

Blockchain Honor Minor Degree : Sem VIII

HBCC801 : Decentralized Finance (DeFi)

Module - 1: Introduction to Centralized & Decentralized Finance (2 Hours)

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Topics to be covered

- [Evolution of Finance](#)
- [Purpose of Money](#)
- [Characteristics of Money](#)
- [Introduction to Centralized and Decentralized Finance](#)
- [Difference between Centralized and Decentralized Finance](#)
 - [Architecture](#)
 - [Payment and Clearance systems](#)
 - [Transaction Flow](#)
 - [Accessibility](#)
 - [Centralization and Transparency](#)
 - [Cost & Time Comparison](#)
- [Impact & Challenges of DeFi](#)
- [Comparison on DeFi with Traditional Finance in India](#)

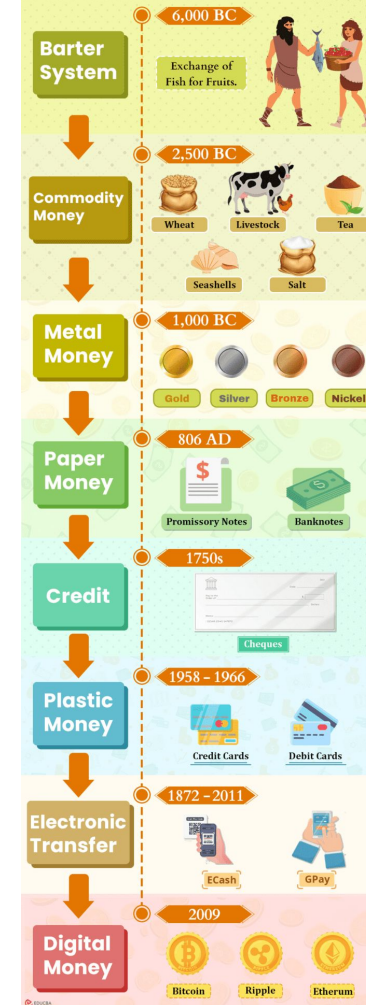
Evolution of Finance

1. Barter System (Pre-monetary Era)

- First peer - peer DeFi
- Direct exchange of goods and services
- Example: Grain exchanged for cattle
- **Limitations:**
 - Double coincidence of wants
 - No standard value measure
 - Difficult to store wealth

2. Commodity Money

- Commodities used as money (gold, silver, shells)
- Accepted due to intrinsic value
- **Advantages:** Durable and divisible
- **Limitations:** Heavy, not easy to transport



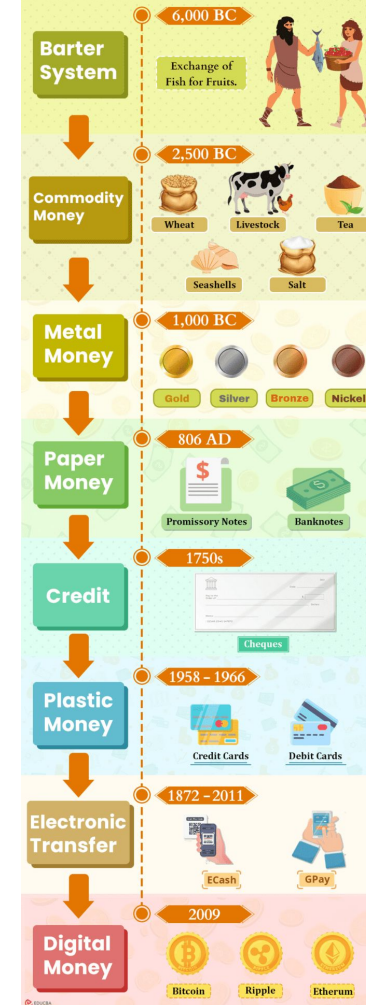
Evolution of Finance

3. Metallic Money

- Coins made of gold, silver, copper
- Issued by rulers or governments
- Standardized value and weight
- Increased trust and acceptance

4. Paper Money (Fiat Currency)

- Introduced by governments
- Value backed by trust, not commodities
- Easier storage and portability
- Regulated by central banks



