

Eline Van der Auwera • Wim Schoutens •
Marco Petracco Giudici • Lucia Alessi

Financial Risk Management for Cryptocurrencies

Springer

Contents

Part I Introduction to Cryptocurrencies

1 Blockchain.....	3
1.1 Blockchain in a Nutshell.....	4
1.2 Network and Nodes.....	4
1.3 Cryptographic Algorithm.....	6
1.3.1 Hash Algorithm.....	7
1.4 Distributed Ledger.....	9
1.5 Consensus Algorithms.....	10
1.5.1 Proof-of-Work.....	10
1.5.2 Proof-of-Stake.....	12
1.5.3 Byzantine Fault Tolerance.....	14
1.5.4 Delegated Proof-of-Stake.....	15
1.5.5 Summarizing Table.....	16
References.....	16
2 Types of Cryptocurrencies.....	19
2.1 General Information on Cryptocurrencies.....	20
2.1.1 Creation.....	21
2.1.2 Objectives.....	22
2.1.3 Users of Cryptocurrencies.....	23
2.1.4 Opportunities.....	23
2.2 Proof-of-Work Coins.....	25
2.2.1 Bitcoin (BTC).....	25
2.2.2 Ethereum.....	27
2.2.3 Litecoin (LTC).....	29
2.2.4 Mohero (XMR).....	30
2.3 Byzantine Fault Tolerance Coins.....	32
2.3.1 Ripple.....	32
2.3.2 Stellar.....	33

2.4	Proof of Stake Coins.....	35
2.4.1	EOS.....	35
2.4.2	Tether (USDT).....	36
2.5	Toy Coins.....	37
2.6	Summary of the Key Characteristics.....	38
	References.....	38

Part II Risk in Dealing with Cryptocurrencies

3	Qualitative Risks.....	43
3.1	Cryptocurrency Market.....	43
3.2	Regulatory Issues.....	44
3.2.1	Regulation in Place.....	47
3.3	Design Risk.....	47
3.3.1	51% Attack.....	48
3.3.2	Selfish Mining.....	51
3.3.3	ICO.....	51
3.4	Operational Risk.....	54
3.4.1	Wallet.....	54
3.4.2	Exchanges.....	54
3.4.3	Other Operational Risks.....	56
	References.....	57
4	Quantitative Risks.....	59
4.1	Descriptive Analysis of Returns.....	59
4.2	Correlation and Diversification.....	64
4.2.1	Correlation Between Several Cryptocurrencies.....	64
4.2.2	Correlation Between Cryptocurrencies and Other Stocks ...	65
4.3	Flash Crash.....	67
4.4	Pump and Dump.....	68
4.5	Distributional Behaviour.....	68
4.6	Volatile Behaviour.....	72
4.6.1	ARMA-GARCH Model.....	75
4.7	Market Efficiency.....	83
	References.....	84
5	Futures and Options on Cryptocurrencies.....	85
5.1	Futures.....	85
5.1.1	Chicago Mercantile Exchange Futures.....	86
5.1.2	Cryptocurrency Exchanges Trading Futures.....	86
5.2	Options on Cryptocurrencies.....	87
5.3	Volatility Measures of Cryptocurrencies.....	89
5.4	Stochastic Volatility.....	91
	References.....	94

- 6 Portfolio Management..... 97**
 - 6.1 Portfolio Simulation 99
 - References..... 103

- 7 Further Related Work..... 105**
 - 7.1 News Impact on Cryptocurrencies..... 105
 - 7.2 Bubble Analysis..... 106
 - References..... 107

- Part III Summary and Conclusion**

- 8 Conclusion..... III**

- Index..... 113**