotes a stage of the Risk Measurement process where different risks are considered jointly in order to obtain a integrated risk profile.

Through the rear-view mirrors is dangerous. Since then, organizations – especially banks and financial services institutions – recommend adopting a forward-looking approach to risk management. Organizations of all sizes now want to assess and aggregate risks across various processes, business lines, and risk types using multiple methods.

The process of identifying the impact of various risks on a business requires the ability to aggregate risks both vertically and horizontally. A robust aggregation mechanism enables risk officers not only to understand the total risk exposure, but to also make risk-aware decisions and define risk treatment plans that are in line with their organization's risk appetite definitions.

What is the need of risk aggregation?

Managing risks across a large enterprise can be a challenge. The process of identifying the impact of multiple risks on an organization requires the ability to aggregate risks at multiple levels. The basic goal of risk aggregation is to collect several risks in order to arrive at a total risk exposure for all or a part of an organization. Risk aggregation allows grouping of similar risks from different perspectives to provide a complete picture of risk across the enterprise.

Basel Committee on Banking Supervision (BCBS) points out the need for risk aggregation in banking and financial services sectors as below:

"Naturally, the organization of risk management functions varies across firms. In some firms, risk management is a highly centralized function where the dedicated risk management function exercises substantial authority. In other firms, particularly in the insurance sector, local business units with a limited risk profile retain substantially greater autonomy over significant risk management decisions. Moreover, even in some firms with a bias toward centralized risk-management decision-making, the key decisions are made by a senior management committee, rather than by the risk management function itself. The organizational infrastructure of risk management decision-making varies considerably across firms, and it is difficult to conclude that any single approach is becoming dominant."

Additionally, companies follow different organizational structures to support their nature of business. Some organizations might group risks as per organizational structure while others might group them by legal entities, geographical structure, processes, products or risk categories. Risks can be present at multiple levels within an organization. Risk owners at each level would want to easily identify their exposure as against the total exposure at enterprise level. There could be common risks between two functions or locations. Stakeholders at each level would want to view aggregated level of risk exposure for specific risks or risk types, for example, External Fraud, Attrition etc. This can be useful for monitoring changes in risk profile over time. Risk owners at various levels would want to look at top risks at their levels and take necessary actions to mitigate them. They would also want to easily identify if any risk or a group of risks are approaching risk appetite limits or have already breached those limits. To facilitate all these, organizations have to adopt risk aggregation methodologies that suits their risk management approach and business strategy.

Risk aggregation at multiple levels and also at enterprise level helps risk leaders understand the root cause of risks and take meaningful, remedial actions. Slicing and dicing of risk data by aggregating at different levels enables risk owners and organizations to make risk-based decisions and take advantage of market movements and conditions.

Challenges in risk aggregation

- **Data Collection:** Collection, quality, and applicability of data are a major challenge while rating and scoring risks. In the absence of a tool, data may be residing in multiple scattered locations. Collating this data is not only time consuming, but also affects the outcome if not collated properly.
- **Managing different criticality threshold limits**: Risks are at different threshold limits based on their criticality. For example, a risk rated very high by a business unit may not have the same threshold limit assigned by another business unit or at an enterprise level,

making it a medium or low risk. Considering this, there may be multiple thresholds e.g. financial, reputational etc. across an intersection of different hierarchies making the challenge further complicated. Hence, using the simple average method to aggregate risk may not give an accurate picture of risk exposure.

- **Combination of qualitative and quantitative data**: A majority of the information is qualitative making it difficult to come to an exact risk score.

5.6 Economic capital

Economic capital is a measure of risk in terms of capital. More specifically, it's the amount of capital that a company (usually in financial services) needs to ensure that it stays solvent given its risk profile.

- Economic capital is the amount of capital that a company needs to survive any risks that it takes. It's essentially a way of measuring risk.
- Financial services companies calculate economic capital internally.
- Economic capital should not be confused with regulatory capital (also known as a capital requirement).
- Economic capital is used for measuring and reporting market and operational risks across a financial organization.
- Economic capital measures risk using economic realities rather than accounting and regulatory rules, which can sometimes be misleading.
- As a result, economic capital is thought to give a more realistic representation of a firm's solvency.

Measuring Economic Capital

The measurement process for economic capital involves converting a given risk to the amount of capital that it's required to support it.

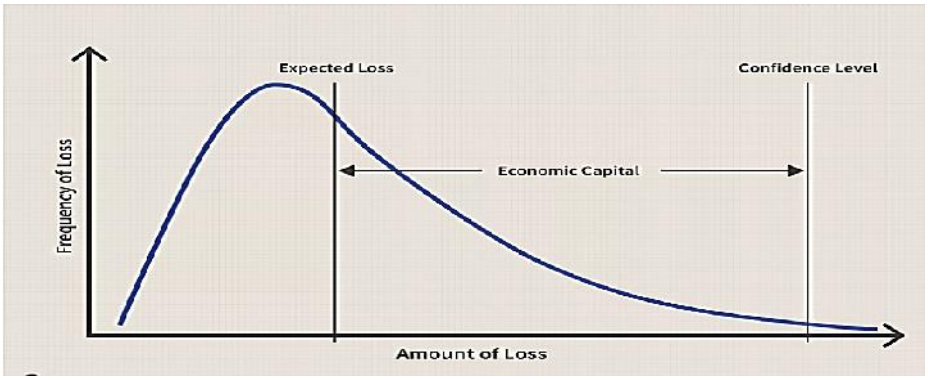
The calculations are based on the institution's financial strength (or credit rating) and expected losses.

Financial strength is the probability of the firm not becoming insolvent over the measurement period and is otherwise known as the confidence level in the statistical calculation.

The firm's expected loss is the anticipated average loss over the measurement period.

Expected losses represent the cost of doing business and are usually absorbed by operating profits.

The relationship between the frequency of loss, amount of loss, expected loss, financial strength or confidence level, and economic capital can be seen in the following graph:



 Some examples of economic capital:

A bank wants to evaluate the risk profile of its loan portfolio over the next year. Specifically, the bank wants to determine the amount of economic capital needed to absorb a loss approaching the 0.04% mark in the loss distribution corresponding to a 99.96% confidence interval.

The bank finds that a 99.96% confidence interval yields $1 billion in economic capital in excess of the expected (average) loss. If the bank had a shortfall in economic capital, it could take measures such as raising capital or increasing the underwriting standards for its loan portfolio in order to maintain its desired credit rating. The bank could further break down its loan portfolio in order to evaluate if the risk-reward profile of its mortgage portfolio exceeded its personal loan portfolio.

5.7 Trader Compensation

The compensation structure of traders should be given a due thought. Usually, traders are paid a bonus that is directly related to their performance – for instance, 20% of profits – when positive. A trader who is successful can become a millionaire at a very young age. A trader who loses money is simply fired.

Such a compensation scheme is designed to attract the very best talents into trading.

The downside is that the trader, who is now long an option, has an incentive to increase the value of this option by increasing the risk of this position. This however may not be in the best interest of the company. Such a tendency of risk taking can be controlled by various means…

By modifying the structure of the compensation contract to better align the interest of the trader and the company (e.g., By paying with company stock or tying compensation with long-tern performance)

By subtracting a risk-based capital charge from trading profits

By appointing an independent risk manager

Recent regulatory changes are putting limits on compensation in the financial industry

To be effective, the compensation structure of the risk managers must be independent of how well the traders perform

Trader Limits:

Risk can be managed by imposing limits (backward and forward-looking limits).

Backward looking limits

- consists of stop loss limits

- loss occurrence cannot be prevented

- losing traders attempts can be limited

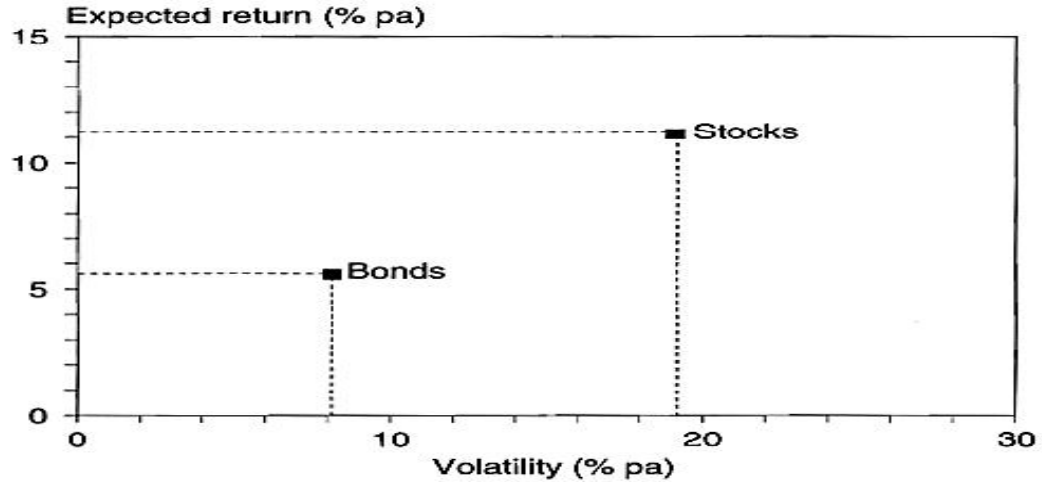
Forward looking limits

- exposure limits / VaR limits

- exposure limits are imposed on traders as a means to control losses before they occur (maximum position for a yen trader could be set as the equivalent of $10 million)

5.8 Risk Adjusted Performance Measurement

It's very important to know how performance can be adjusted for risk. Risk adjusted returns give us an idea whether returns are delivered in an asset / portfolio due to taking higher risk or due to the expertise of the investor / portfolio manager.



Sharpe Ratio

The Sharpe ratio calculates how well an investor is compensated for the risk they've taken in an investment.

When comparing two different investments against the same benchmark, the asset with the higher Sharpe ratio provides a higher return for the same amount of risk or the same return for a lower risk than the other asset.

Developed by American economist William F. Sharpe, the Sharpe ratio is one of the most common ratios used to calculate the risk-adjusted return.

Sharpe ratios greater than 1 are preferable; the higher the ratio, the better the risk to return scenario for investors.

Sharp Ratio = (Rp-Rf)/σp

Rp = Return on portfolio

Rf = Risk free rate of return

σp = Standard Deviation of the Portfolio's Excess Return

Example: Mutual Fund A returned 12% over the past year and had a standard deviation of 10%, Mutual Fund B returns 10% and had a standard deviation of 7%, and the risk-free rate over the time period was 3%. The Sharpe ratios would be calculated as follows:

Mutual Fund A: (12% - 3%) / 10% = 0.9

Mutual Fund B: (10% - 3%) / 7% = 1

Even though Mutual Fund A had a higher return (12%), Mutual Fund B had a higher risk-adjusted return (1), meaning that it gained more per unit of total risk than Mutual Fund A.

Calculating Sharpe ratio:

From the given information calculate the sharp ratio of the portfolio(s) and decide which one is better?

A) Average annual return on portfolio 15%

Risk free return (364-day T Bills) 5%

Volatility (standard deviation) of portfolio 12%

B) Average annual return on portfolio 22%

Risk free return (364-day T Bills) 5%

Volatility 16%

Solution:

(.15-.05)/.12 = 0.83

(.22-.05)/.16 = 1.06

Treynor Ratio

The Treynor Ratio is a portfolio performance measure that adjusts for systematic risk.

In contrast to the Sharpe Ratio, which adjusts return with the standard deviation of the portfolio, the Treynor Ratio uses the Portfolio Beta, which is a measure of systematic risk.

These ratios are concerned with the risk and return performance of a portfolio and are a quotient of return divided by risk.

$$Treynor\ Ratio = \frac{Portfolio\ Return - Risk\ Free\ Rate}{Portfolio\ Beta}$$

$$T = (rp - rf)/\beta p$$

T = Treynor ratio

rp = Portfolio return

rf = Risk free rate

βp = Beta of the portfolio

The Treynor ratio is calculated the same way as the Sharpe ratio, but uses the investment's beta in the denominator.

As is the case with the Sharpe, a higher Treynor ratio is better.

Using the previous fund example, and assuming that each of the funds has a beta of 0.75, the calculations are as follows:

Mutual Fund A: (12% - 3%) / 0.75 = 0.12

Mutual Fund B: (10% - 3%) / 0.75 = 0.09

Here, Mutual Fund A has a higher Treynor ratio, meaning that the fund is earning more return per unit of systematic risk than Fund B.

5.9 Jensen's Alpha

Jensen's Alpha is used to describe the active return on an investment.

It measures the performance of an investment against a market index benchmark that represents the market movement as a whole.

The alpha shows the performance of the investment after its risk is considered.

$\dot{\alpha}$ jensen = Rp-[Rf +β (Rm-Rf)]

Where:

Rp = Expected Portfolio Return

Rf = Risk-free Rate

Beta(p) = Portfolio Beta

Rm = Market Return

Interpretation (Jensen's Alpha)

Alpha < 0 means the investment was too risky for the expected return.

Alpha = 0 means the return earned is sufficient for the risk taken.

Alpha > 0 means the return earned is greater than the assumed risk.

Example: Assume a portfolio realized a return of 17% in the previous year. The market index returned 12.5%. The beta is 1.4, and the risk-free rate is 4%.

Jensen's Alpha = 17- [4+1.4*(12.5-4)]

= 17- [4+ 11.9]

=17-(15.9) = 1.1%

An alpha of 1.1% means the investor receives a high return for the risk assumed over the year.

Summary

Risk aggregation is a common concept in risk management contexts. Overall, it relates to the process of summing and showing the interaction between single or individual risks, to see the bigger picture. Risk aggregation provides necessary information that enables effective group-wide or enterprise-wide risk management, as well as a wide variety of other key business decisions and business processes. A core element of modern risk management and control is analyzing the capital adequacy of a financial institution, which is concerned with the assessment of the firm's required capital to cover the risks it takes. Financial firms seek to quantify their overall risk exposure by aggregating all individual risks associated with different risk types or business units, and to compare this figure with a so-called risk-taking capacity, defined as the total amount of capital as a buffer against potential losses.

Keywords

Market risk - Market risk is the risk of losses on financial investments caused by adverse price movements. Examples of market risk are: changes in equity prices or commodity prices, interest rate moves or foreign exchange fluctuations.

Liquidity risk - Liquidity is the ability of a firm, company, or even an individual to pay its debts without suffering catastrophic losses. Conversely, liquidity risk stems from the lack of marketability of an investment that can't be bought or sold quickly enough to prevent or minimize a loss.

Credit risk - Credit risk is the risk of loss that may occur from the failure of any party to abide by the terms and conditions of any financial contract, principally, the failure to make required payments on loans due to an entity.

Exchange rate risk - Foreign exchange risk, also known as exchange rate risk, is the risk of financial impact due to exchange rate fluctuations. In simpler terms, foreign exchange risk is the risk that a business' financial performance or financial position will be impacted by changes in the exchange rates between currencies.

Risk aggregation - The basic goal of *risk aggregation* is to collect several risks in order to arrive at a total risk exposure

Economic capital - *Economic capital* is the amount of capital that a company needs to survive any risks that it takes.

Traders' compensation – How much compensation is paid to a trader on the basis of the skills, experience, market outperformance and peer group performance etc., refers to traders compensation.

Self Assessment

Q1. When a particular risk leads to a new risk or risks is known as…

A. Risk aggregation

B. Risk interaction

C. Risk exposure

D. Risk explosion

Q2. A portfolio delivered a return of 70% in last one year vis a vis 45% by the benchmark. The portfolio beta is 1.5 and risk-free rate is 3%. Calculate the Jensen's Alpha value of the portfolio.

A. 4%

B. 3%

C. 2%

D. 1%

Q3. Interest rate risk refers to

A. Changes in economic conditions

B. the risk of default.

C. Probability of bankruptcy because an enterprise has borrowed too much.

D. Fluctuation in bond prices due to changes in overall interest rates.

Q4. Which asset class will be affected more in case of rising inflation?

A. Debt instruments (bonds & debentures)

B. Real estate

C. Gold

D. Stock market investments

Q5. Which portfolio below is most appropriately diversified?

A. International stocks and tangibles.

B. High-quality Indian stocks, low-quality Indian stocks, and Treasury bills

C. Balance mutual funds having exposure in debt and equity

D. Gold ETF, blue-chip Indian stocks and Government bonds

Q6. Interest rate risk is a type of__

A. Credit risk

B. Market risk

C. Operational risk

D. Liquidity risk

Q7. Risk interaction refers to

A. Various risks that a business face

B. Analyzing business risks and their management

C. When a particular risk leads to a new risk or multiple risks

D. Identification of risks that may arise in future

Q8. The relationship between interest rates and bond prices is

A. interest rates and bond prices move in the same direction.

B. interest rates and bond prices move in the opposite direction.

C. sometimes move in the same direction, sometimes in opposite directions.
D. have no relationship with each other (i.e., they are independent).

Q9. The global factory encounters the following exposures to foreign exchange risk:

A. Translation exposure
B. Economic exposure
C. Transaction
D. All of the above

Q10. In the foreign exchange market, the _____ of one country is traded for the_____ of another country

A. Currency; currency
B. Currency; financial instruments
C. Currency; goods
D. Goods; goods

Q11. The exchange rate is the

A. total yearly amount of money changed from one country's currency to another country's currency
B. total monetary value of exports minus imports
C. amount of countries currency which can be exchanged for one ounce of gold
D. price of one country's currency in terms of another country's currency

Q12. The risk stating the assets are sold at low prices because of sudden surge in withdrawals of liabilities is classified as

A. payment risk
B. liquidity risk
C. income risk
D. balance risk

Q13. If an organization is facing funding liquidity risk, it shows___

A. lenders are not interested to lend
B. Poor credit history
C. Worsening financial situation
D. All of the above

Q14. Which of the following risk statement is categorized as operational risk?

A. People risk
B. System risk
C. Process risk
D. All of the above

Q15. Economic capital refers to

A. Economic capital is the amount of capital that a company needs to survive any risks that it takes
B. That capital which brings economy in business operations of an organization
C. Capital that comes to a business due to economies of scale
D. Economic capital is raised by a business in an economic downturn

Q16. Which common factor is calculated by Sharpe ratio and the Treynor ratio?

A. Standard deviation
B. Risk adjusted return
C. Beta
D. Alpha factor

Q17. is the process of combining together various investment assets to obtain optimum returns with minimum risk.

A. Portfolio construction
B. Portfolio analysis
C. Portfolio evaluation
D. Portfolio revision

Q18. A higher standard deviation is an indicator of…..

A. Greater risk and higher potential returns
B. Moderate risk and higher potential returns
C. Lower risk and higher potential returns
D. Greater risk and lower potential returns

Q19. A mutual fund has delivered 25% return in last 1 year and the beta of this fund is 1.33. Risk free rate is 4%. The Treynor ratio of the fund would be:

A. 0.1578
B. 6.33
C. 0.633
D. 15.78

Q20. Sharpe Ratio = (R - Rf) / _____.

A. Beta
B. Covariance
C. Standard deviation
D. Mean return

Answers for Self Assessment

1.	B	2.	A	3.	D	4.	A	5.	D
6.	B	7.	C	8.	B	9.	D	10.	A
11	D	12.	B	13.	D	14.	D	15.	A

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16 B 17. A 18. A 19. A 20. A

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Further Reading

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Unit 06:Credit Risk Management

CONTENTS

Objectives

- Understand Market risk
- Differentiate between Credit risk and Market risk
- Understand various drivers of credit risk

Introduction

Credit risk management is the practice of mitigating losses by understanding the adequacy of a bank's capital and loan loss reserves at any given time – a process that has long been a challenge for financial institutions. Credit risk is the possibility of a loss that a lender takes on due to the possibility of a borrower not paying back a loan.

Market risk is the possibility that an individual or other entity will experience losses due to factors that affect the overall performance of investments in the financial markets. Credit risk is considered to be more of a financial institution related term specially those involved in lending activities whereas market risk affects all type of institutions.

6.1 Measurement of Credit Risk

Credit risk is the risk of loss due to a borrower not repaying a loan. More specifically, it refers to a lender's risk of having its cash flows interrupted when a borrower does not pay principal or interest to it. Credit risk is considered to be higher when the borrower does not have sufficient cash flows to pay the creditor, or it does not have sufficient assets to liquidate to repay the creditor. If the risk of nonpayment is higher, the lender is more likely to demand compensation in the form of a higher interest rate.

The credit being extended is usually in the form of either a loan or an account receivable. In the case of an unpaid loan, credit risk can result in the loss of both interest on the debt and unpaid principal, whereas in the case of an unpaid account receivable, there is no loss of interest. In both cases, the party granting credit may also incur incremental collection costs. Further, the party to

whom cash is owed may suffer some degree of disruption in its cash flows, which may require expensive debt or equity to cover.

When lenders offer mortgages, credit cards, or any other type of loan, there could be a risk that the borrower might not have the ability to repay the loan. Similarly, if a company extends credit to a customer, there could be a risk that the customer might not pay their invoices. Credit risk also represents the risk that a bond issuer may fail to make a payment when requested, or an insurance company will not be able to pay a claim.

Credit risks are identified based on the borrower's overall likelihood to repay a loan according to the initial terms. Lenders look at the five Cs to assess credit risk - credit history, capacity to repay, the loan's conditions, capital and associated collateral.

6.2 Causes for Credit Risk Problems in Banks

Although credit risk is inherent in lending, various measures can be taken to ensure that the risk is minimized. Poor lending practices result in higher credit risk and related losses. The following are some banking practices that result in higher credit risk for the bank:

Credit Concentration: Where a majority of the lending of the banks is concentrated on specific borrower/borrowers or specific sectors, it causes a credit concentration. The conventional form of credit concentration includes lending to single borrowers, a group of connected borrowers, a particular sector or industry.

Examples of Credit Concentration

Let us consider the following examples to understand credit concentration better

Example #1 – A major bank focuses on lending only to Company A and its group entities. In the event that the group incurs major losses, the bank would also stand to lose a major portion of its lending. Therefore, in order to minimize its risk, the bank should not restrict its lending to a particular group of companies alone.

Example #2 – A bank lends only to borrowers in the real estate sector. In the event that the whole sector faces a slump, the bank would also automatically be at a loss as it will be unable to recover the monies lent. In this scenario, although the lending is not restricted to one company or related group of companies if all the borrowers are from a specific sector, there still exists a high level of credit risk.

Therefore, in order to ensure that the credit risk is kept at a lower rate, it is important that lending practices are distributed amongst a wide range of borrowers and sectors.

Credit Issuing Process: This includes flaws in the banks' credit granting and monitoring processes. Although credit risk is inherent in lending, it can be kept at a minimum with sound credit practices.

The following are instances wherein flaws in the credit processes of the bank results in major credit problems –

1. Incomplete Credit Assessment

In order to evaluate the creditworthiness of any borrower, the bank needs to check for (1) credit history of the borrower, (2) capacity to repay, (3) capital, (4) loan conditions, and (5) collateral. In the absence of any of the above information, the creditworthiness of the borrower cannot be evaluated accurately. In such a case, the bank must exercise caution while lending.

 **For Example,** – Company X wants to borrow $100,000, but it does not furnish sufficient information to perform a thorough credit evaluation. Therefore, it is a higher credit risk and will be eligible for a loan only at a higher interest rate as compared to companies that are a lower credit risk. In such a scenario, if a bank agrees to lend money to Company X with a view to earning higher interest, it stands to lose both interests as well as the principal as Company X poses a higher credit risk, and it may default at any stage during repayment.

2. Subjective Decision Making

This is a common practice in many banks and other institutions wherein the senior management is given free rein in making decisions. Where the senior management is allowed to make decisions independent of the company policies, which are not subject to any approvals, there could be instances where loans are granted to related parties with no credit evaluations being done, and accordingly, the risk of default also increases.

 **For Example** – In the absence of strict guidelines, Mr. K, a director of a major bank, will be more likely to advance a loan to a company headed by his relative or close associate without performing adequate credit evaluations. If the loan had been advanced to a third-party company with no associations with Mr. K, there would have been a thorough credit check, and the credit risk would be lower. Therefore, it is essential that senior management is not given free rein in lending decisions.

3. Inadequate monitoring

Where the lending is for the long term, they are almost always secured against assets. However, the value of assets may deteriorate over time. Therefore, it is not only important to monitor the performance of the borrowers, but also monitor the value of assets. If there is any deterioration in their value, additional collateral may help reduce credit problems for the bank. Also, another issue could be the instances of fraud relating to collaterals. It is important for banks to verify the existence and value of collaterals prior to lending to minimize the risk of any fraud.

 **Example A –** Company P borrowed $250,000 from a bank against the value of its offices. If the bank regularly monitors the value of the asset, in the event of any diminution in its value, it would be in a position to ask for additional collateral from the Company; however, if there is no regular monitoring mechanism, where both the value of the asset decreases and company P defaults in its loan, the bank stands to lose, which could have been avoided with a sound monitoring practice.

 **Example B –** Let us consider the same example – Company P borrowed $250,000 from a bank against the value of its offices. Prior to lending, it is important that the bank verifies the existence of the asset as well as its value and not go simply by the paperwork submitted. There could be instances of fraud wherein loans are taken against fictitious assets.

 **Example C –** Company P borrows $100,000 with no collateral based on its performance. Performing credit evaluation prior to lending is not sufficient. It is essential that the performance of Company P is regularly monitored by the Bank to ensure that it is in a position to repay the loan. In

case of poor performance, the bank may request collateral to be provided and therefore reduce the credit risk impact.

Cyclical Performances

Almost all industries go through a depression and a boom period. During the boom period, the evaluations may result in the good creditworthiness of the borrower. However, the cyclical performance of the industry must also be taken into account in order to arrive at the results of credit evaluations more accurately.

Example – Company Z obtains a loan of $500,000 from a bank. It is engaged in the business of real estate. If it borrows during a period of boom, the bank must also take into account its performance during any subsequent depression. The bank must not always go by current trends but must also provide for any future slumps in the industry performances.

6.3 Types Of Credit Risks

There are three types of credit risks:

a) Credit spread risk which happens because of the volatility in the difference between investments' interest rates as well as the risk-free return rate.
b) Default risk rises when the borrower is unable to make contractual payments.
c) Downgrade risk emerging from the downgrades in the risk rating of an issuer.

How to Mitigate Credit Risk

There are several ways to mitigate credit risk. A company that is contemplating the extension of credit to a customer can reduce its credit risk most directly by obtaining credit insurance on any invoices issued to the customer (and may even be able to bill the customer for the cost of the insurance). Another alternative is to require very short payment terms, so that credit risk will be present for a minimal period of time. A third option is to offload the risk onto a distributor by referring the customer to the distributor. A fourth option is to require a personal guarantee by someone who has substantial personal resources.

A lender that wants to reduce its credit risk can do so by increasing the interest rate on any loans issued, requiring substantial collateral, or requiring a variety of debt covenants that allow it to call the loan if they are breached, and to force the customer to pay off the debt before it is allowed to spend funds on other activities (such as paying dividends).

6.4 Drivers of Credit Risk

Probability of Default

- Probability that the borrower will not be able to make scheduled principal and interest payments over a specified period, usually one year.

- The default probability depends on both the borrower's characteristics and the economic environment.
- Default probability is implied by the credit rating.
- Borrowers with a high default probability are charged a higher interest rate to compensate the lender for bearing the higher default risk.

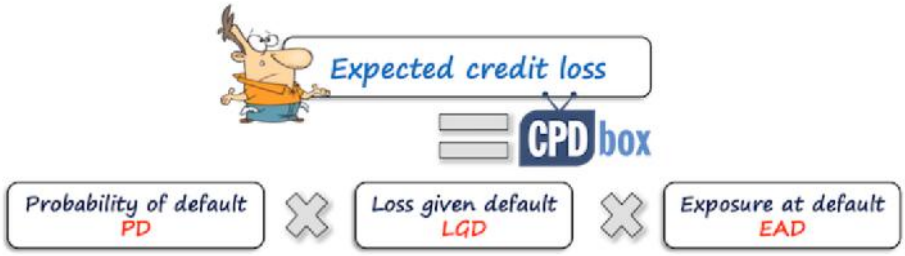
Loss Given Default

- Amount of money that a lender stands to lose when a borrower defaults on the debt obligations.
- Most lenders calculate loss given default as a percentage of total exposure to loss in the entire loan portfolio.
- For example, if ABC Bank lends 1,000 cr to Borrower A and 10,000 cr to Borrower B, the bank stands to lose more money in the event that Borrower B defaults on repayments.

Exposure at Default

- The amount of loss that a lender is exposed to at any particular point, due to loan defaults.
- Initially, the exposure is calculated per loan, and banks use the figure to determine the overall default risk for the entire loan portfolio.
- As borrowers make loan repayments, the value of exposure at default reduces gradually.

Calculating expected credit loss



Let's say that you have a debtor that owes you 10 lac rupees repayable in 1 year. The debtor has severe financial troubles and your lawyers estimate that there is 20% chance of going bankrupt. If the debtor goes bankrupt, you would lose 70% of the amount he owes you. You lose nothing when there is no bankruptcy.

In this short example:

- PD = 20%;
- LGD = 70%;
- EAD = 10 lac

Expected credit loss will be: (.20) *(.70) *(100,0000) = 140,000

6.5 Market Risk

A financial firm's market risk is the potential volatility in its income due to changes in market conditions such as interest rates, liquidity, economic growth etc.

It is typically measured for a time period of one year or less.

Market risk may arise due to one or more reasons given below –

- Interest rate risk – Bonds, loans
- Equity Risk – Nifty50, BSE500, S&P500 indices

- Commodity Risk – Gold, Oil, Silver, Copper
- Foreign Exchange Risk – USD/INR, GBP/Euro

Interest rate risk

Interest rate risk arises from unanticipated fluctuations in the interest rates due to monetary policy measures undertaken by the central bank. The yields offered on securities across all markets must get equalized in the long run by adjustment of market demand and supply of the instrument. Hence, an increase in the rates would cause a fall in the security price. It is primarily associated with fixed-income securities.

For example: Consider a situation where a sovereign bond offers a fixed coupon payment of 6% p.a. on the principal value. Now, if the market interest rate rises to 8%, the demand for the 6% bond will decline after a fall in the prices, causing the Yield (Fixed – Coupon Payment / Market Price of Bond) to rise until it is equal to 8%. Similarly, a decline in the market interest rate will lead to an unanticipated gain in the security's price.

Remember the cardinal rule of bonds: When interest rates fall, bond prices rise, and when interest rates rise, bond prices fall. Interest rate risk is the risk that changes in interest rates (in the U.S. or other world markets) may reduce (or increase) the market value of a bond you hold. Interest rate risk—also referred to as market risk—increases the longer you hold a bond.

Let's look at the risks inherent in rising interest rates.

Say you bought a 10-year, $1,000 bond today at a coupon rate of 4 percent, and interest rates rise to 6 percent.

If you need to sell your 4 percent bond prior to maturity you must compete with newer bonds carrying higher coupon rates. These higher coupon rate bonds decrease the appetite for older bonds that pay lower interest. This decreased demand depresses the price of older bonds in the secondary market, which would translate into you receiving a lower price for your bond if you need to sell it. In fact, you may have to sell your bond for less than you paid for it. This is why interest rate risk is also referred to as market risk.

Rising interest rates also make new bonds more attractive (because they earn a higher coupon rate). This results in what's known as opportunity risk—the risk that a better opportunity will come around that you may be unable to act upon. The longer the term of your bond, the greater the chance that a more attractive investment opportunity will become available, or that any number of other factors may occur that negatively impact your investment. This also is referred to as holding-period risk—the risk that not only a better opportunity might be missed, but that something may happen during the time you hold a bond to negatively affect your investment.

Bond fund managers face the same risks as individual bondholders. When interest rates rise—especially when they go up sharply in a short period of time—the value of the fund's existing bonds drops, which can put a drag on overall fund performance.

6.6 Equity Risk

Investing cash in a company's stock is usually riskier than investing in so-called 'risk free' investments, such as government bonds. This is called equity risk.

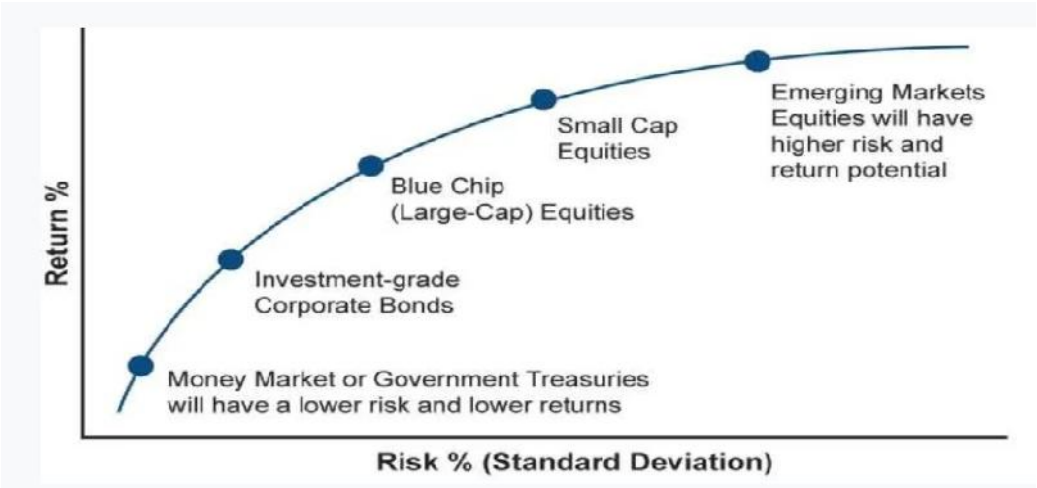
You may have heard about equity risk in relation to equity risk premium – the larger return investors expect to receive for taking their money out of 'risk free' investments and taking on equity risk by investing in the stock market instead.

The risks of investing in equity include share price falls, receiving no dividends or receiving dividends lower in value than expected. They also include the risk that a company restructure may make it less profitable.

One basic way to limit equity risk is with diversification of stocks. Many professionals encourage investors to hold several stocks in order to provide diversification. The idea is that, if one stock experiences a sudden and significant decline, it will affect the portfolio less if additional stocks or equities are involved. Recently, some experts have been coming out with a more extreme call for diversification, urging the average investor to own at least 30 or more stocks.

Another way to avoid equity risk is in more specific diversification of the types of equities that the investor owns. For example, holding stock in various "sectors" like energy, technology, retail, or agriculture, helps with lowering equity risk. So does buying into a basket of global stocks, rather than keeping all stock investments rooted in the same national economy. All of these methods help investors to balance out their stock purchases and lower the risk that their total values will experience sudden price drops.

