



**The Institute of Chartered Accountants of India**  
(Setup by Act of Parliament)

# **WICASA NAGPUR**

## **Quarterly E-Newsletter**

**April-May-June 2022**

# **SAMVĀD**

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## WICASA Chairperson's Communique

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Dear Future CAs

It is a delight to be able to communicate with you all through this 2nd issue of SAMVĀD.

Firstly I would like to wish you all a very happy new financial year. The beginning of New Year marks the beginning of new challenges and opportunities. Your ability to discipline yourself to set clear goals, and then to work towards them every day, will do more to guarantee your success than any other single factor.

Further I would like to add that this magazine is a platform for the students to express their creative pursuit which develops in them originality of thought and perception. The Contents of the magazine reflect the wonderful creativity of thoughts and imagination of our 'To be' Chartered Accountants.

During the quarter ended in June 2022, we organised many programs including Swimming Competition, One Day Revisionary, Mock Tests, Fire Side Chat with New Age Professionals, Seminar on Taxation of shares and derivatives, Understanding Crypto and NFTs, Investor Awareness Program, Indoor Sports, Industrial Visits, WICASA got talent and many more., we are greatly thankful to all the Speakers and participants who joined this event to make them successful. I hope you all have enjoyed them and learned many new things.

I would take this opportunity to invite you all to the Mega CA Students' Conference which is scheduled to be held on 21st and 22nd Jul. I wish to see you all participating as paper presenter, Student Delegates or as a volunteer to any of the various Organising Committees. After COVID, this is the first event happening on such a large scale.

I invite you all to come and be part of this Fun learning expedition by sending articles, creativities and suggestions for the future events at [wicasa@nagpuricai.org](mailto:wicasa@nagpuricai.org).

Happy Learning!!

Regards  
CA. Deepak Jethwani  
Chairperson, WICASA Nagpur

## WICASA Committee

2022-23



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Chairperson, WICASA Nagpur

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**Parth Shukla**  
Jt. Editor



## WICASA Communique

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Dear Fellow Colleagues',

It is my absolute pleasure and delights to communicate with our Generation, the Future Gen-Z of Chartered Accountants through this very edition of Western India Chartered Accountants Student Association e-Newsletter: SAMVĀD.

Firstly, I wish you all a very Happy New Financial Year! With the New Year, there comes an immense opportunity to attain new highs and experiences. Grabbing the opportunity and making the fullest of it, has been always an unsaid moto of our course as well as for life. The Chartered Accountancy course teaches you the same, application and adaptation of new learnings, through hard work and perseverance. These learnings if properly channelised can do wonders.

Friends, these opportunities are provided to you by the Nagpur Branch of WICASA by organizing various activities- Academic as well as Non-Academic. Do get yourself enrolled with your active participation in the activities and learn the best with us! The activities organised for you bring you a fun learning expedition and immense opportunities to sharpen your skills, which will surely help you to become an Extra-Ordinary one.

There are many forthcoming activities, upcoming and planned for you by the Nagpur Branch of WICASA. Half Day Seminars, Full day Seminars and as well as Sports events are a few of them. Show your support and have a great learning experience.

Wishing you all the best of experiences and learnings!

Best Wishes,  
Anushka Ringangaonkar  
Secretary  
Nagpur Branch of WICASA

## Student's Article



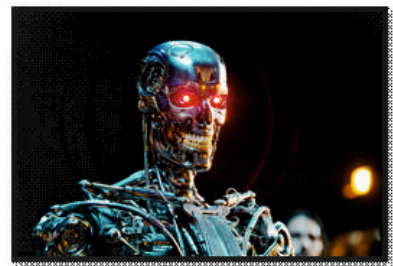
### The Changing Areas Of Audit : AI, Robotics & Machine Learning Statements

Aviral Barange  
CRO0608007

While the Motivation of exceptional client service will be humancentric, the delivery of a timely & reliable Audit is and will be powered by technology.

-Walter Mupanguri  
EY Central Africa Cluster Leader

The 1984 movie, The Terminator, portrays a dystopian future where robots and intelligent machines seize control of the world. In the movie, an intelligent killer robot – the terminator – is sent back in time from the early-20th century to change history. Now clearly, none of that has come even close to coming true, but what is clear is that technology Not that long ago artificial intelligence (AI), robots and machine learning (ML) were thought to be things only found in science fiction films. Today, this type of technology is taking centre stage in workplaces across the globe.



In the highly competitive global environment, the role of Chartered Accountants (CAs) is crucial for businesses to flourish. In past years, there has been a marked shift towards strategic decision making and entrepreneurial roles that add value beyond the traditional financial reporting.



Technology is transformational and it is impacting the practice of accounting and assurance, proving to be a game changer for the Profession. Knowledge of existing and emerging technologies like Artificial Intelligence, Blockchain, robotics, automation, Machine Learning is extremely essential for new age accountants. Leveraging professional opportunities in digital era will require more focus on analytical and advisory role by using technology as a tool.

**Respected CA. Atul Kumar Gupta, Past-President, ICAI said**

*"Technology is changing by leaps and bounds and transforming the world around us. The accountancy profession is no exception and with the introduction of Artificial Intelligence, Robotic Process Automation, Blockchain Technology, among others it becomes imperative for all to be vigilant and respond to the technological innovations to continuously improve business operations" so, Adapt, Adopt and Automate.*



Technology is revolutionising the way audits are being conducted now and into the future. Technology is changing the way business is conducted and data is analysed.

**The Changing role of the Audit**

It is common knowledge that audited financial information is essential for both companies and individuals alike. The credibility of financial reports underpins various transactions that may be entered into for trading and investment purposes. This is no doubt an exciting and demanding role to fulfill especially in the current climate. With the rapid technological advancements, legislative changes, and the catalytic effects of Covid-19, every sector is being challenged including the auditing profession. It is no wonder that globally the role of the auditor has fallen under tighter scrutiny with regards to issues concerning auditor independence, and the scope and quality of today's audits.

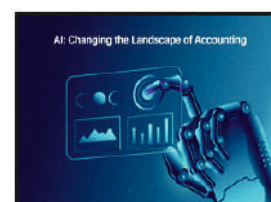
The impact of COVID-19 is a case in point. In COVID times, many audits were delivered and concluded remotely. This practice continues. This by no means suggests that the traditional audit premise of inquiry, observance, and reperformance were not being done. They are now happening in a smarter way. Covid-19 sped up a process that may have taken another couple of years to happen much sooner. The environment in which the audit is being conducted has changed. There is no going back.

Additionally, seeing as the auditor's client is also most likely working remotely, this moment calls for new methods of interacting and communicating between auditor and client. The technological advancements taking place with the clients will continue to place pressure on auditors to think and act differently. Undoubtedly, this is why any worthwhile audit is data-driven and technology-focused. While the motivation of exceptional client service will always be "human-centric", the delivery of a timely and reliable audit is and will be powered by technology.

