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Blockchain Economic Networks: Economic Network Theory—Systemic Risk and Blockchain Technology

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Business Transformation through

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the replication of network statistical behavior in cryptographic networks indicates the robust (not merely anecdotal) adoption of blockchain systems. Part II addresses balance sheet network analysis (ongoing obligations over time), first from the classical sense of central bank balance sheet network analysis developed by Castrén (2009, 2013), Gai and Kapadia (2010), and Chan-Lau (2010), and then proposes how blockchain economic networks might help solve systemic risk problems. The chapter concludes with the potential economic and social benefits of blockchain economic networks, particularly as a new technological affordance is created, algorithmic trust, to support financial systems.

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References

Albert, R., & Barabási, A. (2002). Statistical mechanics of complex networks. *Reviews of Modern Physics*, 74(1), 47–97.

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Aldasoro, I., & Alves, I. (2016, September). *Multiplex interbank networks and systemic importance:* An application to European data (Working Paper No 1962). European Central Bank.

Google Scholar

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Boss, M., Elsinger, H., Summer, M., & Thurner, S. (2003). *The network topology of the interbank market* (Working Paper 03-10-054:3). Santa Fe Institute.

Google Scholar

Brandes, U., Robins, G., McCranie, A., & Wasserman, S. (2013). What is network science? *Network Science.*, 1, 1–15.

Article Google Scholar

Brunswicker, S., Matei, S., Zentner, M., Zentner, L., & Klimeck, G. (2016). Creating impact in the digital space: Digital practice dependency in communities of digital scientific innovations. *Scientometrics*, 110(1), 417–442.

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Chaturvedi, M. (2017). Contagion in financial (balance sheets) networks. *Viewpoints which matter* blog.

https://chaturvedimayank.wordpress.com/2016/06/22/contagion-in-financial-balance-sheets-networks/

Chinsky, M. (2017). Symbiont wins "Best Distributed-Ledger Technology Project" category at Waters Technology's Buy-Side Technology Awards for second consecutive year. *Business Wire*.

https://www.businesswire.com/news/home/20171103005598/en/Symbiont-Wins-%E2%80%9CBest-Distributed-Ledger-Technology-Project%E2%80%9D-Category

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Diebolt, C. (2012). Where are we now in cliometrics? *Historical Social Research.*, 37(4), 309–326.

Google Scholar

Embree, L., & Roberts, T. (2009). *Network analysis and Canada's large value transfer system* (Discussion Paper No. 2009-13). Bank of Canada.

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Erdos, P., & Rényi, A. (1959). On random graphs I. *Publicationes Mathematicae*, 6, 290–297.

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Higgins, S. (2017). JPMorgan launches interbank payments platform on Quorum blockchain. *Coindesk*. https://www.coindesk.com/jpmorgan-launches-interbank-payments-platform-quorum-blockchain/

Hurd, T. R. (2015). The construction and properties of assortative configuration graphs. *arXiv*:1512.03084.

Google Scholar

Inaoka, H., Ninomiya, T., Taniguchi, K., Shimizu, T., & Takayasu, H. (2004). Fractal network derived from banking transaction—An analysis of network

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Kirman, A. (1997). The economy as an evolving network. *Journal of Evolutionary Economics.*, 7(4), 339–353.

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König, M. D., & Battiston S. (2009). From graph theory to models of economic networks. A tutorial. In A. K.Naimzada, S. Stefani, & A. Torriero (Eds.), *Networks, topology and dynamics* (Lecture Notes in Economics and Mathematical Systems, vol. 613). New York: Springer.

Google Scholar

Lagerstrom, R., Baldwin, C., MacCormack A., & Dreyfus, D. (2013). *Visualizing* and measuring enterprise architecture: An exploratory BioPharma case (Working

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Moreno-Sanchez, P., Zafar, M. B., & Kate, A. (2016). Listening to whispers of ripple: Linking wallets and deanonymizing transactions in the ripple network. *Proceedings on Privacy Enhancing Technologies*, 2016(4), 436–453.

Article Google Scholar

Moreno-Sanchez, P., Modi, N., Songhela, R., Kate, A., & Fahmy, S. (2018, April 23–27). Mind your credit: Assessing the health of the Ripple credit network. In *IW3C2 (International World Wide Web Conference Committee), WWW 2018*, Lyon, France.

Google Scholar

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working capital survey. https://www.pwc.com/gx/en/business-recovery-restructuring-services/working-capital-management/working-capital-survey-2015-report.pdf

Ripple. (2017a). *Ripple insight*. https://ripple.com/insights/federal-reserve-task-force-ripple-improves-speed-transparency-global-payments/

Ripple. (2017b). *Company press release*. https://ripple.com/ripple_press/ripples-blockchain-network-now-100-strong/

Roos, S., Moreno-Sanchez, P., Kate, A., & Goldberg, I. (2017). *Settling payments fast and private: Efficient decentralized routing for path-based transactions.*arXiv:1709.05748. Preprint appearing at NDSS 2018.

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Soramäki, K., et al. (2007). The topology of interbank payment flows. *Physica A:* Statistical Mechanics and its Applications, 379, 317–333.

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Swan, M. (2017). Anticipating the economic benefits of blockchain. *Technology Innovation Management Review*, 7(10), 6–13.

Article Google Scholar

Swan, M. (2018a). Blockchain economics: Ripple for ERP. *European Business Review*. Feb-Mar:24–7.

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properties. *Coin Telegraph*. https://cointelegraph.com/news/sweden-officially-started-using-blockchain-to-register-land-and-properties

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