Investors can also use various types of modern funds to help with equity risks. Mutual funds and exchange traded funds are some specific kinds of financial products that can help traders get into more stocks quickly and easily. Many of these funds are a more appealing substitute for all of the tedious single purchases that would go into broader diversification of a stock portfolio.



6.7 Credit risk Vs. Market Risk

Market risk is just fluctuation of the value/price of the securities you hold. Credit risk is the chance that you won't get all your money back.

Market risk may lead to the Credit risk but Credit risk may not lead to the Market risk

Market risk is the risk that the value of a bond will decline even when the issuer makes timely payments. Credit risk is the risk that the issuer won't make timely payments.

Market risk is the risk that cannot be diversified. It is inherent to all financial securities, while credit risk is the risk of a loss due to untimely payments or full payments.

Market risk is different than credit risk. The bank's assets are mostly invested in loans and securities (about 90% of average assets). These loans and securities have differing interest rate structures – some are fixed and some are floating. They also have differing maturities. Meanwhile, the bank's liabilities, deposits and borrowings also have differing maturities and interest rate characteristics. If the bank's (asset-based) interest income structure is not properly aligned with the (liability-based) interest expense structure, the result is interest rate risk. As market rates change (up or down), the bank's earning is impacted (positively or negatively) based on the mismatch in its balance sheet structure.

The bank can offset market risk by purchasing interest rate swaps or other interest rate derivatives. The impact of insufficient attention to interest rate risk can damage earnings and may, again, negatively affect the bank's capital position.

So, ultimately, the bank's risk-based capital acts as the last line of defence against the negative impact from, you guessed it, unpredictable variability – or "risk." That is why equity is considered risk-based capital. Good risk management, predicting and risk-based pricing leads to safer earnings performance and equity position.

Summary

Credit risk has emerged as a biggest threat to the financial institutions involved in the lending business. In the light of recent COVID-19 pandemic lending institutions have faced a lot of challenges to lend to the financially sound borrowers and to recover already lent funds from the struggling borrowers. BASEL III has given the specific guidelines for the banking industry to safeguard its capital and to keep the banking industry in a healthy stage. Other big corporates other than financial institutions are also involved in credit sales and the challenging business environment is posing a threat on the recoveries. Different ways are developed by such corporations to reduce the credit defaults and dealing with the stakeholders who would not pose any future threat and help a business to remain solvent.

Keywords

- **Credit risk -** Credit risk is the risk of loss that may occur from the failure of any party to abide by the terms and conditions of any financial contract
- **Loss given default -** Amount of money that a lender stands to lose when a borrower defaults on the debt obligations.
- **Probability of default -** Probability that the borrower will not be able to make scheduled principal and interest payments over a specified period, usually one year.
- **Exposure at default -** The amount of loss that a lender is exposed to at any particular point, due to loan defaults.
- **Market risk** - Market risk is the risk of losses on financial investments caused by adverse price movements. Examples of market risk are: changes in equity prices or commodity prices, interest rate moves or foreign exchange fluctuations.
- **Interest rate risk** - Interest rate risk is the potential for investment losses that result from a change in interest rates. If interest rates rise, for instance, the value of a bond or other fixed-income investment will decline.

Self Assessment

1. When taking out a loan, credit risk means what?

A. It's very likely that the borrower won't repay the lender.
B. It's very likely that the borrower will repay the lender.
C. The person has a lot of capital
D. The person has a lot of credit

2. When you want to purchase a house, which of the following statements is true?

A. A high credit risk will give you the lowest interest rate
B. A high credit risk will give you more money to use
C. A low credit risk will give you a higher interest rate
D. A low credit risk will give you the lowest interest rate

3. A high credit score when you go to purchase a car translates into what?
A. A low credit risk
B. A high credit risk
C. A medium credit risk
D. Guaranteed acceptance

4. When a bank borrower, or counter party, fails to meet its payment obligations regarding the terms agreed with the bank, it is called
A. Market Risk
B. Operational risk
C. Liquidity risk
D. Credit Risk

5. When the actions can lead to the entire financial system coming to a standstill, it is called
A. Market risk
B. Equity risk 0
C. Business risk 0
D. Systematic risk

6. When the bank is not able to have enough cash to carry out its day-to-day operations, it is called

A. Liquidity risk
B. Operational risk O
C. Systemic risk O
D. Liquidity risk

7. Credit risk refers to a bonds?

A. Probability of default
B. Price-earnings ratio
C. dividend
D. tax treatment

8. Which of the following is Not a type of risk in Banking Sector?

A. Credit Risk

B. Account Risk

C. Market Risk

D. Liquidity Risk

9. _____ risk is the potential loss due to changes in the value of a bank's assets or liabilities resulting from exchange rate fluctuations.

A. Interest rate

B. Equity

C. Foreign exchange

D. Commodity

10. Market risk may lead to the Credit risk but Credit risk may not lead to the Market risk

A. True

B. False

11. Market risk is the risk that cannot be diversified.

A. True

B. False

12. _____ is the relationship between interest rates and bond prices.

A. Positive

B. Negative

C. Indifferent

D. None of these

13. Which one is a bigger risk in equity investing?

A. Fall in share price

B. Receiving no dividends

C. Change in top management

D. Capital expenditure

14. Which among the following is not a cause of market risk?

A. Interest rate risk

B. Equity Risk

C. Operational risk

D. Foreign Exchange Risk

15. Exposure at default refers to - The amount of loss that a lender is exposed to at any particular point, due to loan defaults.

A. True
B. False

16. Credit concentration refers to –

A. Lending to diverse category of borrowers
B. Lending to financially sound borrowers only
C. Lending to borrowers belonging to same sector
D. None of these

Answers for Self Assessment

1.	A	2.	A	3.	D	4.	D	5.	D
6.	D	7.	A	8.	B	9.	C	10.	A
11.	A	12.	B	13.	A	14.	C	15.	A
16.	C								

Review Questions

1. What are causes of credit risk in financial institutions and what steps can be taken by lending institutions to minimize
2. What are the types of credit risks that can affect the financial health of a bank? Elaborate in the context of recent pandemic and the challenges faced by the banks in recovering the credit.
3. Being a treasury department head of a bank, you are expecting interest rates to rise in the future. What would be the impact on debt portfolio of the bank and how the impact of rising interest rates can be managed effectively without getting a hit on portfolio value?
4. Market risk can change the value of the assets as well as the valuations of any business. In the light of above statement throw some light on factors causing market risk and how does it introduce an enterprise to risk.
5. Equity investing is getting popular specially during and after COVID-19. By nature, equity is a risky asset class and one should do a proper risk management if venturing into equities. What type of risk management steps you would recommend to equity investors?

Further Readings

https://www.finra.org/investors/learn-to-invest/types-investments/bonds/understanding-bond-risk (Risks associated with debt instruments)

https://www.rbnz.govt.nz/research-and-publications/videos/what-is-credit-concentration (Credit concentration)

https://www.sec.gov/files/ib_interestraterisk.pdf (Relationship between interest rates and bond prices)

https://www.spglobal.com/marketintelligence/en/news-insights/research/7-key-drivers-of-credit-risk-in-commercial-loan-portfolios (Drivers of credit risk)

Unit 07: Hedge Funds

CONTENTS

Objectives

- Understand hedge funds and their functioning
- Explore the global volume and trade of Hedge funds
- Understand hedge fund risks
- Explore the factors causing risks to hedge funds

Introduction

Hedge funds pool money from investors and invest in securities or other types of investments with the goal of getting positive returns. Hedge funds are not regulated as heavily as mutual funds and generally have more leeway than mutual funds to pursue investments and strategies that may increase the risk of investment losses. Hedge funds are limited to wealthier investors who can afford the higher fees and risks of hedge fund investing, and institutional investors, including pension funds.

7.1 Concept of Hedge Funds

A hedge fund is a pool of money that takes –

- both short and long positions,
- buys and sells equities,
- initiates arbitrage,

- trades bonds, currencies, convertible securities, commodities and derivative products to generate returns at reduced risk.

As the name suggests, the fund tries to hedge risks to investor's capital against market volatility by employing alternative investment approaches.

Hedge fund investors typically include –

- high net worth individuals (HNIs) and families,
- endowments and pension funds,
- insurance companies, and banks.

These funds work either as private investment partnerships or offshore investment corporations. They are not required to be registered with the securities markets regulator and are not subject to the reporting requirements, including periodic disclosure of NAVs.

Hedging in finance means to limit or reduce exposure to risk, with the hope to make an investment more secure and successful, despite market instability. To offset risk, hedge funds will deploy various financial instruments or market strategies. The idea is that by diversifying their investments, which make up their investment portfolio, they are at less risk because they're not completely dependent on one asset class.

A hedge fund is a form of alternative investment that pools capital from individual or institutional investors to invest in varied assets, often relying on complex techniques to build its portfolio and manage risk. Hedge funds can invest in anything from real estate to currencies and other alternative assets; this is one of many ways in which hedge funds differ from mutual funds, which normally only invest in stocks or bonds.The aim of all hedge funds is to maximise investor returns and eliminate risk, regardless of whether the market is going up or down.

While every hedge fund will have its own specified investment strategy, the idea of 'hedge fund' derives from the agency of the fund manager (or 'general partner') to implement certain trading tactics, such as shorting stocks (if they anticipate a drop in the market) or 'hedging' themselves by going long (if they foresee a market rise).As you can see, much depends on the ability of the fund manager to anticipate shifts in the market and react accordingly.

Hedge funds pool money from professional investors and invest it with the intent of making a profit, also known as realizing a return on their investment. Hedge funds are typically managed by institutional investors who utilize a wide array of non-traditional investment strategies with the primary goal of mitigating risk.

They were created under the idea of generating returns, regardless of whether the market was up or down. As such, they've branded themselves as immune to market forces, though analysis of performance shows that may not be the case.

7.2 Key features of a Hedge Fund

The main features of a hedge fund are as follows:

- The fund is open to only qualified or accredited investors and cannot be offered or sold to the general public. Certain net worth requirements need to be met by potential investors (net worth of more than $1M excluding primary residence).
- The fund can exist as extensive investments in various sectors, such as land, stocks, derivatives, currencies, and commodities.
- It often uses borrowed money to create leverage and multiply returns.
- The fund comes with management and performance fees. It usually pays an annual manager's fee of 1% of the amount of invested assets and a performance fee of 20% on any gains.

- Investors are required to maintain their money in the fund for a locked-in period of at least one year. Withdrawals of funds may only happen at specific times, such as quarterly or semi-annually.
- The fund uses different investment strategies that must be disclosed upfront to the investors.

7.3 Hedge Fund Types

Since hedge funds are private investment vehicles, they can do more or less whatever they like so long as they are upfront about their strategy to investors. (The investment strategy is normally outlined in a prospectus for investors to read before they invest.) While this degree of latitude can prove highly risky, it also affords hedge funds a huge amount of flexibility.

Hedge fund strategies can focus on:

- Macro – invests in stocks, bonds and currencies in the hope of profiting from changes in macroeconomic variables (e.g., global interest rates, economic policies etc)
- Equity – invests in stocks globally or nationally while hedging against downturns in equity markets by shorting overvalued stocks or stock indices
- Relative-value – takes advantage of price or spread inefficiencies
- Activism - manager manipulates fund volatility by changing the board of directors, appointing new management or pushing for the sale of a company

In addition, it is possible for a hedge fund to take a 'fund of funds' strategic approach by combining other hedge funds or pooled investment vehicles. The aim here is to better control the volatility, risk and returns of the umbrella fund by strategically mixing the underlying strategies and funds.

7.4 Some of the Main Hedge Fund Strategies

1) Long/Short Equity Strategy

- In this type of Hedge Fund Strategy, the Investment manager maintains long and short positions in equity and equity derivatives.
- Thus, the fund manager will purchase the stocks they feel are undervalued and sell those who are overvalued.
- A wide variety of techniques are employed to arrive at an investment decision. It includes both quantitative and fundamental methods.
- Such a hedge fund strategy can be broadly diversified or narrowly focused on specific sectors.
- It can range broadly in terms of exposure, leverage, holding period, concentrations of market capitalization, and valuations.
- The fund goes long and short in two competing companies in the same industry.
- But most managers do not hedge their entire long market value with short positions.

 **Example**

- If Tata Motors looks cheap relative to Hyundai, a trader might buy $100,000 worth of Tata Motors and short an equal value of Hyundai shares. The net market exposure is zero in such a case.
- But if Tata Motors does outperform Hyundai, the investor will make money no matter what happens to the overall market.
- Suppose Hyundai rises 20%, and Tata Motors rises 27%; the trader sells Tata Motors for $127,000, covers the Hyundai short for $120,000, and pockets $7,000.
- If Hyundai falls 30% and Tata Motors falls 23%, he sells Tata Motors for $77,000, covers the Hyundai short for $70,000, and still pockets $7,000.
- If the trader is wrong and Hyundai outperforms Tata Motors, however, he will lose money.

2) Market Neutral Strategy

- By contrast, in market-neutral strategies, hedge funds target zero net-market exposure, which means that shorts and longs have equal market value.
- In such a case, the managers generate their full return from stock selection.
- This strategy has a lower risk than the first strategy that we discussed, but at the same time, the expected returns are also lower.

 **Example**

- A fund manager may go long in the ten biotech stocks expected to outperform and short the ten biotech stocks that may underperform.
- Therefore, in such a case, the gains and losses will offset each other despite how the actual market does.
- So even if the sector moves in any direction, the gain on the long stock is offset by a loss on the short.

3) Merger Arbitrage Strategy

- In such a hedge fund strategy, the stocks of two merging companies are simultaneously bought and sold to create a riskless profit.
- This particular hedge fund strategy looks at the risk that the merger deal will not close on time, or at all.

- Because of this small uncertainty, this is what happens:
- The target company's stock will sell at a discount to the price that the combined entity will have when the merger is done.
- This difference is the arbitrageur's profit.
- The merger arbitrageursbeing approved and the time it will take to close the deal.

Example

- Consider these two companies– ABC Co. and XYZ Co.
- Suppose ABC Co is trading at $20 per share when XYZ Co. comes along and bids $30 per share, a 25% premium.
- The stock of ABC will jump up but will soon settle at some price, which is higher than $20 and less than $30 until the takeover deal is closed.
- Let's say that the deal is expected to close at $30, and ABC stock is trading at $27.
- To seize this price-gap opportunity, a risk arbitrageur would purchase ABC at $28, pay a commission, hold on to the shares, and eventually sell them for the agreed $30 acquisition price once the merger is closed.

  Thus, the arbitrageur makes a profit of $2 per share, or a 4% gain, less the trading fees.

4) Convertible Arbitrage

- Hybrid securities including a combination of a bond with an equity option.
- A convertible arbitrage hedge fund typically includes long convertible bonds and short a proportion of the shares into which they convert.
- In simple terms, it includes a long position on bonds and short positions on common stock or shares.
- It attempts to exploit profits when there is a pricing error made in the conversion factor i.e.; it aims to capitalize on mispricing between a convertible bond and its underlying stock.
- If the convertible bond is cheap or if it is undervalued relative to the underlying stock, the arbitrageur will take a long position in the convertible bond and a short part in the stock.
- Conversely, if the convertible bond is overpriced relative to the underlying stock, the arbitrageur will take a short position in the convertible bond and a **long position**.
- In such a strategy, managers try to maintain a delta-neutral position so that the bond and stock positions offset each other as the market fluctuates.
- (Delta Neutral Position- Strategy or Position due to which the value of the Portfolio remains unchanged when small changes occur in the importance of the underlying security.)
- Convertible arbitrage generally thrives on volatility.
- The same is that the more the shares bounce, the more opportunities arise to adjust the delta-neutral hedge and book trading profits.

Example

- Visions Co. decides to issue a 1-year bond that has a 5% coupon rate. So on the first day of trading, it has a par value of $1,000, and if you held it to maturity (1 year), you would have collected $50 of interest.

- The bond is convertible to 50 shares of Vision's common shares whenever the bondholder desires to get them converted. The stock price at that time was $20.
- If Vision's stock price rises to $25, the convertible bondholder could exercise their conversion privilege. They can now receive 50 shares of Vision's stock.
- Fifty shares at $25 are worth $1250. So if the convertible bondholder bought the bond at issue ($1000), they have now made a profit of $250. If they decide that they want to sell the bond, they could command $1250 for the bond.
- But what if the stock price drops to $15? The conversion comes to $750 ($15 *50). If this happens, you could never exercise your right to convert to common shares. You can then collect the coupon payments and your original principal at maturity.

5) Capital Structure Arbitrage

- It is a strategy in which a firm's undervalued security is bought, and its overvalued security is sold.
- Its objective is to profit from the pricing inefficiency in the issuing firm's capital structure.
- It is a strategy used by many directional, quantitative, and market neutral credit hedge funds.
- It includes going long in one security in a company's capital structure while at the same time going short in another security in that same company's capital structure.
- For example, long the sub-ordinate bonds and short the senior bonds, long equity, and short CDS.

Example

- An example could be – A news of a particular company performing poorly.
- In such a case, both its bond and stock prices are likely to fall heavily. But the stock price will fall by a greater degree for several reasons like:
- Stockholders are at a greater risk of losing out if the company is liquidated because of the priority claim of the bondholders.
- Dividends are likely to be reduced.
- The market for stocks is usually more liquid as it reacts to news more dramatically.
- Whereas on the other hand, annual bond payments are fixed.
- An intelligent fund manager will take advantage of the fact that the stocks will become comparatively much cheaper than the bonds.

6) Fixed-Income Arbitrage

- This particular Hedge fund strategy makes a profit from arbitrage opportunities in interest rate securities.
- Here opposing positions are assumed to take advantage of small price inconsistencies, limiting interest rate risk. The most common type of fixed-income arbitrage is swap-spread arbitrage.
- In swap-spread arbitrage, opposing long and short positions are taken in a swap and a Treasury bond.
- Point to note is that such strategies provide relatively small returns and can cause huge losses sometimes.
- Hence this particular Hedge Fund strategy is referred to as 'Picking up nickels in front of a steamroller!'

Example

- A Hedge fund has taken the following position: Long 1,000 2-year **Municipal Bonds** at $200.
- 1,000 x $200 = $200,000 of risk (unhedged)
- The Municipal bonds payout 6% annual interest rate – or 3% semi.
- Duration is two years, so you receive the principal after two years.
- After your first year, the amount that you have made assuming that you choose to reinvest the interest in a different asset will be:

  $200,000 x .06 = $12,000

- After two years, you will have made $12000*2= $24,000.
- But you are at risk the entire time of:
- The municipal bond is not being paid back.
- Not receiving your interest.

  So, you want to hedge this duration risk.

- The Hedge Fund Manager Shorts **Interest Rate Swaps** for two companies that pay out a 6% annual interest rate (3% semi-annually) and are taxed at 5%.

  $200,000 x .06 = $12,000 x (0.95) = $11,400

  So, for 2 years it will be: $11,400 x 2 = 22,800

  Now if this is what the Manager pays out, then we must subtract this from the interest made on the Municipal Bond: $24,000-$22,800 = $1,200

  Thus $1200 is the profit made.

7) Event-Driven

- In such a strategy, the investment Managers maintain positions in companies that are involved in mergers, restructuring, **tender offers**, shareholder buybacks, debt exchanges, security issuance, or other capital structure adjustments.

Example

- One example of an Event-driven strategy is distressed securities.
- In this type of strategy, the hedge funds buy the debt of companies in **financial distress** or have already filed for bankruptcy.
- If the company has yet not filed for bankruptcy, the Manager may sell short equity, betting the shares will fall when it does file.

8) Global Macro

- This hedge fund strategy aims to profit from massive economic and political changes in various countries by focusing on bets on interest rates, sovereign bonds, and currencies.
- Investment managers analyze the economic variables and what impact they will have on the markets. Based on that, they develop investment strategies.
- Managers analyze how macroeconomic trends will affect interest rates, currencies, commodities, or equities worldwide and take positions in the **asset class** that is most sensitive in their views.

- A variety of techniques like systematic analysis, quantitative and fundamental approaches, long and short-term holding periods are applied in such cases.
- Managers usually prefer highly liquid instruments like futures and currency forwards for implementing this strategy.

Example

- An excellent example of a Global Macro Strategy is George Soros shorting of the pound sterling in 1992. He then took a massive short position of over $10 billion worth of pounds.
- He consequently profited from the Bank of England's reluctance to either raise its interest rates to levels comparable to those of other European Exchange Rate Mechanism countries or to float the currency.
- Soros made 1.1 billion on this particular trade.

9) Short Only

- Short selling that includes selling the shares that are anticipated to fall in value.
- To successfully implement this strategy, the fund managers have to **financial statements**, talk to the suppliers or competitors to dig any signs of trouble for that particular company.

7.5 Pros and Cons of Investing in Hedge Funds

Investing in hedge funds can bring very high returns to an investor. However, there is always risk involved in potential high-reward investments.

Pros

- The use of various investment strategies provides the ability to generate positive returns despite favorable or unfavorable market conditions.
- A balanced portfolio hedge fund can decrease overall risk and volatility, with multiple returns on investment.
- Provides investors the ability to precisely customize investment strategies.
- Investors can access the services of skilled investment managers.

Cons

- Exposes the fund to huge potential losses if the wrong strategy is taken.
- Investors are usually required to lock in the money for a period of years.
- The use of borrowed money or leverage can turn a minimal loss into a major loss.

7.6 Global Hedge Fund Statistics

- Globally there are 13,180 North American funds, 4,432 Asian funds, 13,330 European funds, 884 Latin American funds and 4,316 emerging market funds
- 7,146 UCITS* hedge funds, 3,225 commodity trading advisors, 2,579 long only absolute returns funds and 280 insurance-linked securities hedge funds

* Undertaking for Collective Investments in Transferable Securities and the framework - is a set of directives developed by the European Commission to allow collective investment schemes

- There are over 1,453 funds with assets greater than US$1 billion managed by 423 distinct advisory companies

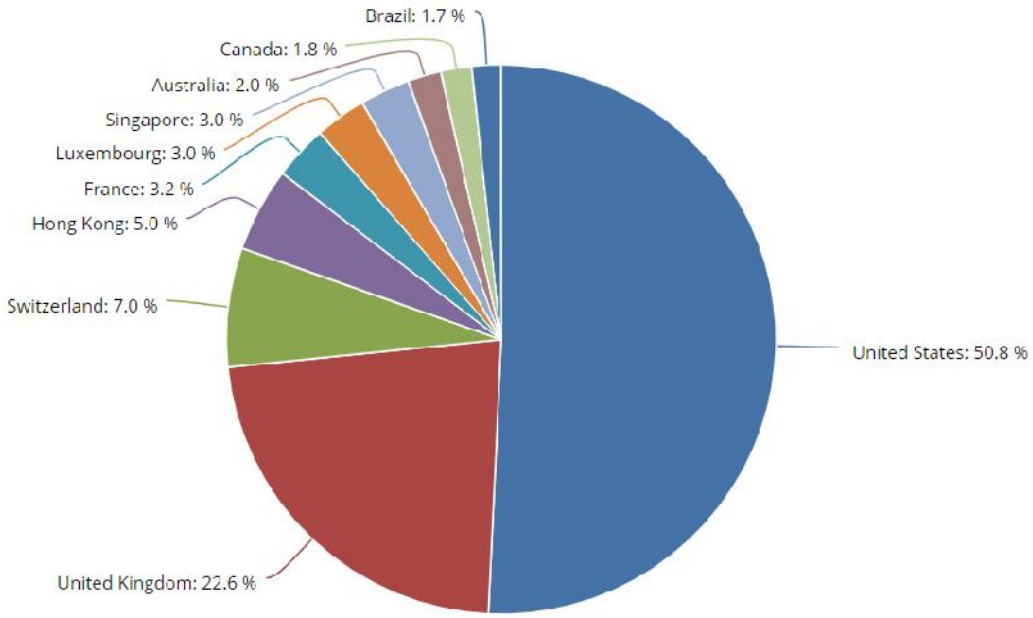
- The obsolete fund database has 14,174 dead funds going back to January 1998 – an essential tool for academics, historical portfolio construction and back testing index research

7.7 Global Hedge Funds by Manager Location

Currently there are 12,661 live funds in the database with the top 5 most popular locations for running a global hedge fund strategy being-

- United States (5,695 funds),
- United Kingdom (2,540 funds),
- Switzerland (786 funds),
- Hong Kong (556 funds) and
- France (359 funds).

Global hedge funds by manager location



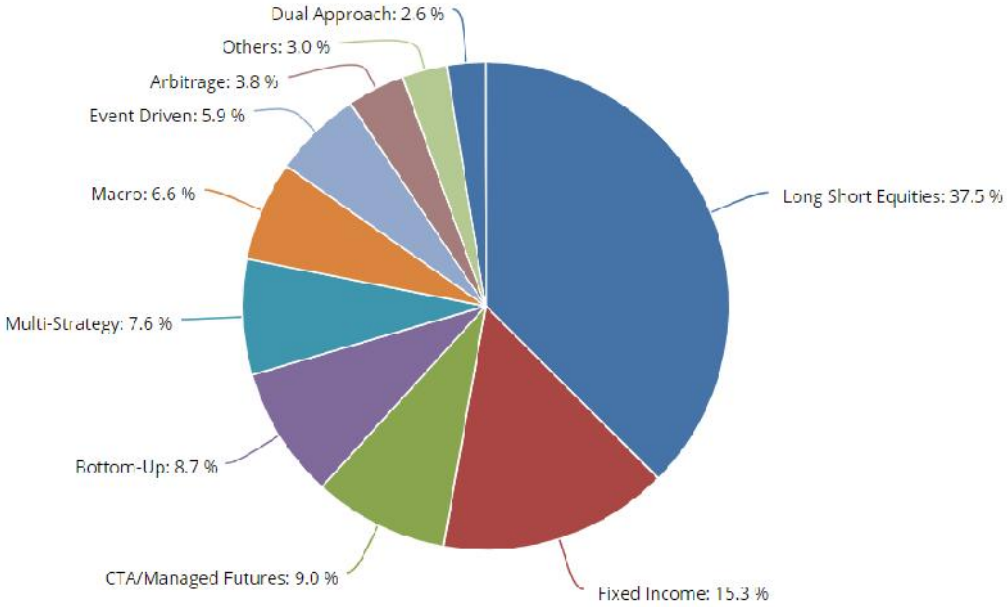
Breakdown of the global hedge fund database by hedge fund strategies

The global hedge fund strategies can be broadly categorized as –

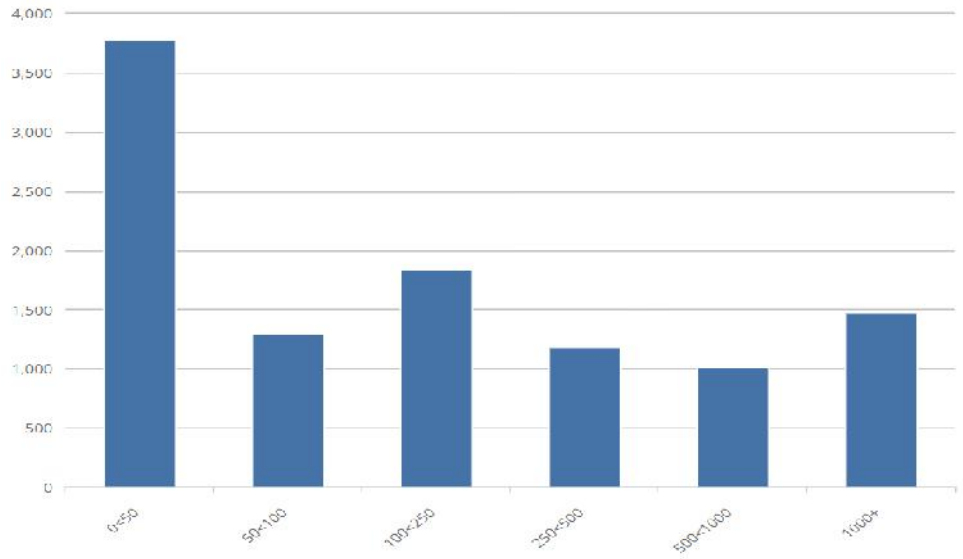
- pure hedge funds,
- commodity trading advisors (CTAs) and
- long only absolute returns funds.

73% of the strategies are represented by Long Short Equities (4,453 funds), Fixed Income (1,822 funds), CTA/Managed Futures (1,066 funds), Bottom-Up (1,037 funds), multi-Strategy (907 funds).

Breakdown of the global hedge fund database by hedge fund strategies

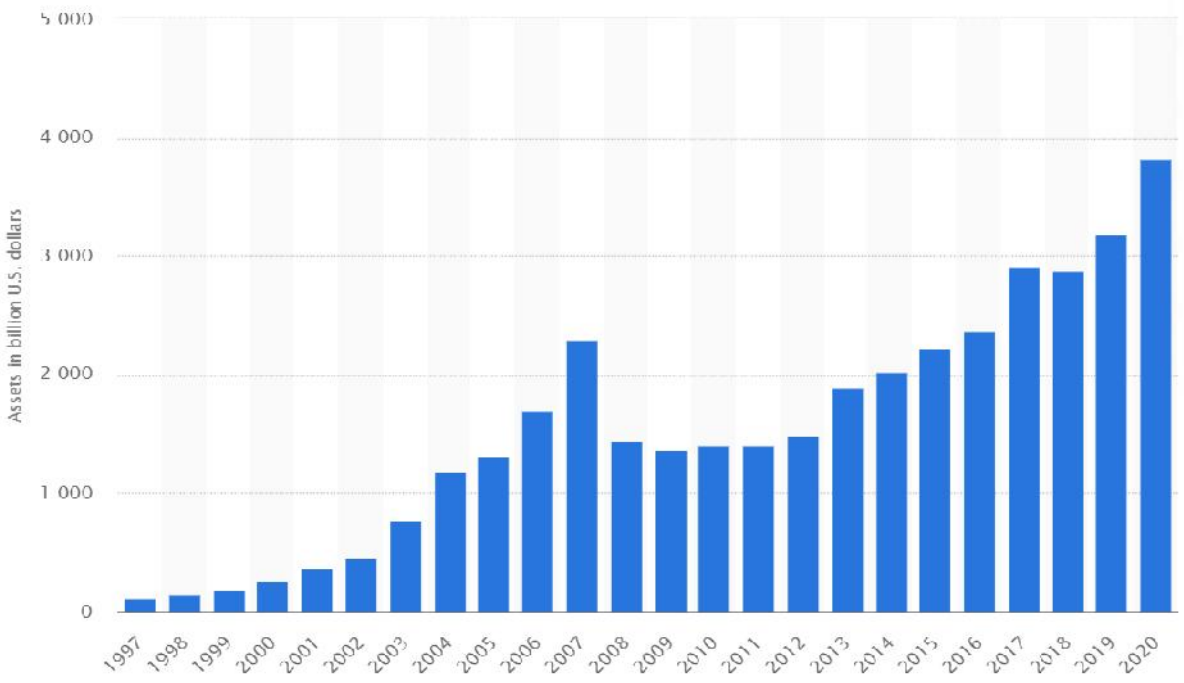


Breakdown of global hedge funds by assets under management (US$ million)



- The most popular fund size of global investing managers is in the US$0 to US$50 million range with 3,777 global hedge fund managers running funds of this size.
- There are 1,470 funds that are greater than US$1 billion.

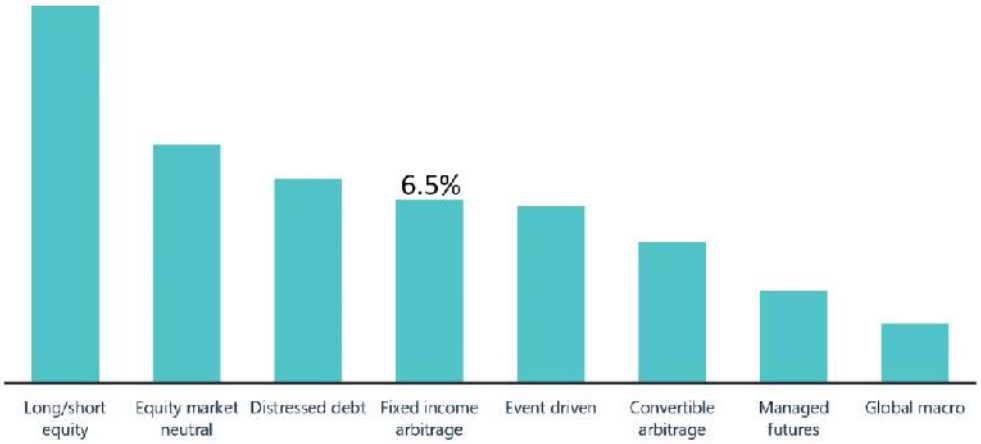
Value of assets managed by hedge funds worldwide from 1997 to 2020



Top hedge fund industry trends for 2021

- Hedge fund industry AUM to reach all-time high driven by net inflows
- Increased activity in hedge fund searches
- Resurrection of Long Short Equity
- Greater focus on ESG and diversity
- The line between hedge funds and private equity continues to blur
- Fee compression: 1 & 15 becoming the new fee schedule for large institutional investors
- In-person meetings to resume in Q4 of 2021, resulting in increased asset flows to mid-sized firms
- Virtual meetings and virtual cap intro events are here to stay
- Healthcare institutions are helping to drive growth within the alternative investment industry
- Increased regulatory scrutiny of the hedge fund industry
- Machine learning and artificial intelligence
- The emergence of cryptocurrency hedge funds

Global Volume and Trade in Hedge Funds



7.8 Hedge Fund Risks

1) Lack of Transparency– Hedge funds are private entities with relatively less public disclosure requirements. This, in turn, is perceived as a 'lack of transparency

2) Regulatory issues - Not subjected to regulatory oversight and rigid Registration requirements.

3) Liquidity risk - Funds generally employ a lock-up period

4) Redemption risk – Money may be invested in securities which are not listed in secondary markets, hence causing redemption issues

5) Concentration risk – Exposure into single asset class or in very few asset classes / securities

6) Rising fee – Globally the fund management fee is rising which will affect the investor' return

7) Mismatch or Incomplete Information - results can be fabricated to match the directions of the fund manager

8)Taxation - Hedge funds are generally taxed as Partnerships to avoid instances of "Double Taxation" and the Profits and Losses being passed on to the investors.