**Machine Learning and AI in Audits**

Artificial intelligence (AI) and machine learning are becoming more popular in the auditing field, so what is AI?

AI short for Artificial Intelligence is a field of computer science



that involves interactions between machines and software, where the software learns to mimic human behaviour. It does this by studying large amounts of data. Machine learning goes one step further. The software not only mimics human behaviour, but it also “teaches itself” how to do that behaviour by analysing vast amounts of data.

AI and machine learning are already being used in auditing. Firms are either already using artificial intelligence technologies, or plan to use them in upcoming years.

### **The Impact of AI and Machine Learning on Audits**

#### **Quicker and Cheaper than Traditional Auditing**

In today's auditing world, auditors rely on experience & statistical sampling to manually verify hundreds of documents and evidence, determine areas of strength, and review organizational procedures and transactions in depth. However, this manual process has made auditing a time-consuming and resource-intensive activity.

Although auditors are focused on the quality of the audits not at all clear that these traditional systems will be reliable enough to assist them. As the business complexity increases, auditors often review less each day due to complex and endless work.

However, the new technologies (AI) (Artificial intelligence) and ML (Machine Learning) could allow audits to no longer be constrained by traditional limitations, like time.

#### **How AI and Machine Learning are affecting the Future of Audit ?**

- **The Path to Automating Audit with AI and Machine Learning**

The future is here. Machine learning and artificial intelligence systems are no longer technologies of the future but are becoming a reality today.



- **Continuous Audit Reporting**

With AI and machine learning, auditors can use a predictive model to grade various risks on a suitable scale quickly and reliably, rather than the traditional categorical grading systems, ensuring the continuous audit reporting.

## Robotics in Auditing



Robotic Process Automation, or RPA, is becoming increasingly common in internal audit to streamline and optimize straightforward, repetitive tasks involved in the internal audit process. With this automation, organizations see quality improvements, increased speed and efficiency, better accuracy, and growing value.

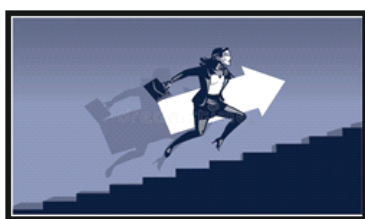
### What is Robotic Process Automation?

Robotic Process Automation (RPA) can be thought of as a next-level form of automation, but one which remains a step below an artificial intelligence (AI) application. RPA is all about taking the time-consuming, repetitive, simple, and rules-based tasks that eat up much of an auditor's time and handing them to a computer program. RPA software interacts with other applications in the same way a human auditor would to input machine-readable data but does so faster, more accurately, and tirelessly, freeing human auditors to focus on more complex tasks.

Here then are three key benefits that auditors will experience with the implementation of RPA in their practice.

1. Improved audit quality and reduced errors
2. Improved efficiency and lower costs
3. Demonstrate value to the organization

These are the emerging areas which will help in enhancement of efficiency & effectiveness in the field of Auditing & Accounting. However, there are certain Doubts arising as to whether the jobs of Chartered Accountants is in danger? The answer to which is Chartered Accountants are indispensable so moving towards technology will not affect our working in a negative manner but enhance the Quality of audit performed.



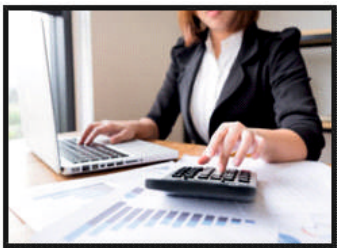
### How can we move forward?

Auditors once spent their time searching for mistakes, but that changed with the development of computer technology. In the digital era, Auditing professionals can accomplish much more in much less time, and their focus has shifted toward analysis and consultation.

As the ability for auditors to capture big data increases, so does the need for appropriately qualified professionals who can interpret, analyse, and advise based on this data. The ability to work with this data creates opportunities for accountants & auditors to be integral in managing the direction of corporations large and small.

While technological advances have made some careers obsolete, the core elements of auditing remain the same and the role is as vital as ever before. They have always provided information to stakeholders, predominately management but also to shareholders and others. This has not changed but the way this information is generated and communicated has changed.'

Auditors who want to ensure career viability and succeed in the long term must develop technical competence in the areas of data analytics, data science, business intelligence, and information systems and expertise in more traditional (yet high demand) skills like financial planning, decision support, internal controls, and risk management.



The bottom line is that automation is replacing and even annihilating some aspects of traditional accounting & auditing, but this is actually a blessing in disguise paving the way towards affirming the fundamental role the profession plays in the growth and sustainability of business. The question is: Are professionals prepared to do the work needed to upskill and reskill to match their new upgraded job description?

### Technology Will Support, Not Replace, Auditors

Auditors will need to embrace the rapid advances in accounting technology if they want to remain relevant in the accounting industry. This includes staying up to date with technological trends, optimizing and being open to accepting and learning advancing technologies.



The types of jobs that will become available in future will be highly impacted by intelligent technology shaping the future of auditing Technology like automated accounting systems, AI and Robotic process automation will continue to impact the role of the auditors.

### **Tomorrow's Auditor : More Relevant, Strategic and Creative Than Ever**

Tomorrow's auditor may play an advisory role, welcoming business intelligence and procurement professionals and working to chart a strategic sourcing plan. They could leverage data management tools, including augmented reality, to humanize and contextualize spend data for the C-suite to make better decisions based on long-term value rather than return on investment alone.



Those who understand the potential and importance of these technologies — and invest in the tools and training required will take full advantage — will be ahead of the curve. We must be comfortable with being uncomfortable, unleashing our natural curiosity and skepticism to analyse and review emerging technologies.

But for that to happen, we need professionals to take a seat at the table and become partners in key decision-making about where the organization is headed. To be clear, this approach is not all about tech skills.

The successful Auditor of the future is equipped with technical, analytical, leadership and consulting skills. These are not skills that will be developed overnight, as they need to interface with technology, strategy, and finance. This won't be easy, but then (as my mum would say) nothing worth doing ever is.

### **Adapt, Adopt and Automate: Augmenting Efficiency for Growth**

The change should never be seen as an intimidating factor; the necessity rather is to embrace it wholeheartedly. This is possible when auditors not only adopt the innovative automation tools and software but also adapt to it.

### **Conclusion**



It is true that AI, machine learning, and robotic process automation have the potential to take over many of the tasks that accountants and auditors perform, they won't replace the professional judgment, insight, and guidance that only a human can provide, at least for the foreseeable future.

Technological disruption is on its way, and it will transform every part of the Accounting & Auditing profession, and has the potential to disrupt auditors out of their jobs unless they become part of that transformation.

