

Advanced Financial Instruments for Sustainable Business and Decentralized Markets

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Lecture – 36 **Week 12**

Dear learners, we thank all of you for joining this course. We hope this course helped you to gain your understanding on the advanced financial instruments for sustainable business and decentralized markets. Now we will provide you the quick summary of all the advanced financial instruments that we have discussed in this course. Now we are going to summarize the topics on, emission trading systems a case study of EU ETS, carbon price determinants and the connectedness of carbon market with other financial markets, socially responsible investing, practices, progress and challenges and lastly blockchain cryptocurrencies, CBDCs, the future of money. Dear learners, my name is Charu Vadhwa and I am a research scholar in the department of management studies, IIT Roorkee. My areas of research interest includes climate finance, carbon markets, financial markets and energy markets.

I am one of the TAs actively involved in the content development of week 5 of this course. We introduced the concept of emission trading scheme in that week in detail where we focused on the functioning and the market design of the world's most successful emission trading scheme called as European Union Emission Trading Scheme or EU ETS. We discussed different phases of EU ETS, their features and the evolution of EU ETS market with time. We also discussed the allowance allocation mechanism in ETS that is free allocation and the auctioning of allowances.

Further approaches to freely allocate allowances are categorized in two parts, benchmarking and grandfathering. The benefits and the challenges associated with these two approaches are also discussed in detail in this course. In the novel market like EU ETS, the surplus of allowance is a major challenge. To deal with this challenge, the various majors are discussed. The short-term major includes backloading of allowances whereas the long-term major includes market stability reserve.

How these majors manage the excess supply and the resulting imbalance of allowances in EU ETS is also discussed in detail. Further the concept of banking and the borrowing of allowances is also defined and considered as an important factor that impacts the volatility in the EU ETS market. Carbon allowances are traded just like any other financial asset and these allowances in the context of EU ETS is called as European Union allowances or EUAs. Trading of EUA takes place both over the counters and the

organized exchanges. Against this backdrop, we have also discussed the organized exchanges that facilitate the auctioning and the secondary trading of the carbon products.

Major carbon products include carbon futures, carbon spot, carbon options and carbon forwards. We further discuss the price formation in the EU ETS market which include demand and supply balancing and its impact on the volatility. We also mention various factors that affect the demand and the supply of emission allowances in ETS and hence determine the allowance prices. The effectiveness of the EU ETS at the end is also discussed. Thank you.

Dear learners, my name is ravi raushan jha and I am a research scholar in the department of management studies, IIT Roorkee. My areas of research interest includes climate finance, energy markets, carbon markets, financial markets, volatility spillovers etc. I am one of the TAs actively involved in week six of this course. Earlier in week five, we have learned about the design, cooperation and intricacies of emission trading schemes specifically focused on EU ETS. In week six, we discuss other global emission trading schemes like China's pilot carbon markets, China's national ETS and the UK ETS. In China, there are eight regional emission trading schemes encompassing cities such as Beijing, Shanghai, Tianjin, Shenzhen and Chongqing as well as provinces including Guangdong, UAE and Fujian.

Based on the experiences on ETS of some national markets for many years, China has started its operation of national ETS in 2021. We thoroughly discuss the distinguishing characteristics of these fragmented pilot and national emission trading schemes in China. The discussion is followed by the UK ETS which was stabilized in January 2021. To replace the UK's participation in the European emission trading schemes after the Brexit transition period, similar to the EU ETS, UK ETS is designed to tackle the greenhouse gas emissions through cap and trade schemes. We further provide a comparative analysis between UK carbon allowance prices and European union allowance prices.

Following the economic law, where the price of any commodity is driven by its demand and supply, carbon prices also adhere to this law and therefore, we cover those factors which may affect the demand and supply of carbon allowances and thus the carbon allowance prices. These factors include fossil energy prices, electricity prices, economic activity, institutional decisions and regulations, unanticipated weather conditions and policy uncertainties like economic and climate policy uncertainty. Furthermore, the integration of carbon markets with other financial markets is also discussed. Carbon markets are expected to closely limit stock, cryptocurrency, green bond and energy markets. The theoretical underpinning behind this expected connectedness among these markets is also discussed in detail.

Thank you.