9)Problem of Plenty - Presently, the biggest problem faced by the hedge fund industry is the existence of far too many hedge funds.

10)Liquidity risk – Sudden financial crises or global pandemic may result in higher selling volume by the hedge funds on behalf of the investors leading to liquidity crunch. Such situation can also lead to distressed selling with serios losses.

11) Credit risk and event risk

12) Leverage risk – To multiply the portfolio returns hedge fund managers use leverage. It may bring in very good gains but in extreme circumstances when portfolio positions are not in the favor can impose huge losses as well.

7.9 Long and Short Position in Hedge Funds

- The purpose of a long / short equity hedge fund is to provide absolute returns by investing in stocks with superior return characteristics, and by disinvesting in or "shorting" stocks with inferior return profiles.
- Typically, these funds will also show some bias to the long or short side - based either on the strength of the manager's conviction in his positions, or on a market view.

Challenges in long/short

The challenge in running such a portfolio is in balancing the return profiles. Put simply, there are three potential outcomes –

- Double alpha
- Single alpha
- Double splat

A) Double alpha - The most favorable outcome is when long positions rise in value and short positions decline - known as "double alpha."

B) Single alpha - When one side of the portfolio - either the long or the short book - moves favorably and to a value in excess of the other book. This is called "single alpha."

C) Double splat - The third potential outcome is when both sides of the portfolio move against the manager - the shorts increase in value, and the longs decline.

D) This is known as "double splat." Obviously, the manager attempts to generate double alpha wherever possible, but at the least he will strive to secure single alpha, with the opposing position constituting a hedge.

Hedge fund managers perspective

- The long/short model implies that the manager must be somewhat opportunistic in his approach to investing.
- Properly-timed entry and exit of positions, and by extension understanding the market's movement, can become a significant contributor to alpha generation.
- However, the manager must be careful not to let his attention wander from the strategy to the screen.
- A balance must be struck between attention and distraction.

Suitability of long/short strategy

- Long/short investing is particularly effective in large, liquid markets, with good trading access and where corporate disclosure is perhaps not optimal.
- This allows the fundamentally driven long/short manager to derive advantage through a thorough investigation of the company or companies in question.
- The momentum or trading-driven long/short manager will also be advantaged, profiting from volatility.

Summary

Hedge funds are mostly unregulated investment pools that can only issue securities privately to qualified investors. Hedge funds seek inefficiencies in the market and attempt to correct them. The four most popular types of hedge funds are long–short equity, event driven, macro, and fixed-income arbitrage. Because the inefficiencies that are exploited are often small, many hedge funds use leverage to amplify the return on each decision. many hedge funds have steady returns in normal times but can become volatile in others. Past performance can be especially misleading as a result. Finally, many illiquid securities are valued based on subjective values rather than on prices observed in the market. During growth in the world economy the risk appetite of the investors is on the rise and gives an impetus to the riskier investments like hedge funds. Many corporates across the world are taking the services of hedge funds to minimize their business risks by actively using their hedging strategies.

Keywords

- **Hedge funds -**Put simply, a hedge fund is a pool of money that takes both short and long positions, buys, and sells equities, initiates arbitrage, and trades bonds, currencies, convertible securities, commodities and derivative products to generate returns at reduced risk. As the name suggests, the fund tries to hedge risks to investor's capital against market volatility by employing alternative investment approaches.
- **Long- short hedge funds -**Long-short equity strategy is a type of portfolio management strategy where the manager attempts to minimize market risk by taking both long and short positions. The idea is that if the market declines and the long positions take losses, the short positions will provide gains and minimize overall losses and keep the portfolio profitable.
- **Fund manager -**A fund manager is responsible for implementing a fund's investing strategy and managing its portfolio trading activities. The fund can be managed by one person, by two people as co-managers, or by a team of three or more people.
- **Leverage -**Leverage is nothing more or less than using borrowed money to invest. Leverage can be used to help finance anything from a home purchase to stock market speculation. Businesses widely use leverage to fund their growth, families apply leverage—in the form of mortgage debt—to purchase homes, and financial professionals use leverage to boost their investing strategies.
- **Asset under management –**Assets Under Management refers to the total market value of the assets that a hedge fund manages at a given point in time. AUM includes the returns a hedge fund has made on its investment as well as the capital a manager has at disposal to make new investments.
- **Arbitrage -**Arbitrage is the process of simultaneous buying and selling of an asset from different platforms, exchanges or locations to cash in on the price difference (usually small in percentage terms). While getting into an arbitrage trade, the quantity of the underlying asset bought and sold should be the same. Only the price difference is captured as the net pay-off from the trade.

Self Assessment

Q1. Unlike mutual funds, hedge funds...

A. are commonly organized as private partnerships.
B. allow private investors to pool assets to be managed by a fund manager.
C. are typically only open to wealthy or institutional investors.
D. a & c

Q2. The risk profile of hedge funds _____, making performance evaluation _____.

A. can shift rapidly and substantially; challenging
B. can shift rapidly and substantially; straightforward
C. is stable; challenging
D. is stable; straightforward

Q3. Hedge funds are typically set up as _____ and provide _____ information about portfolio composition and strategy to their investors.

A. limited liability partnerships; minimal
B. limited liability partnerships; extensive
C. investment trusts; minimal
D. investment trusts; extensive

Q4. Hedge funds are _____ transparent than mutual funds because of _____ strict regulation on hedge funds.

A. more; more
B. more; less
C. less; less
D. less; more

Q5. Hedge funds may invest or engage in

A. distressed firms.
B. convertible bonds.
C. currency speculation
D. all of the above

Q6. Regulations on hedge funds are strict as compared to mutual funds.

A. more
B. less
C. equally
D. more or less likely

Q7. Which one of the following has not caused the huge growth in hedge funds and private equity?

A. Tough financial regulations which promote greater investment and therefore better returns
B. Financial institutions looking for a better rate of return

C. The freedom of hedge fund managers to use innovative methods of investing to increase returns

D. Private investors seeking better returns

Q8. With regard to hedge funds, '2 and 20' is best explained as:

A. 2 per cent commission and 20 month lock-up

B. 2 year lock-up and 20 per cent commission

C. 2 per cent performance fee and $20m high-water mark

D. 2 per cent annual fee and 20 per cent performance fee

Q9. Hedge fund investors typically include – high net worth individuals (HNIs) and families,endowments and pension funds and insurance companies, and banks.

A. True

B. False

Q10. Hedge funds can borrow money to create leverage and multiply returns.

A. True

B. False

Q11. A long / short equity strategy of managing a hedge fund doesn't include

A. Long and short in two competing companies in the same industry.

B. The fund manager will purchase the stocks they feel are undervalued and sell those who are overvalued

C. Only midcap stocks are used for short selling and blue-chip stocks for long positions

D. It includes both quantitative and fundamental methods.

Q12. ESG investing stands for

A. Environmental, Scientific and Governance

B. Economic, Social and Government

C. Environmental, Social and GDP

D. Environmental, Social and Governance

Q13. Which among the following is not a part of event – driven strategy of managing hedge funds?

A. Companies that are involved in mergers

B. Restructuring, tender offers of companies

C. Shareholder buybacks, debt exchangesetc.

D. Announcement of dividend to share holders

Q14. Concentration risk is having exposure into single asset class or in very few asset classes / securities

A. True

B. False

Q15. Which among the following is not an advantage of investing in hedge fund?

A. The use of various investment strategies provides the ability to generate positive returns despite favorable or unfavorable market conditions.
B. A balanced portfolio hedge fund can increase overall risk and volatility, with guaranteed returns on investment.
C. Provides investors the ability to precisely customize investment strategies.
D. Investors can access the services of skilled investment managers.

Answers for Self Assessment

1.	D	2.	A	3.	A	4.	C	5.	D
6.	B	7.	A	8.	D	9.	A	10.	A
11.	C	12.	D	13.	D	14.	A	15.	B

Review Questions

Q1. Explain the concept of hedge funds along with their key features.

Q2. Elaborate the various types of hedge funds.

Q3. Being a hedge fund manager what are the various types of strategies that can be applied to manage the investor's portfolio?

Q4. Long-short strategy of managing a hedge fund is considered very effective in all type of market conditions. Why it is considered effective? Explain with a dummy portfolio example.

Q5. Being a sales manager at a global hedge fund company what key features will you tell to a prospective investor who is about to invest $50 million?

Further Readings

https://www.syndicateroom.com/alternative-investments/hedge-funds

https://www.investor.gov/introduction-investing/investing-basics/investment-products/private-investment-funds/hedge-funds

https://pitchbook.com/blog/hedge-funds-101-what-are-they-and-how-do-they-work

https://www.sec.gov/files/ib_hedgefunds.pdf

https://corporatefinanceinstitute.com/resources/knowledge/finance/hedge-fund-strategies/

https://www.wallstreetmojo.com/hedge-fund-strategies/

Unit 08: Hedge Fund Risk Management

CONTENTS

Objectives

- Understand Hedge Fund Styles
- Understand and manage hedge fund risks
- Understand and use leverage
- Explore the pros and cons of leverage

Introduction

Hedge funds are alternative investments that use market opportunities to their advantage. These funds require a larger initial investment than many other types of investments and generally are accessible only to accredited investors.Hedge funds are alternative investments that use market opportunities to their advantage. These funds require a larger initial investment than many other types of investments and generally are accessible only to accredited investors. Leverage involves purchasing securities on margin – borrowing money to strengthen their buying power in the market.Margin can also be used to make short bets or make trades in derivatives such as futures and swaps contracts that can be highly leveraged.Using leverage can amplify returns but can also amplify losses. Hedge funds may be exposed to credit risk or may face margin calls if their investment bets go the wrong way.

8.1 Hedge Fund Styles

Hedge fund styles can be built from several different elements:

- Style: Global Macro, Directional, Event-Drive, Arbitrage
- Market: Equity, Fixed Income, Commodities, Foreign Exchange
- Instrument: Long/Short Equity, Futures, Options, Swaps

- Exposure: Directional, Market Neutral
- Sector: Healthcare, Industrials, Consumer, Energy, Real Estate, Financials, Tech, etc.
- Diversification: Multi-Manager, Multi-Strategy, Multi-Fund, Multi-Market

Global Macro Style

This styletries to anticipate and capitalize on global macroeconomic events; this is usually considered a "top-down approach" to investing.

- Discretionary Macro: The strategy is carried out by investment managers selecting investments.
- Systematic Macro: The strategy is carried out using mathematical models and software.
- Multi-Strategy: The hedge fund uses a combination of strategies.

A global macro strategy is a hedge fund or mutual fund strategy that bases its holdings primarily on the overall economic and political views of various countries or their macroeconomic principles. Holdings may include long and short positions in various equity, fixed income, currency, commodities, and futures markets.

 **For example**, if a manager believes the United States is headed into a recession, he may short sell stocks and futures contracts on major U.S. indices or the U.S. dollar. He may also see a big opportunity for growth in Singapore, taking long positions in that country's assets.

Directional Style

Directional style is hedge investments with exposure to the equity market.

- Long/Short Equity: Takes long equity positions while short-selling other equities or indices
- Emerging Market: Specializes in emerging markets such as China, Brazil, India, etc.
- Sector Funds: Specializes in niche areas such as Healthcare, Industrials, or Consumer
- Fundamental Growth: Invests in companies with more earnings growth than the broader market
- Fundamental Value: Invests in companies that are considered undervalued
- Multi-Strategy: Uses a combination of strategies
- A directional strategy is most appropriate for aggressive investors willing to take some risk in exchange for potentially higher returns.

Directional funds are hedge funds that don't hedge — at least not fully. Managers of directional funds maintain some exposure to the market, but they try to get higher-than-expected returns for the amount of risk that they take.

Because directional funds maintain some exposure to the stock market, they're said to have a stock-like return. A fund's returns may not be steady from year to year, but they're likely to be higher over the long run than the returns on an absolute-return fund.

Directional funds are the glamorous funds that grab headlines for posting double or triple returns compared to those of the stock market. The fund managers may not do much hedging, but they have the numbers that get potential investors excited about hedge funds.

8.2 Event-Driven or Special Situations Style

The fund profits from price inefficiencies caused by anticipated specific corporate events, such as bankruptcy, reorganization, divestitures, and legal situations.

Event-driven strategies are equity-oriented strategies involving investments, long or short, in the securities of corporations undergoing significant change such as spin-offs, mergers, liquidations,

bankruptcies and other corporate events. Substantial profits may be generated by managers who correctly analyze the impact of the anticipated corporate event, predict the course of restructuring and take positions accordingly. Depending on the nature of the corporate event, either relative value or directional positions will be taken. Event-driven strategies are therefore intimately linked to the level of corporate activity. Despite a correlation with corporate activity and stock market performance, both investors and managers aim to capture consistent absolute levels of returns.

Distressed Debt

Specializes in companies trading at discounts because of bankruptcy or the threat thereof.

Investors can earn money even from companies that are in financial trouble. This happens when investors have bought the company's debt rather than its stock. This buying method is often referred to as distressed debt investing. It's a common practice among hedge funds and many institutional investors.

Distressed debt investing involves buying the debt of a troubled company. It can often be bought at a steep discount. This allows you to turn a profit if the company recovers. An investor who buys equity shares of a company instead of debt could make more money if the company *does* turn itself around. But shares could lose their entire value if the company goes bankrupt.

Debt still retains some value even if a turnaround doesn't happen. Investors can walk away with payments even if a company goes bankrupt in many cases. Restructuring during bankruptcy can even result in distressed-debt investors becoming part owners of the troubled company.

Distressed debt is often held by investment firms and hedge funds. It can also be held by non-traditional investment funds, such as business development companies

Activist Style

Takes large positions in companies and uses this ownership stake to influence the decision making of management in the companies.

Activist investing is the practice of buying a large amount of a company's stock with the goal of gaining influence and pressuring the leadership team to make a specific set of changes to the enterprise. Activist investors push for changes that would increase the company's share price or benefit the activist investor directly. Companies that are poorly managed, have inefficient operations, or face some other solvable problems are common targets of activist investors, who often specialize in only certain types of enterprises.

An activist investor's recommendations can range from strategic initiatives, such as restructuring the company, to changing the composition of the board of directors. An activist investor might demand a personal seat on a company's board or insist on the appointment of certain independent directors. The activist investor may even target specific directors for removal.

8.3 Legal Catalysts

Profits from position taking with companies involved in major lawsuits.

In equity markets, a catalyst is an event or other news that propels the price of a security dramatically up or down.

A catalyst can be almost anything: an earnings report, an analyst revision, a new product announcement, a piece of legislation, a lawsuit, the outbreak of war, an offer to buy a company, a move by an activist investor, a comment from a CEO or government official, or the conspicuous absence of a company officer at a special event.

A catalyst is anything that precipitates a drastic change in a stock's current trend. It can be negative news that rattles investors and breaks upward momentum or good news that pushes the stock out of the doldrums.

Arbitrage Style / Relative Value style

Profits from perceived price inefficiencies between related securities.

The term "arbitrage" strictly means a riskless profit – seldom found in actual traded securities markets.

However, the term is used to also describe investment opportunities that have a relatively high probability of profit with relatively low downside.

- Fixed Income Arbitrage: Profits from price inefficiencies between fixed income securities
- Equity Arbitrage: Profits from price inefficiencies between equity securities (keeping a close balance between long and short positions)
- Convertible Arbitrage: Profits from price inefficiencies between convertible securities and their corresponding stocks
- Others: Statistical Arbitrage, Volatility Arbitrage, Regulatory Arbitrage
- Merger Arbitrage: Profits from price inefficiencies relating to companies involved in announced Mergers & Acquisitions activity; a typical position might involve buying the equity of an acquisition target, and hedging the investment by shorting an appropriate amount of the equity in the acquirer.
- Credit Arbitrage: Profits from relative value investments in corporate fixed income securities, such as purchasing the unsecured debt of a corporation while selling short the secured debt of the same corporation.

8.4 Hedge Fund Risks

- When it comes to risk management, there is no "one size fits all" for hedge funds.
- Depending on performance objectives, portfolio size, securities traded and investment strategy, different hedge funds will end up with different approaches to managing risk.
- That said, when considering how they want to manage risk, all funds need to consider four key tasks: defining risk; monitoring risk; controlling risk; and communicating risk.

Some of the major risks faced by hedge funds are:

1) Liquidity Risk
2) Strategy Risk
3) Performance Risk
4) Fraud Risk

Liquidity Risk

- Hedge funds are pooled investments that might trade in exotic financial instruments -- ones that are hard to sell on short notice. This is called illiquidity.
- Hedge funds don't want investors withdrawing money at inopportune times, forcing the fund to sell off illiquid assets at a loss to raise cash.
- Therefore, funds might limit the access to investment with various techniques to delay investor withdrawals.
- Sufficient cash position should be maintained

Strategy Risk

- Hedge funds regularly employ more than a dozen major investment strategies.
- Typically, a fund has one trading desk for each strategy it follows and offers separate funds for each strategy.

- Investors can therefore select certain strategies and avoid others, depending on their personal risk preferences.
- For instance, a strategy based on mergers and acquisitions might seem riskier to an investor than a different strategy based on, say, the best and worst performers in an industry
- Investors must be informed about the strategies followed and hedging tools be deployed

Performance Risk

- Even the best funds have bad years.
- Diversifying the investments in a fund of funds (FOF), which divides investment among a number of hedge funds in the hopes that a bad performance by one fund will be offset by a winning return from another.
- FOFs add yet another layer of fees to the already steep ones charged by hedge funds, but the justification is that a FOF does due diligence in picking the hedge funds to include in its portfolio, choosing ones that have good management and unusual expertise.

Fraud Risk

- Despite all risk management tools in-place hedge fund managers are not immune to frauds they face.
- Regular monitoring of the risk exposure is required.

8.5 Measures to Control Risk at Hedge Funds

1) Use of derivatives

- A financial derivative is a contract derived from the price of an underlying security. Futures, options, and swaps are all examples of derivatives. Hedge funds invest in derivatives because they offer asymmetric risk.
- Suppose a stock trades for $100, but the hedge fund manager expects it to rise rapidly. By purchasing 1,000 shares outright, they risk losing $100,000 if their guess is wrong and the stock collapses. Instead, for a tiny fraction of the share price, the manager purchases a call option on 1,000 shares. This gives them the option to purchase the stock at today's price at any time before a specified future date.
- If their guess is correct and the stock spikes, they exercise the option and make a quick profit. If they're wrong and the stock remains flat or worse, collapses, they simply let the option expire and the loss is limited to the small premium paid for it.

2) Diversification

- With more money flowing into the industry, trades have become increasingly crowded. Shifting into diverse, often esoteric asset classes and markets offers opportunities to enhance returns. Plus, it's a chance to demonstrate to today's more sophisticated investors—with their portfolio metrics and tighter oversight—that you're delivering value.
- Capital flow trends are another reason. Diversification is often spurred by investor queries. A multi-strategy approach also broadens hedge funds' appeal to a wider range of allocators, and gives managers the flexibility to pivot quickly to exploit often transient opportunities as they arise—a powerful advantage in volatile markets.

3) Leverage

- Leverage is the strategy of using borrowed money to increase return on an investment. If the return on the total value invested in the security (your own cash plus borrowed funds) is higher than the interest you pay on the borrowed funds, you can make significant profit. While leverage does not change the percentage rate of return (starting with $100 and ending with $115 dollars and starting with $1000 and ending with $1150 is still a 15% return in both cases), leverage can increase the total dollar value of return (a return of $15 is significantly less than a return of $150).
- Here's an example of how leverage can result in outsized returns. Let's say you have $100 of your own money, and you can borrow $1500 from the bank at an interest rate of 6%. Let's say you invest the entire $1600 amount in an investment, which you are confident will grow 15% in a year, and return the borrowed money plus interest at the end of a year. The value of the investment will be $1840 at the end of the year and you will pay the bank back $1500 + $90 = $1590, leaving you with a total of $250 and a net gain of $150 once you subtract the initial $100 you invested. That's a 150% return!
- The leverage ratio is defined as the number of dollars being borrowed for each dollar being invested. In the previous example, you borrowed $1500 and invested $100 of your own money; so, the leverage ratio was 15x.

4) Short selling

- It generally involves selling borrowed shares of a stock with the belief that the price will drop, at which point you'd buy shares at a lower price to repay what you borrowed (farther below). And it's not the province of just hedge funds or other large investment entities. Individual investors — for better or worse — can employ it, too, if their brokerage approves it.

8.6 Leverage and Hedge Funds

Leverage refers to the use of debt (borrowed funds) to amplify returns from an investment or project.

- Leverage results from using borrowed capital as a funding source when investing to expand the firm's asset base and generate returns on risk capital.
- Leverage is an investment strategy of using borrowed money—specifically, the use of various financial instruments or borrowed capital—to increase the potential return of an investment.
- Leverage can also refer to the amount of debt a firm uses to finance assets.
- The concept of leverage is used by both investors and companies.
- Investors use leverage to significantly increase the returns that can be provided on an investment.

- They lever their investments by using various instruments, including options, futures, and margin accounts.
- Companies can use leverage to finance their assets. In other words, instead of issuing stock to raise capital, companies can use debt financing to invest in business operations in an attempt to increase shareholder value.

Leverage Vs. Margin

- Although interconnected—since both involve borrowing—leverage and margin are not the same.
- Leverage refers to taking on debt, while margin is debt or borrowed money a firm uses to invest in other financial instruments.
- A margin account allows you to borrow money from a broker for a fixed interest rate to purchase securities, options, or futures contracts in the anticipation of receiving substantially high returns. You can use margin to create leverage.

Example:A company was formed with a Rs 200 Cr investment from investors, where the equity in the company is Rs 200 Cr—this is the money, the company can use to operate. If the company uses debt financing by borrowing Rs 1000 Cr, it now has Rs 1200 Cr to invest in business operations and more opportunity to increase value for shareholders.

Initial Capital	200 cr	Borrowed Capital	1000 cr
Annual return	10%	Total Capital	1200
Final return	**20 cr**	Annual return	10%
		Final return	**120 cr**

8.7 Hedge Funds and Leverage

Hedge funds use leverage in different ways like –

- Equity leverage
- Fixed income leverage
- Futures leverage
- Options leverage

1. Equity Leverage:

- The fund usually purchases stock and then uses the same stock as collateral to borrow even more and purchase even more stock
- The borrowing against stock is usually done in the form of a "repo" or repurchase agreement.
- This means that the borrower sells their stock worth $100 to the lender. The same borrower promises to buyback the share at $101 a week from now.
- Hence, the $1 is effectively an interest paid on the $100.
- However, in the meantime the title of the shares changes hands.

- This is to allow the lender to sell the shares without any legal hassles in case the borrower is unable to pay back the borrowed amount plus interest.

2. Fixed Income Leverage

- Fixed income leverage is very similar to equity leverage.
- The only difference is that the securities being used as collateral are fixed income securities like US Treasury bonds.
- These securities do not change in value as quickly as equities. Therefore, they are considerably less volatile and as a result lender will offer a very high loan to value ratio.
- Hence, when hedge funds are creating positions in fixed income securities, they can borrow money against the existing securities that they hold and magnify their position.

3. Futures Leverage

- Derivatives like futures which trade on the exchange provide an opportunity for hedge funds to create leverage.
- Futures allow hedge funds to take large positions using only 10% of the capital as margin money.
- The movements of the market are tracked, and margin needs to be added into the account in case the price of the security goes down.

4. Options Leverage

- Options are also traded on the exchange.
- This gives traders an opportunity to magnify their leverage without putting in much capital.
- For instance, if a fund were to buy an option worth $10, this would give them the same amount of control as $1000 would if they were to purchase the shares outright.
- This is because options provide traders with the right to but not the obligation to make a purchase at a given price.
- If the price of the stock does not rise high enough, the trader simply writes off the $10 investment in the option price.

Summary

Hedge funds are an important subset of the alternative investments space. Key characteristics distinguishing hedge funds and their strategies from traditional investments include the following:

1) lower legal and regulatory constraints.

2) flexible mandates permitting use of shorting and derivatives

3) a larger investment universe on which to focus

4) aggressive investment styles that allow concentrated positions in securities offering exposure to credit, volatility, and liquidity risk premiums

5) relatively liberal use of leverage

6) liquidity constraints that include lockups and liquidity gates; and

7) relatively high fee structures involving management and incentive fees.

Keywords

- **Global Macro Style -** This style tries to anticipate and capitalize on global macroeconomic events; this is usually considered a "top-down approach" to investing

- **Directional Style -** Directional style is hedge investments with exposure to the equity market.
- **Special Situations Style -** The fund profits from price inefficiencies caused by anticipated specific corporate events, such as bankruptcy, reorganization, divestitures, and legal situations.
- **Distressed Debt - C**ompanies trading at discounts because of bankruptcy or the threat thereof.
- **Diversification** - Diversification is a risk management strategy that mixes a wide variety of investments within a portfolio
- **Short selling** - In short selling, a position is opened by borrowing shares of a stock or other asset that the investor believes will decrease in value. The investor then sells these borrowed shares to buyers willing to pay the market price. Before the borrowed shares must be returned, the trader is betting that the price will continue to decline and they can purchase them at a lower cost.
- **Leverage** - Leverage or financial leverage is basically an investment where borrowed money or debt is used to maximize the returns of an investment, acquire additional assets or raise funds for the company.

Self-Assessment

Q1 Risk is defined as volatility of actual returns from _____.

A. Profit
B. Saving
C. Investment
D. Deposit

Q2 . _____ implies a situation where the future events are unknown.

A. Internal risk
B. External risk
C. Uncertainty
D. None of these

Q3 Which hedge fund strategy decides about its holdings primarily on the overall economic and political views of various countries

A. Directional style
B. Macro style
C. Event driven style
D. Stressed debt style

Q4 If a hedge manager believes the United States is headed into a recession_____ strategy will help him to make good returns in falling markets

A. Hedge
B. Short selling
C. Options
D. Buying low

Q5 A fundamental growth style of investing refers to____

A. Investing in companies with more earnings growth than the broader market
B. Investing in companies showing good growth in stock prices
C. Buying securities of companies having good sales growth
D. Investing in companies showing production growth

Q6 A hedge fund using a combination of investment strategies is applying_____

A. Directional style
B. Fundamental style
C. Multi strategy
D. Long-short strategy

Q7 Hedge funds focusing on 'distressed debt 'Specializes in companies trading at discounts because of bankruptcy or the threat thereof

A. Tue
B. False

Q8 When it comes to_____, there is no "one size fits all" for hedge funds.

A. risk management
B. profitability
C. cost cutting
D. fee structure

Q9 The key objective of a hedge funds is_____

A. maximizing investor returns
B. diversification
C. returns with risk management
D. saving taxes

Q10 Which measure is not used by the hedge funds to control risk?

A. Diversification
B. Derivatives
C. Short selling
D. Dividend distribution

Q11 Which among the following is not a way of hedge fund leverage?

A. Equity leverage
B. Fixed income leverage
C. Options leverage
D. Credit leverage

Q12 The fund usually purchases stock and then uses the same stock as collateral to borrow even more and purchase even more stock

A. True
B. False

Q13 Under fixed income leverage what type of securities are kept as a collateral?

A. Bonds
B. Equity
C. Commodity
D. Gold

Q14 which of the following financial product can be used to take a multi-fold leveraged position?

A. Common stocks
B. Futures
C. Oil bonds
D. Currency

Q15 _____ gives traders an opportunity to magnify their leverage without putting in much capital.

A. Fixed deposits
B. Stocks / shares
C. Option
D. Gold

Answers for Self Assessment

1.	C	2.	C	3.	B	4.	B	5.	A
6.	C	7.	A	8.	A	9.	C	10.	D
11.	D	12.	A	13.	A	14.	B	15.	C

Review Questions

Q1 What are the various hedge fund styles that a fund manager can use as per the need and changes in economic conditions?

Q2 Global macro style of hedge fund is used by most of the fund managers. Elaborate this style of hedge fund management and the key considerations that a fund manager must follow under this style.

Q3 Write a note on distresses debt. What kind of businesses are on the radar of the hedge fund managers from the perspective of distresses debt?

Q4 How leverage can help in bringing multi-fold returns for a portfolio? What are the ways to leverage a portfolio? Highlight the risk aspects of leverage.

Q5 Highlight some of the major risks faced by the hedge funds. What steps can be taken to minimize such risks?

Q6 How diversification can be used in the context of a portfolio? What are the benefits of diversification?

Q7 What is the difference between leverage and Margin?

Q8 What the different ways to use arbitrage by a hedge fund manager? How arbitrage works and helps to minimise the portfolio risks?

Further Readings

https://thehedgefundjournal.com/event-driven-strategies/

https://www.thebalance.com/distressed-debt-investing-and-how-it-works-4176037

https://caia.org/sites/default/files/3investing_in_distressed_debt_caia_aiar_q2_2012.pdf

https://thehedgefundjournal.com/distressed-private-equity/

https://online.hbs.edu/blog/post/distressed-debt-investing

https://www.hec.edu/en/knowledge/articles/activist-hedge-funds-good-some-bad-others

https://www.blueleaf.com/articles/how-leverage-works-in-investments/

https://www0.gsb.columbia.edu/faculty/aang/papers/HFleverage.pdf

Unit 09: Portfolio Risk Management

CONTENTS

Objectives

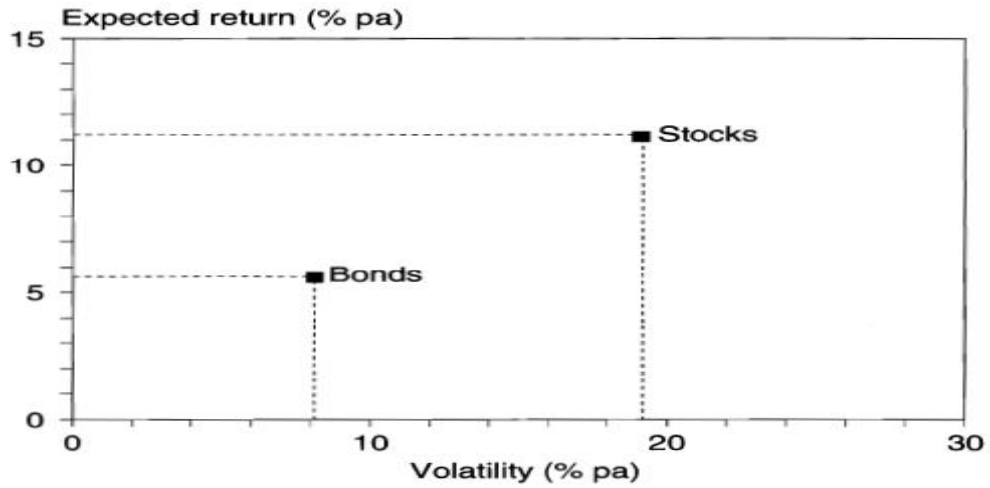
- Understand risk adjusted performance and how to calculate it
- Understand the portfolio performance attributes based on returns/ positions
- Take investment decisions on portfolio performance by their holding pattern or return parameters
- Calculate portfolio risk

Introduction

Risk is inseparable from return. Every investment involves some degree of risk, which is considered close to zero in the case of a U.S. T-bill or very high for something such as emerging-market equities or real estate in highly inflationary markets. Risk is quantifiable both in absolute and in relative terms. A solid understanding of risk in its different forms can help investors to better understand the opportunities, trade-offs, and costs involved with different investment approaches. Inadequate risk management can result in severe consequences for companies, individuals, and the economy.For example, the subprime mortgage meltdown in 2007 that helped trigger the Great Recession stemmed from bad risk-management decisions, such as lenders who extended mortgages to individuals with poor credit; investment firms who bought, packaged, and resold these mortgages; and funds that invested excessively in the repackaged, but still risky, mortgage-backed securities (MBS).

9.1 Risk-Adjusted Performance Measurement

- It's very important to know how performance can be adjusted for risk.
- Risk adjusted returns give us an idea whether returns are delivered in an asset / portfolio due to taking higher risk or due to the expertise of the investor / portfolio manager.



When analyzing risk, we look at the factors that may cause investment funds to fail in meeting their objectives.

Listed below are some of the risks that are considered when selecting and monitoring investment managers:

1) Volatility of return;
2) Lack of liquidity in assets;
3) Credit risk;
4) Sensitivity to the market i.e., beta and duration;
5) Investment style;
6) Sector and stock specific risk.

Here, we will discuss one of the above risk measures i.e., the volatility of return and how it is used as a component in the calculation of some risk-adjusted performance ratios. These ratios are popular in investment practice as they attempt to capture the consistency of a portfolio's performance in terms of its risk (or volatility) in one single number.

Sharpe Ratio

- The Sharpe ratio calculates how well an investor is compensated for the risk they've taken in an investment.
- When comparing two different investments against the same benchmark, the asset with the higher Sharpe ratio provides a higher return for the same amount of risk or the same return for a lower risk than the other asset.
- Developed by American economist William F. Sharpe, the Sharpe ratio is one of the most common ratios used to calculate the risk-adjusted return.
- Sharpe ratios greater than 1 are preferable; the higher the ratio, the better the risk to return scenario for investors.

$$\textbf{Sharperatio} = \frac{R_p - R_f}{\sigma p}$$

Rp = Return on portfolio

Rf = Risk free rate of return

σ**p** = Standard Deviation of the Portfolio's Excess Return

Mutual Fund A returned 12% over the past year and had a standard deviation of 10%, Mutual Fund B returns 10% and had a standard deviation of 7%, and the risk-free rate over the time period was 3%. The Sharpe ratios would be calculated as follows:

- Mutual Fund A: (12% - 3%) / 10% = **0.9**
- Mutual Fund B: (10% - 3%) / 7% = **1**
- Even though Mutual Fund A had a higher return (12%), Mutual Fund B had a higher risk-adjusted return i.e.,1, meaning that it gained more per unit of total risk than Mutual Fund A.

Calculating Sharpe Ratio:

From the given information calculate the Sharpe ratio of the portfolio(s) and decide which one is better?