## Student's Article



### Impact of Russia - Ukraine War on Indian Stock Markets

Vikrant Bokade  
WRO0670135

Every country and their economies are connected with each other. Thus, any International event could leave negative impact on the markets. As the war between Russia and Ukraine has taken place, markets across Asia get volatile and the oil prices surge. If the situation does not improve in the future, the market is likely to take a further hit as the oil prices will continue to remain at high prices.

Rising crude prices result in depreciating rupee thereby increasing inflation results in downfall in GDP growth, according to estimates, a 10% rise in crude prices reduces the GDP growth by 20 basis points and increases inflation by around 40 basis points while raising the current account deficit by around 30 basis points.

War results in inflation in economy and commodity prices have started rising. Russia is a key supplier of energy globally. Moreover, Ukraine and Russia account for 90% of India's sunflower oil imports.

As per SBI research report, because of the Russia-Ukraine war, food and beverages, fuel, light and transport alone contributed around a 52% increase in overall inflation since February.

Russia-Ukraine war can benefit Indian investors as Sensex index closed about 1,500 points lower at 52,842, while the Nifty 50 index dropped 382 points to close at 15,863 on March 7 which makes an opportunity for investors to build their portfolio. The last time there was a big crash like this was when the Indian government announced a total economic shutdown barring a few essential services in March 2020.

Some companies get benefit out of the war as Russia is the 5th largest steel producer, while Ukraine ranks 14th globally. Both these countries together account for 20% of the global steel supply due to war steel has been trading up 8% ever since the war has begun, Tata steel India's largest steel producer has been benefitted out of it.

Russia's ambassador to India said that Indian pharma companies may replace the western manufacturers, which benefits Dr Reddy's Laboratories.

India is the second-largest consumer of crude oil thus, sensitive to price swings. Every time oil prices shoot up by \$10 per barrel, the inflation goes up by roughly about 50-55 basis points. Thus, higher oil prices are a drag on our growing economy. Therefore, the country is always on the hunt for cheap oil. Russia is largest crude oil producers globally. Aligning with sanction imposed on Russia, many countries stayed away from Russian crude. As a result, Russia had a hard time selling its crude reserves. Consequently, the country tendered its crude at a steep discount to the market price. Spotting an opportunity and defying sanctions, India bought 6 m barrels from Russia at discount of \$20-25 per barrel, Out of the 6m barrels, Indian Oil Corporation (IOC) alone bought 3m barrels which increase net profit of the company.

Gas prices in India have shot up by 64.7% ever since the war between Russia and Ukraine broke out. Russia is the second-largest producer of natural gas globally. It is also the world's largest pipeline gas exporter. Europe alone accounts for 41 % of Russia's total gas exports. As gas prices soaring high, GAIL (Gas Authority of India Limited) could take benefit.

Besides the companies mentioned above, there are others that deserve a mention. Rajesh Exports, Adani Wilmar and ITC are some of the stocks that may benefit from the higher commodity prices.

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# FINANCE

## CORPORATION

**Definition:** A legal form of business organization wherein the firm's owners or stockholders have limited liability.

### CORPORATE DECISIONS

- **INVESTMENT:** What real (physical) assets should the firm acquire? How much money should be invested in real assets?
- **FINANCING:** What securities or financial assets should the firm issue? How much money should be raised through the issuance of securities?
- **DIVIDEND:** What portion of the firm's profits should be paid to stockholders in the form of dividends?
- **WORKING CAPITAL:** Management of current assets and current liabilities.
- **GOAL OF THE FIRM:** To maximize shareholders' wealth or equivalently, to maximize the price of the firm's common stock.

## ACCOUNTING STATEMENTS

### BALANCE SHEET IDENTITY

**Assets = Liabilities + Owners' Equity**

### INCOME STATEMENT

**Sales**

- Cost of Goods Sold (COGS)
- = **Gross Profit (GP)**
  - Administrative Expenses
  - Depreciation
  - Other Expenses
- = **Earnings Before Interests and Taxes (EBIT)**
  - Interest
- = **Earnings before taxes**
  - Taxes
- = **Net Income (Net Profit)**

### STATEMENT OF RETAINED EARNINGS

- Beginning Balance Retained Earnings
- + Net Profit
  - Dividends on Preferred Stock
  - Dividends on Common Stock
- = **Ending Balance Retained Earnings**

### STATEMENT OF CASH FLOWS

- Cash Flows from Operations**
- + Cash Flows from Investments
- + Cash Flows from Financing
- = **Net Increase (or Decrease) in Cash**

### CASH FLOW IDENTITY

- Cash flow from assets =
- Sum of the Cash Flow paid to the suppliers of capital to the firm

## FINANCIAL RATIOS

### LIQUIDITY

**Definition:** Measure of the firm's ability to meet its short-term obligations.

$$\text{Current Ratio} = \frac{\text{current assets}}{\text{current liabilities}}$$

$$\text{Quick Ratio} = \frac{\text{current assets} - \text{inventory}}{\text{current liabilities}}$$

$$\text{Net Working Capital to Total Assets Ratio} = \frac{\text{current assets} - \text{inventory}}{\text{total assets}}$$

### ACTIVITY

**Definition:** Measure of the firm's efficiency in generating sales with its assets.

$$\text{Inventory Turnover} = \frac{\text{cost of goods sold}}{\text{average inventory}}$$

$$\text{Collection Period} = \frac{\text{accounts receivable}}{\text{credit sales per day}}$$

$$\text{Fixed Asset Turnover} = \frac{\text{sales}}{\text{net fixed assets}}$$

$$\text{Total Assets Turnover} = \frac{\text{sales}}{\text{total assets}}$$

### LEVERAGE

**Definition:** Measure of the firm's degree of indebtedness and its ability to meet long-term obligations.

$$\text{Debt Ratio} = \frac{\text{total liabilities}}{\text{total assets}}$$

$$\text{Debt to Equity Ratio} = \frac{\text{long-term debt}}{\text{stockholders' equity or equity}}$$

$$\text{Times Interest Earned Ratio} = \frac{\text{EBIT}}{\text{interest}}$$

$$\text{Cash Coverage Ratio} = \frac{\text{EBIT} + \text{depreciation}}{\text{interest}}$$

$$\text{Fixed Charge Coverage Ratio} = \frac{\text{EBIT} + \text{lease payments}}{\text{interest} + \text{lease payments}}$$

$$\text{Equity Multiplier Ratio} = \frac{\text{total assets}}{\text{total equity}}$$

### PROFITABILITY

**Definition:** Measure of the returns on assets and equity.

$$\text{Gross Profit Margin} = \frac{\text{gross profit}}{\text{sales}}$$

$$\text{Net Profit Margin} = \frac{\text{net income}}{\text{sales}}$$

$$\text{Return on Assets (ROA)} = \frac{\text{net income}}{\text{total assets}}$$

$$\text{Return on Equity (ROE)} = \frac{\text{net income}}{\text{equity}}$$

$$\text{Price / Earnings (P/E) Ratio} = \frac{\text{price per share}}{\text{earnings per share}}$$

$$\text{Earnings per share (EPS)} = \frac{\text{earnings available to common stockholders}}{\text{number of shares of common stock outstanding}}$$

$$\text{Market-to-Book Ratio} = \frac{\text{common stock price per share}}{\text{book value of common stock per share}}$$

