

Digital currencies

The current ongoing digital transformation of our society is impetuously forcing entrepreneurs to redesign their business models or invent new ones and regulators to reformulate and update the current legal systems. We are at the dawn of a revolution that will bring long-term implications for our socio-economic systems. Emerging new technologies such as machine learning, artificial intelligence, autonomous vehicles, fog computing or blockchain can disrupt many business sectors and the society at large. In particular, blockchain is a foundational technology still into the so-called “era of ferment” and progressively approaching the “Peak of Inflated Expectations”. This phase is represented by technological uncertainty, technology variations, rivalry and competition and emerging new risks, which regard both the legal, technological and business spheres. For these reasons, this special issue of the *Journal of Risk Finance* wishes to shed light on the risks of different blockchain applications with focus on digital currencies. This special issue on “Digital Currencies” is original not only for the choice of the topic but also for the interdisciplinary research methods and methodologies used by the authors.

Certainly, Bitcoin is the most famous application of blockchain and distributed ledger technologies. Despite there are more than 1,000 alternative digital currencies in circulation at present, Bitcoin still remains the largest in terms of market capitalization. In this special issue, the article “Using sentiment analysis to predict interday Bitcoin price movements” tries to analyse the Bitcoin price and possibly predict its trend by measuring the price impact of expert media articles. By applying lexicon-based sentiment analysis techniques combined with Harvard psychosocial and finance industry-specific dictionary to quantify sentiment in an automated fashion, the authors observed that the sentiment changes over the time. Then, to support the analysis, sentiment-based trading strategies inspired by a reaction pattern are proposed. The main finding of the study shows that specialised media can influence semi-short term Bitcoin price movements. The market price initially overreacts and then faces multiple price corrections. Traders who want to exploit all price movements cannot achieve abnormal returns because of transaction costs and the elevated risk of the strategy. The results suggest that Bitcoin price to satisfy semi-strong form market efficiency hypothesis, which is an indication of a mature market. To continue, article “The evolution of the Bitcoin economy: extracting and analyzing the network of payment relationship” tracks the global use of Bitcoin over a period of six years. It proposes four specific business categories, namely, mining pools, exchanges, online gambling and black markets, by analyzing specific transaction patterns. The paper introduces a map of the network of payment relationship and analyzes transaction behavior found in each business category. The authors identify three regimes over the lifespan of the Bitcoin economy: the “proof-of-concept” stage, dominated by small test transactions and mining with limited economic activities; the second “sin” stage, consisting mainly of “sin” enterprise (i.e. gambling service and black market); and the third “maturation” stage, controlled by legitimate merchants and a proliferation of exchange activity. The authors conclude by observing that gradually the Bitcoin economy is becoming more mature and concerns regarding illegal transactions are legitimate but sometimes overstated.

The article “Blockchains and distributed ledgers in retrospective and perspective”, provides an historical perspective of the blockchain evolution by comparing private and public ledgers and by outlining their suitability for different use cases. At the end, the author explores the role of



digital currencies in modern society and provides a comparison between various forms of digital cash, such as central bank issued electronic cash, bank money, bitcoin and P2P money, are compared and contrasted. The author aims to explore the potential applications of blockchain to banking and trading activities. In particular, the author believes that blockchain and distributed ledger technologies in general have a promising future because of its low cost and high efficiency compared with traditional banking. However, the author brings our feet to the ground by emphasizing that decisions about what financial applications (e.g. micropayments, trade finance, etc.) are supposed to be handled first still remains quite tricky. The author argues that until now, there remains a certain level of uncertainty among decision-makers who often fail to understand that current systems may not be as they are because of technological reasons, but rather because of business and other reasons.

The article “From digital currencies to digital finance: the case for a smart financial contract standard” explores the use of smart contracts. The authors point that the lack of recognition of uniqueness of the financial contract within economic contracts leads to failure of representing financial contracts in real-world application of Fintech. The obligation of financial contracts can be represented mathematically with greater precision than natural language contracts. This supports the author’s interpretation of the algorithmic nature of financial contracts.

The article “An innovative RegTech approach to financial risk monitoring and supervisory reporting” tries to understand the use of smart contracts as a tool to improve monitoring and supervision in financial markets. Because of little interest and limited technical capability to share their internally generated risk data, financial institutions lack interoperable risk data, and this situation aggravates the rising levels of systemic risk. The authors propose a novel RegTech approach to monitor and supervise financial risk. Their new approach (called DTD) enhances the supervisors’ capacity to monitor the evolution of risk in the system by utilizing financial data at the most granular level with the use of blockchain time stamping. The application of blockchain to trading is covered in the article “Application of blockchain for trade clearing”, which analyses how blockchain can be applied to clearing and settlement.

The articles cover a thorough examination of current clearing processes from many white papers and then introduce a new trade-clearing framework. Three important stakeholders of clearing and settlement are included in a “super large ledger” within this new framework, i.e. exchanges, banks and regulators. The super large ledger contains all related trading information from exchange, which can help to get better performance of clearing and settlement. Super large ledgers have the ability to deal with workload at high speed with scalability.

Finally, the article “Case Study of Lykke Exchange: architecture and outlook” goes further by exploring how exchanges will evolve over time thanks to the use of blockchain. It shows architecture of an exchange based on colored coin principles. The article concludes that high performance exchange for colored coins is technically feasible even in the presence of a number of tradeoffs between performance and security. It also states that the important component that is missing is a global market place that enables exchange of digital assets.

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