A) Average annual return on portfolio 15%

Risk free return (364-day T Bills) 5%

Volatility (standard deviation) of portfolio 12%

B) Average annual return on portfolio 22%

Risk free return (364-day T Bills) 5%

Volatility 16%

Solution:

A) (.15-.05)/.12 = 0.83

B) (.22-.05)/.16 = 1.06

Treynor Ratio

- The Treynor Ratio is a portfolio performance measure that adjusts for systematic risk.
- In contrast to the Sharpe Ratio, which adjusts return with the standard deviation of the portfolio, the Treynor Ratio uses the Portfolio Beta, which is a measure of systematic risk.
- These ratios are concerned with the risk and return performance of a portfolio and are a quotient of return divided by risk.

$$Treynor\ Ratio = \frac{Portfolio\ Return - Risk\ Free\ Rate}{Portfolio\ Beta}$$

$$\boldsymbol{Treynor\ ratio = \frac{R_p - R_f}{\beta_p}}$$

Where:

T = Treynor ratio

Rp = Portfolio return

Rf = Risk free rate

βp = Beta of the portfolio

- The Treynor ratio is calculated the same way as the Sharpe ratio, but uses the investment's beta in the denominator.
- As is the case with the Sharpe, a higher Treynor ratio is better.

Taking an example and assuming that each of the funds has a beta of 0.75, the calculations are as follows:

- Mutual Fund A: (12% - 3%) / 0.75 = 0.12
- Mutual Fund B: (10% - 3%) / 0.75 = 0.09
- Here, Mutual Fund A has a higher Treynor ratio, meaning that the fund is earning more return per unit of systematic risk than Fund B.

Jensen's Alpha

- Jensen's Alpha is used to describe the active return on an investment.
- It measures the performance of an investment against a market index benchmark that represents the market movement.
- The alpha shows the performance of the investment after its risk is considered.

$$Jansen\ alpha = R_p - [R_f + \beta(R_m - R_f)]$$

Where:

- Rp = Expected Portfolio Return
- Rf = Risk-free Rate
- Beta(p) = Portfolio Beta
- Rm = Market Return

Interpretation (Jensen's Alpha)

- Alpha < 0 means the investment was too risky for the expected return.
- Alpha = 0 means the return earned is sufficient for the risk taken.
- Alpha > 0 means the return earned is greater than the assumed risk.

Assume a portfolio realized a return of 17% in the previous year. The market index returned 12.5%. The beta is 1.4 and the risk-free rate is 4%.

Jensen's Alpha = 17- [4+1.4*(12.5-4)]

= 17-[4+ 11.9]

=17-(15.9) = **1.1**%

An alpha of 1.1% means the investor receives a high return for the risk assumed over the year.

9.2 Returns Based and Position Based Performance Attributes

Holdings-based style analysis is a bottom-up approach in which the characteristics of a fund over a period are derived from the characteristics of the securities it contains at various points in time over the period. Holdings-based style analysis requires a security database that contains the characteristics of each security in the investable universe of the funds being analyzed. It also requires a record of the security holdings of each fund being analyzed. The databases needed to perform holdings-based style analysis are expensive to obtain and keep up to date. Therefore, there are only a handful of investment research firms that have the needed datasets to perform holdings-based style analysis. Returns-based style analysis is a low-cost alternative to holdings-based style analysis.

- Investment style is now the dominant principle used to classify, analyze, and deploy equity or debt portfolios.

- Investment research firms classify funds for ratings and other purposes into categories based on investment style.
- Institutional investors, consultants, financial investors, and individuals use investment style as a criterion for selecting funds, either to achieve diversification or make style bets.
- Here, the focus is to get the best returns in a comparative universe.
- When investors look at 'returns' only, before making an investment decision then portfolio holdings take the backseat.
- Portfolio managers focus is also on delivering returns instead of the portfolio quality.
- In a broad market rally this style may prove to be well rewarding than a narrow market.

Small Cap Fund »	Crisil Rank	AUM (Cr)	1 M	6 M	1 Y	3 Y	5 Y
Union SCF -DP (G)	4★	15.71	6.20%	39.60%	95.70%	22.10%	17.10%
Union SCF -RP (G)	4★	402.49	6.20%	39.00%	94.10%	21.30%	16.20%
Axis Small Cap Fund - Direct (G)	5★	1,529.00	5.40%	34.30%	88.30%	28.60%	22.50%
SBI Small Cap Fund - D (G)	4★	2,317.48	3.60%	27.90%	86.50%	22.20%	23.90%
Axis Small Cap Fund (G)	5★	2,541.05	5.20%	33.20%	85.20%	26.80%	20.90%

Returns Based Style:

Scheme Name	Crisil Rank	AUM (Cr)	1W	1M	3M	6M	YTD	1Y	2Y	3Y	5Y
DSP India T.I.G.E.R. Fund - Direct Plan - Growth Sectoral/Thematic	3★	1,109.52	0.14%	5.01%	20.69%	28.86%	43.55%	83.67%	25.80%	14.30%	13.56%
L&T Infrastructure Fund - Direct Plan - Growth Sectoral/Thematic	3★	1,238.37	-0.30%	3.35%	18.02%	23.84%	39.11%	72.02%	23.54%	9.04%	13.53%
IDFC Infrastructure Fund - Direct Plan - Growth Sectoral/Thematic	2★	622.94	1.60%	5.75%	26.39%	39.72%	60.02%	102.80%	32.04%	13.85%	16.24%
ICICI Prudential Infrastructure Fund - Direct Plan - Growth Sectoral/Thematic	2★	1,542.31	1.58%	4.26%	16.39%	27.58%	40.97%	79.06%	24.13%	13.93%	12.77%
Franklin Build India Fund - Direct - Growth Sectoral/Thematic	2★	1,032.26	1.33%	3.04%	18.34%	20.87%	35.94%	79.73%	25.32%	14.42%	14.57%
Aditya Birla Sun Life MNC Fund - Direct Plan - Growth Sectoral/Thematic	2★	4,112.50	-0.04%	1.89%	7.86%	9.77%	12.07%	34.55%	19.76%	9.08%	10.56%
Aditya Birla Sun Life Infrastructure Fund - Direct Plan - Growth Sectoral/Thematic	2★	511.91	-0.08%	4.57%	21.17%	26.43%	43.39%	90.25%	29.49%	12.71%	12.40%
ICICI Prudential Exports and Services Fund - Direct Plan - Growth Sectoral/Thematic	1★	824.04	2.67%	6.14%	13.75%	16.20%	24.81%	56.06%	26.09%	13.90%	12.80%
SBI Magnum Equity ESG Fund - Direct Plan - Growth Sectoral/Thematic	1★	3,922.43	2.18%	3.55%	12.58%	10.49%	19.34%	47.46%	24.00%	15.33%	14.16%
HSBC Infrastructure Equity Fund - Direct Plan - Growth Sectoral/Thematic	1★	104.73	-0.30%	4.49%	19.65%	28.49%	45.45%	88.36%	27.74%	5.96%	7.29%
HDFC Infrastructure Fund - Direct Plan - Growth Sectoral/Thematic	1★	573.41	-1.09%	3.79%	21.91%	22.37%	36.28%	82.17%	14.55%	3.59%	4.53%

Position Based Performance:

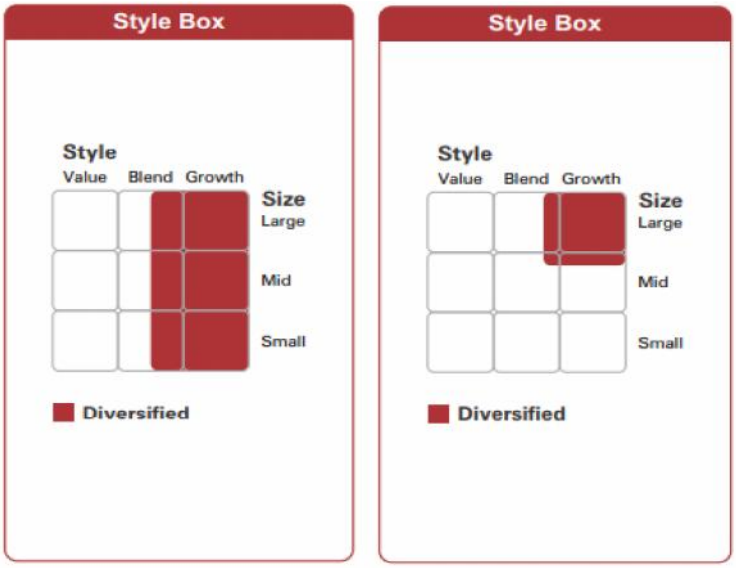
- When performance of a portfolio is measured based on the portfolio holdings, their quality, and their respective weights in a portfolio.
- Sometimes a fund manager may keep a very few stocks in the portfolio indicating a concentrated approach which seems to be quite risky in a market fall but highly rewarding in an up-move.

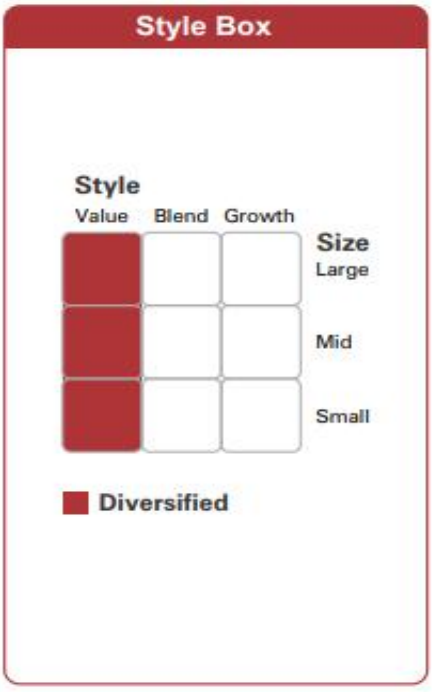
- Positions may belong to a specific sector(s) as per the outlook of the fund manager.

Position Based Style Analysis:

- Holdings-based style analysis requires two sets of data.
- First, we need a security database that contains the characteristics of each security in the investable universe of the funds being analyzed.
- Second, we need a record of the security holdings of each fund being analyzed.
- Each database must contain the requisite data for each time being studied.

Position Based Style:





9.3 Risk Budgeting

Risk budgeting is a type of portfolio allocation in which the risk of the portfolio is distributed among various asset classes with the objective of maximizing total portfolio returns while keeping the total portfolio risk at the minimum.

The most common approach to portfolio allocation is based on capital i.e., how much proportion of the capital should go in stocks or bonds or other such asset classes.

For example, if I have $100 with me and invest $70 in stocks and $30 in bonds, we know our capital allocation to each asset class, but we have no idea of how much risk quantitatively we have assigned to stocks and how much to bonds.

In risk budgeting, the investor has to first calculate what proportion of the overall portfolio risk each asset class represents and then reverse calculate the proportions of each asset class so as to minimize the total portfolio risk.

Risk Budgeting Calculation

Risk budgeting primarily used three steps i.e., risk measurement, risk attribution, and risk allocation.

Let us look at an example to understand how risk budgeting works. Suppose we have two asset classes X & Y, with equal weights and the following five returns values.

	A	B	C
2	X	Y	Portfolio Returns
3	4.00%	6.00%	5.00%
4	6.00%	3.00%	4.50%
5	8.00%	5.00%	6.50%
6	9.00%	11.00%	10.00%
7	11.00%	12.00%	11.50%

- The portfolio returns can be easily calculated using the weighted average method considering 50:50 weights (Wx, Wy) of each asset class.
- Next, we calculate the standard deviation (which is a measure of risk or volatility) of each asset class (σ_x,σ_y)

  Next, we calculate the standard deviation (which is a measure of risk or volatility) of each asset class (σ_x,σ_y), and Correlation

	A	B	C
2	X	Y	Portfolio Returns
3	4.00%	6.00%	5.00%
4	6.00%	3.00%	4.50%
5	8.00%	5.00%	6.50%
6	9.00%	11.00%	10.00%
7	11.00%	12.00%	11.50%

	A	B	C	D
9		X	Y	
10	Average Return	7.60%	7.40%	
11	Standard Deviation	2.42%	3.50% →	STDEVP(B3:B7)
12	Corelation	0.752246166 →		CORREL(A3:A7,B3:B7)
13	Weights	50%	50%	

The calculation of portfolio standard deviation (σ_p) using the below formula can be done as follows –

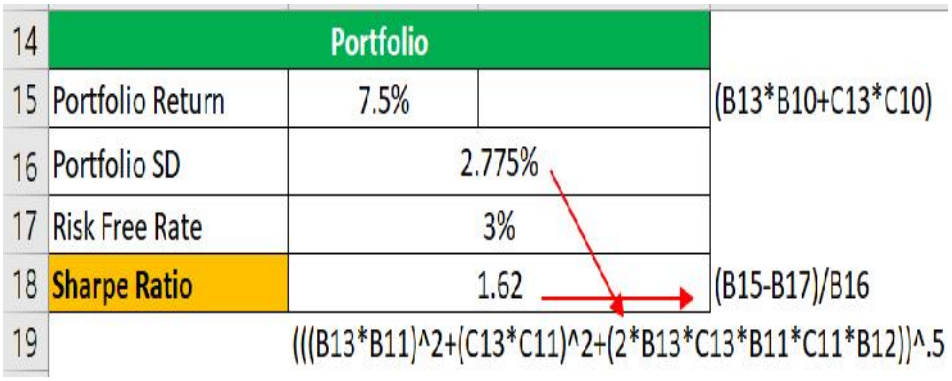
	A	B	C	D
2	X	Y	Portfolio Returns	
3	4.00%	6.00%	5.00%	
4	6.00%	3.00%	4.50%	
5	8.00%	5.00%	6.50%	
6	9.00%	11.00%	10.00%	
7	11.00%	12.00%	11.50%	
8				
9		X	Y	
10	Average Return	7.60%	7.40%	
11	Standard Deviation	2.42%	3.50% →	STDEVP(B3:B7)
12	Corelation	0.752246166 →		CORREL(A3:A7,B3:B7)
13	Weights	50%	50%	
14		Portfolio		
15	Portfolio Return	7.5%		(B13*B10+C13*C10)
16	Portfolio SD	2.775%		
17	Risk Free Rate	3%		
18	Sharpe Ratio	1.62 →		(B15-B17)/B16
19		(((B13*B11)^2+(C13*C11)^2+(2*B13*C13*B11*C11*B12))^.5		

The calculation of portfolio standard deviation (σ_p) using the below formula can be done as follows –

	A	B	C	D
14		Portfolio		
15	Portfolio Return	7.5%		(B3*B10+C3*C10)
16	Portfolio SD	2.775%		
17	Risk Free Rate	3%		
18	Sharpe Ratio	1.62 →		(B15-B17)/B16
19		(((B13*B11)^2+(C13*C11)^2+(2*B13*C13*B11*C11*B12))^.5		

- $\sigma_p^2 = (Wx*\sigma_x)^2 + (Wy*\sigma_y)^2 + 2*Wx*\sigma_x*Wy*\sigma_y*Corr_{xy}$
- = (50%*2.42%) ^2+(50%*3.50%) ^2+(2*50%*50%*2.42%*3.50%*0.752246166)) ^0.5
- **Portfolio SD = 2.775%**
- The objective of risk budgeting is to minimize the overall portfolio risk σ_p by varying the portfolio weights Wx and Wy.
- The most obvious way to achieve this is by decreasing the proportion of riskiest assets.
- But this will affect the return of the portfolio because the riskiest asset often has the highest return.
- To solve this issue, instead of minimizing portfolio standard deviation, we minimize a ratio called Sharpe Ratio, which is given by the following formula:

- **SR = (Rp – Rf) / σ_p,** where Rp and Rf are overall portfolio return and risk-free return, respectively.



14	Portfolio		
15	Portfolio Return	7.5%	(B13*B10+C13*C10)
16	Portfolio SD	2.775%	
17	Risk Free Rate	3%	
18	Sharpe Ratio	1.62	(B15-B17)/B16
19		(((B13*B11)^2+(C13*C11)^2+(2*B13*C13*B11*C11*B12))^.5	

- Sharpe ratio, in a crude way, signifies the return per unit risk of a portfolio.
- Hence, we minimize the Sharpe Ratio of a portfolio (SR) by varying the proportion of various asset classes.
- Sharpe ratio is a relative measure of risk-adjusted return. If considered in isolation, it does not provide much information about the portfolio performance.

Advantages of Risk Budgeting

- Risk budgeting helps an investor to optimize portfolio performance and, at the same time, maintaining the risk with which he is comfortable.
- It is a powerful technique because it accounts not only for asset classes but also for the correlation effects of the various asset classes.
- Risk budgeting can also account for the effects of an external factor on a portfolio and its interaction with various asset classes, which is not possible in capital budgeting.

Limitations of Risk Budgeting

- The primary limitation of risk budgeting is its operational difficulty. Active portfolio management using risk budgeting requires continuous data and statistical analysis.
- Secondly, risk budgeting requires technical expertise, which is very difficult for most of the retail investors to attain or make time for, and hence this method is less acceptable among the masses.

9.4 Risk Measurement

- Risk measurement is a critical part of investing because it allows one to quantify the level of uncertainty in the portfolio.
- Portfolio managers rely on several risk metrics when making asset allocation or security selection decisions.

Risk Measurement Categories

- When it comes to investing, risk can be quantified in several ways, with the most common measurements being standard deviation, Sharpe ratio, and beta.
- These and other measurements can be further broken down into two categories:
    - Absolute risk metrics
    - Relative risk metrics

- In each case, risk measures quantify uncertainty of an investment outcome over a specific time period.

Absolute Metrics

Absolute risk metrics measure the risk of financial assets in absolute terms, i.e., not in relation to other assets or market returns.

They include:

a. Portfolio Standard Deviation
b. Value-at-Risk (VaR)
c. Shortfall Risk

(A) Portfolio Standard Deviation

- Portfolio standard deviation is one of the most widely used metrics for evaluating risk.
- Mathematically, it refers to the extent of dispersion for a population of observations.
- This measure provides valuable insight if goal is to look at investment return volatility.
- However, if it needs to determine whether returns are below average, standard deviation alone is insufficient.

(B) Value-at-Risk (VaR)

- The value-at-risk metric examines the potential of extreme loss in the value of a portfolio over a certain timeframe and for a given level of confidence.
- VaR is calculated using a specified level of loss, a time period covering the risk assessment and a confidence interval.
- Typically, confidence intervals are set at either 1% probability or 5% probability, which are in turn called 99% or 95% VaR, respectively.
- If a portfolio has a one-day 95% VaR of $100,000, there's a 5% probability that the portfolio will lose more than $100,000 over a one-day period.

(C) Shortfall Risk

- A shortfall risk is the likelihood that an investment's value will be less than what is needed to meet the portfolio's objectives.
- Using data simulation, shortfall risk may determine,
- For example, an investment portfolio has a 30% chance of being exhausted before the end of the liability funding period.

Relative Metrics

- Relative risk metrics measure volatility and the comparable risk of potential investments relative to the broader market.
- They include:
  a) Tracking error
  b) Sharp ratio
  c) Information ratio
  d) Beta
  e) Treynor ratio

(A) Tracking Error

- When it comes to investing, tracking error measures the standard deviation of excess returns compared with a common benchmark. In other words, it measures the volatility of excess returns of a security relative to a benchmark.
- For example, a fund with a tracking error of 10 basis points relative to its benchmark should return between 9.9% and 10.1% annually if the benchmark returns 10% each year.

(B) Sharpe Ratio

- The Sharpe ratio represents the risk-adjusted return of a portfolio.
- It measures how much return is being earned for each unit of risk assumed.
- If the ratio is negative, it means the portfolio underperforms risk-free assets, such as Treasury bills.

(C) Information Ratio

- The information ratio is another risk metric used by portfolio managers to analyze the risk-adjusted return of an investment versus a benchmark.
- It is calculated by dividing an asset's excess return byits tracking error relative to the benchmark.

(D) Beta

- Beta is another commonly used risk ratio that measures volatility of an investment relative to the market as a whole.
- It is expressed as a positive integer, with 1 representing a perfect match between security and the overall market's performance.
- Any number above that indicates that the investment in question will have greater volatility than the overall market.

(E) Treynor Ratio

- The Treynor ratio measures the risk-adjusted return of a portfolio relative to the overall market.
- It essentially compares an investment's excess return relative to a risk-free asset (Treasury bills) divided by the asset's beta.
- This metric is only useful if we assume that the portfolio manager has accounted for unsystematic risk (i.e., company-level risk).

Summary

"Risk-adjusted returns" is one of the most basic premises in finance, but one that few investors truly understand. A risk-adjusted return is a measure that puts returns into context based on the amount of risk involved in an investment. In short, the higher the risk, the higher return an investor should expect.

Risk is also an opportunity When it comes to investments, just like in life, the higher risk you take, the more the chances that you'll make more returns. So don't simply ignore an investment option which strikes you as risky. Instead, evaluate how much risk you are actually willing to take, and if you are considering said risky product, then also evaluate how much of your portfolio should be invested at such risk levels. Investing should be based on data and facts, and how much risk you are taking to get the returns you aim for. Assessing the risk-return link will give you an idea about the level of possibility of actually making money on a given investment or suffering a loss. This will help you make informed choices and reduce the element of chance from your portfolio.

Keywords

- Risk-adjusted returns help you measure performance, volatility, index alignment and quality.
- Standard deviation is an easy way to measure volatility.
- Examining risk-adjusted returns is a good measure of fund manager performance.

Self Assessment

Q1Risk adjusted returns give us an idea whether returns are delivered in an asset / portfolio due to taking higher risk or due to the_____.

A. Expertise of the investor / portfolio manager

B. Sudden movement in the asset prices

C. Luck factor

D. Political factors affecting the asset prices

Q2A portfolio has returned 15% returns in the past year and had a standard deviation of 8%, the risk-free rate over the same time period was 4%. The Sharpe ratios would be…

A. 1.375

B. 2.275

C. 0.175

D. 3.175

Q3. Which of the following is the variability of return on stocks or portfolios associated with chances in return on the market as a whole?

A) Systematic risk

B) Standard deviation

C) Unsystematic risk

D) Coefficient of variation

Q4.Sharp ratio and the Treynor ratio measures which of the following?

A) Standard deviation

B) Risk adjusted returns

C) Beta

D) Alpha

Q5.Jensen's alpha focuses on_____

A) Systematic risk

B) Unsystematic risk

C) Political risk

D) Legal risk

Q6.Returns based performance attributes would focus on

A. Portfolio return

B. Portfolio diversification

C. Sector specific positions

D. Risk aspects

Q7.Which of the following risk factors needs to be considered before taking investment decisions?

A. Volatility of return;

B. Lack of liquidity in assets;

C. Sensitivity to the market i.e., beta and duration;

D. All of the above

Q8.An investment proposal should be judged and accepted, where….

A. A return equal to the return require by the investor

B. A return more than required by investor

C. A return less than required by investor

D. None of Above

Q9.The conventional measure of dispersion is?

A) A probability distribution

B) The expected return

C) Coefficient of variation

D) The standard deviation

Q10. Suppose two portfolios have the same average returns, same standard deviation ofreturns but portfolio A has a lower Beta than portfolio B. According to the Treynor measurethe performance of portfolio A_____.

A. Is better than the performance of portfolio B.

B. Is the same as the performance of portfolio B

C. Is poorer than the performance of portfolio B

D. Cannot be measured as data is insufficient

Q11.Risk budgeting is a type of portfolio allocation in which the risk of the portfolio is distributed among various_____

E. Risk factors

F. Asset classes

G. Fund managers

H. None of the above

Q12. The objective of maximizing total portfolio returns should be complemented by keeping the total portfolio risk at the_____

A. Maximum

B. Minimum

C. Zero

D. None of the above

Q13.The rate of return you earn on an investment before adjusting for inflation is called the_____ rate?

A) Nominal

B) Real

C) Premium

D) Coupon

Q14.The additional return we must expect to receive for assuming risk?

A. Risk discount

B. Risk premium

C. Par risk

D. Risk free rate of return

Q15.The total risk is calculated by adding Unsystematic risk with

A. Systematic risk

B. Market risk

C. Country specific risk

D. All of the above

Q16.If we multiply each possible outcome by its probability of occurrence and then sum these products then we get?

A. Variance

B. Expected Rate of Return

C. Standard Deviation

D. Co-efficient of Variation

Q17. Which among the following is not a common risk measurement tool?

A. Standard deviation

B. Sharp ratio

C. Expense ratio

D. Beta

Q18.Of the following four investments, _____ is considered the safest?

A. Commercial paper

B. Corporate bonds

C. Certificate of deposit

D. Treasury bills

Q19.If the future return on common stock is 14% and the rate on T-bonds is 5% then the current market risk premium will be

A. 0.19

B. 0.09

C. 9

D. 19

Q20.The Treynor ratio measures the risk-adjusted return of a portfolio relative to the_____

A. Overall market
B. Other competing portfolios
C. Risk free asset class
D. Government bonds

Answers for Self Assessment

1.	A	2.	A	3.	A	4.	B	5.	B
6.	A	7.	D	8.	B	9.	D	10.	A
11.	B	12.	B	13.	A	14.	B	15.	D
16.	B	17.	C	18.	D	19.	B	20.	A

Review Questions

1. What do you understand by the term risk? What are the different ways to calculate risk related to investments?
2. What is the concept of risk adjusted performance? How does it help to take better decisions regarding investment?
3. Calculate the Sharpe ratio of a portfolio where average annual return on portfolio is 13%,risk free return (364-day T Bills) 4% and the volatility (standard deviation) of portfolio is 10%
4. What are the absolute and relative risk metrics? Elaborate all the metrics in brief.
5. What is the usefulness of tracking error? Why it is important to watch the tracking error of index funds?
6. What is the significance of calculating VaR (value at risk) at 99% confidence level? How it is different from a confidence level of 95%?

Further Readings

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4. https://www.wallstreetmojo.com/risk-adjusted-returns/
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Unit 10: Operational Risk Management

CONTENTS

Objectives

- Identify Operational Risks
- Manage Operational Risks
- Understand implications of implementing operational risk management

Introduction

Operational risks come in many forms and can cause losses of almost any size. The losses can be insignificantly small or large enough to destroy an institution almost overnight. Just as the term "operational risk" is relatively new, the methods and strategies for managing it are similarly new and still developing. To date, these operational risk management strategies have primarily involved measuring past operational risks and allocating capital to meet minimum regulatory capital requirements and, if possible, purchasing insurance or some other risk-transfer product. When dealing with operational risk, the organization has to consider every aspect of all its objectives. Since operational risk is so pervasive, the goal is to reduce and control all risks to an acceptable level. Operational Risk Management attempts to reduce risks through risk identification, risk assessment, measurement and mitigation, and monitoring and reporting while determining who manages operational risk.

Identification &Management of Operational Risks

The most important aspect in business enterprises is the identification of the various operational issue which brings in various risks and lead to the losses which may be financial or non-financial in nature. Operational risk is the risk of loss resulting from ineffective or failed internal processes, people, systems, or external events that can disrupt the flow of business operations. The losses can be directly or indirectly financial. For example, a poorly trained employee may lose a sales

opportunity, or indirectly a company's reputation can suffer from poor customer service. Operational risk can refer to both the risk in operating an organization and the processes management uses when implementing, training, and enforcing policies

10.1 Operational Risks

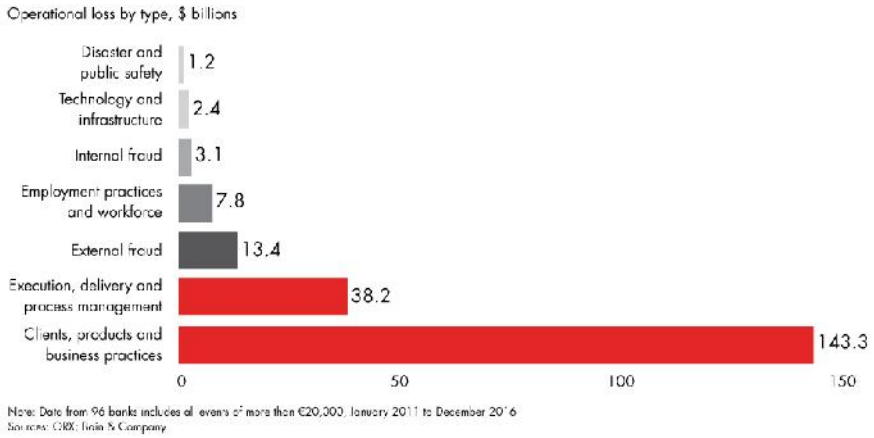
- Operational risk summarizes the uncertainties and hazards a company faces when it attempts to do its day-to-day business activities within a given field or industry.
- Operational risk is the risk of loss that stems from inadequate or failed internal systems, internal controls, procedures, or policies due to employee errors, breaches, fraud, or any external event that disrupts a financial institution's processes.
- Operational risk, which includes cybersecurity risk, is one of the most critical risks that financial institutions have to manage and evaluate.
- In the years since the global financial crisis, the financial services sector has become ever more aware of the need to manage operational risk.
- Although financial institutions have established advanced systems to control financial risk, including credit risk, liquidity risk, and market risk, they haven't been able to deal with operational risk effectively.

10.2 Some key Operational Risks inFinancial Industry

- Cybersecurity risks - ransomware and phishing
- Third-party risks - risks associated with the vendors, suppliers, and contractors
- Internal fraud - misappropriation of assets, forgery, tax non-compliance, bribes, and theft etc.
- Business disruption and systems failures - Hardware or software system failures, power failures, and disruption in telecommunications
- External fraud - check fraud, theft, hacking, breaching system security, and data theft etc.
- Missed deadlines,
- Accounting or data entry errors,
- Vendor disagreements,
- Inaccurate client records, and
- Loss of client assets through negligence.

Figure 1

Major banks lost nearly $210 billion from operational risk events from 2011 to 2016, mostly from client interactions and process management

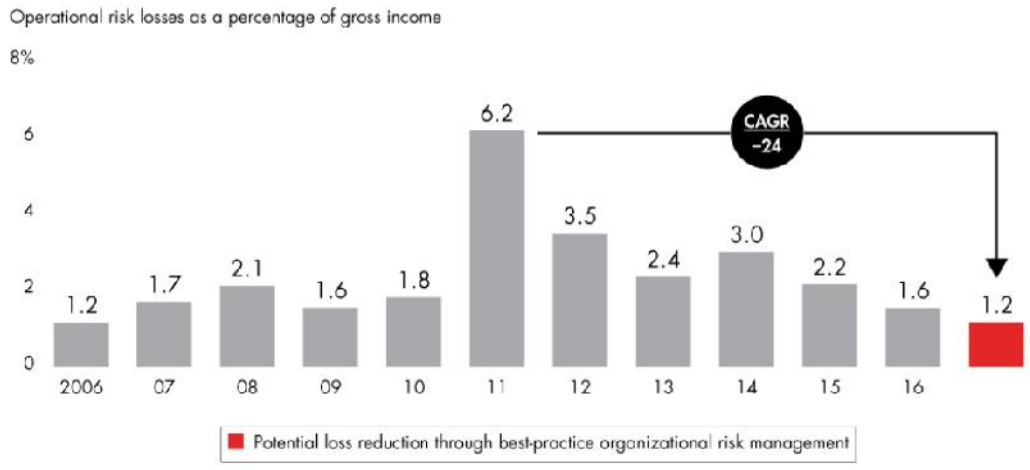


Note: Data from 96 banks includes all events of more than €20,000, January 2011 to December 2016
Sources: ORX; Bain & Company

10.3 How to Reduce Operational Risks?

- Managing Equipment Failures
  - Safeguard information
  - Make sure all equipment works properly
  - Ensure alternate plans are in place in the event of a failure
- Keep Strong Business to Business Relationships
- Quantify and prioritize risks - in terms of probability and severity & costs - benefits
- How to reduce Operational Risks?
- Having Adequate Insurance
- Know the Regulations
- Establish appropriate key performance indicators to monitor and assess performance.
- Reinforce the importance of risk management through regular communications

Improved operational risk management has helped major banks cut their losses in recent years



Note: Data includes all events of more than €20,000
Sources: ORX; Bain & Company

10.4 Managing Operational Risks

To Develop Strong ORM Programs, Organizations Should

- **Establish ORM as an integral function:** Establishing ORM as a central function and promoting firm-wide
- **Leverage technology for change, not simply reporting:** Technology can increase ORMs value to the business
- **Let ORM stand alone:** One of the main functions within an operational risk program is capturing and aggregating operational risk data.
- **Focus ORM on risk, not rule breaking**
- **Position ORM as a partner, not a competitor:** The effectiveness of an ORM team is, in part, dependent on its ability to partner with other functions within the organization.

10.5 Operations Risk Management in Financial Institutions

The risk management process is as follows -

1) Setting up a Risk Identification Mechanism

- Identify the risks posing a challenge
- Understand modern day challenges (Technology)
    - the development of technology,
    - the use of mobile-based banking applications for carrying out transactions,
    - the development of Artificial Intelligence (AI),
    - IoT (Internet of things), and
    - machine learning processes would increase the operational problems in the bank.

For example- by using a loan software that has Artificial Intelligence enabled in it, the bank can understand the borrowing behaviour of specific borrowers and predetermine whether to provide the loan or not.

Understanding the market using predictive technologies;

Consumer behaviour analysis;

Technology not only helps the bank in becoming digital but also helps in increasing the amount of vigilance that is used in Banking Software;

Prioritize their banking and business goals faster thus saving excess time which is used in traditional banking processes; and

Use of these technologies also improves the overall corporate governance framework of the bank.

Using such technologies, operational risks in banking processes can be effectually managed.

2) Risk Analysis and Measurement

risks are measured based on the following basis:

- Market Risks
- Lending Risks
- Corporate Governance
- Transparency
- Frauds

- Changes in technology
- Development of banking software on smartphones
- Customer Satisfaction

3) Development of Solutions

- Once risks are identified and measured on the potential impact, solutions are developed to reduce or eradicate the risk.
- if there is a technological problem that poses as a risk in a bank, it can be solved by having proper support in technical processes
- If there are risks related to fraud, then there has to be useful systems in place to reduce the number of frauds that occur in the banking process.
- **For example**- consider the market-related risks in a bank. Developing effective risk mechanisms in place can reduce the amount of damage caused by the market risks.

4) Implementation

- After solutions are developed, to understand the risks which affect the bank, effective implementation mechanisms are required.
- Without effective implementation and auditing, there will be no scope for improvement.

5)Proper Monitoring

- External monitoring processes can be conducted by an independent consultant performing the features such as the internal audit process for the bank.
- By using external audit processes in banking, the banks can ensure that there is independence as the relationship maintained by the external consultant would be related to the beneficiary and fiduciary.
- Professionalism will be preserved if this relationship subsists in the banking process.