**Dupont system:**

ROE = net profit margin x total asset turnover x equity multiplier  
or  
ROE = ROA x (1 + debt-to-equity ratio)

## TIME VALUE OF MONEY

### PRESENT VALUES

- **SINGLE AMOUNT:** Present Value (PV) of a lump sum (FV<sub>n</sub>) given at the end of n periods at an interest rate of r %.
- **Discounted once per period:**  $PV = \frac{FV_n}{(1+r)^n}$

$$\text{Discounted "m" times per period: } PV = \frac{FV_n}{(1+\frac{r}{m})^{mn}}$$

$$\text{Discounted Continuously: } PV = FV_n \times e^{-rn}$$

(e = base of natural logarithms)

### ANNUITIES

- **Ordinary Annuity** – Present value of an ordinary annuity (PVA) of PMT per period for n periods at r % per period:

$$PVA = \sum_{t=1}^n \frac{PMT}{(1+r)^t} = \frac{PMT}{r} \left[ 1 - \frac{1}{(1+r)^n} \right]$$

- **Annuity Due** – Present value of an annuity due (PVD) of n cash flows (PMT) at r % per period:

$$PVD = \sum_{t=1}^n \frac{PMT}{(1+r)^t} \times (1+r) = \frac{PMT}{r} \left[ 1 - \frac{1}{(1+r)^n} \right] \times (1+r)$$

- **Perpetuity:** Present value of a perpetuity (PVP) of PMT per period at r % per period:  $PVP = \frac{PMT}{r}$

- **SERIES OF CASH FLOWS** – Present value of a series of cash flows (CF<sub>t</sub>) at times, t = 1, 2, ..., n, at r % per period:

$$PV = \sum_{t=1}^n \frac{CF_t}{(1+r)^t} = \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \dots + \frac{CF_n}{(1+r)^n}$$

### FUTURE VALUES

- **SINGLE AMOUNT:** Future value at the end of n periods (FV<sub>n</sub>) of a present amount (PV) invested today at r % per period.
- **Compounded once per period:**  $FV_n = PV(1+r)^n$
- **Compounded m times per period:**

$$FV_n = PV \left( 1 + \frac{r}{m} \right)^{nm}$$

- **Compounded continuously:**  $FV_n = PVe^{rn}$

### ANNUITIES

- **Ordinary Annuity** – Future value at the end of n periods of an ordinary annuity (FVA) of PMT per period for n periods at r % per period:

$$FVA = \sum_{t=1}^n PMT(1+r)^{n-t} = \frac{PMT}{r} \left[ (1+r)^n - 1 \right]$$

- **Annuity Due** – Future value at the end of n periods of an annuity due of PMT per period at r % per period:

$$FVD = \sum_{t=1}^n PMT(1+r)^{n-t+1} = \frac{PMT}{r} \left[ (1+r)^n - 1 \right] \times (1+r)$$

- **SERIES OF CASH FLOWS** – Future value at the end of n periods of a series of cash flows, CF<sub>t</sub>, at times, t = 1, 2, ..., n:

$$FV = \sum_{t=1}^n CF_t(1+r)^{n-t} = CF_1(1+r)^{n-1} + CF_2(1+r)^{n-2} + \dots + CF_n$$

### EFFECTIVE ANNUAL RATE (EAR)

$$EAR = \left( 1 + \frac{\text{nominal rate}}{m} \right)^m - 1$$

where m = number of compounding intervals.

### ANNUAL PERCENTAGE RATE (APR)

APR = rate per period x periods per year

## RISK AND RETURN

### RETURN

- EXPECTED RETURN ( $E(r)$ )** – The expected return of an investment with  $n$  possible outcomes,  $r_i, i=1, \dots, n$ , each with probability of  $p_i$ :

$$E(r) = \sum_{i=1}^n p_i \times r_i = p_1 \times r_1 + p_2 \times r_2 + \dots + p_n \times r_n$$

- VARIANCE OF RETURNS ( $\sigma^2$ )** – The variance of returns of an investment with  $n$  possible outcomes and with an expected return,  $E(r)$ :

$$\sigma^2 = \sum_{i=1}^n ((r_i - E(r))^2 \times p_i = ((r_1 - E(r))^2 \times p_1 + \dots + ((r_n - E(r))^2 \times p_n$$

- STANDARD DEVIATION ( $\sigma$ ):**

$$\sigma = \sqrt{\sigma^2}$$

- COEFFICIENT OF VARIATION (CV):**

$$CV = \frac{\sigma}{E(r)}$$

- COVARIANCE OF RETURNS ( $\sigma_{ij}$ ):** The covariance between the returns of asset  $i$  and asset  $j$ , each having  $n$  possible outcomes with joint probabilities  $p_{ij}(r_i, r_j)$ :

$$\sigma_{ij} = \sum_{s=1}^n (r_{is} - E(r_i))(r_{js} - E(r_j)) \times p_{ij}(r_i, r_j) = (r_{i1} - E(r_i))(r_{j1} - E(r_j)) \times p_{ij}(r_i, r_j) + \dots + (r_{in} - E(r_i))(r_{jn} - E(r_j)) \times p_{in}(r_i, r_j)$$

- CORRELATION COEFFICIENT ( $\rho_{ij}$ )**

$$\rho_{ij} = \frac{\sigma_{ij}}{\sigma_i \times \sigma_j}$$

- TWO-ASSET PORTFOLIO:**

- Expected Return ( $E(r_p)$ )** – The expected return on a two-asset portfolio with proportion  $x_1$  invested in asset  $i$ , and  $x_2$  invested in asset  $j$ :

$$E(r_p) = x_1 \times E(r_i) + x_2 \times E(r_j)$$

- Variance of returns ( $\sigma_p^2$ ):**

$$\sigma_p^2 = x_1^2 \sigma_i^2 + x_2^2 \sigma_j^2 + 2x_1 x_2 \sigma_{ij}$$

- N-ASSET PORTFOLIO:**

- Expected Return ( $E(r_p)$ )** – The expected return on an N-asset portfolio having a proportion  $x_i$  invested in asset  $i, i=1, \dots, N$ :

$$E(r_p) = \sum_{i=1}^N x_i \times E(r_i)$$

- Variance of Returns ( $\sigma_p^2$ ):**

$$\sigma_p^2 = \sum_{i=1}^N \sum_{j=1}^N x_i x_j \sigma_{ij}$$

### BETA COEFFICIENT

- ASSET**

$$\text{Beta of an asset} = \beta = \frac{\text{covariance of the asset returns with the market index portfolio}}{\text{variance with the market portfolio}} = \frac{\sigma_{im}}{\sigma_m^2}$$

- PORTFOLIO ( $\beta_p$ ):** The beta coefficient of an N-asset portfolio with  $x_i$  invested in asset  $i$  with beta equal to  $\beta_i$ :

$$\beta_p = \sum_{i=1}^N x_i \beta_i = x_1 \beta_1 + x_2 \beta_2 + \dots + x_N \beta_N$$

### CAPITAL ASSET PRICING MODEL (CAPM)

In equilibrium, the expected return (as well as the required return) ( $E(R_i)$ ) on asset  $i$  having a beta coefficient,  $\beta_i$ , is given by:

$$E(R_i) = R_f + \beta_i [E(R_m) - R_f]$$

where  $R_f$  is the risk-free rate of return, and  $E(R_m)$  is the expected return on the market portfolio. The term  $[E(R_m) - R_f]$  is the expected market risk premium.