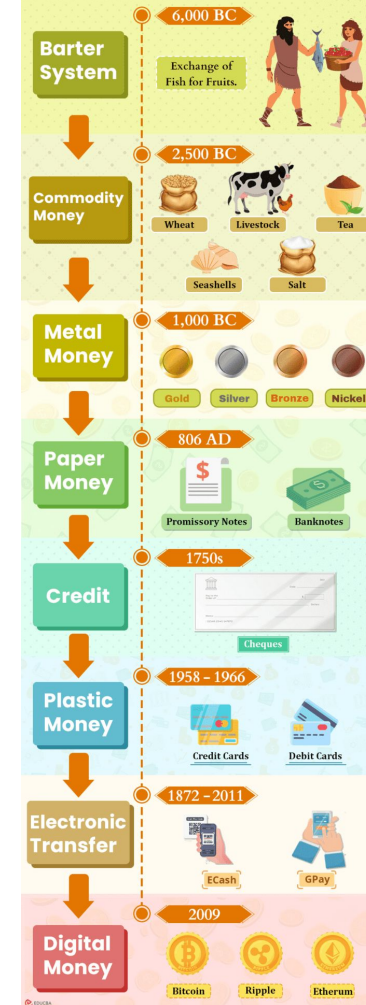
Evolution of Finance

5. Banking System & Centralized Finance

- Emergence of banks and financial institutions
- Services: deposits, loans, payments
- Centralized control and regulation
- Examples: NEFT, RTGS, SWIFT

6. Electronic & Digital Banking

- Internet banking and mobile banking
- Faster electronic payments
- Examples: Debit cards, Credit cards, UPI
- Reduced dependence on physical cash



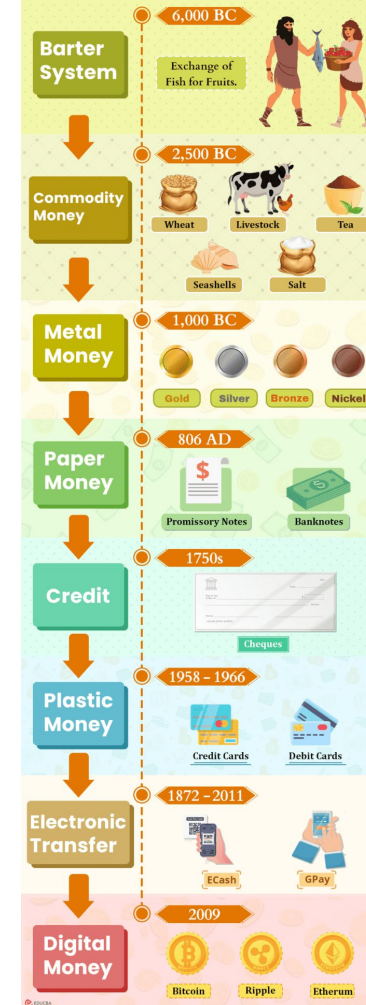
Evolution of Finance

7. FinTech Era

- Technology-driven financial services
- Innovations in payments, lending, insurance
- Examples: Paytm, PhonePe, Stripe
- Increased financial inclusion

8. Cryptocurrency

- Introduction of Bitcoin (2009)
- Peer-to-peer digital currency
- Decentralized and borderless
- Eliminates intermediaries



9. Decentralized Finance (DeFi)

- Financial services on blockchain
- Uses smart contracts and DApps
- Examples: Ethereum, Uniswap, MakerDAO
- Transparent, permissionless, global



Courtesy :

- [DeFi - The Future of Finance. Campbell et. al](#)
- [Alamy](#)

Purpose of Money

Primary

- Unit of Account: A way to compare the value of various goods and services
- Medium of Exchange: Allows for non-barter transactions.

Secondary

- Store of Value: Allows value to be retained – even if partially – rather than complete decay (e.g., storing food).
- Transfer of Value: Ease of transfer of value and to defer value.

Characteristics of Money

- Durability: Withstand repeated use (coins, paper, gold)
- Portability: You can carry around
- Divisibility: Fractional units
- Uniformity: Versions of the same currency have identical value
- Limited Supply: Unlimited supply would mean zero value
- Acceptability: “This is legal tender for all debts, public and private”
- Stability: If unstable, people will look for alternatives



Introduction to Centralized and Decentralized Finance

- **Traditional finance / Centralized Finance**

- Relies on centralized institutions (banks)
- Centralized control
- Facilitate payments, deposits, loans
- **stability and regulation**
- Eg: ICBC, JP Morgan, Bank of America
- SWIFT: Global bank messaging network

Central banks and commercial banks

Custodial and permissioned systems

Introduction to Centralized and Decentralized Finance

- **Key Problems with Traditional / Centralized Finance**

1. Centralized Control
2. Limited Access
3. Inefficiency
4. Lack of Interoperability
5. Opacity

Introduction to Centralized and Decentralized Finance

- **Key Problems with Traditional / Centralized Finance**

Centralized control

- Centralized banking system is highly concentrated
- National central banks control currency
- Non-financial centralization of tech giants, e.g., Amazon-retail, Facebook/Google-digital advertising

Limited access

- 1.7 billion unbanked
- Billions underbanked
- Many entrepreneurs use credit cards to finance their businesses, since banks won't lend to them because they are small (negative impact on growth)

Introduction to Centralized and Decentralized Finance

- **Key Problems with Traditional / Centralized Finance**

Inefficiency

- 3% for a credit card swipe
- 5-7% for a wire transfer
- 2 days settlement time for a stock transaction
- Slow transfers of funds
- Fraud, chargebacks, insecurity
- No micro transactions
- Difficult to get paid