10.6 Classification of internal Operational Risks

Internal Risks		
People	**Processes**	**Systems**
Employee collusion/fraud	Accounting error	Data quality
Employee error	Capacity risk	Programming error
Employee misdeed	Contract risk	Security breach
Employer liability	Misselling/unsuitability	Strategic risk
Employment law	Product complexity	(platform/supplier)
Health and safety	Project risk	System capacity
Industrial action	Reporting error	System compatibility
Lack of knowledge/skills	Settlement/payment error	System delivery
Loss of key personnel	Transaction error	System failure
	Valuation error	System unsuitability

10.7 Implications of Operational Risks Management Implementation

- Improving the reliability of business operations.
- Improving the effectiveness of the risk management operations.
- Strengthening the decision-making process where risks are involved.
- Reduction in losses caused by poorly-identified risks.
- Early identification of unlawful activities.
- Improved credibility of the products / services
- Better market standing and market share
- Customer satisfaction
- Improved revenue generation

10.8 How Many Steps Are in the ORM Process?

While there are different versions of the ORM process steps, Operational Risk Management is generally applied as a five-step process. All five steps are critical, and all steps should be implemented.

Step 1: Risk Identification

Risks must be identified so these can be controlled. Risk identification starts with understanding the organization's objectives. Risks are anything that prevents the organization from attaining its objectives.

Step 2: Risk Assessment

Risk assessment is a systematic process for rating risks on likelihood and impact. The outcome from the risk assessment is a prioritized listing of known risks. The risk assessment process may look similar to the risk assessment done by internal audit.

Step 3: Risk Mitigation

The risk mitigation step involves choosing a path for controlling the specific risks. In the Operational Risk Management process, there are four options for risk mitigation: transfer, avoid, accept, and control.

Transfer: Transferring shifts the risk to another organization. The two most often means for transferring are outsourcing and insuring. When outsourcing, management cannot completely transfer the responsibility for controlling risk. Insuring against the risk ultimately transfers some of the financial impact of the risk to the insurance company. A good example of transferring risk occurs with cloud-based software companies. When a company purchases cloud-based software, the contract usually includes a clause for data breach insurance. The purchaser is ensuring the vendor can pay for damages in the event of a data breach. At the same time, the vendor will also

have their data centre provide SOC reports that show there are sufficient controls in place to minimize the likelihood of a data breach.

Avoid: Avoidance prevents the organization from entering into the risk situation. For example, when choosing a vendor for a service, the organization could choose to accept a vendor with a higher-priced bid if the lower-cost vendor does not have adequate references.

Accept: Based on the comparison of the risk to the cost of control, management could accept the risk and move forward with the risky choice. As an example, there is a risk that an employee will burn themselves if the company installs new coffee makers in the breakroom. The benefit of employee satisfaction from new coffee makers outweighs the risk of an employee accidentally burning themselves on a hot cup of coffee, so management accepts the risk and installs the new appliance.

Control: Controls are processes the organization puts in place to decrease the impact of the risk if it occurs or to increase the likelihood of meeting the objective. For example, installing software behind a firewall reduces the likelihood of hackers gaining access, while backing up the network decreases the impact of a compromised network since it can be restored to a safe point.

Step 4: Control Implementation

Once the risk mitigation choice decisions are made, the next step is implementation. The controls are designed specifically to meet the risk in question. The control rationale, objective, and activity should be clearly documented so the controls can be clearly communicated and executed.The controls implemented should focus preventive control activities over policies

Step 5: Monitoring

Since the controls may be performed by people who make mistakes, or the environment could change, the controls should be monitored. Control monitoring involves testing the control for appropriateness of design, implementation, and operating effectiveness. Any exceptions or issues should be raised to management with action plans established.

Within the monitoring step in Operational Risk Management, some organizations, especially in the financial industry, have adopted continuous monitoring/early warning systems built around key risk indicators (KRIs). Key risk indicators are metrics used by organizations to provide an early signal of increasing risk exposures in various areas of the enterprise. KRIs designed around ratios that are monitored by business intelligence applications are how banks can manage operational risk, but the concept can be applied across all industries. KRIs can be designed to monitor nearly any potential risk and send a notification. As an example, a company could design a key risk indicator around customer satisfaction scores. Falling customer satisfaction scores could indicate that customer service representatives are not being trained or that the training is ineffective.

What Are the Challenges and Shortcomings of Operational Risk Management?

In many organizations, operational risk management is one of the most tenuous links in their ability to meet the demands of customers and stakeholders. While operational risk management is a subset of enterprise risk management, similar challenges like competing priorities and lack of perceived value affect proper development among both programs. Some common challenges include:

A common perception that organizations do not have sufficient resources to invest in operational risk management or ERM.

Need for greater communication and education around the importance of operational risk management and the consequences of operational failures on a company's bottom line.

Need for increased awareness and appreciation across boards and C-suite executives to better understand operational risk management steps.

Lack of consistent methodologies to measure and assess risk is an area of concern when it comes to providing an accurate portrait of an organization's risk profile.

Establishing standard risk terminology that will be used moving forward, which is conducive to successful Risk and Control Self-Assessments (RCSAs).

The process is varied and complex due to changes in technology.

The function is oftentimes lumped in with other functions such as compliance and IT which is why it does not receive significant attention.

Operational Risk Management programs can be manual, disjointed, and over-complicated, mostly because ORM developed as a reactive function in response to regulations and compliance.

What Are the Benefits of a Strong Operational Risk Management Program?

Establishing an effective operational risk management program is helpful for achieving an organization's strategic objectives while ensuring business continuity in the event of disruptions to operations. Having a strong ORM also demonstrates to clients that the company is prepared for crisis and loss. Organizations that can effectively implement a strong ORM program can experience improved competitive advantages, including:

- Better informed business risk-taking.
- Improved product performance and better brand recognition.
- Stronger relationships with customers and stakeholders.
- Greater investor confidence.
- Better performance reporting.
- More sustainable financial forecasting.

Summary

Technology enablement increases the value Operational Risk Management brings to the organization. When planning the Operational Risk Management function, consider building the library of risks and controls and the risk assessment process into a risk management application. Establishing effective risk management capabilities is an important part of driving better business decisions and is an important toolfor competitive advantage. Embedding the processes with technology ensures these are applied consistently. A strong Operational Risk Management program can help drive operational audits and Cybersecurity compliance programs.

Keywords

- **Operational risk -** Operational risk summarizes the chances and uncertainties a company faces in the course of conducting its daily business activities, procedures, and systems.
- **Risk identification -** Risk identification is the process of determining risks that could potentially prevent the program, enterprise, or investment from achieving its objectives. It includes documenting and communicating the concern.
- **Risk measurement -** Risk measures are statistical measures that are historical predictors of investment risk and volatility
- **Risk Assessment -** Risk assessment is a systematic process for rating risks on likelihood and impact. The outcome from the risk assessment is a prioritized listing of known risks.
- **Internal risks** - Internal risks are faced by a company from within its organization and arise during the normal operations of the company. These risks can be forecasted with some reliability, and therefore, a company has a good chance of reducing internal business risk.

Self Assessment

Q1. Operational risk summarizes the uncertainties and hazards a company faces when it attempts to do its_____ business activities within a given field or industry.

A. Annual

B. Promotional

C. Accounting
D. Day-to-day

Q2. Operational risk is the risk of loss that stems from inadequate or failed_____

A. Business expansion plans
B. Merger & Acquisition activity
C. Attempts of fund raising
D. Internal systems, internal controls, procedures, or policies

Q3. Which among the following is an operation risk for a business entity?

A. Change in tax laws
B. Currency fluctuation
C. Cyber security risk
D. Raw material availability

Q4. Which among the following is not an internal fraud?

A. Misappropriation of assets
B. False commitment to investors
C. Forgery
D. Tax non-compliance

Q5. What could be the best option to minimize operational risks at a manufacturing plant?

A. Propper training to mechanics for usage of machines
B. Borrowing and investing in business
C. Promoting products through celebrities
D. Paying high salaries to employees

Q6. The first step of risk management is

A. Identify risk
B. Characterize threats
C. Assess the vulnerability
D. Identify ways to reduce those risks

Q7. What can result, due to data entry errors?

A. Duplicate Records
B. Missing Data
C. Nonstandard Formats
D. All of these

Q8. Insurance is applied under which risk management technique

A. Sharing
B. Reduction
C. Retention
D. None of these

Q9. What is affected due to various risks faced by an organization?

A. Profitability
B. Quality
C. Brand value
D. All of these

Q10. Risk management focuses on_____

A. Reducing profits volatility
B. Reducing earnings volatility
C. Reducing losses volatility
D. Reducing depreciation volatility

Q11. The important feature of risk management is_____

A. Be transparent and inclusive
B. Explicitly address uncertainty
C. Be systematic and structured
D. All of these

Q12. What type of risk should banks opt for?

A. Good risk
B. Bad risk
C. Small risk
D. Big risk

Q13. Risk is characterized as_____

A. Loss
B. Depreciation of capital
C. Decrease in profitability
D. A Possible loss depending on occurrence of an event

Q14. Which among the following is a 'People' related internal operational risk?

A. Product complexity
B. System failure
C. Health & safety
D. Project risk

Q15. Which among the following is a 'systems' related internal operational risk?

A. Security breach
B. Accounting error
C. Employee error
D. Valuation error

Answers for Self Assessment

1.	D	2.	D	3.	C	4.	B	5.	A
6.	A	7.	D	8.	A	9.	D	10.	B
11.	D	12.	A	13.	D	14.	C	15.	A

Review Questions

Q1. Why, the identification of operational risks is considered important? What are the various ways to identify such operational risks?

Q2. Financial institutions are prone to a number of operational risks due to the economic ups and downs. Elaborate some key operational risks that may be faced by the financial institutions like banks.

Q3. Being a risk manager in a business conglomerate what kind of steps you will take to reduce operational risks?

Q4. What steps can be taken in an organization to develop a strong operations risk management?

Q5. What is an ideal process to manage the operational risks in financial institutions?

Q6. What are the different classifications of internal operational risks? Which category can be categorized as riskier for any organization?

Q7. What are the implications of implementing operations risk management?

Q8. What steps you will advise to minimize the human errors in a manufacturing unit to reduce operational risks?

Further Readings

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Unit 11: Liquidity Risk Management

CONTENTS

Objectives

- Understand liquidity risk
- Identify factors causing liquidity risk
- Understand the indicators causing liquidity risk
- Take corrective steps to avoid liquidity risks
- Understand what is funding liquidity risk
- Identify the causes of funding liquidity risk
- Understand and explore the sources of liquidity risk

Introduction

Liquidity risk arises from our potential inability to meet payment obligations when they come due or only being able to meet these obligations at excessive costs. The objective of liquidity risk management framework is to ensure that payment obligations are complied with at all times and can manage liquidity and funding risks within its risk appetite. The framework considers relevant and significant drivers of liquidity risk, whether on-balance sheet or off-balance sheet."Liquidity risk," therefore, as the risk to their ability to meet commitments in a timely and cost-effective manner while maintaining assets and, for some firms, the inability to pursue profitable business opportunities and continue as a viable business due to a lack of access to sufficient cost-effective resources.

11.1 Assessing Asset Liquidity Risk

- Liquidity is how easily an asset or security can be bought or sold in the market, and converted to cash.
- There are two different types of liquidity risk:
  - Funding liquidity and
  - Market liquidity risk.
- Funding or cash flow liquidity risk is the chief concern of a corporate treasurer who asks whether the firm can fund its liabilities.

11.2 Funding or Cash Flow Liquidity Risk

Period	Q1 2020	Q2 2020	Q3 2020	Q4 2020
Operating Cash Flows	$3 million	$3 million	$0.5 million	$0.5 million
Debt Obligations Due	$2 million	$2 million	$2 million	$2 million
Funding Liquidity Risk?	Unlikely	Unlikely	Likely	Likely

- Market or asset liquidity risk is asset illiquidity or the inability to easily exit a position.
- The most popular and crudest measure of liquidity is the bid-ask spread—a low or narrow bid-ask spread is said to be tight and tends to reflect a more liquid market.

Understanding Bid-Ask Spread

- The bid-ask spread can be considered a measure of the supply and demand for a particular asset.
- Bid represent demand and the ask represent the supply for an asset, it would be true that when these two prices expand further apart the price action reflects a change in supply and demand.

- If the bid price for a stock is $19 and the ask price for the same stock is $20, then the bid-ask spread for the stock in question is $1.
- The bid-ask spread can also be stated in percentage terms; it is customarily calculated as a percentage of the lowest sell price or ask price.
- For the stock in the example above, the bid-ask spread in percentage terms would be calculated as $1 divided by $20 (the bid-ask spread divided by the lowest ask price) to yield a bid-ask spread of 5% ($1 / $20 x 100).

- This spread would close if a potential buyer offered to purchase the stock at a higher price or if a potential seller offered to sell the stock at a lower price.
- Example - Consider the following example where a trader is looking to purchase 100 shares of Apple for $50. The trader sees that 100 shares are being offered at $50.05 in the market.
- Here, the spread would be $50.00 - $50.05, or $0.05 wide.
- While this spread may seem small or insignificant, on large trades, it can create a meaningful difference, which is why narrow spreads are typically more ideal.
- The total value of the bid-ask spread, in this instance, would be equal to 100 shares x $0.05, or $5.

11.3 Causes of Funding liquidity risk

- Seasonal fluctuations in revenue generation
- Business disruptions
- Unplanned capital expenditures
- Increased operational costs
- Poor working capital management
- Poor matching of asset duration to debt duration
- Limited financing facilities
- Poor cash flow management

Controlling Liquidity Risks

- Reliance on more stable source of funding
- Diversification across sources of funds, geographical locations and debt maturities

11.4 Liquidity Risk

Liquidity risk occurs when an individual investor, business, or financial institution cannot meet its short-term debt obligations. The investor or entity might be unable to convert an asset into cash without giving up capital and income due to a lack of buyers or an inefficient market.

Financial institutions depend upon borrowed moneyStrict compliance requirements and stress tests to measure their financial stability.During the 2008 financial crisis, many big banks failed or faced insolvency issues due to liquidity problems.

Types of Liquidity Risks

A) Market Liquidity Risk

Market liquidity risk refers to the risk that an asset cannot be sold on a market without incurring a loss.

B) Funding Liquidity Risk

Funding liquidity risk refers to the inability to meet financial obligations caused by a lack of funding.

11.5 Liquidity Risk in Banking Industry

Banks operate by accepting deposits from customers and using those funds to issue loans (e.g., mortgages, personal loans, student loans) to other customers.

Received deposits are considered liabilities (since the funds must be accessible to customers) while issued loans are considered assets (since the borrowed funds are owed back to the bank).

Banks are only required to keep a small percentage of their total deposits as cash on hand (the reserve requirement),they are free to invest the majority of their money into less liquid assets. This typically means more loans.The fundamental nature of commercial banking involves the conversion of liquid liabilities (deposits) into illiquid assets. This creates an inherent liquidity risk in the banking sector.

Investments with Highest Liquidity Risk

1) Fixed assets (e.g., land, equipment, property)
2) Real estate
3) Art
4) Vehicles
5) Issuing long-term loans (e.g., mortgages)
6) Infrequently-traded stocks

11.6 Managing Liquidity Risk

Following are some of the ways to manage the liquidity risk

- Forecasting Cash Flow
- Comparing Assets and Liabilities
- Creating a Buffer Between Earnings and Expenses
- Holding Liquid Assets vs. Illiquid Assets
- Analysing Financial Ratios
- Reducing Leverage
- Conducting Stress Tests
- Diversifying Investments

Liquidity Risk Indicators in Financial Institutions

- Rapid asset growth, especially when funded with probable volatile liabilities
- Growing concentrations in assets or liabilities
- Decrease of the weighted average maturity of liabilities
- Rising wholesale/retail funding costs
- Counterparties requesting additional collateral or resisting entering into new transactions
- Drop-in credit lines
- Increasing retail deposit outflows
- Increasing redemptions of CDs before maturity
- Difficulty accessing longer-term funding
- Difficulty placing short-term liabilities
- Significant deterioration in the bank's financial condition
- Negative publicity Credit rating downgrade
- Stock price declines
- Rising debt costs

11.7 Funding Liquidity Risk

It is the risk that takes place when the market lacks the supply of money because of which the people/firms/industries etc., are not able to borrow.

This usually occurs during a credit crunch (a sudden reduction in the availability of credit or money from banks and other lenders).

So, when there's a supply problem and we can't borrow. This happens as a result of the world recession.

Banks become risk-averse (when banks are not ready to take any risks) and they stopped lending money to the people or the organizations.

 **For example,** if an organization needs some money to start a new operation or to buy some assets or some other such work the organization needs some kind of liquidity but couldn't get it as the banks are being risk-averse.

This type of risk is known as Funding Liquidity Risk because there is a need for funds from another organization that is not ready to lend their funds.

It is very much dependent on the environment and economic conditions prevailing at that moment and is out of our control.

Funding liquidity risk is the risk of not being able to meet one's financial obligations due to a lack of liquid funds.

The operating cash flows may be low for a company, resulting in the risk of non-fulfillment of its short-term payments.

This may result in damage of goodwill, frequent shortages of raw materials and inputs due to supply cuts leading to loss of production, customer shifts, etc.Funding liquidity risk is the risk that a bank will be unable to pay its debts when they fall due.

In simple terms, it is the risk that the bank cannot meet the demand of customers wishing to withdraw their deposits.

11.8 Managing Liquidity Risk

Liquidity (according to THE BASEL COMMITTEE ON BANKING SUPERVISION) is the ability of a bank to meet all regular financial obligations when they come due without suffering undesirable losses. Because banks convert short-term deposits (such as savings accounts and other deposits) into long-term loans, they are more vulnerable to liquidity risk than other financial institutions. As a result, they're susceptible to not having enough liquid assets on hand when deposits need to be withdrawn or other commitments come due.

Nearly every transaction has implications on bank's liquidity, so banks need a liquidity risk management strategy that ensures that cash flows are sufficientand banks are prepared for external market shifts or changes in depositor behavior.

Especially with unstable financial markets in the past decade, liquidity management has become more complex than ever before – so it's essential that you understand the driving principles behind a robust strategy.

11.9 Liquidity

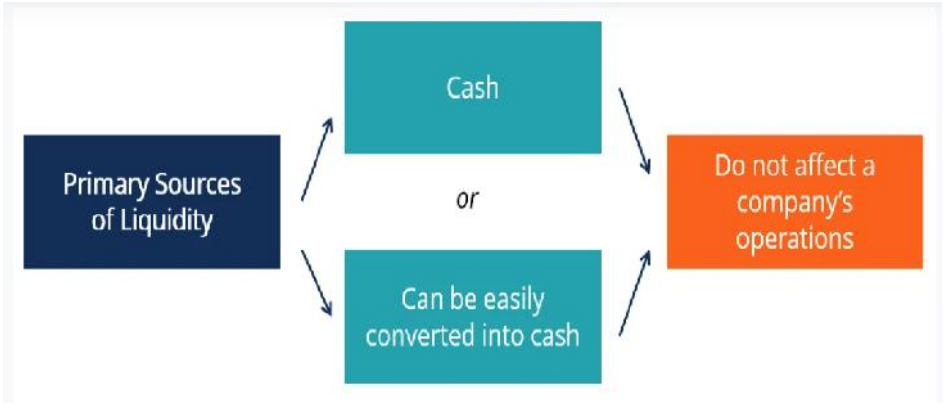
The liquidity of a firm refers to its ability to meet short-term obligations using firm's assets can be quickly converted to cash. Cash is the most liquid form of asset a firm has.

Different assets offer different levels of liquidity. For example, a firm's inventory is considered a liquid asset but may not be as liquid as other assets such as short-term money market securities that can be converted into cash very quickly.

11.10 Sources of Liquidity

- For a company, its sources of liquidity are all the resources that can be used to generate cash.
- There are generally two major classes of sources of liquidity for a company:
    - The primary sources of liquidity, which are either cash or other resources that can be converted into cash very easily; and
    - The secondary sources of liquidity, which usually can't be converted into cash as easily and fast as the primary sources and may imply asset sales or other actions that would affect a company's operations.

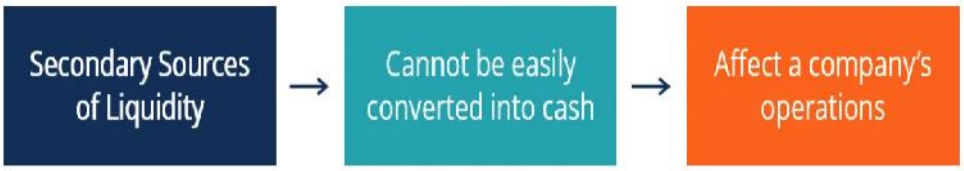
Primary Sources of Liquidity



- Primary sources of liquidity can be easily used to generate liquidity for the company.
- They are generally cash and other near-cash assets.

  More specifically, they include:
    - Cash balances (in a bank account)
    - Short-term funds - trade payables, bank credit, and short-term securities
    - Cash flow management

Secondary Sources of Liquidity



- Unlike the primary sources of liquidity, the secondary sources usually cannot be converted into cash without an effect on the company's operations.

  For example, it can be the case of a company that has run out of cash and near-cash assets and needs to liquidate assets, such as inventory, plants, and equipment, to pay its bills.

  More specifically, a company's secondary sources of liquidity include:
    - Negotiating its debt obligations - by renegotiating maturities, the size and timing of principal repayments, and interest rates.
    - Liquidating assets

Other sources of liquidity Risk

- Inability to Obtain Financing

- Unexpected economic disruption
- Unplanned Capital Expenditures

Summary

Liquidity is a critical consideration for any business. Having enough liquidity available to meet the company's commitments is essential to the health of the organization – so it's important to manage liquidity effectively and ensure that cash is in the right place at the right time. And in order to make better decisions about firm liquidity, corporate treasury and finance teams first require visibility of the company's cash position, both now and in the future. Banks across the globe are facing problems with the liquidity crisis because of poor liquidity management. As every transaction or commitment has implications for a bank's liquidity, managing liquidity risks are of paramount importance. Liquidity risk has become one of the most important elements in enterprise-wide risk management framework. A bank's liquidity framework should maintain sufficient liquidity to withstand all kinds of stress events that will be faced. Constant assessment of liquidity risk management framework and liquidity position is an important supervisory action that will ensure the proper functioning of the bank.

Keywords

- **Market / asset liquidity -** Market or asset liquidity risk is asset illiquidity or the inability to easily exit a position.
- **Liquidity risk -** Liquidity is the ability of a firm, company, or even an individual to pay its debts without suffering catastrophic losses.
- **Market liquidity risk -** Market liquidity risk is the loss incurred when a market participant wants to execute a trade or to liquidate a position immediately while not hitting the best price.
- **Funding liquidity risk -** Funding liquidity risk is the risk that a bank is not able to meet the cash flow and collateral need obligations.
- **Bid-Ask Spread** - The bid-ask spread can be considered a measure of the supply and demand for a particular asset.
- **Sources of liquidity** - For a company, its sources of liquidity are all the resources that can be used to generate cash.

Self Assessment

Q1. Liquidity is how easily an asset or security can be bought or sold in the market, and converted to_____.

A. Asset
B. Cash
C. Profit
D. Liability

Q2. The two prominent liquidity risks are - Funding liquidity risk and

market liquidity risk.

A. True
B. False

Q3. If a firms operating cash flow is $3 million and debt obligations are $2 million then which of the following statement is more relevant?

A. Funding liquidity risk is unlikely to happen
B. Funding liquidity risk is likely to happen
C. Market liquidity risk is unlikely to happen
D. Market liquidity risk is likely to happen

Q4. Market or asset liquidity risk is asset illiquidity or the inability_____.

A. To generate profits
B. To easily exit a position
C. To improve the sales
D. To create assets

Q5. Which of the following is not a cause of funding liquidity risk?

A. Poor cash flow management
B. Unplanned capital expenditures
C. Seasonal fluctuations in revenue generation
D. Price war by competition

Q6. Liquidity risk occurs when an individual investor, business, or financial institution cannot meet its_____.

A. Short-term debt obligations
B. Long-term debt obligations
C. Required rate of profitability
D. Tax payment requirements

Q7. The term leverage refers to

A. Using borrowed capital
B. Buying assets
C. Dividend distribution
D. Capital expenditure

Q8. Funding liquidity risk refers to the inability to meet financial obligations caused by a lack of_____.

A. Profits
B. Funding
C. Goodwill
D. Working capital

Q9. The deposits received by the banks are considered_____.

A. Assets
B. Liabilities
C. Revenue
D. expenses

Q10. If a firm is talking about reducing the leverage it is trying to_____

A. Improve the profits
B. Cost reduction
C. Loan repayment
D. Increase the asset base

Q11. Funding liquidity risk refers to_____

A. Firms/industries etc., are not able to borrow.
B. Insufficient funds in business
C. Poor revenue to fund expansion
D. None of these

Q12. Funding liquidity risk will not result in_____

A. Damage of goodwill
B. Shortage of raw material
C. Customer shift
D. Improved market share

Q13. Liquidity risk arises, when _____.

A. Personal problems of company
B. Asset /security cannot be traded quickly in the market
C. Increase competition in the market
D. Delay in payment

Q14. The best time to use leverage is_____

A. Rising interest rate scenario
B. Falling interest rate scenario

Q15. Financial reliability of the company is determined by_____.

A. Debt – equity ratio
B. Efficiency ratio
C. Working capital ratio
D. Cash ratio

Q16. Banks convert short-term deposits (such as savings accounts and other deposits) into_____

A. long-term loans
B. Short term assets
C. Cash reserves
D. None of these

Q17. Regularly scheduled stress tests include which of the following?

A. Institution-specific strains
B. Market-wide stress scenarios of individual variables
C. Market-wide stress scenarios of multiple, combined variables
D. All of the above

Q18. _____deals with a company's ability to generate sufficient cash flow and able to make interest payment.

A. Business risk
B. Operational risk
C. System risk
D. Financial risk

Q19. Risk management process end with _____

A. Identify risk
B. Monitor and review the risk
C. Analyze risk
D. Treat risk

Q20. Which of the following is not creating high degree of uncertainty?

A. Increase global competition
B. Complex financial instruments
C. Change organizational structure
D. Stable economy

Q21. Primary sources of liquidity for a company includes_____

A. Cash balances
B. Bank credit
C. Short term securities
D. All of the above

Q22. Which among the following is a secondary source of liquidity for a firm?

A. Bank borrowing
B. Debenture issue
C. Liquidating assets
D. Issuing shares

Q23. The bulk of the 'assets' of scheduled commercial banks

A. Is Bank Credit
B. Is Investment
C. Is Assets with the Banking System
D. None of the above

Q24. Negotiating debt obligations is a source of liquidity.

A. True
B. False

Q25. _____ type of expenditure may lead to liquidity risk

A. Employee salaries
B. Day to day petty expenses
C. Unplanned capital expenditure
D. Increase in raw material cost

Answers for Self Assessment

1.	B	2.	A	3.	A	4.	B	5.	D
6.	A	7.	A	8.	B	9.	B	10.	C
11.	A	12.	D	13.	B	14.	B	15.	A
16.	A	17.	D	18.	D	19.	B	20.	D
21.	D	22.	C	23.	A	24.	A	25.	C

Review Questions

Q1. What is the concept of liquidity? Why it is considered an important aspect of effective working of any business enterprise?

Q2. What are the broad two types of liquidity risk? Elaborate the two broad categories taking your own examples?

Q3. Write a short note on bid-ask spread.

Q4. Being a risk manager, you are afraid that your firm may face funding liquidity risk in coming months. What would be the probable causes that you will avoid to keep your firm safe from funding liquidity risk.?

Q5. What is the difference between market liquidity risk and funding liquidity risk?

Q6. What are the different ways that you will use to manage liquidity risk?

Q7. What are the various liquidity risk indicators to identify and mage risk in financial institutions like banks?

Q8. What are the primary and secondary sources of liquidity risk? How they are different from each other?

Further Readings

https://www.sas.com/en_in/insights/risk-management/liquidity-risk.html

https://www.finlync.com/blog/liquidity-management/

https://www.theglobaltreasurer.com/2008/08/12/why-liquidity-is-important-for-banks/

Unit 12: Basel Accord

CONTENTS

Objective

- Understand Basel accords
- Understand capital requirements by banks to mitigate risk(s)
- Understand risk weights as per Basel Accord
- Understand risk mitigating mechanism of banks
- Understand the need of Basel I accord
- Explore the risks faced by global banks
- Understand the capital requirements of banks

Introduction

The Basel Accords refers to a set of banking supervision regulations set by the Basel Committee on Banking Supervision (BCBS). They were developed over several years between 1980 and 2011, undergoing several modifications over the years.

The Basel Accords were formed with the goal of creating an international regulatory framework for managing credit risk and market risk. Their key function is to ensure that banks hold enough cash

reserves to meet their financial obligations and survive in financial and economic distress. They also aim to strengthen corporate governance, risk management, and transparency.

The regulations are considered to be the most comprehensive set of regulations governing the international banking system. The Basel Accords can be broken down into Basel I, Basel II, and Basel III.

12.1 Basel Accord

The Basel Accords refer to a set of banking regulations that gives recommendations with respect to market risk, capital risk, and operational risk. The Basel Accords are set by the Basel Committee on Bank Supervision (BCBS) to guide financial institutions on capital risk, market risk, and operational risk. BCBS acts as a supervisory authority for banks, this authority ensures that banks have enough liquidity to meet their financial obligations and liabilities.

The Basel Accords comprises a series of banking regulations names Basel I, Basel II and Basel III. These sets of regulations are internationally agreed upon as a response to the Financial Crisis in the banking industry. These banking regulations were created by the ten largest economies.

The Basel Committee on Bank Supervision (BCBS) was established in 1974 to act as the supervisory authority over banking matters. When it was established, the objective of BCBS was to enhance the financial stability of banks and improve the quality of banks through adequate banking supervision. BCBS also ensures that banks have enough capital to absorb risks and perform their obligations.

12.2 Basel I

Basel I, also known as the Basel Capital Accord, was formed in 1988. It was created in response to the growing number of international banks and the increasing integration and interdependence of financial markets. Regulators in several countries were concerned that international banks were not carrying enough cash reserves. Since international financial markets were deeply integrated at that time, the failure of one large bank could cause a crisis in multiple countries (Lehman Brother, 2008)

Basel I regulations

The regulations aimed to improve the stability of the financial system by setting minimum reserve requirements for international banks.It also provided a framework for managing credit risk through the risk-weighting of different assets.

According to Basel I, assets were classified into four categories based on risk weights:

- 0% for risk-free assets (cash, treasury bonds)
- 20% for loans to other banks or securities with the highest credit rating
- 50% for residential mortgages
- 100% for corporate debt

- Banks with a significant international presence were required to hold 8% of their risk-weighted assets as cash reserves.
- International banks were guided to allocate capital to lower-risk investments.
- Banks were also given incentives for investing in sovereign debt and residential mortgages in preference to corporate debt.

12.3 Basel II

Basel II, an extension of Basel I, was introduced in 2004.

Basel II included new regulatory additions and was centered around improving three key issues – minimum capital requirements, supervisory mechanisms and transparency, and market discipline.Basel II created a more comprehensive risk management framework. It did so by creating

standardized measures for credit, operational, and market risk. It was mandatory for banks to use these measures to determine their minimum capital requirements.

12.4 Basel II Regulations

A key limitation of Basel I was that the minimum capital requirements were determined by looking at credit risk only. It provided a partial risk management system, as both operational and market risks were ignored.Basel II created standardized measures for measuring operational risk. It also focused on market values, instead of book values, when looking at credit exposure. Additionally, it strengthened supervisory mechanisms and market transparency by developing disclosure requirements to oversee regulations. Finally, it ensured that market participants obtained better access to information.

The Global Financial Crisis of 2008 exposed the weaknesses of the international financial system and led to the creation of Basel III. The Basel III regulations were created in November 2010 after the financial crisis. Their implementation's constantly been delayed in recent years and is expected to occur in January 2022.

12.5 Basel III

Basel III identified the key reasons that caused the financial crisis.

- They include
    - poor corporate governance and liquidity management,
    - over-levered capital structures due to lack of regulatory restrictions,
    - misaligned incentives in Basel I and II.
- Basel III strengthened the minimum capital requirements outlined in Basel I and II.
- In addition, it introduced various capital, leverage, and liquidity ratio requirements.
- According to regulations in Basel III, banks were required to maintain the following financial ratios:
- Tier I Capital Ratio: Equity Capital/Risk Weighted Assets >=4.5%
- Leverage Ratio: Tier I capital/ Average Total Assets >=3%
- Liquidity Coverage Ratio: Liquid Assets/ Total outflows over next 30 days >=100%
- The Basel Accords are extremely important for the functioning of international financial markets.
- They can never be constant and need to continuously be updated based on present market conditions and lessons learned from the past.

12.6 On Balance Sheet and Off-Balance Sheet Credit Risk Charge

Credit risk is related to the traditional bank lending activities, while it also comes from holding bonds and other securities.Basel (1999) reports that for most banks, loans are the largest and most obvious source of credit risk; however,throughout the activities of a bank, which include in the banking book as well as in the trading book, and both on and off the balance sheet, there are also other sources of credit risk.

Various financial instruments including acceptances, inter-bank transactions, financial futures, guarantees, etc. increase banks' credit risk.

Therefore, it is indispensable to identify all the credit exposures — the possible sources of credit risk for most banks.

Bank capital

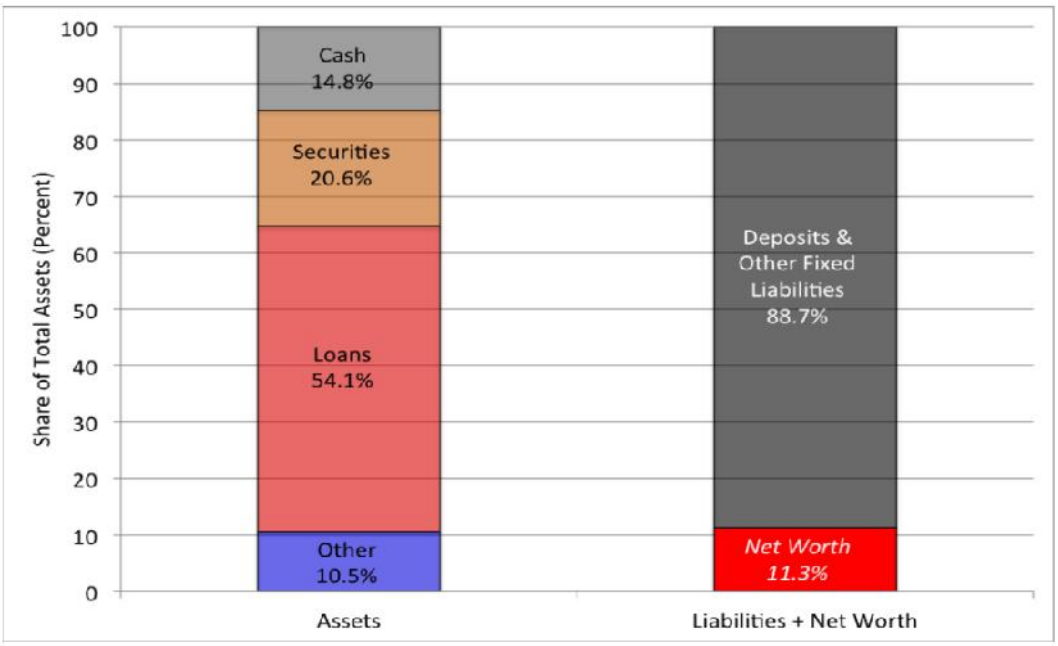
There are several consistent definitions of a bank's *capital* (or, equivalently, its *net worth*).