### RISK

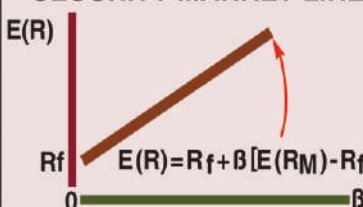
## QuickStudy

- SINGLE ASSET:** The risk of a single asset held in isolation is equal to the variance of the returns on the asset,  $\sigma^2$ .
- PORTFOLIO:** The risk of a portfolio of assets is given by the variance of the returns in the portfolio,  $\sigma_p^2$ .
- SINGLE ASSET IN A PORTFOLIO:** The risk of a single asset held as a part of a portfolio of assets is given by the beta coefficient for that asset.
- SYSTEMATIC RISK:** The portion of the total risk that cannot be eliminated through diversification. This risk is also known as "market" risk. The systematic risk of an asset or portfolio is given by their beta coefficients.
- DIVERSIFIABLE RISK:** The portion of the total risk of a portfolio that can be eliminated through diversification. Note that:  
Total Risk = Systematic Risk + Diversifiable Risk

### SECURITY MARKET LINE (SML)

Definition: A graphical representation of the CAPM.

## SECURITY MARKET LINE



The slope of the SML is equal to  $[E(R_M) - R_f]$ .

## VALUATION

### VALUE OF AN ASSET

The value of an asset with expected cash flows,  $CF_t$ , at times,  $t=1, 2, \dots, n$ , with required rate of return,  $r$ :

$$\text{Value of asset} = \sum_{t=1}^n \frac{CF_t}{(1+r)^t} = \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \dots + \frac{CF_n}{(1+r)^n}$$

### VALUE OF A BOND

The value of a bond with coupon interest payments of  $I$  per year, maturity value (or par value) of  $M$ , maturity of  $n$  years, and a required rate of  $r_d$ :

- ANNUAL COUPONS:**

$$\text{Bond Value} = \sum_{t=1}^n \frac{I}{(1+r_d)^t} + \frac{M}{(1+r_d)^n} = \frac{I}{r_d} \left[ 1 - \frac{1}{(1+r_d)^n} \right] + \frac{M}{(1+r_d)^n}$$

- SEMIANNUAL COUPONS:**

$$\text{Bond Value} = \frac{I}{2} \left[ 1 - \frac{1}{(1+\frac{r_d}{2})^{2n}} \right] + \frac{M}{(1+\frac{r_d}{2})^{2n}}$$

### VALUE OF COMMON STOCK

- THE VALUE TODAY ( $P_0$ )** of one share of common stock with expected cash dividends,  $D_t$ , at times,  $t=1, 2, \dots, \infty$ , and a required rate of return,  $r_s$ :

$$P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+r_s)^t} = \frac{D_1}{(1+r_s)} + \frac{D_2}{(1+r_s)^2} + \dots$$

- CONSTANT GROWTH** – The value of one share of common stock with a current dividend per share of  $D_0$ , expected to grow at a constant growth rate of  $g$  % per period, and a required rate of  $r_s$ :

$$P_0 = \frac{D_0(1+g)}{r_s - g} = \frac{D_1}{r_s - g} \quad r_s > g$$

## CAPITAL BUDGETING

### PROJECT OPERATING CASH FLOW

The incremental operating cash flow after taxes ( $\Delta OCF$ ) for a project in a firm with a marginal corporate tax rate,  $T$ , is given by:

$$\Delta OCF = (\Delta \text{Revenues} - \Delta \text{Costs}) \times (1-T) + T \times \Delta \text{Depreciation}$$

where  $\Delta$  denotes incremental quantities.

### PROJECT NET CASH FLOW ( $\Delta NCF$ )

$$\Delta NCF = \Delta OCF - \Delta NWC - \Delta CI$$

where  $\Delta NWC$  is the incremental change in net working capital, and  $\Delta CI$  is the incremental capital investment required by the project.

### DISCOUNTED CASH FLOW TECHNIQUES

- NET PRESENT VALUE (NPV):** A project with net cash flows,  $\Delta NCF_t$  ( $t=0, 1, \dots, N$ ), and a required rate of return of  $k$ , has a net present value (NPV):

$$NPV = \sum_{t=1}^N \frac{\Delta NCF_t}{(1+k)^t} = \Delta NCF_0 + \frac{\Delta NCF_1}{(1+k)} + \dots + \frac{\Delta NCF_N}{(1+k)^N}$$

- INTERNAL RATE OF RETURN (IRR):** The IRR of a project is the rate of discount that makes the NPV of the project's cash flows equal to zero. The IRR of a project with net cash flows,  $\Delta NCF_t$  ( $T=0, 1, 2, \dots, N$ ), is the solution to the following polynomial equation:

$$NPV = \sum_{t=0}^N \frac{\Delta NCF_t}{(1+IRR)^t} = 0$$

$$\Delta NCF_0 + \frac{\Delta NCF_1}{(1+IRR)} + \dots + \frac{\Delta NCF_N}{(1+IRR)^N} = 0$$

- PROFITABILITY INDEX (PI):** The PI of a project with net cash flows,  $\Delta NCF_t$  ( $T=0, 1, \dots, N$ ), and a required rate of return of  $k$ , is given by:

$$PI = \frac{\text{present value of future cash flow (t=1 to t=N)}}{\text{initial outlay } (\Delta NCF_0)} = \frac{\sum_{t=1}^N \frac{\Delta NCF_t}{(1+k)^t}}{\Delta NCF_0}$$

- ACCEPT/ REJECT CRITERIA**

- Independent Projects:**

### ACCEPT/REJECT CRITERIA INDEPENDENT PROJECTS

TECHNIQUE	ACCEPT	REJECT	INDIFFERENT
NPV	> 0	< 0	= 0
IRR**	> $k^*$	< $k^*$	= $k^*$
PI	> 1	< 1	= 1

$k^*$  is the required rate of return on the project

\*\* This criterion is correct for projects with standard patterns of cash flows

- Mutually Exclusive Projects:** Two projects are mutually exclusive if the acceptance on one project precludes the firm from undertaking the other project. For mutually exclusive projects, the firm should select the project with the greatest NPV.

