Distributed ledgers have the potential to transform economic organization and financial structure. Yet the subject is embroiled in controversy, hype, and terminological inconsistencies. Rather than get waylaid by alternative possible definitions of distributed ledgers, or decentralized ledgers, we focus more broadly on an economic analysis of what distributed ledgers can do. We proceed by analyzing key individual components. We also compare and contrast the economics framework with the frameworks of computer science and data management disciplines, to clarify the technology.

The familiar but key component parts of distributed ledgers are: ledgers as financial accounts, e-messages and e-value transfers, cryptography, and contracts including multi-party mechanisms. Each component is discussed, evaluated, and illustrated through the context of historical and contemporary economies, with featured applications in both developed economies and emerging market countries. These use cases are a
hallmark of the paper. A recurrent focus is the general equilibrium impact of innovations and welfare gains from innovations featuring key components. This does not require that all components be introduced at the same time.

Contract theory is used to derive optimal arrangements, constrained only by obstacles to trade, featuring how the various aspects of ledgers can deepen infrastructure. Mechanism design and monetary theory are used to study public versus partitioned ledgers and improvements in payment systems. Prudential regulation, rather than being a barrier to innovation, can be improved with the use of distributed ledger technologies.

The goal is to provide blueprints for the ex ante optimal design and regulation of financial systems, including not only choices at the end points of the spectrum, of centralized versus decentralized systems, as in the hype, but the choice of hybrid forms in between. Overall, the paper provides a vision for where we are heading, being clear about obstacles along the way.