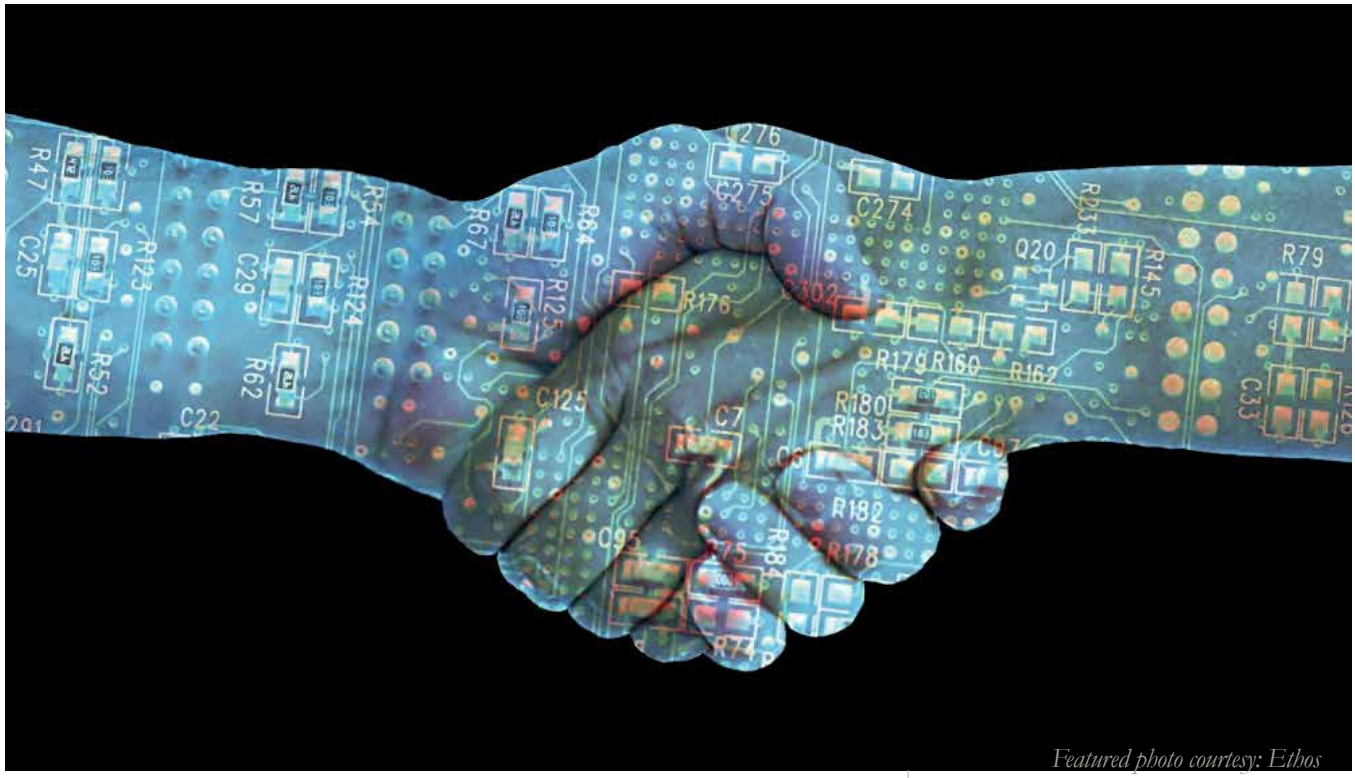

Featured photo courtesy: Ethos

Should Central Banks Fear the **BLOCKCHAIN**?

BY DIRK NIEPELT

The blockchain technology underlying Bitcoin and other krypto currencies attracts growing interest. Blockchain facilitated transactions denominated in domestic currency may affect central banks much faster and more directly. What are the likely implications of this for central banks and the monetary system?

While excitement about Bitcoin, the krypto currency of near-mystical origination, appears to have subsided lately, the blockchain technology underlying Bitcoin and other krypto currencies attracts growing interest.[1] Not only fintechs and brick-and-mortar financial institutions pay attention. Increasingly, central banks take note as well.[2] Not a week passes by without a monetary authority declaring interest in the technology and opportunities to employ it. What are the likely implications of this for central banks and the monetary system?

Internet based technology has rendered it cheap to collect information and to network. This has not only empowered the "sharing economy" but it allows fintechs to seize intermediation business from banks and degrade them to utilities, now that the financial crisis has severely damaged banks' reputation. But both fintechs and sharing-economy businesses manage information centrally – they serve as middle-men – exactly as traditional financial institutions do.

