

Contents

<i>Contributors</i>	xv
<i>Foreword</i>	xix
<i>Preface</i>	xxi

PART 1 Digital currency and bitcoin

1. Introduction to Bitcoin	3
Lam Pak Nian and David Lee Kuo Chuen	
1.1 The next generation of money and payments	3
1.2 Digital currency as alternative currency	3
1.3 Cryptocurrency	5
1.4 General features of bitcoin	11
1.5 Benefits and risks	20
1.6 Impact of the digital currency revolution	23
1.7 Conditions for a successful cryptocurrency	24
1.8 Future prospects and conclusion	25
Acknowledgments	26
References	26
2. Is Bitcoin a Real Currency? An Economic Appraisal	29
David Yermack	
2.1 Introduction	29
2.2 History and background of bitcoin	31
2.3 Bitcoin's weaknesses as a currency	34
2.4 Conclusion: Obstacles faced by bitcoin	39
Acknowledgments	40
References	40
3. Bitcoin Mining Technology	41
Nirupama Devi Bhaskar, Chen Wanfeng, Li Haili and David Lee Kuo Chuen	
3.1 Introduction	41
3.2 Technology behind bitcoin	42
3.3 Mining process	50
3.4 Mining possibilities	50
3.5 Mining pools	55

3.6	Threats to mining	60
3.7	Relocation of mining facilities	62
3.8	Recent advancements	62
3.9	Conclusion	63
	References	63
	Further reading	64
4.	National Cryptocurrencies	65
	Andras Kristof	
4.1	The first wave	65
4.2	The future of national cryptocurrency	76
4.3	Conclusion	77
	Sources	78
5.	Evaluating the Potential of Alternative Cryptocurrencies	79
	Bobby Ong, Teik Ming Lee, Guo Li and David Lee Kuo Chuen	
5.1	Introduction	79
5.2	Different types of altcoins	80
5.3	Launching an altcoin	81
5.4	Data collection and altcoin evaluation strategy	82
5.5	Altcoin evaluation results	83
5.6	Empirical research using social network data	88
5.7	Empirical analysis using time series and cross-section data	90
5.8	Conclusion	91
	Appendix empirical analysis of bitcoin and altcoins	92
	Appendix	122
	References	132
6.	The Effect of Payment Reversibility on E-Commerce and Postal Quality	133
	Christian Jaag and Christian Bach	
6.1	Introduction	133
6.2	The model	137
6.3	Basic case	138
6.4	Results with postal quality	141
6.5	Conclusion	144
	References	145
7.	Blockchain and Digital Payments: An Institutional Analysis of Cryptocurrencies	147
	Georgios Papadopoulos	
7.1	Introduction	147
7.2	Definition	148

7.3	The structure and the incentives behind the supply and demand of cryptocurrencies	152
7.4	Understanding institutional change	155
7.5	The ceremonial encapsulation of cryptocurrencies in the established model of regulation for digital payments	159
7.6	Cryptocurrencies as mature payment technologies: Challenges in the near future	162
7.7	Conclusions	165
	Acknowledgments	166
	References	166
8.	Counterfeiting in Cryptocurrency: An Emerging Problem	169
	Ralph E. McKinney, Jr., Lawrence P. Shao, Duane C. Rosenlieb, Jr. and Dale H. Shao	
8.1	Chapter overview	169
8.2	Introduction: Cryptocurrency has virtually evolved from hard currency	169
8.3	The basic function of currency: A medium of exchange	172
8.4	Counterfeiting: Methods, motivation, and opportunities	176
8.5	The global anticounterfeiting initiative	178
8.6	Deterring counterfeiting in the future	180
8.7	Summary	181
	References	181
	Further reading	183
9.	Emergence, Growth, and Sustainability of Bitcoin: The Network Economics Perspective	185
	Ernie G.S. Teo	
9.1	Network economics and cryptocurrencies	185
9.2	Sustainability of a cryptocurrency network	188
9.3	Discussion/conclusion	193
	References	194
10.	Cryptocurrencies as Distributed Community Experiments	195
	Matthias Tarasiewicz and Andrew Newman	
10.1	Introduction	195
10.2	From Bitcoin as single cryptocurrency to an ecosystem of cryptocurrencies	196
10.3	Altcoins as evolutionary problem solving and "proof of concepts"	197
10.4	Overview of the main critique and discourse on cryptocurrencies	198
10.5	The future of the blockchain	213
10.6	Conclusion	215
	References	216
	Further reading	218