First, capital is the accounting residual that remains after subtracting a bank's fixed liabilities from its assets.

Second, it is what is owed to the banks' owners—its shareholders—after liquidating all the assets at their accounting value.

Third, it is the buffer that separates the bank from insolvency: the point at which its liabilities exceed the value of assets.

A Simple Bank: Percent Shares of Assets and of Liabilities and Net Worth (Capital)



12.7 Banks and Risk-Based Capital Requirements

Risk-based capital requirement refers to a rule that establishes minimum regulatory capital for financial institutions. Risk-based capital requirements exist to protect financial firms, their investors, their clients, and the economy as a whole. These requirements ensure that each financial institution has enough capital on hand to sustain operating losses while maintaining a safe and efficient market.

On Balance Sheet Risk Charge

Risk Capital Weights by Asset Classes:

Weights	Asset Type
0%	Cash held
	Claims on OECD central governments
	Claims on central governments in national currency
20%	Cash to be received
	Claims on OECD banks and regulated securities firms
	Claims on Non-OECD banks below 1 year

	Claims on foreign OECD Public sector entities
50%	Residential mortgage loans
100%	Claims on the Private Sector (corporate debt , equity etc.)
	Real estate
	Plant and equipment

The credit risk charge (CRC) is defined for balance sheet (BS) items as –

CRC(BS)= 8% x (RWA)= 8% x (ΣRWi x Notional i)

Where, RWA is risk weighted assets

RWi is risk weight attached to asset i

Example, A Bank subject to the Basel I Accord makes a loan of INR 100 Cr to a firm with a risk weight of 50%. What is the basic on-balance-sheet credit risk charge?

a) 8 cr
b) 4 cr
c) 2 cr
d) 1 cr

To account for off-balance-sheet items, the Basel Accord computes a

- **Credit exposure (CE)** that is equivalent to the notional for a loan, through credit
- **Conversion factor**

Five broad categories are identified under off-balance-sheet risk charge…

1. Instruments that substitute for loans (e.g., guarantees, bankers' acceptances, standby letters of credit serving as guarantees for loans & securities) carry the full 100% weight.
2. Transaction-related contingencies (performance bonds or commercial letters of credit related to particular transactions) carry a 50% factor. The rationale is that a performance letter of credit is typically secured by some income stream and has lower risk then a general financial LC.
3. Short–term, self-liquidating trade related liabilities carry a 20% factor. These liabilities are backed by collateral.
4. Commitments with maturity greater than a year (such as credit lines) carry a 50% credit conversion factor. Shorter-term commitments or revocable commitments have a zero weight
5. Other derivatives, such as swaps, forwards and options on currency, interest rate, equity and commodity products are given special treatments due to the complexity of their exposures.
   Credit Exposure=Credit Conversion factor x Notional

12.8 On Balance Sheet Risk Charge – Balance Sheet

On-Balance-Sheet Assets ($ Billion)

Item	Notional	Not Covered	Risk Weight Category 0%	20%	50%	100%
Cash and due	174.6	0.0	140.6	29.9	0.0	4.1
Securities	257.0	(10.6)	129.5	64.2	11.0	63.0
Loans and leases	464.7	(23.9)	10.5	77.0	110.1	291.1
Trading assets	156.0	156.0	0.0	0.0	0.0	0.0
All other assets	109.0	27.9	6.7	14.6	1.0	58.7
Total on-BS	1161.4	149.4	287.3	185.6	122.1	416.8

12.9 Basel Norms and Credit Risk Management

Banks use a number of techniques to mitigate the credit risks to which they are exposed.

For example, exposures may be collateralized by first priority claims, in whole or in part with cash or securities, a loan exposure may be guaranteed by a third party, or a bank may buy a credit derivative to offset various forms of credit risk.

Additionally, banks may agree to net loans owed to them against deposits from the same counterparty.

- Credit Risk Mitigation relates to the reduction of credit risk by -
    - taking Collateral
    - obtaining Credit derivatives
    - Guarantees OR
    - taking an offsetting position subject to a netting agreement
    - New products such as credit derivatives have allowed banks to unbundle their credit risk in order to sell those risks that they do not wish to retain.
    - It reduces the transaction cost of intermediating

Approaches of credit risk mitigation

I Standardised approach

II Internal ratings-based (IRB) approach

1) Standard approach

- Under the standardized approach, banks use a prescribed risk weight schedule for calculating RWAs.
- The risk weights depend on asset class and are generally linked to external ratings.

Classification of Risk Weighted Assets:

Item of Asset	Weighted Risk Percent
Cash	0%
Balance with Reserve Bank of India	0%
Central or state Government Guaranteed advances	0%
SSI advances up to CGF guarantee	0%
Loans against Fixed Deposits,and LIC Policy	0%
Government approved Securities	2.5%
Balance with Bank (excluding RBI) which maintains the 9% CRAR	20%
Secured Loan to the Staff Members	20%
Housing Loans less than **Rs.** 30 Lakh	50%
Housing Loans more than **Rs.** 30 Lakhs	75%
Loans against Gold and Jewellery less than <**Rs.**1 Lakh	50%
Retail Lending up to **Rs.** 5 crore	75%
Loans Guaranteed by DGCGC / ECGC	50%
Loans to Public Sector Undertakings	100%
Foreign Exchange and Gold in open	100%
Claims on unrated corporates	100%
Commercial Real estate	100%
Consumer Credit	125%
Credit Cards	125%
Exposure to Capital Markets	125%
Venture Capital Investment	150%

2) Internal ratings-based (IRB) approach

- Banks can use their internal rating systems for credit risk, subject to the explicit approval of their respective supervisors.
- Internal estimates of risk parameters such as probability of default (PD), loss-given-default (LGD) and exposure-at-default (EAD) are also used by banks to mitigate risks

Probability of Default

The probability of default (PD) is the probability of a borrower or debtor defaulting on loan repayments. Within financial markets, an asset's probability of default is the probability that the asset yields no return to its holder over its lifetime and the asset price goes to zero.Investors use the probability of default to calculate the expected loss from an investment.

Loss given default

The loss incurred by a bank or lender when a borrower default (does not pay back) on the loan is called loss given default. The LGD value is often expressed as a percentage.During an economic downturn, individuals and companies suffer the consequences of a sluggish economy. It leads to the downfall of numerous companies across various sectors, and very often, they are unable to pay back loans borrowed from the bank.

Exposure at Default

Exposure at Default (EAD) is the predicted amount of loss a bank may face in the event of, and at the time of, the borrower's default. The loss is dependent upon the amount to which the bank was exposed to the borrower at the time of default, as the default occurs at an unknown future date. It is obtained by adding the risk already drawn on the operation to a percentage of undrawn risk.

Expected Loss

A bank may calculate its expected loss by taking the product of EAD, PD, and LGD.

- **Expected Loss = EAD * PD * LGD**

12.10 Basel Accord I

The Basel Accords were formed with the goal of creating an international regulatory framework for managing credit risk and market risk. Their key function is to ensure that banks hold enough cash reserves to meet their financial obligations and survive in financial and economic distress. They also aim to strengthen corporate governance, risk management, and transparency.The regulations are considered to be the most comprehensive set of regulations governing the international banking system.

- Basel I, also known as the Basel Capital Accord, was formed in 1988.
- It was created in response to the growing number of international banks and the increasing integration and interdependence of financial markets.
- Regulators in several countries were concerned that international banks were not carrying enough cash reserves.
- Since international financial markets were deeply integrated at that time, the failure of one large bank could cause a crisis in multiple countries.
- Basel, I refer to a set of international banking regulations created by the Basel Committee on Bank Supervision (BCBS), which is based in Basel, Switzerland.
- The committee defines the minimum capital requirements for financial institutions, with the primary goal of minimizing credit risk.
- Basel I is the first set of regulations defined by the BCBS.
- The accords' essential purpose is to standardize banking practices all over the world.

Bank Asset Classification System

The Bank Asset Classification System classifies a bank's assets into five risk categories on the basis of a risk percentage: 0%, 10%, 20%, 50%, and 100%.

The assets are classified into different categories based on the nature of the debtor, as shown below:

0% Risk Category	10% Risk Category	20% Risk Category	50% Risk Category	100% Risk Category
• Cash, government debt, central bank debt, and the debt of governmental departments or organizations	• Central bank debt of countries with high inflation in the recent past	• Development bank debts, OECD bank debt, non-OECD bank debt under one year of maturity, and non-OECD public sector debt	• Residential mortgages	• Private sector debt, non-OECD bank debt with maturity over a year, real estate, plant and equipment, and capital instruments issued at other banks.

12.11 Implementation of Basel I

- Basel I primarily focus on credit risk and risk-weighted assets (RWA).

- It classifies an asset according to the level of risk associated with it.
- Classifications range from risk-free assets at 0% to risk assessed assets at 100%.
- The framework requires the minimum capital ratio of capital to RWA for all banks to be at 8%.
- Tier 1 capital refers to capital of more permanent nature (shareholders' equity and retained earnings). It should make up at least 50% of the bank's total capital base.
- Tier 2 capital is temporary or fluctuating in nature.

12.12 Benefits of Basel I Accord

- Significant increase in Capital Adequacy Ratios of internationally active banks
- Competitive equality among internationally active banks
- Augmented management of capital
- A benchmark for financial evaluation for users of financial information

12.13 Limitations of Basel I accord

- Other kinds of risk, such as market risk, operational risk, liquidity risk, etc. we're not taken into consideration.
- Emphasis is put on the book values of assets rather than the market values.

Summary

The banking industry has undergone drastic change in the past three to four decades. Hence, the Basel norms that were first formulated became obsolete and Basel –II norms had to be introduced. At the present moment, even the Basel-II norms seem inadequate and the major banks in the world are swiftly moving towards a new accord called the Basel-III system.

After the collapse of the gold standard in 1971 and the fall of the Smithsonian arrangement in 1973, many banks were concerned about the fact that banks with an international presence were not holding sufficient capital. Since the international financial system had come to be deeply integrated by this time, it became a source of great concern for the various countries involved. A crisis that was born in one country could quickly spiral out of control and affect the other countries as well.

It is for this reason that the central banks of the prominent G-10 nations created a committee of experts. This committee came to be called as the Basel Committee on Banking Supervision or simply as the Basel Committee. As per the recommendations of this committee the Basel norms were first formulated under the patronage of the Bank for International Settlements (BIS).

Keywords

Basel accord - The Basel Accords refers to a set of banking supervision regulations set by the Basel Committee on Banking Supervision (BCBS).

Basel I - The regulations aimed to improve the stability of the financial system by setting minimum reserve requirements for international banks.It also provided a framework for managing credit risk through the risk-weighting of different assets.

Basel II - Basel II included new regulatory additions and was centered around improving three key issues – minimum capital requirements, supervisory mechanisms and transparency, and market discipline.

Basel III - Basel III identified the key reasons that caused the financial crisis.They include

poor corporate governance and liquidity management,

over-levered capital structures due to lack of regulatory restrictions,

misaligned incentives in Basel I and II.

Risk-based capital requirement - Refers to a rule that establishes minimum regulatory capital for financial institutions. Risk-based capital requirements exist to protect financial firms, their investors, their clients, and the economy as a whole.

OECD - Organization for Economic Co-operation and Development

Exposure at Default (EAD) - Is the predicted amount of loss a bank may face in the event of, and at the time of, the borrower's default. The loss is dependent upon the amount to which the bank was exposed to the borrower at the time of default, as the default occurs at an unknown future date.

Loss given default - The loss incurred by a bank or lender when a borrower default (does not pay back) on the loan is called loss given default. The LGD value is often expressed as a percentage.

Self Assessment

Q1. The Basel Accords refer to a set of banking regulations that gives recommendations with respect to:

A. Investment risk, currency risk and capital risk
B. Market risk, capital risk, and operational risk.
C. Operational risk, political risk and currency risk
D. Natural disaster, environmental risk and market risk

Q2. The Basel Committee on Bank Supervision (BCBS) was established in_____ to act as the supervisory authority over banking matters.

A. 1972
B. 1974
C. 1976
D. 1980

Q3. Basel I regulations provides a framework for managing credit risk through the_____ of different assets

A. Categorization
B. Risk-weighting
C. Diversification
D. Grouping

Q4. According to Basel I, assets were classified into_____ categories based on risk weights:

A. Three
B. Four
C. Five
D. Six

Q5. According to Basel I regulations 100% risk weightage is given to:

A. Treasury bonds
B. Residential mortgage
C. Corporate debt
D. Securities with highest credit rating

Q6. Banks with a significant international presence were required to hold_____ of their risk-weighted assets as cash reserves

A. 8%
B. 10%
C. 12%
D. 14%

Q7. _____is related to the traditional bank lending activities, while it also comes from holding bonds and other securities.

A. Operational risk
B. Credit risk
C. Political risk
D. Economic risk

Q8. For most banks, _____ are the largest and most obvious source of credit risk

A. Deposits
B. Loans
C. Customer
D. Competition

Q9. Banks capital refers to

A. The accounting residual that remains after subtracting a bank's fixed liabilities from its assets.
B. What is owed to the banks' owners—its shareholders—after liquidating all the assets at their accounting value.
C. It is the buffer that separates the bank from insolvency: the point at which its liabilities exceed the value of assets
D. All of the above

Q10. A Bank subject to the Basel I Accord makes a loan of INR 400 Cr to a firm with a risk weight of 25%. What is the basic on-balance-sheet credit risk charge?

A. 5 cr
B. 6 cr
C. 7 cr
D. 8 cr

Q11. Which among the following is the most important risk to be managed by the banks?

A. Liquidity risk
B. Market risk
C. Currency risk
D. Credit risk

Q12. The simplest way to mitigate the credit risk is

A. Taking collateral
B. Security deposit
C. Guarantors
D. All of the above

Q13. The risk weights depend on asset class and are generally linked to external ratings.

A. True
B. False

Q14. The probability of default (PD) is the probability of

Choose the correct statement(s)

1) A borrower or debtor defaulting on loan repayments.
2) A Bank unable to pay to the depositors
3) A seller is not able to sell the products in the market
4) Government not able to pay the salaries

A. All statements are correct
B. Only 1) & 2) are correct
C. Only 3) is correct
D. Only 3) & 4) are correct

Q15. Loss given default refers to

A. The loss incurred by a bank when a borrower default (does not pay back) on the loan
B. The loss incurred by a borrower when a bank default (does not pay back) on the deposit
C. The loss incurred by a firm when a supplier default (does not supply) on the supplies
D. None of the above

Q16. Basel accord was initiated because of

A. Growing number of international banks and the increasing integration and interdependence of financial markets
B. Globalization and increased global trade among different countries
C. Financial frauds happening in banks and loss to the depositors
D. Poor risk management in banks leading to financial crises

Q17. Which among the following statement is correct with regard to Basel accord

A. Basel I, refer to a set of international banking regulations created by the Basel Committee on Bank Supervision (BCBS).
B. Basel I,refers to a set of international banking regulations created by the world bank.
C. Basel I, refers to the way a bank business must be managed to make as much profit as possible
D. Basel I, refers to the rules regarding the safety of depositor's money and guaranteeing them a fix rate of interest.

Q18. The Bank Asset Classification System classifies a bank's assets into five risk categories on the basis of a risk percentage, i.e.

A. 0%, 10%, 20%, 50%, and 100%.
B. 10%, 20%, 50%, and 100%.
C. 0%, 10%, 20%, 30%, and 50%.
D. 20%, 30%, 50%, and 100%.

Q19. As per the Basel accords how much risk weightage is given to 'central bank debt of countries with high inflation in the recent past'?

A. 10%
B. 20%
C. 50%
D. 100%

Q20. Tier 1 capital refers to capital of more permanent nature and it includes:

A. Preference share capital and long-term debt
B. Fixed assets and net working capital
C. Cash reserves and short-term borrowings
D. Shareholders' equity and retained earnings

Answers for Self Assessment

1.	B	2.	B	3.	B	4.	B	5.	C
6.	A	7.	B	8.	B	9.	D	10.	D
11.	D	12.	D	13.	A	14.	B	15.	A
16.	A	17.	A	18.	A	19.	A	20.	D

Review Questions

Q1. What was the objective behind Basel accord? Throw some light on key features of various Basel accords.

Q2. What risk weights were mentioned under Basel I accord. Elaborate the categories of risk weights and the respective asset types.

Q3. What are your views on Basel accord for the global banking industry? Are these accords actually helping the banks in risk management?

Q4. What are the benefits and limitations of Basel I accord?

Q5. Write short notes on:

a) Loss given default
b) Exposure at default

Q6. Being a risk manager of a bank, what risk measures you will take to keep your bank safe and away from various risks that a bank is exposed to?

Further Readings

https://www.bis.org/bcbs/history.htm (History of Basel accords)

https://www.managementstudyguide.com/three-basel-accords.htm

https://www.sciencedirect.com/topics/economics-econometrics-and-finance/basel-accord.

Lalit Kumar Bhardwaj, Lovely Professional University

Unit 13: Understanding Publicly Available Portfolios

CONTENTS

Objective

After studying this unit, you should be able

- Understand debt mutual funds and debt portfolios
- Explore publicly available portfolios
- Calculate portfolio standard deviation
- Take investment decisions based on standard deviation
- Understand the concept of Beta
- Calculate beta and its implications
- Take investment decisions based on expense ratio
- Calculate expense ratio
- Calculate sharp ratio and take investment decisions.

Introduction

Publicly available portfolios managed by entities like mutual funds, insurance companies, pension funds etc. share valuable information for various stakeholders. This information is used by investors (existing and prospective), research agencies, academia etc. to meet their different requirements. Such publicly available portfolios provide an important insight on various parameters like – periodic returns, assets under management and portfolio related technical information in the form of standard deviation, beta, expense ratio, price to earnings ratio (P/E), price to book ratio (P/B), dividend yield and sharp ratio etc. Across industry the endeavor of the fund managers is to provide the best risk adjusted returns. For a normal investor the most important criteria to choose an investment portfolio is the portfolio returns whereas for an educated investor returns adjusted to risk play an important role. Publicly available portfolios contain all such information for the various stakeholders to take an aware decision and it is also required by the regulatory authorities.

13.1 Debt Mutual Funds

A debt mutual fund (also known as a fixed-income fund) invests a significant portion of your money in fixed-income securities like government securities, debentures, corporate bonds and other money-market instruments.

- By investing money in such avenues, debt mutual funds lower the risk factor considerably for investors.
- This is a relatively stable investment avenue that could help to generate wealth

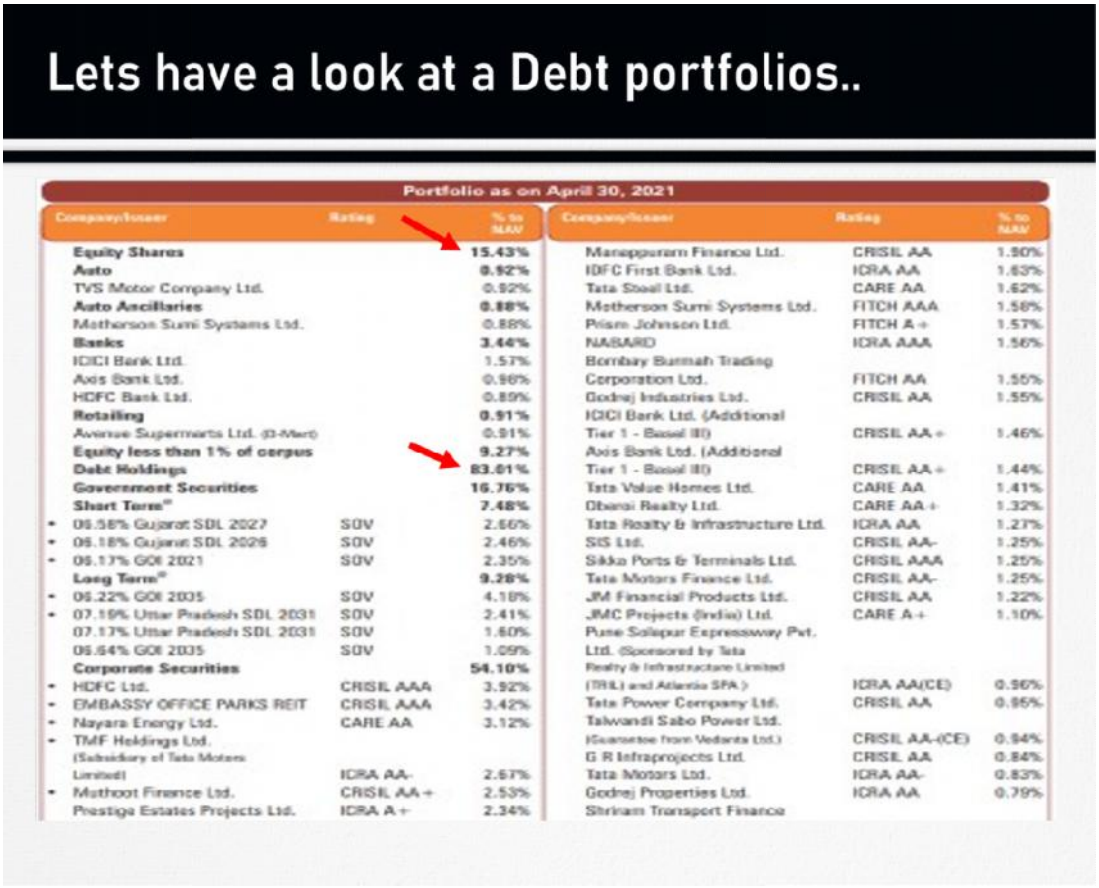
A debt mutual fund portfolio looks like:

PORTFOLIO

Instrument Type/ Issuer Name	Rating	% of NAV
GOVERNMENT BOND		**77.75%**
5.22% GOI (MD 15/06/2025)	Sovereign	31.21%
5.85% GOI (MD 01/12/2030)	Sovereign	24.79%
5.15% GOI (MD 09/11/2025)	Sovereign	21.75%
STATE GOVERNMENT BOND		**8.06%**
8.18% Haryana Uday Bond (MD 15/06/2024)	Sovereign	3.38%
6.56% Maharashtra SDL (MD 21/10/2030)	Sovereign	3.10%
6.84% Gujarat SDL (MD 07/10/2030)	Sovereign	1.58%
TREASURY BILL		**6.22%**
182 Days Tbill	Sovereign	6.22%
NET CURRENT ASSETS		**7.97%**
GRAND TOTAL		**100.00%**

PORTFOLIO

Instrument Type/ Issuer Name	Rating	% of NAV
CORPORATE BOND		**53.90%**
Food Corporation Of India (Guarantee from Government of India)	ICRA AAA(CE)/CRISIL AAA(CE)	7.20%
Housing Development Finance Corporation Limited	CRISIL AAA	6.87%
Indian Railway Finance Corporation Limited	CRISIL AAA	6.78%
National Bank For Agriculture and Rural Development	CRISIL AAA/ICRA AAA	5.53%
National Highways Auth Of Ind	CRISIL AAA	4.92%
Power Finance Corporation Limited	CRISIL AAA	4.58%
State Bank of India	CRISIL AAA	4.46%
NHPC Limited	ICRA AAA/IND AAA	3.87%
Housing & Urban Development Corporation Limited	ICRA AAA	2.59%
NTPC Limited	CRISIL AAA	2.21%
REC Limited	CRISIL AAA	2.17%
Power Grid Corporation of India Limited	CRISIL AAA	1.36%
Indian Oil Corporation Limited	CRISIL AAA	0.92%
HDFC Bank Limited	CRISIL AAA	0.28%
India Infrastructure Fin Co Ltd	CRISIL AAA	0.16%
GOVERNMENT BOND		**22.63%**
5.85% GOI (MD 01/12/2030)	Sovereign	22.56%
6.19% GOI (MD 16/09/2034)	Sovereign	0.05%
8.60% GOI (MD 02/06/2028)	Sovereign	0.02%
STATE GOVERNMENT BOND		**18.58%**
6.51% Karnataka SDL (MD 30/12/2030)	Sovereign	6.07%
6.87% Maharashtra SDL (MD 07/10/2030)	Sovereign	3.15%
6.63% Maharashtra SDL (MD 14/10/2030)	Sovereign	1.75%
6.5% Gujarat SDL (MD 11/11/2030)	Sovereign	1.53%
6.5% Gujarat SDL (MD 25/11/2030)	Sovereign	1.28%
6.7% Karnataka SDL (MD 23/09/2030)	Sovereign	1.04%
6.53% Karnataka SDL (MD 02/12/2030)	Sovereign	1.02%
7.04% Gujarat SDL (MD 18/03/2030)	Sovereign	0.86%
7.78% Maharashtra SDL (MD 24/03/2029)	Sovereign	0.83%
6.7% Gujarat SDL (MD 23/09/2030)	Sovereign	0.52%
7.83% Maharashtra SDL (MD 08/04/2030)	Sovereign	0.28%
6.84% Gujarat SDL (MD 07/10/2030)	Sovereign	0.26%
NET CURRENT ASSETS		**4.88%**
GRAND TOTAL		**100.00%**



13.2 Benefits of Investing in Debt Funds

- Stable income – Relative to equity over a longer period
- Tax efficiency – Indexation benefit
- High liquidity - Relative to FD
- Stability – Returns are stable than equity
- Flexibility – Switch / STP options available

13.3 Types of Debt Funds

- Overnight funds
- Liquid funds
- Ultra-Short Duration fund
- Low Duration fund
- Money Market funds
- Dynamic bond funds
- G-Sec funds
- Monthly Income Plans
- Fixed Maturity Plans
- Capital Protection oriented funds

Overnight funds

Overnight Funds are a type of open-ended debt scheme that invests in debt securities maturing the next day. This means, the securities in the portfolio mature every day and the fund manager uses the proceeds to buy new securities for the portfolio maturing the very next day. Since the securities in these funds mature the next day, these funds are not exposed to the kind of interest rate risk or default risk like the rest of the debt funds. This low risk profile also implies they offer the least return.Overnight funds are suitable for businessmen or entrepreneurs.

Overnight funds invest in CBLOs, overnight reverse repos, and other debt or money market securities that mature in one day. This is in keeping with SEBI norms, which requires them to invest only in assets with overnight maturity. The entire asset holding of an overnight fund can be classified as "Cash and Cash Equivalents". The portfolio of an overnight fund is replaced every day with new overnight securities. Overnight schemes are not permitted to invest in deposits or specified risky debt instruments; this rule aims to reduce the risk of default in their bond portfolio.

Liquid Funds

A Liquid Mutual Fund is a debt fund which invests in fixed-income instruments like commercial paper, government securities, treasury bills, etc. with a maturity of up to 91 days. The net asset value or NAV of a liquid fund is calculated for 365 days. Further, investors can get their withdrawals processed within 24 hours. These funds carry the lowest interest-rate risk in the debt funds category.

Ultra-Short Duration Funds

Ultra-short duration funds are fixed income mutual fund schemes which invest debt and money market securities such that the Macaulay Duration of the scheme portfolio is 3 months to 6 months. These funds are suitable for short term investments since they are less volatile and aim to produce more stable income compared to funds with longer duration profiles. Many investors get confused between liquid funds and ultra-short duration funds.

Low Duration Funds

Low duration funds are debt funds that invest in short term debt securities, such that the duration of the fund portfolio is between 6 to 12 months. As compared to overnight or liquid funds, low duration funds hold assets of longer maturity and/or lower credit quality; therefore, they have a relatively higher interest rate risk and credit risk.

Money Market Funds

Money market mutual funds (MMF) invest in short-term debt instruments, cash, and cash equivalents that are rated high quality. It is for this reason that money market mutual funds are considered safe or investment with minimal to low risk. As these funds invest in high-quality instruments, they offer a predictable risk-free return rate.

Dynamic Bond Funds

The dynamic bond schemes, as the name suggests, are dynamic in terms of the composition and maturity profile. The main objective of dynamic bond funds is to provide 'optimal' returns in both rising and falling market scenarios. It majorly depends on the fund manager's decisions and management of the portfolio.

These funds generally have huge assets under management (AuM)running to a portfolio worth several thousand crores. Sometimes, there could be a long pause in between interest rate changes. This can take a hit on the income of bond investors. Therefore, these funds are an excellent alternative for those wishing to ride the interest rate cycles.

G-Sec Funds

Government Securities, or G-Secs, are debt paper issued by the Reserve Bank of India, or RBI, on behalf of the Government of India or state governments.

When you buy a bond, you lend money to the company that issued the bond (issuer). In exchange, the company promises to return your money (principal) on a predetermined date (maturity date), and till it does so, it will pay you a specified rate of interest (coupon rate).

Now the same happens with the government.

When the government requires money, it issues bonds of various maturities. Debt funds, banks and financial institutions purchase these instruments. Besides debt funds, there are specific mutual funds that invest only in such instruments. These are called gilt funds. They are pure debt funds that have a minimum of 80% of the portfolio invested in G-Secs and State Development Loans (SDLs), the balance in cash and cash equivalents.

Monthly Income Plans

Monthly Income Plans (MIPs) are designed for pensioners or conventional investors who are risk-averse. Over 70% to 80% of the MIP corpus goes in debt funds and the remaining in stocks. However, unlike the name suggests, it is not something that delivers a fixed monthly income.

Fixed Maturity Plans

Fixed maturity plans, commonly referred to as FMPs, are a class of debt funds that primarily invest in fixed income instruments such as a certificate of deposit or bonds that lock in the yields that are currently available. This is done to eliminate interest rate fluctuation faced by debt markets.

Fixed maturity plans are close-ended mutual fund schemes with a pre-defined maturity. The tenure varies from 30 days to 5 years. The most commonly available tenures range from thirty days to 180 days, 370 days and 395 days.

13.4 Capital Protection-Oriented Funds

As the name suggests, capital protection funds invest meticulously in fixed income options and equity. These are closed-ended hybrid mutual fund schemes with a clear focus on debt to achieve capital protection. Typically, the allocation between equity and debt is based on the bond yield and the term of the scheme.

A significant portion of the corpus is invested in high-rated fixed-income securities to earn assured returns, and the rest of the money is invested in equity to earn additional returns. The capital protection orientation of the fund means that the debt component of the fund is managed in a way that the returns from it increase to match the level of the amount of the initial capital that was invested.

Capital protection funds typically invest a major share, about 80% of the total investment amount into highly secure debt instruments like AAA-rated bonds. The remaining 20% of the amount is invested in much riskier avenues like equity. The design of the fund thus protects the principal, regardless of how the equity market fares during economic downturns, the principal amount is protected.

13.5 Equity Mutual Funds

- An equity portfolio is a collection of investments in the stock market. Certain corporations offer publicly-traded stocks through trading facilities that are regulated by the Securities and Exchange Board of India (SEBI).
- The shares represent ownership in the companies, which then use the funds to generate revenues.
- Offering equities is an alternative to a corporation taking out a business loan, and can be beneficial to both investors and the company itself.