The blockchain technology undermines this middle-man business model. It renders cheating in transactions much harder and thereby reduces the value of credibility lent by trusted intermediaries. The fact that counter parties do not know and trust each other looses importance and becomes less of an impediment to trade.

This opens up new possibilities for financial market participants. Getting rid of middle-men does not only save cost, speed up clearing and settlement (possibly easing capital requirements), and reduce operational risks. It can also help to implement tailor-made transaction protocols or to keep transaction details confidential while at the same time providing records for supervisors. Maybe most importantly, it improves the bargaining power of

buyers and sellers vis-à-vis brokers. All this is worrying for whoever is in the business of intermediating.

Blockchain technologies may lend credibility to a plethora of decentralised transactions, including payments denominated in traditional fiat monies or virtual krypto currencies. Either type of transaction is associated with novel challenges and opportunities for central banks (see Raskin and Yermack (2016) for a discussion of legal aspects).

Consider first the rise of krypto currencies and the currency competition that derives from it. In the contest for market share, krypto currencies have one fundamental advantage on their side: the power to commit using "smart contracts". Unlike the supply of fiat monies that hinges on discretionary decisions by monetary policy makers, the supply of krypto currencies can in principle be insulated against human interference ex post and at the same time conditioned on arbitrary verifiable outcomes. This opens the possibility for krypto currencies to overcome age-old commitment problems at the heart of monetary policy, for example by having a smart contract fix the growth rate of the virtual currency subject to clearly defined escape clauses. Currently, however, the issuing bodies of most krypto currencies do not make use of this possibility; like traditional monetary authorities they allow discretionary interference by their respective "monetary policy committees" instead.

In other respects, krypto currencies are similar to US dollars, say, in a "dollarised" economy. Demand for them is fostered by loss of trust in the domestic central bank or a desire of transacting parties to hide their identities. And the implications of widespread use can be substantial. The more payments are made using krypto currencies the lower is the demand for traditional central bank issued cash and reserves. As a consequence, seignorage revenues fall and the central bank's ability to monitor the payments system is diminished. In the extreme, the monetary authority may not only loose control over the money supply and credit but also the ability to provide lender-of-last-resort support.

Presently, this threat is not acute. Krypto currencies still offer limited benefits for users without overwhelming privacy needs and their usefulness as money suffers from limited liquidity and thus, substantial exchange rate volatility. As long as the user base of krypto currencies is small, the incentive for others to adopt the new means of payment remains limited as well. But strong network effects may quickly disrupt the payments system once a critical mass of users coordinate on, and adopt a specific krypto currency.

Blockchain facilitated transactions denominated in domestic currency may affect central banks much faster and more directly. Consider a security purchase paid with domestic currency using the blockchain. The change of ownership of the security may go hand in hand with an exchange of *claims* on domestic currency (the seller's account at a bank participating in the blockchain is credited say), or of *actual* central bank money, "Fedcoins" in Koning's (2014) terminology. In the former case, payment eventually requires clearing through traditional central bank managed channels, at a cost in terms of added complexity and resources. In the latter case, it doesn't. If base money "lives" on the blockchain the buyer can directly transfer domestic currency to the seller; the transfer of ownership of the security and of central bank money may then occur jointly, in real time.

To fully reap the benefits of distributed ledger technologies, it is thus in the interest of traders to have the central bank participate in the blockchain. Eventually, having central banks on board could even lead towards dismantling central bank managed payments systems and shifting all clearing to the new decentralised networks.

Should central banks oppose these developments or rather embrace change and engage with the private sector? If they don't join forces, central banks risk being cut out from intermediation and surveillance. They also run the risk that payment service providers may move to other currency areas with an institutional environment that is more appealing for buyers and sellers. Neither can be in the interest of monetary authorities, even if the technical and legal challenges of engagement are huge.

Central banks increasingly are under pressure to keep "their" currencies attractive. They should let the general public, not only financial institutions access electronic central bank money (see Niepelt, 2015). And they should embrace the blockchain as one medium among others to do so.

Dirk Niepelt is Director of the Study Center Gerzensee and Professor at the University of Bern. He received his PhD in economics from the Massachusetts Institute of Technology (MIT) and holds a licentiate and doctorate from the University of St. Gallen. His research interests include macroeconomics, international finance, political economy, and public finance.

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