11. Extracting Market-Implied Bitcoin's Risk-Free Interest Rate	219
Nicolas Wesner	
11.1 Introduction	219
11.2 A model for the determination of bitcoin's risk-free interest rate	220
11.3 Application to US\$ and euro data	222
11.4 Perspective on bitcoin interest rate	225
11.5 Conclusion	226
References	226
12. A Microeconomic Analysis of Bitcoin and Illegal Activities	227
Tetsuya Saito	
12.1 Introduction	227
12.2 The baseline model	229
12.3 Market equilibrium	232
12.4 Demand for bitcoins	237
12.5 Extensions	240
12.6 Concluding remarks	242
Acknowledgments	243
References	243
13. Legal Issues in Cryptocurrency	245
Vrajlal Sapovadia	
13.1 Introduction	245
13.2 Legality versus illegal	248
13.3 Global regulatory movement	254
13.4 Conclusion	257
References	258
Further reading	258
14. Cryptocurrency and Virtual Currency: Corruption and Money Laundering/ Terrorism Financing Risks?	259
Kim-Kwang Raymond Choo	
14.1 Corruption: A social evil	259
14.2 Review of financial action task force on money laundering compliance on PEPs	264
14.3 Cryptocurrencies and virtual currencies and their potential to be misused for money laundering	282
14.4 The way forward: A conceptual intelligence-led AML/CTF strategy	286
References	288

15. A Light Touch of Regulation for Virtual Currencies	291
Lam Pak Nian and David Lee Kuo Chuen	
15.1 Introduction	291
15.2 Legitimate uses	293
15.3 Potentially regulated risks	294
15.4 Survey of regulatory approaches in tackling these risks	295
15.5 Highlight on US regulation	301
15.6 Toward a light-touch approach to regulation	305
References	307
16. Real Regulation of Virtual Currencies	309
Richard B. Levin, Aaron A. O'Brien and Madiha M. Zuberi	
16.1 Introduction	309
16.2 Background	311
16.3 Bitcoin prosecutions	314
16.4 FinCEN regulation of virtual currencies	317
16.5 SEC regulation of virtual currencies	327
16.6 CFTC regulation of virtual currencies	330
16.7 IRS treatment of virtual currencies	334
16.8 FINRA concerns regarding virtual currencies	335
16.9 Congressional concerns regarding virtual currencies	335
16.10 Conclusions	336
References	337
Further reading	340
17. A Facilitative Model for Cryptocurrency Regulation in Singapore	341
Jonathan W. Lim	
17.1 Introduction	341
17.2 Background to cryptocurrencies	343
17.3 Clear and targeted regulation	347
17.4 A self-regulatory framework	356
17.5 International coordination and harmonization	358
17.6 Conclusion	360
References	361
Further reading	361
18. Advancingz Egalitarianism	363
Gavin Wood and Aeron Buchanan	
18.1 Introduction	363
18.2 Development of centrally controlled money systems	363
18.3 A new paradigm: Decentralization of authorities	366

18.4	Practicalities	370
18.5	The future of blockchain-based systems	374
18.6	Conclusion	378
	References	379
	Further reading	379
19.	How Digital Currencies Will Cascade up to a Global Stable Currency: The Fundamental Framework for the Money of the Future	381
	Gideon Samid	
19.1	Introduction	381
19.2	Commodity backed digital mint	385
19.3	Derived commodities	386
19.4	Cascading	387
19.5	Outlook	394
	References	395
20.	Bitcoin-Like Protocols and Innovations	397
	Ignacio Mas and David Lee Kuo Chuen	
20.1	The bitcoin system and the element of trust	398
20.2	A new digital commodity	398
20.3	Pseudonymous ownership and trades	399
20.4	An open and decentralized ledger system	400
20.5	Blockchain, mining, block time, and forks	400
20.6	Validation of transaction over a peer-to-peer network	402
20.7	Operation via open-source protocols	403
20.8	The anatomy of bitcoin	403
20.9	Bitcoin ecosystem	410
20.10	Benefits of bitcoin: An assessment	414
20.11	Future-proofing bitcoin: Addressing key risks	418
20.12	Potential demand drivers for bitcoin	427
20.13	Conclusions: The new vistas opened up by bitcoin	432
	References	436
21.	Blockchain Electronic Vote	437
	Pierre Noizat	
21.1	The problem with proprietary voting systems	437
21.2	Open-source, free software electronic transaction and voting systems	437
21.3	Conclusion	444
	References	444