An equity portfolio looks like:

Portfolio Disclosure

Core Equity		
Name	**Industry**	**% of Net Assets**
Bajaj Holdings & Investment Ltd.	Finance	8.14%
ITC Ltd.	Consumer Non Durables	8.10%
Persistent Systems Ltd.	Software	5.73%
Indian Energy Exchange Ltd.	Capital Markets	5.13%
Hero Motocorp Ltd.	Auto	5.03%
HCL Technologies Ltd.	Software	4.94%
Mphasis Ltd.	Software	3.77%
Multi Commodity Exchange of India Ltd.	Capital Markets	3.76%
Central Depository Services (I) Ltd.	Capital Markets	3.14%
ICICI Bank Ltd.	Banks	2.75%
Balkrishna Industries Ltd.	Auto Ancillaries	2.63%
Axis Bank Ltd.	Banks	2.61%
HDFC Bank Ltd.	Banks	2.43%
Oracle Financial Services Software Ltd.	Software	1.41%
ICRA Ltd.	Capital Markets	1.30%
Cadila Healthcare Ltd.	Pharmaceuticals	1.14%
Lupin Ltd.	Pharmaceuticals	1.03%
Dr. Reddy's Laboratories Ltd.	Pharmaceuticals	0.97%
Sun Pharmaceutical Industries Ltd.	Pharmaceuticals	0.90%
IPCA Laboratories Ltd.	Pharmaceuticals	0.48%
Computer Age Management Services Ltd.	Capital Markets	0.14%
Total		**65.53%**
Overseas Securities, IDRS and ADRs		
# Microsoft Corporation	Internet & Technology	7.18%
# Facebook INC	Internet & Technology	6.23%
# AMAZON.COM INC	Consumer Services	4.80%
# Alphabet Inc (Google Class C)	Internet & Technology	4.29%

Portfolio as on April 30, 2021

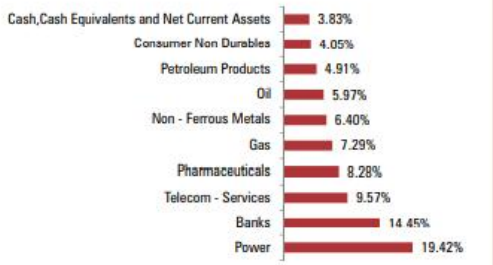
Company/Issuer	% to NAV	% to NAV Derivatives
Equity Shares	**94.75%**	**1.41%**
Auto	**2.05%**	
Tata Motors Ltd. - DVR	2.05%	
Banks	**11.82%**	
• Axis Bank Ltd.	6.00%	
• State Bank Of India	3.16%	
ICICI Bank Ltd.	1.69%	
Bank Of Baroda	0.97%	
Consumer Non Durables	**2.33%**	
United Spirits Ltd.	2.33%	
Ferrous Metals	**2.07%**	
Tata Steel Ltd.	2.07%	
Gas	**6.69%**	
• GAIL (India) Ltd.	6.69%	
Healthcare Services	**0.98%**	
Aster DM Healthcare Ltd.	0.98%	
Insurance	**1.85%**	
Max Financial Services Ltd.	1.85%	
Minerals/Mining	**2.77%**	
Coal India Ltd.	2.77%	
Non - Ferrous Metals	**6.40%**	
• Hindalco Industries Ltd.	5.32%	
Vedanta Ltd.	1.08%	
Oil	**5.22%**	
• Oil & Natural Gas Corporation Ltd.	5.22%	
Pesticides	**1.62%**	
UPL Ltd.	1.62%	
Petroleum Products	**3.27%**	
Indian Oil Corporation Ltd.	2.07%	
Hindustan Petroleum Corporation Ltd.	1.20%	
Pharmaceuticals	**7.61%**	
• Sun Pharmaceutical Industries Ltd.	6.63%	
Shilpa Medicare Ltd.	0.98%	
Power	**19.42%**	
• NTPC Ltd.	9.05%	
• CESC Ltd.	3.45%	
• Tata Power Company Ltd.	3.24%	
Kalpataru Power Transmission Ltd.	1.88%	
Power Grid Corporation Of India Ltd.	1.80%	
Software	**1.26%**	
Cyient Ltd.	1.26%	
Telecom - Services	**9.57%**	
• Bharti Airtel Ltd.	9.57%	
Equity less than 1% of corpus	**9.83%**	**1.41%**
Short Term Debt and net current assets	**3.83%**	
Total Net Assets	**100.00%**	

• Top Ten Holdings

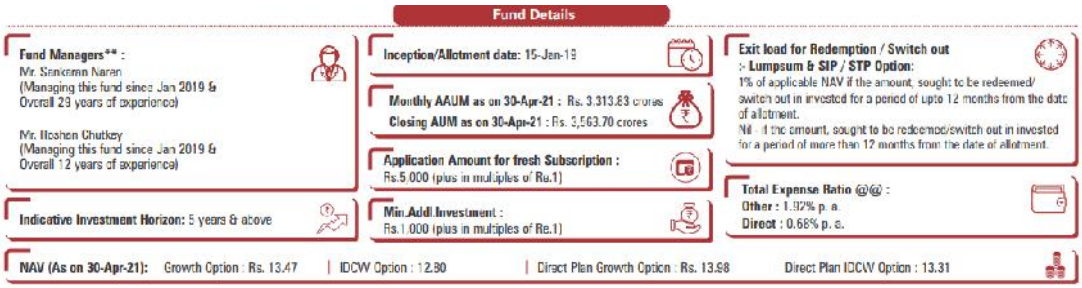
Securities and the corresponding derivative exposure with less than 1% to NAV, have been clubbed together with a consolidated limit of 10%.

Derivatives are considered at exposure value.

Top 10 Sectors



Some related terms to an equity portfolio…



Benchmark

Nifty 500 TRI

Quantitative Indicators

Average P/E :	Average P/B :	Average Dividend Yield :
18.91	2.51	2.01

Annual Portfolio Turnover Ratio :
Equity 0.52 times

Note : - "Portfolio Beta, Standard Deviation, R Squared, Sharpe Ratio and Tracking Error of the Scheme is not computed owing to the short time frame since launch of the Scheme."
@@ Total Expense Ratio is as on the last business day of the month.
**In addition to the fund manager managing this fund, overseas investment is managed by Ms. Priyanka Khandelwal.
Refer page no 124 to 134 for details on option, entry load, SWP, STP/Flex STP/Value STP & minimum redemption amount pertaining to the scheme.
For IDCW History : Refer page no. from 158 to 165, For SIP Returns : Refer page no. from 153 to 156, For Investment Objective : Refer page no. from 166 to 170

Riskometer

Investors understand that their principal will be at **Very High** risk

This Product is suitable for investors who are seeking*:

- Long Term Wealth Creation
- An equity scheme that invests in stocks based on special situations theme.

*Investors should consult their financial advisers if in doubt about whether the product is suitable for them.

Pension fund portfolios:

SBI PENSION FUNDS (P) LTD.

Pension Fund Manager Name : SBI PENSIONS FUNDS PVT.LTD.

Name Of Scheme : NPS TRUST- A/C SBI PENSION FUND SCHEME - CENTRAL GOVT

Portfolio Statements as on: 31-05-2021

Equity Instruments

Name of Instruments	Isin No.	Industry	Quantity	Mkt_Value	% of Portfolio
ZEE ENTERTAINMENT ENTERPRISES LIMITED	INE256A01028	Entertainment - Electronic Media	591,475	123,825,291.25	0.02
WIPRO LTD	INE075A01022	Computers - Software - Large	1,017,698	548,590,106.90	0.08
ULTRATECH CEMENT LIMITED	INE481G01011	Cement - Major - North India	236,290	1,585,033,320.00	0.24
TORRENT PHARMACEUTICALS LTD.	INE685A01028	Pharmaceuticals - Indian - Bulk Drugs & Formln Lrg	65,000	178,187,750.00	0.03
TITAN EQUITY	INE280A01028	DIAMOND CUTTING / JEWELLERY - LARGE	360,000	574,650,000.00	0.09
TECH MAHINDRA LIMITED	INE669C01036	Computers - Software - Large	783,000	799,951,950.00	0.12
TATA CONSULTANCY LIMITED	INE467B01029	Computers - Software - Large	1,245,079	3,933,391,322.65	0.59
TATA STEEL	INE081A01012	Steel - Large	352,466	396,753,352.90	0.06
TATA MOTORS LIMITED	INE155A01022	Automobiles - LCVs/HCVs	2,785,613	887,914,143.75	0.13
SUN PHARMACEUTICALS EQUITY	INE044A01036	Pharmaceuticals - Indian - Bulk Drugs & Formln Lrg	1,313,330	877,698,439.00	0.13
SBI LIFE INSURANCE CO LTD	INE123W01016	Miscellaneous - Medium / Small	597,044	582,505,978.60	0.09
STATE BANK OF INDIA EQUITY	INE062A01020	Banks - Public Sector	7,399,910	3,140,151,808.50	0.47
RELIANCE INDUSTRY LIMITED RIGHTS	IN9002A01024	Refineries	189,103	230,242,357.65	0.03
RELIANCE INDUSTRY LIMITED	INE002A01018	Refineries	3,236,550	6,991,918,965.00	1.05

Life insurance portfolios:

HDFC Life

Manager's Fund as on June 30, 2021

Fund Objective : The Manager's Fund dynamically manages the asset allocation between equity and fixed income instruments to deliver higher returns through the equity exposure, combined with the stability of the fixed income exposure. The fund returns are likely to be volatile due to the market movements.

SFIN Code	:	ULIF03304/08/08ManagerFnd101
Inception Date	:	04 Aug 2008
NAV	:	38.0325

Fund VA Benchmark Performance

Period	Returns (%)	Benchmark Returns (%)#
Inception	10.78%	N/A
10 Years	9.83%	N/A
7 Years	10.47%	N/A
5 Years	10.98%	N/A
3 Years	11.26%	N/A
2 Years	14.81%	N/A
1 Year	39.16%	N/A
6 Months	11.37%	N/A
1 Month	2.07%	N/A

#NA

Note: Returns over 1 year have been annualized.

AUM [in Lakhs]

Equity	Debt	MMI & Others	Total
1,620.95	541.32	51.14	2,213.61

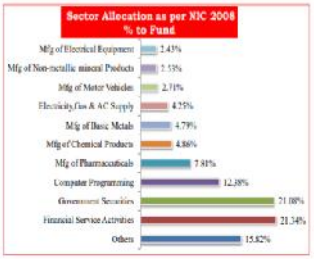
Fund Manager	No. Of Funds Managed		
	Equity Fund	Debt Fund	Balanced Fund
Mr Shailesh Dhamanka	3	-	10
Mr Vinod Chotaria	-	28	3

Asset Category	F&U Mandate	% of Actual
Money Market Instn	0% to 25%	1.54%
Public Deposits		
Govt. Securities	5% to 65%	24.46%
Corporate Bonds		
Large Cap Equities	10% to 45%	46.52%
Mid Cap Equities	10% to 45%	26.71%
Net Current Assets	-	0.77%

Portfolio

Equity	% to Fund
HDFC Bank Limited	6.12%
Infosys Limited	5.00%
Divis Laboratories Ltd.	3.44%
ICICI Bank Limited	3.26%
Hindustan Unilever Limited	3.01%
Tata Power Co. Ltd	2.19%
Larsen & Toubro Infotech Limited	2.13%
Bajaj Holdings & Investment Limited	2.09%
Crompton Greaves Consumer Electricals Ltd	1.99%
Cholamandalam Investment & Finance Company Ltd	1.87%
ITC Limited	1.78%

Sector Allocation as per NIC 2008 % to Fund



13.6 What are publicly available portfolios?

- There are certain investment avenues where regulatory requirements ask to disclose the portfolios in the public domain for the interest of various stakeholders.
- Regulators like SEBI, IRDAI and PFRDA has mandated Mutual Funds, Insurance companies and Pension Funds to disclose the portfolios and other material information publicly.

Public disclosure of portfolios:

Besides regulatory requirements, other reasons for public disclosure of the portfolios are:

- Millions of retail investors in these pooled funds
- Investors must know where the money is invested
- Performance comparison
    - Returns
    - Expense ratio
    - Assets under management
    - Addition and exclusion from the portfolio

13.7 Portfolio Attributes

Let's discuss some of the key portfolio attributes that helps an investor to distinguish various publicly available portfolios.

1. Standard deviation

- The standard deviation can help investors quantify how risky an investment is and determine their minimum required return on the investment.
- The portfolio standard deviation is the financial measure of investment risk and consistency in investment earnings.
- In other words, it measures the income variations in investments and the consistency of their returns.
- It's an indicator as to an investment's risk because it shows how stable its earning are.
- A high standard deviation in a portfolio indicates high risk because it shows that the earnings are highly unstable and volatile.
- Factors that can affect the portfolio risk can be a change in the interest rates, the inflation rate, the unemployment rate, and the exchange rates.
- A firm can't control any of these factors, but they can assume control over factors such as the bargaining power of its suppliers, research and development, and competition

Portfolio Variance & Standard Deviation

In order to calculate the Portfolio Standard Deviation and use it to interpret investment risk, we need to understand a few other calculations.

Portfolio variance and the standard deviation

- Portfolio variance is the degree of dispersion of the returns of a portfolio
- Standard Deviation is the square root of the portfolio variance
- Both express the volatility of stock returns.
- Knowing the standard deviation, we calculate the coefficient of variance (CV), which expresses the degree of variation of returns.

Let's take an example:

Geeta works as an investment analyst in a prominent advisors' firm and she provides investment counseling to her clients. For a portfolio of two stocks, Geeta wants to calculate the portfolio variance and the standard deviation.

Step 1 – Calculate the averages

Knowing the monthly returns of each stock Geeta calculates the average return for each stock as follows:

	Stock A	Stock B
	3.40%	8.60%
	4.28%	9.20%
	3.95%	7.85%
	5.80%	7.00%
	5.50%	6.58%
Average	4.59%	7.85%
	AVERAGE(B4:B8)	AVERAGE(C4:C8)

Stock A: (3.40% + 4.28% + 3.95% + 5.80% + 5.50%) / 5 = 4.59%

Stock B: (8.60% + 9.20% + 7.85% + 7.00% + 6.58%) / 5 = 7.85%

Step 2 – Calculate the variance

	A	B	C	D	E	F
1						
2		Monthly Returns (in %)		Variance (in %)		
3		Stock A	Stock B	Stock A	Stock B	
4		3.40	8.60	1.42	0.56	=(C4-7.85)^2
5		4.28	9.20	0.10	1.82	=(C5-7.85)^2
6	Avg Monthly Return	3.95	7.85	0.41	0.00	=(C6-7.85)^2
7		5.80	7.00	1.46	0.72	=(C7-7.85)^2
8		5.50	6.58	0.83	1.61	=(C8-7.85)^2
9		4.59	7.85	4.21	4.72	
10		AVERAGE(B4:B8)	AVERAGE(C4:C8)			
11						
12						Monthly variance

Stock A:(3.40% – 4.59%) ² + (4.28% – 4.59%) ² + (3.95% – 4.59%) ² + (5.80% – 4.59%) ² + (5.50% –4.59%) ² = 4.21%

Stock B:(8.60% – 7.85%) ² + (9.20% – 7.85%) ² + (7.85% – 7.85%) ² + (7.00% – 7.85%) ² + (6.58% – 7.85%) ² = 4.72%

Step 3 – Calculate Standard Deviation

The standard deviation for each stock is:

- Stock A: Square root of 4.21% = 2.05%
- Stock B: Square root of 4.72% = 2.17%

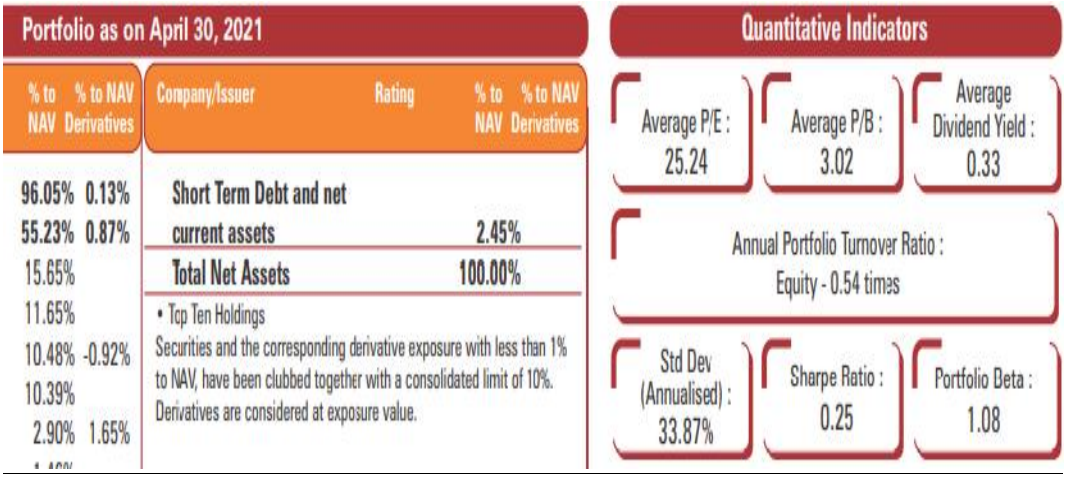
Step 4 – Calculate portfolio variance

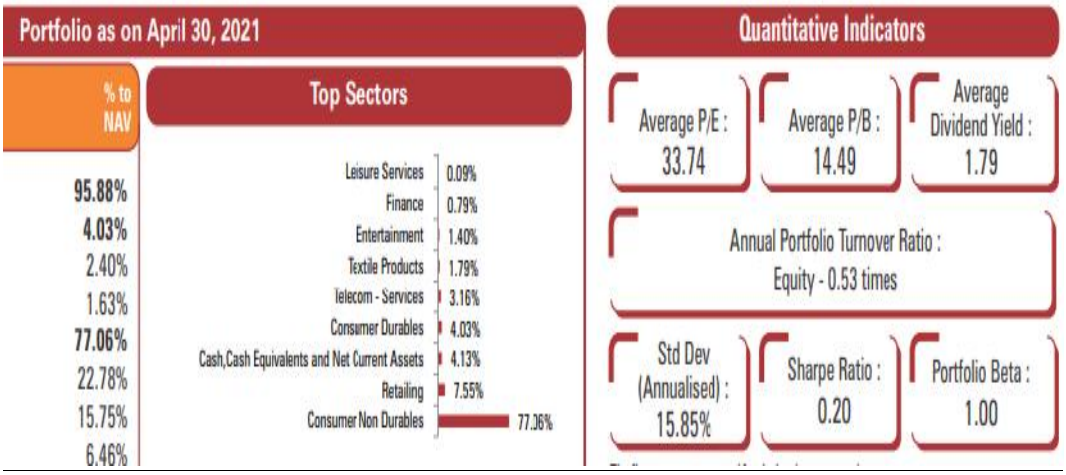
- If, The coefficient of variance (CV) for the two stocks is 0.80 and the portfolio weights for each stock are 65% for stock A and 35% for stock B. Geeta can calculate the variance and standard deviation as follows:

Portfolio variance = (65%² x 2.05%²) + (35%² x 2.17%²) + (2 x 65% x 2.05 x 35% x 2.17% x 0.80) = 0.0004 = 0.04%

- Therefore, portfolio standard deviation is the square root of 0.04% = 2.0%
- Geeta can now compare this with other portfolios to see if it is performing as consistently and if she wants to continuing investing in this fund.

A few real-life examples...





2. Beta

The beta (β) of an investment security (i.e., a stock) is a measurement of its volatility of returns relative to the entire market.

A company with a higher beta has greater risk and also greater expected returns.

Beta coefficient correlation:

The beta coefficient can be interpreted as follows:

β =1 exactly as volatile as the market

β >1 more volatile than the market

β <1 less volatile than the market

β =0 uncorrelated to the market

β <0 negatively correlated to the market

Steps to calculate β in Excel

1. Obtain the weekly prices of the stock
2. Obtain the weekly prices of the market index (i.e. S&P 500 Index)
3. Calculate the weekly returns of the stock
4. Calculate the weekly returns of the market index
5. Use the Slope function and select the weekly returns of the market and the stock, each as their own series
6. The output from the Slope function is the β

Calculating Beta using excel:

	A	B	C	D	E	F	G	H
1								
2		Individual Stock				S&P 500 Index		
3		Date	Price	Return		Date	Price	Return
4		02-01-2018	15.78			02-01-2018	2,696	
5		09-01-2018	16.38	3.8%	C5/C4-1	09-01-2018	2,751	2.0%
6		16-01-2018	16.67	1.8%		16-01-2018	2,776	0.9%
7		23-01-2018	17.17	3.0%		23-01-2018	2,839	2.3%
8		30-01-2018	17.02	-0.9%		30-01-2018	2,822	-0.6%
9		06-02-2018	16.31	-4.2%		06-02-2018	2,695	-4.5%
10		13-02-2018	16.00	-1.9%		13-02-2018	2,663	-1.2%
11		20-02-2018	16.43	2.7%		20-02-2018	2,716	2.0%
12		27-02-2018	16.97	3.3%		27-02-2018	2,765	1.8%
13								
14								
15		Beta (β)		1.21	SLOPE(D5:D12,H5:H12)			

$$\text{Beta} = \frac{\text{Covariance}}{\text{Variance}}$$

	A	B	C	D	E	F	G	H
1								
2		Individual Stock				S&P 500 Index		
3		Date	Price	Return		Date	Price	Return
4		02-01-2018	15.78			02-01-2018	2,696	
5		09-01-2018	16.38	3.8%	C5/C4-1	09-01-2018	2,751	2.0%
6		16-01-2018	16.67	1.8%		16-01-2018	2,776	0.9%
7		23-01-2018	17.17	3.0%		23-01-2018	2,839	2.3%
8		30-01-2018	17.02	-0.9%		30-01-2018	2,822	-0.6%
9		06-02-2018	16.31	-4.2%		06-02-2018	2,695	-4.5%
10		13-02-2018	16.00	-1.9%		13-02-2018	2,663	-1.2%
11		20-02-2018	16.43	2.7%		20-02-2018	2,716	2.0%
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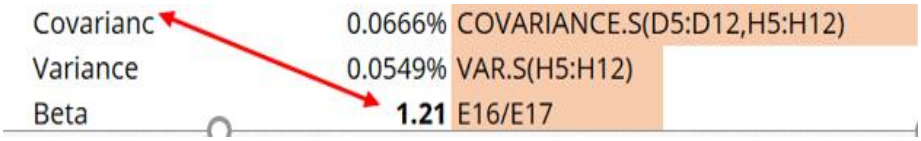
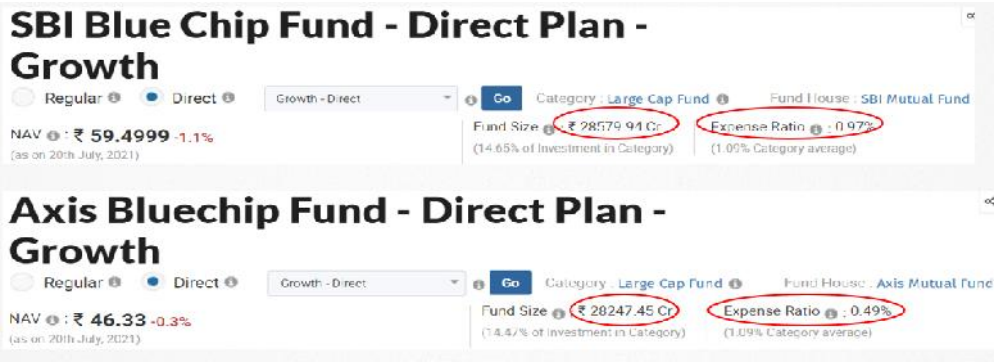
13								
14								
15		Beta (β)		1.21	SLOPE(D5:D12,H5:H12)			



3. Expense ratio

- An expense ratio reveals the amount that an investment company charges investors to manage an investment portfolio, a mutual fund, pension fund, insurance companies' portfolios or an exchange-traded fund (ETF).
- The ratio represents all of the management fees and operating costs of the fund.
- The expense ratio is calculated by dividing a mutual fund's operating expenses by the average total dollar value of all the assets in the fund.
- Expense ratios are listed on the prospectus of every fund and on many financial websites.



- Annual fund operating expenses, mostly known as the expense ratio, is the percentage of assets payable to the fund manager (i.e. AMC) as the maintenance fee.
- The asset manager, with the help of a team of analysts and other experts, allocate, manage (including the auditor and advisor fees) and advertise the fund to maximise returns and manage risks.
- If the funds' assets are small, then the expense ratio can be high.

AuM (assets under management) wise expense ratio

AUM (In Rs crore)	TER for equity funds	TER for debt funds
0-500	2.25	2
500-750	2	1.75
750-2000	1.75	1.5
2000-5000	1.6	1.35
5000-10000	1.5	1.25
10000-50000	Starts at 1.5%, and goes down by 0.05% for every rise of Rs 5000 cr in AUM	Starts at 1.25%, and goes down by 0.05% for every rise of Rs 5000 cr in AUM
>50000	1.05	0.80%

Components of Expense Ratio

- Management fee - The management fee or investment advisory fee is the compensation for the manager's expertise. On average, this annual fee is about 0.50% to 1% of the funds' assets.

- Administrative costs - are the expenses of running the fund. This would include keeping records, customer support, and service, information emails, and any other way of communication.
- 12-1b distribution fee - for advertising and promotional purposes. Usually, they charge their shareholders to market and promote the fund to the investors.

These three fees combined are equal to the percentage of assets deducted from the fund.

Calculation of TER (total expense ratio):

For example, if you invest Rs.50,000 in a fund with an expense ratio of 2%, then you are paying the fund house Rs.1,000 to manage your money.

It can be said that if a fund earns 10% and has a 2% TER, then it means an 8% return for an investor.

The mutual fund's NAVs are reported after netting off the fees and expenses, and hence, it is necessary to know how much the fund is deducting or charging as expenses.

Expense ratio = Total Expenses/Total Assets=

Rs.1.5 lakh/1 crore = 1.5% of your Investment Value

4. Sharpe ratio

- It is often assumed that high returns mean better performance.
- While this may be true in some cases, the real picture of a portfolio's performance can be gauged only when the returns it generates are assessed with respect to the risk it assumes.
- The Sharpe's ratio uses standard deviation to measure a mutual fund's risk adjusted returns.
- It will tell you how well your mutual fund portfolio has performed in excess of the risk-free return (if you would have invested in government securities instead, which are almost risk-free).
- This essentially gives you an idea if your returns are due to smart investment decisions or excessive risk.
- Higher the Sharpe's ratio, better the risk adjusted return of your mutual fund portfolio.
- The downside risk of investing is something that must be duly considered.
- While investors often associate high returns with a high degree of volatility, this is not always the case.
- This is why any good analysis of a portfolio must view its returns in the light of its risk factor.
- The Sharpe Ratio assesses the returns generated by a portfolio against each unit of risk undertaken.

Calculating Sharpe ratio

- Mathematically, the Sharpe Ratio is the difference between the portfolio's returns and the return earned on a risk-free investment, divided by the standard deviation of the portfolio.
- The standard deviation is the risk factor of the portfolio and is indicative of the volatility of the fund.
- A lower standard deviation implies little fluctuation in returns.
- So, the higher the Sharpe Ratio, the better, since a high Sharpe Ratio represents a higher return generated per unit of risk.

Interpreting Sharpe ratio

- In isolation, however, the Sharpe Ratio of a portfolio or fund has little use.
- It must only be used as a comparative tool to evaluate the performance of a number of portfolios or funds.
- In the case of mutual funds, one might compare the Sharpe ratio of a fund with that of its benchmark index.
- If the only information available is that the Sharpe ratio of a fund is 1.2, no meaningful inference can be drawn as nothing is known about peer group performance.
- The numerator – which increases the value of Sharpe ratio – is the extra return you earn over the risk-free rate of return. Ideally, one would want the extra return to be as high as possible.
- The denominator – which decreases the value of Sharpe ratio – is the risk (standard deviation) you take to earn the extra return. Ideally, one would want the risk to be as low as possible.
- Now you know why a higher Sharpe ratio is desirable.
- If the Sharpe ratio of fund A is greater than that of fund B, does it mean that fund A is always *better than* fund B?

Calculating Sharpe ratio

Sharpe ratio = (Returns on investment – Risk-free returns)/Standard deviation of the returns

$$\text{Sharp Ratio} = \frac{Rp - Rf}{\sigma p}$$

Rp = Return on portfolio

Rf = Risk free rate of return

σp = Standard Deviation of the Portfolio's Excess Return

Mutual Fund A returned 12% over the past year and had a standard deviation of 10%, Mutual Fund B returns 10% and had a standard deviation of 7%, and the risk-free rate over the time period was 3%. The Sharpe ratios would be calculated as follows:

- Mutual Fund A: (12% - 3%) / 10% = **0.9**
- Mutual Fund B: (10% - 3%) / 7% = **1**

It is the volatility in returns that is making a difference

- Even though Mutual Fund A had a higher return (12%), Mutual Fund B had a higher risk-adjusted return (1), meaning that it gained more per unit of total risk than Mutual Fund A.

5. R-square

- R-squared in mutual funds is a statistical tool that investors can use to compare a fund to a given benchmark.
- A higher R-squared value means the fund moves with the benchmark.
- This allows investors to monitor investments and maintain a more diversified portfolio.
- R-squared, or R^2, in mutual funds, is a statistical benchmark that investors can use to compare a fund to a given benchmark.
- R-squared values are expressed as a percentage between 1 and 100. A higher R-squared value means the fund moves with the benchmark.
- Knowing a fund's R^2 allows investors to maintain a more diversified portfolio by ensuring that their investments don't all correlate to the same benchmarks.

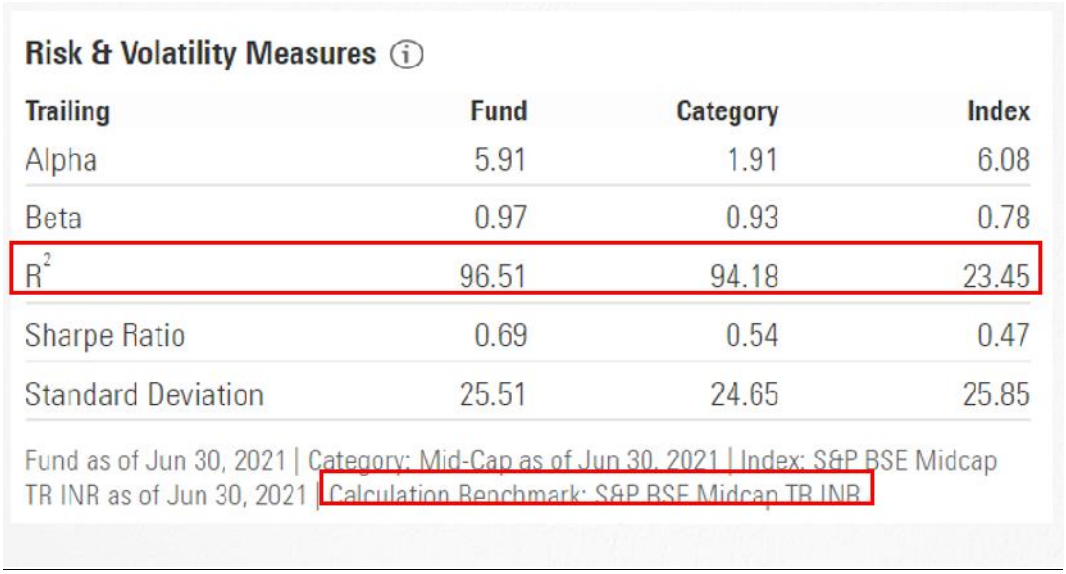
Interpreting R-square

- R-squared does not measure the performance of a mutual fund or of your portfolio, Instead, it compares your portfolio's returns to a benchmark and expresses that comparison as a percentage between one and 100.
- The higher the percentage, the more your portfolio mirrors the benchmark.
- An R-squared of 100% indicates that the movement of your portfolio is entirely explained by the movement of the benchmark.
- For example, if you already hold an S&P 500 mutual fund or another fund with a high R^2 compared to the S&P 500, you will want to find a fund with a lower correlation (lower R^2).
- Holding both types of funds will help you build a portfolio of diversified mutual funds.
- In general, R-squared values are divided into three tiers:
- 1–40%: low correlation to the benchmark
- 40%–70%: average correlation to the benchmark
- 70%–100%: high correlation to the benchmark
- R-Squared measures the relationship between a portfolio and its benchmark. It can be thought of as a percentage from 1 to 100.
- R-squared is not a measure of the performance of a portfolio. A great portfolio can have a very low R-squared. It is simply a measure of the correlation of the portfolio's returns to the benchmark's returns.

Significance of R-square

- If you want a portfolio that moves like the benchmark, you'd want a portfolio with a high R-squared.
- If you want a portfolio that doesn't move at all like the benchmark, you'd want a low R-squared.
- Index funds will have an R-squared very close to 100.
- R-squared can be used to ascertain the significance of a particular beta or alpha.
- Generally, a higher R-squared will indicate a more useful beta figure.
- If the R-squared is lower, then the beta is less relevant to the fund's performance

Kotak Emerging Equity Fund

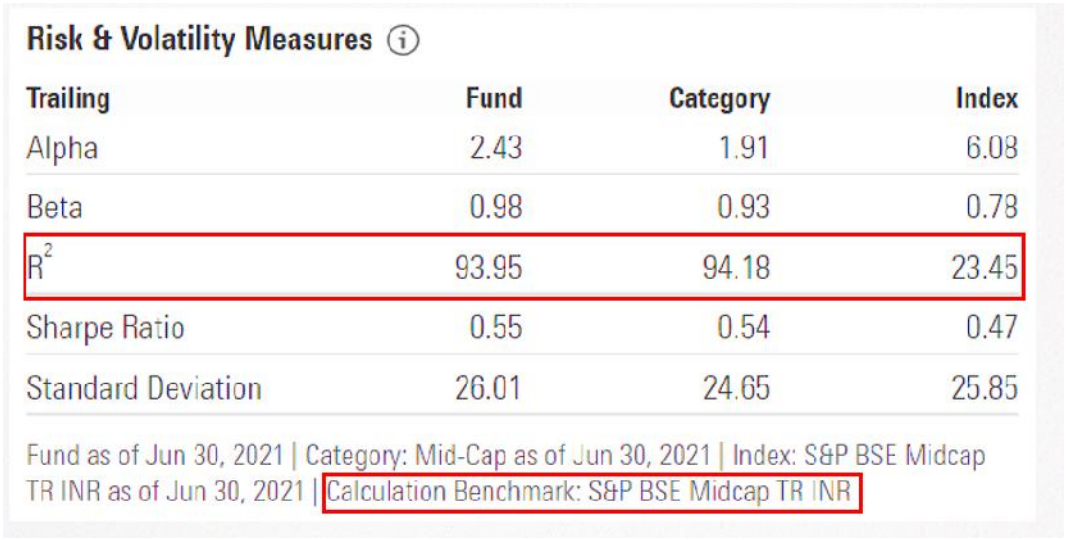


Risk & Volatility Measures

Trailing	Fund	Category	Index
Alpha	5.91	1.91	6.08
Beta	0.97	0.93	0.78
R^2	96.51	94.18	23.45
Sharpe Ratio	0.69	0.54	0.47
Standard Deviation	25.51	24.65	25.85

Fund as of Jun 30, 2021 | Category: Mid-Cap as of Jun 30, 2021 | Index: S&P BSE Midcap TR INR as of Jun 30, 2021 | Calculation Benchmark: S&P BSE Midcap TR INR

BNP Paribas Mid Cap Fund



Risk & Volatility Measures

Trailing	Fund	Category	Index
Alpha	2.43	1.91	6.08
Beta	0.98	0.93	0.78
R^2	93.95	94.18	23.45
Sharpe Ratio	0.55	0.54	0.47
Standard Deviation	26.01	24.65	25.85

Fund as of Jun 30, 2021 | Category: Mid-Cap as of Jun 30, 2021 | Index: S&P BSE Midcap TR INR as of Jun 30, 2021 | Calculation Benchmark: S&P BSE Midcap TR INR

6. Tracking error

Tracking error is a measure of financial performance that determines the difference between the return fluctuations of an investment portfolio and the return fluctuations of a chosen benchmark. The return fluctuations are primarily measured by standard deviations.Generally, a benchmark is a diversified market index that represents part of the total market. The most common benchmarks for equity portfolios are the Nifty50, Nifty200 and Nifty500.

Tracking error is one of the most important measures used to assess the performance of a portfolio, as well as the ability of a portfolio manager to generate excessive returns and beat the market or the benchmark.

Due to the abovementioned reasons, it is used as an input to calculate the information ratio.

Importance of Tracking Error

- Low errors indicate that the performance of the portfolio is close to the performance of the benchmark.

- Low errors are common with index funds and ETFs that replicate the composition of major stock market indices.
- High errors reveal that the portfolio's performance is significantly different from the performance of the benchmark.
- The high errors can indicate that the portfolio substantially beat the benchmark, or signal that the portfolio significantly underperforms the benchmark.

