

DeFi and The Future of Finance by Campbell R. Harvey, Ashwin Ramachandran and Joey Santoro, 208 pp, John Wiley & Sons (2021), \$24.95

Decentralised finance (DeFi) is an evolving financial technology based on the distributed ledger technology. It offers services like trading, lending, or transacting using cryptocurrencies without relying on a traditional centralised intermediary. It has opened a new door to the world of financial innovations which will further increase the competition in the financial markets. For readers interested in knowing about financial innovations and having even modest knowledge about blockchain and cryptocurrencies, this book titled “DeFi and the Future of Finance” by Campbell R. Harvey, Ashwin Ramachandran and Joey Santoro offers useful insights into DeFi and sparks a motivation to dive deep into this area.

The book consists of eight chapters critically analysing the concept of DeFi. The glossary towards the end of the book comes as a great relief to readers to decipher many of the complex terms. The authors discuss the mechanisms involved in DeFi, its uses and how it can replace traditional finance. However, as we go through the chapters, we realise that replacing traditional finance with DeFi may actually be a distant dream and gradual integration of DeFi tools in traditional finance may be a more practical approach.

Chapter one introduces the five problems as mentioned by authors in traditional institutions which can be solved by DeFi: centralised control, limited access to banking, inefficiencies in payments and settlements, lack of interoperability and opacity. These problems may result in lower economic growth and even increased inequality.

Chapter two of the book deals with the origins of modern finance culminating into DeFi and cryptocurrencies. It explains the transition from the barter system to coinage, and to the non-physical or virtual forms of money. The authors argue that all the innovations in finance over the last 150 years or so, including credit cards, ATM, Internet banking and even the recent developments relating to fintech, such as peer-to-peer (P2P) lending, have

not altered the centralised nature of finance, although they have helped in bringing down the transaction costs. The chapter then turns, although briefly, to DeFi-based innovations in finance, including the blockchain technology and cryptocurrencies, which is one of the most important applications of blockchains. Blockchains can impart cryptographic scarcity (mimicking the properties of precious metals to lend value to cryptocurrencies), censorship resistance (leading to the freedom to transact without any interference in cryptocurrencies) and portability to cryptocurrencies, making it a powerful innovation. According to the authors, Bitcoins can evolve into an effective store of value and a potential inflation hedge. DeFi has also enabled the creation of “smart contract platforms”, such as decentralised applications (dApps) as part of Ethereum, which can allow peers to interact directly making a central clearing house redundant for such transactions.

Chapter three delves deeper into blockchains, the infrastructure on which DeFi is built. Blockchains are based on consensus protocols that can prevent any malicious tampering. Apart from cryptocurrencies, the chapter also familiarises the readers to stablecoins. Stablecoins can reduce the volatility witnessed in the case of cryptocurrencies and maintain price parity, as they are pegged to some target assets, such as USD and gold. They can be fiat-collateralised, crypto-collateralised and even non-collateralised. However, there have been instances of collapse of stablecoins as well as redemption pressures on them. Such developments pose threat to financial stability¹.

Chapter four explains the atomic financial actions that are used to create cryptocurrencies and the complex smart contract platforms, illustratively the dApps. It brings out how a simple transaction acts as the foundation for such complex platforms. There are other actions, such as “burn” and “mint” which are used to either reduce or increase the supply of cryptocurrencies. Collateralised loans and uncollateralised flash loans are also other types of actions involving cryptocurrencies. Similar actions or processes can also be seen as part of traditional finance but these are regulated by a central authority. In contrast, in the case of DeFi, they are undertaken using an algorithm. Of course, algorithms can fail during unique or extreme scenarios and that is

¹ *Financial Stability Report*, June 2023, Reserve Bank of India.

where traditional finance methods may have an edge. Also, since the algorithm may not necessarily be common worldwide but may have to be made country specific, further undermining the use of DeFi over traditional finance.

Chapter five once again alludes to the problems in traditional finance discussed in Chapter one and provides mechanisms to solve them using DeFi. The authors argue that the problem of limited access can be solved using yield farming, and DeFi concepts wherein each user can create liquidity based on his/her requirements. Smart usable contracts and “forking” (splits in the blockchain network) can be used for reducing inefficiencies. The authors also argue that only the best technology which is capable of reducing inefficiencies will eventually survive after a prolonged use. Smart contracts can also reduce opacity as all parties will be aware of counterparties. Tokenisation can improve interoperability, while a decentralised autonomous organisation (DAO) can reduce centralisation.

Interestingly, in the Indian context, some of these problems are being addressed through the invention of unified payments interface (UPI) as an open application programming interface (API), which is not a DeFi-based tool. UPI has managed to expand the use of formal finance, ensure interoperability, and bring down inefficiencies in payments and settlements. Hence, as argued by the authors, some of the above-mentioned problems may very well be on the path of becoming irrelevant in modern financial systems.

Chapter six is a deep dive into how various financial technologies can work on a DeFi platform. To illustrate, lending and borrowing through DeFi can take place without an intermediary. There are two protocols which enable lending of money. The first one is compound in which the depositors create liquidity by depositing their money from where the lenders take the money by paying an interest. The interests are based on demand and supply and fixed algorithmically. However, there must be a collateral backing for the loan. Various complex functionalities, such as flash loans, flash liquidations, swapping of collateral are also possible using DeFi. This chapter also explains the concept of decentralised exchanges which are either order book-based or liquidity pool-based. However, there are several limitations of these exchanges, such as low liquidity, lack of inter-operability and high costs which may once again weaken the case for DeFi over traditional finance.

This chapter also briefly explains the concept of decentralised derivatives. The two derivatives present in DeFi platform are Synthetix and Oryn. Similar to traditional derivatives, the decentralised derivatives have an underlying value to determine their cost, such as the Synthetix silver or gold can be based on the real price of silver or gold. The Oryn derivative is similar to call and put options. Evidently, traditional financing tools are at present not just comparable with DeFi-based tools but may even be safer and cost effective. However, going forward, an integration of certain DeFi technologies into traditional financing tools can make finance more secure, fast and accessible.

The last chapter lays out the various risks in DeFi, which mainly included the smart contract risk *i.e.*, risk of the product getting hacked; governance risks as the protocols in many programmes are controlled by smart contracts; oracle risk on securing off-chain data on the chain; scaling risk as the block sizes are fixed; custodial risk wherein the private keys can get lost or locked thus leading to loss of the stored value of custody. Higher use of electricity for computing can lead to increased environmental costs raising questions about sustainability. The governance risks under DeFi can increase multifold owing to the absence of regulators, whose main responsibility is to protect the interests of depositors in traditional finance. Given the new risks that DeFi can entail, whether it is prudent to replace traditional finance using DeFi is indeed a moot question. However, integration of certain DeFi tools and their judicious usage subject to a proper review can have transformational results. The proposals to introduce Central Bank Digital Currencies by many central banks, including the Reserve Bank of India (RBI) is a case in point. Such steps can lead to democratisation of traditional finance and enhance financial inclusion.

Ashish Ranjan*

* Ashish Ranjan is Manager in Department of Supervision at the Reserve Bank of India, Mumbai.