22. Translating Commons-Based Peer Production Values Into Metrics: Toward Commons-Based Cryptocurrencies	445
Primavera De Filippi	
22.1 Introduction	445
22.2 Commons-based peer production	446
22.3 Value metrics	449
22.4 Complementary currencies	454
22.5 Conclusion	461
References	463
Further reading	465
23. The Confluence of Bitcoin and the Global Sharing Economy	467
Alyse Killeen	
23.1 2008 stimulus	467
23.2 Confluence of bitcoin and the global sharing economy	470
23.3 Sharing economy	471
23.4 Resource ownership versus access	471
23.5 Mental accounting	473
23.6 Bitcoin	475
23.7 Distributed network	478
23.8 Token lifecycle	479
23.9 Device-level resources	483
References	484
24. What Does Cryptocurrency Mean for the New Economy?	487
David G.W. Birch	
24.1 Introduction	487
24.2 Bitcoin	492
24.3 A money narrative	495
24.4 Beyond money	497
24.5 Conclusions	497
Acknowledgments	498
References	498
Further reading	499
25. Bitcoin: A Look at the Past and the Future	501
Anton Cruysheer	
25.1 Reasons for success and failure	504
25.2 A numismatic approach	504
25.3 The end of money	505
25.4 The role of the government	505

25.5	The role of banks	506
25.6	Future possibilities	507
	References	508
	Sources	508
26.	Bitcoin Initial Public Offering, Exchange-Traded Fund, and Crowdfunding	509
	Nirupama Devi Bhaskar, Lam Pak Nian and David Lee Kuo Chuen	
26.1	Introduction	509
26.2	Initial public offering: Digital CC	510
26.3	Exchange-traded fund: Winklevoss Bitcoin Trust	517
26.4	Crowdfunding	527
26.5	Conclusion	535
	Acknowledgments	536
	References	536
27.	Bitcoin Exchanges	537
	Nirupama Devi Bhaskar and David Lee Kuo Chuen	
27.1	Introduction	537
27.2	Bitcoin exchanges	537
27.3	Exposure to risk of exchange failure	538
27.4	Survival time of an exchange	542
27.5	Discussion	548
27.6	Conclusion	550
	References	550
	Additional readings	550
28.	Understanding the Evolution of the Internet: Web 1.0 to Web3.0, Web3, and Web 3 +	553
	Zheng JinCheng and David Lee Kuo Chuen	
28.1	Introduction	553
28.2	The evolution of the internet: Web1.0-Web2.0-Web3.0	556
28.3	Why Web3+?	561
28.4	Web3 use case	567
28.5	Web3 risks and limitations	572
28.6	Web3 future outlook	576
28.7	Conclusion	579
	References	580
	Further reading	580

29. Historical Experience of Money and Future Expectations on Digital Money, Cross-border Payments, and the International Monetary System	583
David Lee Kuo Chuen and Yao Zhao	
29.1 Three major transitions of money	583
29.2 Experience gained from history and the enlightenment for the central bank digital currencies	586
29.3 Evolution history of the international monetary system	587
29.4 Some considerations and enlightenment	595
References	602
30. Introduction to Central Bank Digital Currency and Key Considerations	605
Yu Wang	
30.1 Introduction	605
30.2 Motivation of issuing CBDC	608
30.3 Design choice of CBDC	613
30.4 Conclusion	615
References	616
31. Tokenization and Enterprise Blockchain	617
Weibiao Xu	
31.1 Blockchain systems and tokenization	617
31.2 Enterprise developments and consortium blockchain	619
31.3 Enterprise adoption and tokenization	636
31.4 Appendix A comparison of consortium platforms	639
31.5 Appendix B comparison of selected Chinese enterprise projects	642
References	643
32. Stablecoins	647
Wang Zhiguo	
32.1 Introduction	647
32.2 Taxonomy of stablecoins	651
32.3 Current stablecoin market	659
32.4 Roles of stablecoins in DeFi	666
32.5 Recent developments	668
32.6 Research	671
32.7 Conclusions	672
References	674
<i>Index</i>	<i>677</i>