Calculating tracking error

$$\text{Tracking Error} = \omega = \sqrt{Var(Rp - Rb)}$$

Where:

- **Var** – the variance
- r_p – the return of a portfolio
- r_b – the return of a benchmark

- Five years ago, Geeta invested Rs100,000 in Fund A. The fund primarily invests in large-cap equities. During the five-year period, the fund showed positive returns. Also, the economy also grew during the period and equity markets rose.
- In order to assess how successful her investment was, Geeta decides to compare the returns of Fund A against the returns of a benchmark.
- In such a case, the most appropriate benchmark is the S&P 500 because it tracks the performance of the biggest large-cap companies.
- The comparison of the fund against the benchmark can be measured using the tracking error.
- The following data is available for the yearly returns for both Fund A and the S&P 500:

Year	Fund A	S&P 500
2020	16.56%	21.83%
2019	14.24%	11.96%
2018	4.50%	1.38%
2017	11.00%	13.69%
2016	35.59%	32.39%

$$= \sqrt{\frac{(16.56\% - 21.83\%)^2 + (14.24\% - 11.96\%)^2 + (4.50\% - 1.38\%)^2 + (11\% - 13.69\%)^2 + (35.59\% - 32.39\%)^2}{5 - 1}}$$

$$\frac{\sqrt{(16.56\%-21.83\%)^{\wedge}2+(14.24\%-11.96\%)^{\wedge}2+(4.50\%-1.38\%)^{\wedge}2+(11\%-13.69\%)^{\wedge}2-(35.59\%-32.39\%)}}{5-1} = .04$$

- Here, the small tracking error (.04) indicates that Fund A does not significantly outperform the benchmark.
- Therefore, Geeta may consider withdrawing her money from the fund and putting it into other, more promising investment opportunities.

- Alternatively, she may be satisfied with the fact that her portfolio is keeping pace with the gains of the overall market.

ICICI Prudential Nifty Index Fund

Summary

Publicly available portfolios are full of valuable information and help the different stake holders in variety of ways. It helps to understand the mood of the fund managers and what they are picking up in their portfolio. A normal investor can have a look at these portfolios and can assess the stocks and the sectors which are favourite of the fund managers and what kind of exposure is there in such stocks and sectors. A lot of technical information like portfolio standard deviation, beta, sharp ratio, expense ratio and tracking error etc. helps to understand the further details of such portfolios which are available publicly. Researchers use the technical information to further do some data crunching and publish interesting research reports for the masses in general and the interest groups in specific.

Keywords

Portfolio – Collection of financial securities and physical assets is called a portfolio.

Mutual Fund - It is a trust that collects money from a number of investors who share a common investment objective. Then, it invests the money in equities, bonds, money market instruments and/or other securities. Each investor owns units, which represent a portion of the holdings of the fund. The income/gains generated from this collective investment is distributed proportionately amongst the investors after deducting certain expenses, by calculating a scheme's "Net Asset Value or NAV.

Equity - In finance and accounting, equity is the value attributable to the owners of a business. The book value of equity is calculated as the difference between assets and liabilities on the company's balance sheet, while the market value of equity is based on the current share price (if public) or a value that is determined by investors or valuation professionals.

Debt - Debt is the money borrowed by one party from another to serve a financial need that otherwise cannot be met outright. Many organizations use debt to procure goods and services that they can't manage to pay for with cash.

Standard deviation - Portfolio Standard Deviation is the standard deviation of the rate of return on an investment portfolio and is used to measure the inherent volatility of an investment. It measures the investment's risk and helps in analyzing the stability of returns of a portfolio.

Beta- The beta (β) of an investment security (i.e., a stock) is a measurement of its volatility of returns relative to the entire market. It is used as a measure of risk and is an integral part of the Capital Asset Pricing Model (CAPM). A company with a higher beta has greater risk and also greater expected returns.

Expense ratio - The expense ratio is defined as the annual fee that an investor is charged for the management of his or her funds.

Sharp ratio - The Sharpe ratio adjusts a portfolio's past performance—or expected future performance—for the excess risk that was taken by the investor.

Tracking error- Tracking error is the divergence between the price behavior of a position or a portfolio and the price behavior of a benchmark. This is often in the context of a hedge fund, mutual fund, or exchange-traded fund (ETF) that did not work as effectively as intended.

Self Assessment

Q1. Publicly available portfolios…

A. Helps in taking important decisions regarding investments

B. Are mandatory to disclose as per the requirements of the regulators

C. Gives a clear picture of the portfolio performance

D. All of the above

Q2. Credit ratings are given in

A. Debt portfolio

B. Equity portfolio

C. Equity and Debt both

D. Neither debt nor equity portfolio

Q3. Which among the following is not a benefit of debt fund investing?

A. Stable income relative to equity over a longer period

B. High liquidity relative to FD

C. Higher returns than equity funds

D. Transparency

Q4. Money market securities includes

A. Treasury bills, long-term bonds and commercial papers

B. Certificate of deposits, commercial papers and treasury bills

C. Bank loans, long-term bonds and preference shares

D. Commercial papers, treasury bills and bank loans

Q5. A debt mutual fund (also known as a fixed-income fund) invests a significant portion of money in

A. Fixed-income securities like government securities, debentures, corporate bonds and other money-market instruments.

B. Securities like government securities, debentures, equity and corporate bonds

C. Preference shares, commodities and government securities

D. Fixed-income securities like corporate bonds, gold bonds, preference shares and other money-market instruments.

Q6. An equity portfolio is a collection of….

A. investments in the stock market securities
B. investments in the debt market securities
C. investments in the gold and similar securities
D. all of the above

Q7. Which type of securities don't have any type of credit ratings?

A. Long term debentures
B. Commercial papers
C. Certificate of deposits
D. Equity

Q8. Price to earnings ratio (P/E ratio) is more relevant to

A. Debt portfolios
B. Equity portfolios

Q9. Why public disclosure of portfolios is required?

A. Its mandatory by the regulators
B. Millions of retail investors invest in mutual portfolios hence its required
C. Prospective investors want to study the various aspects of portfolio before investing
D. All of the above

Q10. What are the benefits of publicly available portfolios?

A. Diversification
B. Professional fund management
C. Transparency
D. All of the above

Q11. A high standard deviation in a portfolio indicates_____because it shows that the earnings are highly_____.

A. High risk, unstable and volatile
B. Low risk, stable & sure.
C. Low risk, unstable and volatile.
D. High risk, stable & sure.

Q12. Factors that can affect the portfolio risk can be_____

A. A change in the interest rates, the inflation rate, the unemployment rate, and the exchange rates.

B. Change in the availability of the raw material for the manufacturing units
C. Change in climate and the emission norms set by the government
D. None of the above

Q13. Both – portfolio variance and standard deviation express the
A. Return generation capacity of the portfolio
B. How much risk an investor should assume
C. How safe a portfolio is
D. Volatility of portfolio returns

Q14. What type of portfolio should be recommended to an aggressive and a risk-taking investor? Choose the correct statements.
1) A portfolio having higher standard deviation
2) A portfolio having low standard deviation
3) A portfolio having a smaller number of securities
4) A portfolio having a large number of securities

A. All of the above
B. Only 1) and 3)
C. Only 2) and 4)
D. Only 1) and 4)

Q15. Standard deviation indicates how volatile a security is from its average returns.
A. True
B. False

Q16. The beta (β) of an investment security (i.e., a stock) is a measurement of its volatility of returns relative to_____.
A. The entire market
B. The competing businesses
C. The sector in which it operates
D. All of the above

Q17. A Beta >1 for a portfolio indicates
A. Portfolio is less volatile than the market
B. Portfolio is more volatile than the market
C. Portfolio is equal volatile to the market
D. None of the above

Q18. A conservative investor who doesn't want to take too much risk on her portfolio should focus on

A. Portfolios having Beta =1
B. Portfolios having Beta >1
C. Portfolios having Beta <1
D. Portfolios having Beta =0

Q19. A stock having a Beta of 1.5 indicates
A. It will give 50% additional return relative to the broader markets in a rising market
B. It will give 15% additional return relative to the broader markets in a rising market
C. It will give 50% lower return relative to the broader markets in a rising market
D. It will give 15% lower return relative to the broader markets in a falling market

Q20. A company with a higher beta has greater risk and also greater expected returns.
A. True
B. False

Q21. Which of the following statement is not true?
A. Expense ratios are listed on the prospectus of every fund
B. Expense ratios is a fix amount that is charged on investors' money
C. A portfolio with high expense ratio can bring down the portfolio returns
D. Investors should focus on identifying better performing funds with low expense ratio.

Q 22. An expense ratio reveals the amount that an investment company charges investors to manage an investment portfolio.
A. True
B. False

Q23. Which of the following statement is correct?
A. As the size (assets under management) of a mutual fund scheme increase, percentage of expense ratio decrease
B. As the size (assets under management) of a mutual fund scheme decrease, percentage of expense ratio increase
C. It is relatively tough to manage smaller funds than the larger ones
D. Mutual funds with large assets under management gives higher returns compare to mutual funds with small assets under management

Q24. Which statement is true about expense ratio?
A. It represents the expenses incurred to manage the portfolio
B. Expenses are charged from common investment pool of the investors
C. Expense ratio is publicly disclosed
D. All of the above

Q25. What should be the ideal preference order while selecting publicly disclosed portfolios?

A. Portfolio return, expense ratio, standard deviation

B. Expense ratio, standard deviation, portfolio return

C. Standard deviation, portfolio return, expense ratio

D. None of the Above

Q 26. A fund with_____Sharpe ratio than the market is outperforming the market.

A. Lower

B. Higher

C. Average

D. Nil

Q27. The Sharpe's ratio uses _____ to measure a mutual fund's risk adjusted returns.

A. Beta

B. Standard deviation

C. Average return

D. volatility

Q28. _____the Sharpe's ratio, better the risk adjusted return of your mutual fund portfolio.

A. Higher

B. Lower

Q29. Mathematically, the Sharpe Ratio is the difference between the portfolio's returns and the return earned on a risk-free investment, divided by the standard deviation of the portfolio.

A. True

B. False

Q30. Mutual Fund A returned 15% over the past year and had a standard deviation of 8%, if risk free rate is 3% what would be the Sharpe ratio?

A. 4.5

B. 3.5

C. 2.5

D. 1.5

Q31. A higher R-squared value means the fund moves _____.

A. Lower than the benchmark

B. With the benchmark

C. Higher than the benchmark

Q32. To have a portfolio which performs similar to its benchmark one should

A. Try to find a fund with a lower R square value

B. Try to find a fund with a higher R square value

Q33. R-Squared measures the relationship between a portfolio and its _____.

A. Returns

B. Benchmark

C. Risk

D. Beta

Q34. Which of the following funds will have an R-squared very close to 100?

A. Large cap funds

B. Mid cap funds

C. Small cap funds

D. Index funds

Q35. If you want a portfolio that doesn't move at all like the benchmark, you'd want a _____.

a) Low R-squared

b) High R-squared

c) Equal R-squared

A. return fluctuations of an investment portfolio and the return fluctuations of a chosen benchmark.

B. average fluctuations of an investment portfolio and the average fluctuations of a chosen benchmark.

C. return fluctuations of an investment portfolio and the average fluctuations of a chosen benchmark.

D. average fluctuations of an investment portfolio and the return fluctuations of a chosen benchmark.

Q36. While calculating tracking error, portfolio performance is tracked with a _____that represents part of the total market.

A. diversified market index

B. best performing portfolio in that segment

C. competing portfolio

D. None of the above

Q37. If one wants to see the portfolio returns at par with a broad market index, the tracking error should be___

A. High

B. Low

Q38. If a mutual fund portfolio doesn't have any tracking error with its benchmark, it indicates

A. Mutual fund portfolio is not performing at par with its benchmark
B. Mutual fund portfolio is performing at par with its benchmark
C. Mutual fund portfolio is delivering higher returns than its benchmark
D. Mutual fund portfolio is delivering higher returns than its benchmark

Q39. If an investor is interested to see higher returns in its mutual fund portfolio compare to its benchmark, she should focus on

A. High beta mutual funds
B. Mutual funds with higher tracking error
C. Over diversified mutual funds
D. Mutual funds with higher expense ratio

Answers for Self Assessment

1.	D	2.	A	3.	C	4.	B	5.	A
6.	A	7.	D	8.	B	9.	D	10.	D
11.	A	12.	A	13.	D	14.	B	15.	A
16.	A	17.	B	18.	C	19.	A	20.	A
21.	B	22.	A	23.	A	24.	D	25.	A
26.	B	27.	B	28.	A	29.	A	30.	D
31.	B	32.	B	33.	B	34.	D	35.	A
36.	A	37.	B	38.	B	39.	A		

Review Questions

1. How does publicly available portfolios can help the various stakeholders? What kind of information is available in such portfolios?
2. What are the benefits of publicly available portfolios? How can a retail investor benefit from publicly available portfolios?
3. What is the difference between debt and equity mutual funds? Which category you will pick and why?
4. Explain the various categories of mutual funds available in India.
5. What do you understand by expense ratio of a publicly available portfolio?
6. Elaborate: a) Beta
   b) Sharp ratio

7. What are your views on information available in publicly available portfolios like mutual funds, insurance companies and pension fund portfolios? Is this information valuable to take decisions regarding investing in mutual funds, insurance and pension funds?

8. Why does tracking error is considered important for a portfolio? What is the significance of tracking error? For what category of funds tracking error should be seen?
9. Which statistical measure tells us the volatility in the returns of portfolios? How it is calculated?

Further Readings

https://www.mutualfundssahihai.com/en (about mutual funds)

https://zerodha.com/varsity/chapter/mutual-fund-risk-metrics/ (mutual fund beta, standard deviation and sharp ratio)

https://www.iciciprulife.com/about-us/investor-relations/yearly-public-disclosures.html (icici prudential life insurance public disclosure)

https://nism.modelexam.in/ (insurance regulator and public disclosure norms)

https://www.icicipruamc.com/downloads/factsheet-and-portfolio (icici prudential monthly fact sheet)

https://www.maxlifeinsurance.com/content/dam/neo/pdf/individual-fund-annual-reports/MAX%20LIFE%20%20DIVERSIFIED%20EQUITY%20FUND.pdf (max life insurance diversified equity fund)

Unit 14: Regulators and Risk Management

CONTENTS

Objectives

After studying this unit, you should be able

- Explore the role of SEBI as a regulator
- Understand the functions of SEBI as a risk manager
- Understand the role of IRDAI
- Understand the risk management functions of IRDAI
- Define the role of RBI
- Understand the risk management steps taken by RBI
- Understand the functions of PFRDA
- Explore the risks faced by pension funds and their management

Introduction

The breadth and complexity of the corporate regulatory environment has made compliance risk management an essential part of mitigating losses and guarding against a business's reputational damage. Regulatory compliance risk management refers to a business's efforts to operate within the laws, guidelines, and agreements governing its industry. Specific regulatory concerns vary widely, depending upon the nature of a business. A financial services company will be subject to different

regulations than a retail clothing store, but both businesses will need to manage compliance risk. Regulators like SEBI, RBI, IRDAI and PFRDA play a very important role in managing and regulating the capital markets, banks, insurance players and pension fund industry players respectively. Financial frauds and regular customer complaints had been a regular problem of Indian financial system hence, its of utmost importance to have a strong risk management mechanism for a well-managed and a well-run financial sector through strong regulatory bodies.

14.1 Securities and Exchange Board of India (SEBI)

- The Securities and Exchange Board of India (SEBI) was officially appointed as the authority for regulating the financial markets in India on 12th April 1988.
- It was initially established as a non-statutory body, i.e. it had no control over anything but later in 1992, it was declared an autonomous body with statutory powers.
- SEBI plays an important role in regulating the securities market of India. Thereby it is important to know the purpose and objective of SEBI.

Why was SEBI formed?

- At the end of the 1970s and during 1980s, capital markets were emerging as the new sensation among the individuals of India.
- Many malpractices started taking place such as unofficial
  - self- styled merchant bankers,
  - unofficial private placements,
  - rigging of prices,
  - non-adherence of provisions of the Companies Act,
  - violation of rules and regulations of stock exchanges,
  - delay in delivery of shares etc.
- Due to these malpractices, people started losing confidence in the stock market.
- The government felt a sudden need to set up an authority to regulate the working and reduce these malpractices.
- As a result, the Government came up with the establishment of SEBI.

14.2 Risk management system of SEBI

SEBI has been continuously reviewing its policies and drafting risk management policies to mitigate risks (market risks, operational risks and systemic risks), thereby enhancing the level of investor protection and catalyzing market development.

14.3 Key Risk Management Measures initiated by SEBI

- Categorization of securities into groups 1, 2 and 3 for imposition of margins based on their liquidity and volatility.
- Value at risk (VaR) based margining system.
- Specification of Mark to Market margins
- Specification of Intra-day trading limits and Gross Exposure Limits
- Real time monitoring of the Intra-day trading limits and Gross Exposure Limits by the Stock Exchanges
- Specification of time limits of payment of margins
- Collection of margins on upfront basis

- Index based market wide circuit breakers
- Automatic de-activation of trading terminals in case of breach of exposure limits

14.4 Role of SEBI

- SEBI acts as a watchdog for all the capital market participants and its main purpose is to provide such an environment for the financial market enthusiasts that facilitate efficient and smooth working of the securities market.
- It ensures that the three main participants of the financial market are taken care of, i.e. issuers of securities, investor, and financial intermediaries.

1) Issuer of securities

These are entities in the corporate field that raise funds from various sources in the market.

SEBI makes sure that they get a healthy and transparent environment for their needs.

2) Towards investors

Investors are the ones who keep the markets active.

SEBI is responsible for maintaining an environment that is free from malpractices to restore the confidence of general public who invest their hard-earned money in the markets.

3) Towards financial intermediaries

These are the people who act as middlemen between the issuers and investors.

They make the financial transactions smooth and safe.

14.5 Functions of SEBI and Risk Management

SEBI primarily has three functions-

- Protective Function
- Regulatory Function
- Development Function

Protective functions

As the name suggests, these functions are performed by SEBI to protect the interest of investors and other financial participants. It includes-

- Checking price rigging
- Prevent insider trading
- Promote fair practices
  - Create awareness among investors
  - Prohibit fraudulent and unfair trade practices

Regulatory functions

- These functions are basically performed to keep a check on the functioning of the business in the financial markets. These functions include-
- Designing guidelines and code of conduct for the proper functioning of financial intermediaries and corporate.
- Regulation of takeover of companies
- Conducting inquiries and audit of exchanges
- Registration of brokers, sub-brokers, merchant bankers etc.

- Levying of fees
- Performing and exercising powers
- Register and regulate credit rating agency

Development functions

SEBI performs certain development functions also that include but they are not limitedto-

- Imparting training to intermediaries
- Promotion of fair trading and reduction of malpractices
- Carry out research work
- Encouraging self-regulating organizations
- Buy-sell mutual funds directly from AMC through a broker

14.6 Risk Monitoring by IRDAI

Reporting Requirements

- Insurers are required to submit various returns like financial statements, Auditors' opinion statement, reports of valuation of assets, valuation of liabilities and solvency margin
- Incurred But Not Reported claims in case of general Insurance business
- Reinsurance plans on an annual basis; and monthly statement on underwriting of large risks in case of general Insurance companies
- Details of capital market exposure on a monthly basis; Investment policy, Quarterly and annual returns on investments.

Solvency of Insurers

- It has been made mandatory to the insurers to submit solvency report on quarterly basis
- Inherent risk that respective line of business poses to the insurer
- Higher requirements are placed for risky lines of business compared to others posing less risk to the insurers
- Insurers are required to maintain a minimum solvency ratio of 150% at all times
- Quarterly solvency ratio reports have to be submitted to the Supervisor, maintaining minimum solvency ratio of 150%.

Asset-Liability Management

- Insurer must provide the year wise projected cash flows, in respect of both assets and liabilities
- Non-life insurers must submit a report on 'Financial Condition' covering the sensitivity analysis of the financial soundness in meeting the policyholders' liabilities.
- mix and diversification of investments in terms of Types of Investment, Limits on exposure to Group Company, Insurer's Promoter Group Company

Reinsurance

- Transfer of risk through Reinsurance is recognized only to the extent specified in the regulations
- In order to minimize the counterparty risk, the re-insurers with whom business is placed must have the minimum prescribed rating by an independent credit rating agency as specified in the regulations
- General Insurance Corporation of India (GIC of India) is the sole National Reinsurer, providing Reinsurance to the Insurance companies in India.

Corporate Governance

- Governance practices applicable to Insurance companies for maintenance of solvency, sound long-term investment policy and assumption of underwriting risks on a prudential basis
- Insurers are required to adopt sound prudent principles and practices for the governance of the company and should have the ability to quickly address issues of non-compliance or weak oversight and controls.

On and off-site Supervision

- **Onsite Inspections:** The Authority has the power to call for any information from entities related to insurance business – Insurance companies and the intermediaries, as may be required from time to time.
- Inspection of corporate offices and branch offices of the companies. These inspections are conducted with view to check compliance with the provisions of Insurance Act, Rules and regulations framed thereunder.

Off-site Inspection

- The off-site inspection conducted by analyzing periodic statements, returns, reports, policies and compliance certificates mandated under the directions issued by the Authority from time to time.
- The periodicity of these filings is generally annual, half-yearly, quarterly and monthly and are related to business performance, investment of funds, remuneration details, expenses of management, business statistics, auditor certificates related to various compliance requirements.

Micro Insurance and Rural & Social Sector Obligations

In terms of these regulations, insurers are required to cover year wise prescribed targets

(i) in terms of number of lives under social obligations; and

(ii) in terms of percentage of policies to be underwritten and percentage of total gross premium income written direct by the life and non-life insurers respectively under rural obligations.

Duties, Powers and Functions Of IRDAI

The main duty of IRDAI is to regulate, promote and ensure orderly growth of the insurance business and re-insurance business.

14.7 Powers and Functions of the Authority (IRDAI)

- Issue to the applicant a certificate of registration, renew, modify, withdraw, suspend or cancel such registration
- Protection of the interests of the policy holders in matters concerning:
    - assigning of policy,
    - nomination by policy holders,
    - insurable interest,
- settlement of insurance claim, surrender value of policy and otherterms and conditions of contracts of insurance
- Specifying requisite qualifications, code of conduct and practical training for intermediaries or insurance intermediaries and agents
- Specifying the code of conduct for surveyors and loss assessors
- Promoting efficiency in the conduct of insurance business
- Promoting and regulating professional organizations connected with the insurance and re-insurance business
- Levying fees and other charges for carrying out the purposes of this Act;
- Regulating investment of funds by insurance companies
- Regulating maintenance of margin of solvency
- Adjudication of disputes between insurers and intermediaries or insurance intermediaries
- Supervising the functioning of the Tariff Advisory Committee
- Specifying the percentage of life insurance business and general insurance business to be undertaken by the insurer in the rural or social sector

14.8 Reserve Bank of India

- A bank is a place that accepts deposit and grants loan.
- A bank charges interest on the loans lent and pays interest on the deposits received. The difference in the interest received and interest paid is the source of income for the bank.
- Each country has large number of banks that conduct the function of accepting and lending money.
- But, a country has only one central bank that governs the functioning of all the banks situated within the country and regulate their business.
- In India, all the banks are regulated by the Reserve Bank of India (RBI).
- There are large number of activities performed by the RBI in order to regulate the economy of a country and the banks.

14.9 Major Activities of RBI

- Issue of Bank Notes.
- Banker to the Government.
- Custodian of Cash Reserves of Commercial Banks.
- Custodian of Foreign Exchange Reserves.
- Lender to the Last Resort.
- Central Clearance and Account Settlement.

- Controller of Credit.

14.10 Types of Risks Faced by Banks

In order to deal with these risks that the banks have been surrounded by, the Reserve Bank of India provides for some guidelines that needs to be followed by the banks.

- Credit risk
- Market risk
- Interest rate risk
- Liquidity risk
- Operational risk

Credit risk

- Lending money to any other individual involves risk as to the return of the amount lent.
- The risk so associated with lending of money is known as credit risk.
- Credit risk, in simple words can be explained as unwillingness of a person to pay the amount borrowed from the bank which exposes the bank to a risk of loss.
- In addition to the risk involved in lending money, banks are exposed to the risk of the interest amount, forex and country risks.

Market risk

- Market risk arises from adverse changes in various market variables like currencies, interest rate instruments, equities, commodity price, etc.
- These factors play a vital role in functioning of the economy and affects the economy at both the level, i.e., macro and micro.
- The changes in these variables is very volatile, therefore, RBI needs to step up to maintain soundness of the banks.

There are two types of market risk:

a) Foreign Exchange Risk – It is that risk where bank may suffer losses as a result of adverse exchange rate movements in a small period of time.

b) Security Price Risk – It is a financial risk which arises from holding securities in particular investment.

Interest rate risk

- Interest Rate Risk arises when there is potential impact on the Net Interest Margin by unexpected changes in the interest rates. It can be expressed in two ways:
- Its impact on the earnings of the bank.
- Its impact on the economic value of the bank's assets, liabilities and Off-Balance Sheet positions.

Liquidity risk

- A bank faces liquidity risk when it does not have enough cash in hand to meet its daily requirements.
- This may arise due the bank lending all the money they have as loans.
- It also arises when the bank funds long term assets from short term liabilities.
- Various ratios adopted by banks to evaluate the liquidity of the banks are (1) Loans to Total Assets, (2) Loans to Core Deposits etc.

Operational risk

- Basel Committee defines operational risk as the "risk of change in value caused by the fact that actual losses, incurred for inadequate or failed internal processes, people and systems or from external events (including legal risk), differ from the expected losses".
- These risks are not willingly incurred and nor are they revenue driven.

14.11 RBI guidelines

Credit Risk Management

- Measurement of risk through credit rating/scoring
- Quantifying the risk through estimating expected losses
- Risk pricing on a specific basis
- Effective Loan Review Mechanism

Cash Reserve Requirements

- **Cash Reserve Ratio** - deposits with the RBI carry no interest
- **Statutory Liquid Ratio** - a certain percentage of the total deposits with themselves in form of cash, gold reserves, government securities, etc.
- Strong MIS for reporting, monitoring and controlling risks;
- Well laid out procedures, effective control and comprehensive risk reporting framework
- Periodical review and evaluation.

14.12 Pension Fund regulatory and Development Authority (PFRDA)

- PFRDA is the pension regulator and works towards its promotion and development.
- It is a Central autonomous body and is a quasi-government organization and has executive, legislative and judicial powers similar to other financial sector regulators in India such as Reserve Bank of India (RBI), Securities and Exchange Board of India (SEBI), Insurance Regulatory and Development Authority (IRDA).
- PFRDA administers and regulates the National Pension System (NPS) and also administers Atal Pension Yojana.

14.13 Functions of PFRDA

- Regulate NPS and pension schemes to which PFRDA Act applies
- Establish, develop and regulate pension funds
- Protect the interest of pension fund subscribers
- Register and regulate intermediaries

- Approve schemes, terms and conditions, and laying down norms for management of corpus of pension funds
- Establish grievance redressal mechanism for subscribers
- Settle disputes among intermediaries and also between intermediaries and subscribers
- Train intermediaries and educate subscribers and the general public with respect to pension, retirement savings and related issues
- Regulate the regulated assets
- Call for information, conduct inquiries, investigation and audit of intermediaries and other entities connected with pension funds

Risk management framework

The risk management framework is based on the tenets of identification, measurement, control and mitigation of various risks and reporting to the top management.

Some key risks to pension fund industry

- Operational Risk
- Reputation Risk
- Market Risk
- Credit Risk & Investment Risk
- Other Risks (Compliance/Contagion/Strategic)

Summary

Financial or prudential regulation is one of the key elements to protect a country or economic system from too high risks taken by financial institutions. Formulated in beautiful mission statements, the objective of regulators is to avoid risks in a particular bank or insurer spilling over to the real economy and damaging individual deposit or policy-holders. With the advances in the financial industry, regulators have needed to keep pace and update their frameworks accordingly. It is fair to say that risk management and regulation never develop in isolation. Risk managers implement regulations and all the requirements that come along with it. Logically, when they are observing risk practices, they are also reflecting regulation standards. At the same time, regulation has been influenced by what was available in practice.

Key words

- **SEBI –**Securities and exchange board of India, regulating capital markets.
- **IRDAI –** Insurance regulatory and development authority of India, regulating insurance industry in India.
- **RBI –** Reserve Bank of India, regulating banking industry in India
- **PFRDA –** Pension fund regulatory and development authority, regulating pension fund industryin India
- **Re-insurance** - Reinsurance is insurance for insurance companies. It's a way of transferring or "ceding" some of the financial risk insurance companies assume in insuring cars, homes and businesses to another insurance company, the reinsurer. Reinsurance is a highly complex global business.
- **Credit risk** - Credit risk is the possibility of a loss happening due to a borrower's failure to repay a loan or to satisfy contractual obligations.
- **Market risk** - Market risk is the risk of losses on financial investments caused by adverse price movements. Examples of market risk are: changes in equity prices

- Interest rate risk - Interest rate risk is the potential for investment losses that result from a change in interest rates. If interest rates rise, for instance, the value of a bond or other fixed-income investment will decline.
- **Liquidity risk** - Liquidity risk occurs when individual investors, corporations, or financial institutions are unable to meet their short-term debt obligations.
- **Operational risk** - Operational risk is the risk of losses caused by flawed or failed processes, policies, systems or events that disrupt business operations.
- **CRR** - The Reserve Bank of India or RBI mandates that banks store a proportion of their deposits in the form of cash so that the same can be given to the bank's customers if the need arises

Self Assessment

Q1. _____ plays an important role in regulating the securities market of India.

A. SEBI
B. RBI
C. IRDAI
D. PFRDA

Q2. SEBI was formed in late 1970s / early 1980s because

A. Many malpractices started taking place in capital markets
B. Government was focusing on employment generation through such institutions
C. Without SEBI it wasn't possible to bring investors to capital markets
D. None of the above

Q3. The two key objectives of SEBI are

A. Launching new IPOs and attracting new investors
B. Investor protection and market development
C. Portfolio management and managing risk
D. Helping listed companies to grow and business expansion

Q4. SEBI acts as _____ for all the capital market participants and its main purpose is to provide such an environment for the financial market enthusiasts that facilitate efficient and smooth working of the securities market.

A. A Controller
B. A Felicitator
C. A watchdog
D. A helper

Q5. Three prime functions of SEBI are:

A. Regulatory, controlling and protective functions
B. Development, risk management and regulatory functions
C. Protective, regulatory and developmentfunctions
D. Controlling, risk management and protective functions

Q6. What does 'R' stand for in IRDA

A. Regulation
B. Regulatory
C. Research
D. Rate

Q7.What are the main functions performed by the IRDA?
A. Protect the rights of policy holders
B. Adjudication on insurance related matters
C. Promoting insurance business
D. All of these

Q8. IRDAI protects the interests of the policy holders in matters concerning___

A. Nomination by policy holders
B. Insurable interest
C. Settlement of insurance claim
D. All of the above

Q9. Which one objective mentioned below is the key objective of IRDAI?

A. Safeguarding the interests of the policyholders
B. Improving the competition in the insurance industry
C. Launching new and innovative products in insurance industry
D. Attracting foreign direct investment (FDI) in insurance sector

Q10. Reinsurance refers to

A. One or more insurers assuming another insurance company's risk
B. When an individual takes more than one policy for a car / bike
C. Taking insurance every year
D. Taking insurance from multiple insurance companies

Q11. A bank chargesinterest _____and paysinterest _____.

A. On the loans lent, on the deposits received
B. On the deposits received, on the loans lent

Q12. Which among the following is not a function of RBI?

A. Issue of Bank Notes.
B. Banker to the Government.
C. Custodian of Cash Reserves of Commercial Banks.
D. Fixing interest rates for each bank

Q13. Which among the following risks is the least affecting risk for the banking industry?

A. Credit risk

B. Political risk

C. Market risk

D. Interest rate risk

Q14. A bank faces liquidity risk when it does not have enough cash in hand to meet its daily requirements.

A. True

B. False

Q15. Operational risk is caused due to

A. Failed internal processes, people and systems

B. Changes in interest rates

C. Changes in political circumstances

D. Changes in foreign currency rates

Q16. Which amongst the following is not a function of Pension Fund Regulatory and Development Authority (PFRDA)?

A. Establish, develop and regulate pension funds

B. Protect the interest of pension fund subscribers

C. Register and regulate intermediaries

D. Launching new and better pension schemes

Q17. The risk management framework in pension fund industry by PFRDA is based on the tenets of identification, measurement, control and mitigation of various risks and reporting to the top management.

A. True

B. False

Q18. Which among the following is not a risk to the pension fund industry?

A. Operational Risk

B. Reputation Risk

C. Entry of foreign pension fund companies in India

D. Market Risk

Q19. What steps can be taken in India to increase the investments in pension funds?

A. Investor awareness programs

B. Educating people on the need of planning for their retirement

C. Variety of investment options for retirement

D. All of the above

Q20. Which type of financial products are not offering retirement planning / pension planning products?

A. Mutual funds

B. Insurance schemes

C. NPS

D. Stock investments

Answers for Self Assessment

1.	A	2.	A	3.	B	4.	C	5.	C
6.	B	7.	D	8.	D	9.	A	10.	A
11.	A	12.	D.	13.	B	14.	A	15.	A
16.	A	17.	D	18.	A	19.	C	20.	D

Review Questions

Q1. What is the need of regulatory bodies in the financial services industry? What purpose do they fulfil being a regulator?

Q2. What is the risk management system of SEBI? Elaborate the risk management measures initiated by SEBI (Securities and Exchange Board of India).

Q3. SEBI (Securities and Exchange Board of India) is playing an important role in regulating the capital markets. Throw some light on the important roles being played by SEBI.

Q4. Write short notes on:

a) Protective function of SEBI

b) Development function of SEBI

Q5. What are the duties, powers and functions of RBI (Reserve Bank of India)?

Q6. Financial services industry specially banking sector is always under the threat of various types of risks. What are the key risks that brings instability in the banking industry?

Q7. What do you understand by credit risk? How banks can safeguard themselves against credit risk?

Q8. What are the key functions of Pension Fund regulatory and Development Authority (PFRDA)?

Further Readings

https://www.risk.net/behavioural-risk-management/7563486/the-role-of-regulation-in-risk-management

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