### NON-DISCOUNTED CASHFLOW TECHNIQUES

- PAYBACK PERIOD:** The length of time it takes the firm to recover the project's initial investment.
- ACCOUNTING RATE OF RETURN (ARR):**

$$ARR = \frac{\text{Average annual income}}{\text{Average book value}}$$

### VALUE OF PREFERRED STOCK

- VALUE TODAY** of a share of preferred stock with expected dividends of  $D_{ps}$  per share and a required rate of  $r_{ps}$ :
- Value of Preferred Stock** =  $\frac{D_{ps}}{r_{ps}}$

## COST OF CAPITAL

### DEFINITION

The rate of return that must be earned on new investments having the same average risk as the firm's existing assets, in order to provide all investors in the firm with fair market rates of return.

### COST OF DEBT

- WITHOUT FLOTATION** or issuance cost:  
 $k_d = \text{After-tax cost of debt} = (1-T) \times \text{Before-tax cost of debt}$   
 where  $T$  = marginal corporate tax rate, and the before-tax cost of debt is equal to the yield to maturity offered by the firm's debt.
- WITH FLOTATION** cost:  
 $K_d = (1-T) \times \text{Before-tax cost of debt} / (1-f_d)$   
 where  $f_d$  is the % flotation cost.

### COST OF PREFERRED STOCK ( $k_p$ )

- WITHOUT FLOTATION COST:**  
 $k_p = \frac{D_p}{P_p} = \frac{\text{Dividend per share on preferred}}{\text{Price per share of preferred stock}}$
- WITH FLOTATION COST:**  
 $k_p = \frac{D_p}{P_p(1-f_p)}$   
 where  $f_p$  is % flotation cost on preferred stock.

### COST OF RETAINED EARNINGS ( $k_s$ )

- USING THE CONSTANT-GROWTH MODEL:**  
 $k_s = \frac{D_1}{P_0} + g$  where  $D_1$  = expected dividend per share one year hence;  $P_0$  = current market price of common stock;  $g$  = constant growth rate of dividends.

### COST OF EQUITY ( $k_e$ )

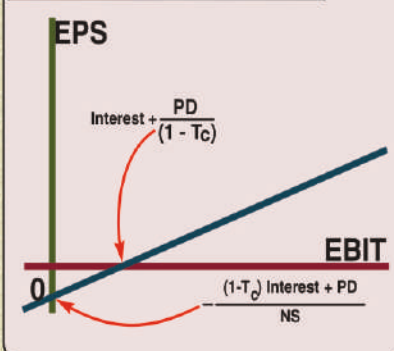
- USING THE CONSTANT-GROWTH MODEL:**
- Without flotation cost:  $k_e = \frac{D_1}{P_0} + g$
- With flotation cost:  $k_e = \frac{D_1}{P_0(1-f_e)} + g$   
 where  $f_e$  is the % flotation cost.
- USING THE CAPITAL ASSET PRICING MODEL:**

$k_e = R_f + \beta_e [E(R_m) - R_f]$   
 where  $\beta_e$  = beta coefficient of the stock;  $R_f$  = risk-free rate;  $E(R_m)$  = expected return on the market portfolio.

### WEIGHTED AVERAGE COST OF CAPITAL (WACC)

$WACC = W_d k_d + W_p k_p + W_s k_s + W_e k_e$   
 where  $W_d$ ,  $W_p$ ,  $W_s$ , and  $W_e$  are the "weights" or proportions of each source of capital. These "weights" can be based on:  
 1. market values      2. book values      3. target values

## SINGLE FINANCING PLAN



## QuickStudy

## CAPITAL STRUCTURE THEORIES

### DEFINITION

Decisions about the mix of financing sources employed by the firm. The optimal capital structure is that mix of financing that maximizes the total value of the firm.

### MODIGLIANI-MILLER (MM)

- CASE 1: No taxes.**  
**Proposition I:** In the absence of taxes or transactions costs, capital structure decisions have no effect on firm value:  
 $V_L = V_U$   
 where  $V_L$  is the value of a levered firm (a firm with debt in its capital structure,) and  $V_U$  is the value of an unlevered but otherwise identical firm to the levered one.

**Proposition II:** The rate of return on equity ( $K_E$ ) increases linearly with the debt-to-equity (D/E) ratio:

$$K_E = K_0 + \frac{D}{E} (K_0 - K_d)$$

where  $K_0$  is the weighted-average cost of capital, and  $K_d$  is the cost of debt.

- CASE 2: Corporate taxes.**  
**Proposition I:** In a world where corporate income is subject to taxation and there are no bankruptcy costs, the firm value increases with leverage:

$$K_E = K_0 + \frac{D}{E} (1 - T_c) (K_0 - K_d)$$

where  $T_c$  is the marginal corporate tax rate, and is the market value of the firm's debt.

**Proposition II:** The levered cost of equity increases with the after-tax debt-to-equity ratio:

$$K_E = K_0 + \frac{D}{E} (1 - T_c) (K_0 - K_d)$$

where  $K_0$  is the after-tax weighted-average cost of capital.

### TRADE-OFF OR STATIC THEORY

This theory adds the possibility of costly financial distress and bankruptcy to Modigliani-Miller under corporate taxes:

**Present value of financial distress costs**  
 $V_L = V_U + T_c D - \text{Present value of financial distress costs}$   
 According to this theory, the optimal level of debt in a firm's capital structure is determined by the balance of the tax-shield provided by debt and the present value of financial distress costs.

### MILLER'S MODEL

This theory of capital structure incorporates corporate as well as personal income taxes in the selection of the optimal capital structure for the firm. Under Miller's model:

$$V_L = V_U + D \left[ 1 - \frac{(1 - T_c)(1 - T_s)}{(1 - T_B)} \right]$$

where  $T_s$  is the personal income tax rate on equity income, and  $T_B$  is the personal income tax rate on debt income.

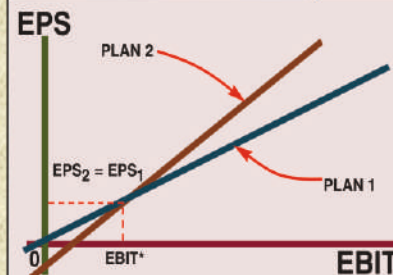
### EPS - EBIT ANALYSIS

This technique is used to analyze the relationship between earnings per share (EPS) and EBIT under a given financing plan. The EPS under a given financing plan is given by:

$$EPS_{\text{plan}} = \frac{(EBIT - \text{Interest})(1 - T_c) - PD}{NS}$$

where  $PD$  = preferred dividends;  $NS$  = number of common stock shares outstanding. The break-even level of EBIT under a given plan is given by:  $EBIT_{BE} = \text{Interest} + \frac{PD}{(1 - T_c)}$

## TWO FINANCING PLANS



FOR TWO FINANCING PLANS, the indifference level of EBIT is the EBIT that yields the same EPS for each plan.