Introduction to Centralized and Decentralized Finance

- **Key Problems with Traditional / Centralized Finance**

Lack of Interoperability

- Siloed institutions
- Difficult to move money from one banking institution to another
- Difficult to move money from a bank to a non-bank
- Note: Visa attempted acquisition of fintech company Plaid

Opacity

- Very little transparency
- Bank customers do not know the health of the bank
- Must rely on costly regulation and the promise of bailouts

Introduction to Centralized and Decentralized Finance

● Results of these Key Problems

Missed growth opportunities

- Entrepreneur might have a great project, say with a 25% ROI, but the project is never pursued because the cost of credit card borrowing is 24%
- High ROI project fuels high CAPEX, strong real GDP growth, and robust employment growth

Inequality of opportunities

- Projects should be financed based on the quality of the idea and the soundness of the execution plan
- Many have no access to internet commerce (to buy or sell)
- Given the number of unbanked and underbanked, this creates unequal opportunities and perpetuates or even exacerbates inequality.

Introduction to Centralized and Decentralized Finance

- **DeFi (Decentralized Finance)**

- uses Blockchain and smart contracts
- Removes intermediaries and increases transparency
- **openness and innovation**
- Eg : Ethereum: Blockchain platform for DeFi

Uniswap: Decentralized Exchange (DEX)

MakerDAO: Decentralized lending & stablecoin

Traditional Financial Institution (Banks) / CeFi

- Central authority
- Custodial funds
- Limited transparency

Decentralized Finance (DeFi)

- Decentralized network
- Non-custodial
- Fully transparent



Traditional Financial Institution (Banks) / CeFi

- Uses SWIFT messaging network
- Multiple intermediaries
- High fees and slow settlement (2–5 days)

Decentralized Finance (DeFi)

- Peer-to-peer transfers
- Smart contract execution
- Settlement in seconds to minutes

Note : *SWIFT (Society for Worldwide Interbank Financial Telecommunication)*

- Global messaging network
- enables banks to securely exchange financial transaction instructions.

Traditional Financial Institution (Banks) / CeFi

1. User requests transfer
2. Bank approval
3. Intermediary banks
4. Settlement delay

Decentralized Finance (DeFi)

1. User signs transaction
2. Broadcast to blockchain
3. Smart contract execution
4. Instant settlement

Traditional Financial Institution (Banks) / CeFi

Accessibility:

- Requires KYC, documents
- Excludes unbanked

Centralization & Transparency:

- Central points of failure
- Opaque operations

Decentralized Finance (DeFi)

Accessibility:

- Internet + wallet
- Open to everyone

Centralization & Transparency:

- Open-source smart contracts
- Public blockchain auditability

CeFi Vs DeFi w.r.t Cost & Time Comparison

Traditional Financial Institution (Banks) / CeFi

- Sending \$1,000 from USA to Australia
 - Exchange rate markup: ~\$30
 - Outbound wire fee: ~\$25
 - Inbound wire fee: ~\$15
 - **Total fees: ~\$70**
- Settlement time: 2–5 business days

Decentralized Finance (DeFi)

- Sending \$1,000 worth of crypto globally
 - Network (gas) fee: ~\$0.50 – \$5
 - No intermediary fees
 - **Total fees: <\$5**
- Settlement time: 15 seconds – 5 minutes

Impact of DeFi

- Financial inclusion
- Faster and cheaper transactions
- Innovation in lending, trading, insurance

Challenges of DeFi

- Smart contract risks
- Regulatory uncertainty
- Scalability and usability

Note : [Hybrid financial systems may dominate the future](#)

Comparison on DeFi with Traditional Finance in India

Parameter	RTGS / NEFT	UPI	Crypto / DeFi
System Type	Traditional banking	Digital banking	Blockchain-based
Control	RBI & Banks	NPCI & Banks	Decentralized network
Settlement Mode	RTGS: Real-time NEFT: Batch-based	Real-time	Near real-time
Availability	Bank working hours (RTGS) 24×7 (NEFT)	24×7	24×7 / 365
Transaction Speed	Minutes to hours	Seconds	Seconds to minutes
Fees	NEFT: ₹2.5–₹25 RTGS: ₹25–₹55	Mostly free	Low network (gas) fee

Comparison on DeFi with Traditional Finance in India

Parameter	RTGS / NEFT	UPI	Crypto / DeFi
Intermediaries	Banks, RBI	Banks, NPCI	No intermediaries
Geographic Reach	India only	India only	Global
Transparency	Limited	Limited	High (public blockchain)
Security Model	Trust-based	Trust-based	Cryptography & smart contracts
Example	Bank transfer	Google Pay, PhonePe	Ethereum, Polygon, Uniswap