Hi, I am Lagan and I am one of the teaching assistants for this course. Presently I am pursuing my phd at in the department of management studies, IIT Roorkee. My research interest includes ESG mutual funds, social responsible investing, asset pricing and sustainable finance. I am also well versed with R studio and previously I have also contributed to the course on ML4 finance on Coursera. In this course, I was particularly involved in the segment related to sustainable investing and socially responsible investing. So we started our discussion with an introduction to sustainable investing in which we first talked about the concepts like impact investing, thematic investing, EHG integration and social responsible investing. After that, we began our discussion on proponents and critiques of stakeholder value maximization theory.

After its meaning and basic understanding, we had a brief overview of the history of socially responsible investing. We saw that there are many types of screens that are often employed while creating a EHG friendly portfolio like we discuss negative screening, positive screening, best in class screening and norms based screening. After that, we had a detailed discussion on the relationship between financial performance and screening intensity. In that, we saw that the combination of modern portfolio theory and stakeholder theory suggests that the relationship between social and financial performance may be curvilinear, not strictly monotonic. We then came to the concept of SRA mutual funds.

These SRA mutual funds or socially responsible mutual funds are the investment vehicles that seek to generate financial returns while othering to specific environmental, social and governance criteria. There are many variants of SRA mutual funds like we discuss ethical funds, Islamic funds, green funds, etc. Then we discuss rules and regulations related to social responsible investing in various economies like Europe, US, Japan, Australia, New Zealand and India. We also discuss other financial instruments that are available in the market for sustainable investing like green bonds, sustainable real estate, etc. We also discuss the concepts related to greenwashing and shareholder engagement in SRA investing.

We concluded our discussion with the challenges and areas of action in sustainable investing. Overall, with this segment, we show that individuals and businesses can financially benefit by making their investments more sustainable. By solidifying sustainable business strategies, purpose driven leaders and organizations can thrive as they solve the world's biggest challenges. Thank you.

Hello everyone, my name is Manisha and I'm one of the teaching assistants for this course.

Presently I'm pursuing my PhD from the Department of Management Studies at IIT, Roorkee. My research interests include behavioral finance, asset pricing and cryptocurrencies. I'm also well versed with RStudio. Previously, I have contributed to courses like Amel for Finance on Coursera and also a course on investment analysis and portfolio management with St. Petersburg University in Russia.

In this course, I was particularly involved in the blockchain, cryptocurrencies and CBDC segment. So we started our discussion with an introduction to blockchain in which we first talked about what is centralized ledger and decentralized ledger. After that, we began our discussion on blockchain and in simple terms, we defined blockchain as a sequence of blocks containing transaction records and each block is linked to each other in a cryptographic manner. After its meaning and basic understanding, we had a brief overview of the history of blockchain. We saw that two types of blockchain are often employed, that is permissioned and permissionless blockchain.

After that, we had a detailed discussion on the working of blockchain. In that, we saw that blockchain is a combination of three important technologies, cryptographic keys, a peer-to-peer network and a digital ledger. And then we moved on to discuss all these three concepts in detail. We then came to the concept of digital signature. Talking about digital signature, we saw that a digital signature is used to establish the validity of a piece of data by using a cryptographic algorithm.

Next, we talked about the concept of consensus. So a very important problem addressed by blockchain design is that of Byzantine generals problem. And the solution to the Byzantine generals problem requires the development of a consensus mechanism across the members that do not have any central authority. Next, in our discussion on cryptocurrencies, we started with a brief overview of traditional payment systems. We discussed that modern day economies employ monetary and payment systems which are regulated by central banks.

And this system can be explained with the help of money flower taxonomy. Against this backdrop, cryptocurrencies have emerged as a new petal in this flower. So in the last five to seven years, there's been a considerable rise of interest among the investor community about cryptocurrency assets. And this has been reflected in the periodic boom and burst in the market cap of major crypto assets, such as Bitcoin and ether. We concluded our discussion on cryptocurrencies with their comparison with the fiat money.

Lastly, we talked about CBDCs. In this, we saw that with the decreasing usage of cash and the technological advancements in payment systems, various central banks are

experimenting with different forms of CBDCs. And they are currently in different stages of development. We discussed that the motivation of advanced economies and emerging economies are often different. Further, we saw that CBDCs can be categorized on several parameters, and they could be either retail CBDCs or wholesale CBDCs.

The second classification is account based and token based. Another classification is based on the technical architecture and distribution. This includes direct CBDCs or indirect CBDCs. Lastly, we compared CBDCs with cryptocurrencies. Here, CBDCs are more suitable as a means of payment, store of value and unit of account as compared to cryptocurrencies. Thank you.