## BREAK-EVEN AND LEVERAGE

### NOTATIONS

$p$  = price per unit;  $v$  = variable cost per unit;  $FC$  = total fixed cost;  $Q$  = number of units;  $I$  = interest.

### BREAK-EVEN

The break-even number of units,  $Q^*$ , is given by:

$$Q^* = \frac{FC}{p - v}$$

### DEGREE OF OPERATING LEVERAGE

Refers to the sensitivity of the firm's EBIT to changes in the firm's sales. The degree of operating leverage (DOL) at  $Q$  units is:

$$DOL \text{ at } Q = \frac{\% \Delta EBIT}{\% \Delta \text{Sales}} = \frac{Q(p-v)}{Q(p-v) - FC}$$

where  $\Delta$  denotes change and  $EBIT = Q(p-v) - FC$ .

### DEGREE OF FINANCIAL LEVERAGE

Refers to the sensitivity of the firm's EPS to changes in the firm's EBIT. The degree of financial leverage (DFL) at  $Q$  units is given by:

$$DFL \text{ at } Q = \frac{\% \Delta EPS}{\% \Delta EBIT} = \frac{EBIT}{EBIT - I} = \frac{Q(p-v) - FC}{Q(p-v) - FC - I}$$

### DEGREE OF COMBINED LEVERAGE

Refers to the sensitivity of EPS to changes in the firm's sales. The degree of combined leverage (DCL) at  $Q$  is given by:

$$DCL \text{ at } Q = DOL \times DFL = \frac{Q(p-v)}{Q(p-v) - FC - I}$$

## LEASING

### DEFINITION

Leasing is an alternative to owning the asset through 100% debt financing wherein the lessor grants the use of a fixed asset for a specific amount of time in exchange for payment usually in the form of rent from the lessee.

### EQUIVALENT LOAN VALUE

- The equivalent loan value of a financial lease over the life of the asset is given by:

$$\text{Equivalent Loan Value} = \text{Present value of lease cash flows at the after-tax borrowing rate} + \text{Present value of after-tax salvage value}$$

where  $r_B = (1 - T_c) \times$  borrowing rate;  $S_N$  = after-tax salvage.

$$ELV = \sum_{t=1}^N \frac{(1 - T_c)L_t + T_c \times DEP_t}{(1 + r_B)^t} + \frac{S_N}{(1 + r_B)^N}$$

Lease cash flow = lease payment + After-tax loss of depreciation tax shield

- Lease instead of buying the asset through debt financing if  $ELV < \text{present value of loan needed to purchase the asset}$ .

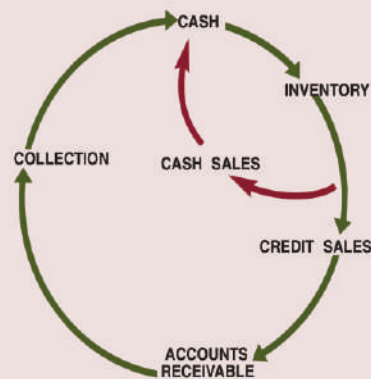
## WORKING CAPITAL MANAGEMENT

Definition: Management of current assets and current liabilities.

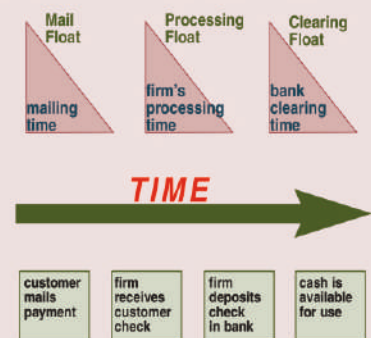
### NET WORKING CAPITAL (NWC)

$$NWC = \text{current assets} - \text{current liabilities} = \text{cash} + \text{marketable securities} + \text{accounts receivable} + \text{inventory} + \text{other current assets} - [\text{accounts payable} + \text{other current liabilities}]$$

## CASH CYCLE



## CASH COLLECTION TIME



Don't wait  
for  
opportunity,  
create it.



## DIVIDENDS

### DEFINITIONS

- DIVIDEND PAYOUT RATIO** =  $\frac{\text{Dividends per share}}{\text{Earnings per share}}$
- DIVIDEND YIELD** =  $\frac{\text{Annual dividends per share}}{\text{Common stock price per share}}$
- DECLARATION DATE**: Date on which board of directors formally declares a dividend.
- DATE OF RECORD**: Date on which the holder of record is designated to receive a dividend.
- EX-DIVIDEND DATE**: Two business days before the date of record.
- PAYMENT DATE**: Date on which the dividend is actually paid.
- STOCK DIVIDEND**: Distribution of new share of common stock to existing shareholders. The amount of the increase has to be 25% or less of the total shares outstanding.
- STOCK SPLIT**: Distribution of new shares to existing stockholders. The amount of the increase has to exceed 25% of the total number of shares outstanding.
- STOCK REPURCHASE**: The firm purchases its own shares.

### DIVIDEND POLICIES

- CONSTANT DIVIDEND PAYOUT**: A firm pays a constant percentage of earnings in dividends.
- STABLE DOLLAR DIVIDEND PER SHARE**: The firm maintains a policy of paying a stable dollar dividend per share over time.
- CONSTANT DIVIDENDS PLUS EXTRA**: The firm pays a small dividend every quarter plus an extra year-end dividend when the firm experiences a good year.

## REAL INTEREST RATE

$$\text{Real Rate of Interest} = \text{Nominal rate of interest} - \text{inflation}$$

## ACCOUNTS RECEIVABLE (A/R)

### INVESTMENT

$$\text{Average investment in A/R} = \frac{\text{total variable cost of annual sales}}{\text{A/R turnover}}$$

$$\text{A/R turnover} = \frac{360}{\text{collection period}}$$

### DEFINITIONS (A/R)

- CREDIT POLICY**: Involves the determination of credit terms and standards for the selection and granting of credit by the firm.
- CREDIT SCORING**: A procedure for ranking credit applicants based upon key financial and credit characteristics.
- CREDIT STANDARDS**: The set of minimum requirements for extending credit to a customer.
- CREDIT TERMS**: Specify repayment terms for credit customers. Credit terms typically include:
  - cash discount
  - discount period
  - credit period.

## INVENTORY

$$\text{Total cost of inventory} = \text{order cost} + \text{carrying cost}$$

where order costs are associated with placing and receiving an order, and carrying costs are variable costs per unit of holding an inventory item over time.

## INTERNATIONAL FINANCE

### DEFINITIONS

- EXCHANGE RATE**: Price of one currency in units of another currency.
- BID RATE**: Price at which a dealer is willing to buy a given currency.
- ASK RATE**: Price at which a dealer is willing to sell a currency.
- % BID/ASK SPREAD** =  $\frac{\text{Ask rate} - \text{Bid rate}}{\text{Ask rate}} \times 100$
- DIRECT QUOTE**: US dollar price of 1 unit of a foreign currency.
- INDIRECT QUOTE**: Foreign price of one US dollar.
- SPOT RATE**: Exchange rate of a currency for immediate delivery. Settlement within one to two business days.
- FORWARD RATE**: Exchange rate of a currency with delivery at some point in the future.
- CROSS RATE**: An exchange rate between two currencies other than the US dollar.

### INTEREST RATE PARITY (IRP)

This theory states that the % annualized forward premium or discount in the foreign currency equals the interest rate differential between the two currencies.

$$\frac{F_n(\$_f) \cdot S(\$_f)}{S(\$_f)} \times \frac{360}{n} = \frac{i_{us} - i_f}{(1 + i_f)}$$

where  $i_{us}$  and  $i_f$  are the interest rates for the US and foreign currencies,  $F_n$  is the n-days forward rate in US dollars per foreign currency unit,  $S$  is the spot rate in US dollars per foreign currency unit;  $n$  is the number of days of the forward rate. When the IRP holds, there are no covered-interest arbitrage opportunities

### PURCHASING POWER PARITY (PPP)

This theory relates the % change in the spot rate for a currency to the inflation rate differential between countries over the time period.

$$\frac{S_t - S_{t-1}}{S_{t-1}} = \frac{i_{us} - i_f}{1 + i_f}$$

where  $S_t, S_{t-1}$  are the spot rates for times  $t$  and  $t-1$ ,  $i_{us}, i_f$  are the US and foreign inflation rates over the period  $(t, t-1)$ . If PPP exists, then the expected spot rate at the end of period  $t$  is given by:

$$E(S_t) = S_0 \left[ 1 + \frac{i_{us} - i_f}{(1 + i_f)} \right]^t$$

### INTERNATIONAL FISHER EFFECT (IFE)

If PPP holds and real rates of interest are equal across countries, then the IFE is given by:

$$\frac{S_t - S_{t-1}}{S_{t-1}} = \frac{i_{us} - i_f}{(1 + i_f)}$$

where  $S_t, S_{t-1}$  are the spot rates at times  $t$  and  $t-1$ ;  $i_{us}, i_f$  are the US and foreign interest rates. If the IFE holds, countries with low interest rates will have their currencies appreciate through time.

### FOREIGN CURRENCY FINANCING

The effective financing rate of using a foreign currency over a single period is given by:

$$r_f = (1 + i_f) (1 + e_p) - 1$$

where  $i_f$  is the foreign currency interest rate per period, and  $e_p$  is the expected percentage change in the spot rate (dollar price of 1 unit of the foreign currency) over the period.

## Poem



**'CHASE'**

**Khushi Patel**  
**WRO0687417**

There are many cheers to life, here's to life,  
With some twist and turns, zigs-zags,  
Along with climbs and dives,  
But, each time a big YES YES to any of the wild ride.

There are many fears to life, dears to life,  
'Speed up if wanna win the race' they say;  
seems like a 'do or die' phase in a way;  
Cause even if they understand, they don't understand

"Taking my message from the veins  
Speaking my lesson from the brain  
Seeing the beauty through the Pain!"

There are many songs to life, smiles to life,  
'So take aim and find a way  
Even if you live one day  
Put your weaknesses away'  
A soul in me says.

Self-core reminds to get up,  
As Your goals are high,  
Keep moving  
Learn what you love, do what you feel  
Get up; Dress up, show up and never give up.

Bcoz time is running  
And you have a lot to dig  
& much more to CHASE..

## Amazing Corner



Kritika Khilwani  
WRO0721215



Smruti Sadrani  
WRO0714119



## *Glimpses of Past Events*



**One Day Revision -  
CA Intermediate Law**



**One Day Revision -  
CA Intermediate Taxation**



**Awareness Meet on Traffic Noise  
at NEERI Nagpur**



**Exam Neeti**



**Exam Neeti**



**Exam Neeti**

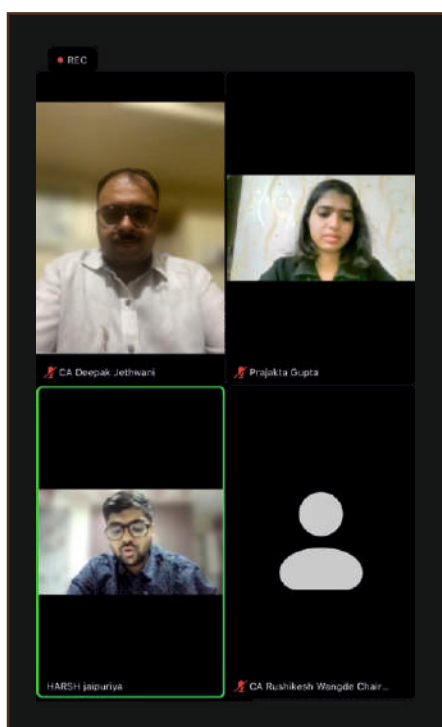
## *Glimpses of Past Events*



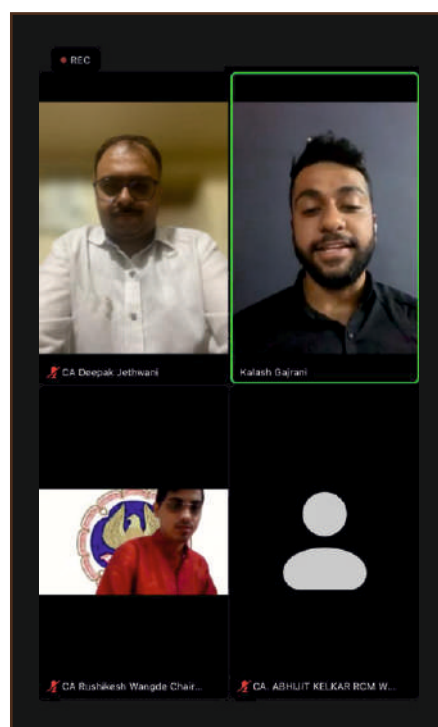
**Taxation on Derivatives**



**Taxation on Derivatives**



**Guidance to CA Foundation**



**Guidance to CA Foundation**

## *Glimpses of Past Events*



Yoga



Yoga



Marathon



Marathon



National Outreach Programme



National Outreach Programme

## Glimpses of Past Events



Tree Plantation



WICASA Got Talent



WICASA Got Talent



WICASA Got Talent

## Press Release



## *Glimpses of Past Events*

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