

## Can Blockchain Technology Address De-Risking in Emerging Markets?

*Blockchain, or distributed ledger technology, has the potential to address many problems in emerging markets. In this note we consider whether blockchain can be used to mitigate the problem of de-risking by financial institutions, which affects receivers of remittances, businesses that need correspondent banking relationships, and charities working in conflict countries. Blockchain is an evolving technology, and understanding its scope and limitations will be critical to employing it to address these and related issues.*

At its simplest, blockchain is an online database for the exchange of information that takes place on a digital network to form a secure, transparent, and easy-to-use platform. This technology can be used to send money between countries, verify land ownership, share electricity across grids, and reduce the cost to banks of verifying customers and transactions.

Blockchain allows data to be stored securely and accessed by multiple users without recourse to a trusted third party such as a bank. Instead, a network of users verifies and stores the information.

### What is blockchain or distributed ledger technology?

The term ‘blockchain’ refers to the way that data are stored. Transactions are recorded in time-stamped “blocks” and each block is connected to previous blocks, forming a chain of transactions. This chain is stored by all users on a network; every time a new block is verified and added, the entire chain is updated simultaneously across users.

Currently, when buying, selling, or verifying the ownership of an asset, individuals must rely on institutions such as banks, credit card companies, or governments. Blockchain technology provides an alternative to that method by making use of cryptography and computer code to generate the trust that would otherwise be provided by an institution.

### Blockchain is a shared digital ledger

Let us now consider a more technical definition. A ledger is a book or computer file that records transactions. Blockchain technology is a **shared digital ledger** wherein transactions can be **recorded and verified** without recourse to a central authority to oversee the transaction.

**Shared:** Traditionally, computing services run on centralized networks in which a central server distributes information to computers (clients) on a network. A digital ledger is different—it is replicated and distributed across nodes—several computers around the world that compete to verify transactions in a peer-to-peer network—where information is shared by all parties engaged with the transaction.

Unlike a centralized network where there is one hub or server and every other node is a client, blockchain has smaller mini-hubs where a peer-to-peer network, consisting of equal peer nodes, functions as both client and server. Each peer on the blockchain provides computing power and stores a replicated version of the ledger, thereby creating consensus and sharing the responsibility of governance.

**Recorded and verified:** Transactions on the blockchain are confirmed by all participants on the network, and once they are recorded they become secure from revision and tampering. Banks spend significant resources to reconcile records with counterparties. By contrast, blockchain technology updates and stores information in real time, and has the potential to vastly reduce the costs of reconciliation.

### The problem of de-risking in the financial sector

De-risking is a common response to regulations related to anti-money laundering or combating the financing of terror (AML/CFT).<sup>1</sup> Although financial crimes such as money laundering, terrorism financing, and tax evasion are serious offenses which may have negative repercussions for both wealthy and poor nations, anti-money laundering regulations intended to counter these types of financial crimes may sometimes serve to hinder capital flows, especially to individuals in poorer countries. They may also reduce the transparency of financial flows.

Tougher banking regulations require banks to assess the risks of doing business in countries with weak anti-money laundering regimes or customers who might be engaged in illicit activity. Failure to do so could cost banks heavy penalties. However, regulatory guidance on how to manage these risks is often vague and contradictory. As a result, to reduce their own risks banks have become more conservative and less discretionary when evaluating customers.

Available evidence suggests that some banks are denying services to firms, market segments, and entire countries that appear to have higher risk and lower profit, and that could cause costly future fines or legal issues. In short, banks are engaging in de-risking entire segments of customers rather than judging the risk levels of clients on a discretionary basis.<sup>2</sup>

### Who loses from de-risking?

The poor and economically vulnerable—and organizations that serve them—stand to lose the most from this type of de-risking. They include:

- Migrants who remit money across borders to their families and therefore require a healthy money transfer sector. Money transfer organizations that are denied services by banks are often forced to use services that carry higher transactional fees or that are based in less transparent jurisdictions.

In 2013, Barclays Bank informed over 140 United Kingdom-based remittance companies that their accounts would be closed. Following this and similar de-banking episodes in the United States and Australia, only larger money transfer organizations have had access to bank accounts. Reports from industry associations indicate that several smaller players in the money service sector have had to close, become agents of larger businesses, or even disguise the true nature of their operations in order to obtain or keep a bank account. De-banking of money service businesses can impact global remittances, a vital source of finance for poorer countries that totals some \$440 billion a year—over three times the amount of foreign aid disbursed.

- Nongovernmental organizations (NGOs) delivering humanitarian assistance to vulnerable individuals in post-disaster or conflict situations. These organizations are affected by de-risking because they can fall outside of a bank's narrowed risk appetite.
- Small to medium-sized firms in poor countries. Their ability to apply for credit often depends on the rating of local banks vis-a-vis larger international financial institutions and the global financial system. Rich-country banks increasingly report withdrawing correspondent banking services from banks in high-risk jurisdictions, including those in poor countries.

### How can blockchain help?

Blockchain technology can help with de-risking by reducing regulatory compliance costs while increasing the transparency of transactions. In particular, blockchain has the potential to reduce compliance costs associated with “Know Your Customer” requirements.

Lower customer verification costs and greater transparency can mitigate de-risking by financial institutions while also benefiting senders and recipients of remittances, businesses needing trade finance, and charities operating in conflict areas.<sup>3</sup>

Financial institutions dedicate a significant amount of resources to complying with Know Your Customer requirements. They must meet these requirements when taking on a new customer even if the customer's identity and credentials have already been verified by another financial institution. A Thompson Reuters survey found that Know Your Customer costs are, on average, \$60 million per year for financial institutions.<sup>4</sup> Some institutions spend up to \$500 million a year on procedures to verify customers that can take several months.

Blockchain has the potential to improve this situation. As discussed earlier, each block of information contains a record of valid transactions with time stamps, and carries the history of all transactions on the network by including a reference to the previous block. And while the blockchain can replace a centralized authority or trusted third party, its multiple users can also ensure that any data stored is extremely difficult to change or tamper with. This feature, combined with biometric identification or Know Your Customer utilities, can be an effective, inexpensive way to verify customers and their transactions.

Blockchain is not a perfect technology; nor is it impervious to hackers. While it enables the protection of confidential information, the level of anonymity it allows can be problematic, leaving it open for bad actors to conceal their identities and making the tracking of individual payments difficult.

Yet blockchain could also bolster anti-money laundering efforts, according to the Bipartisan Policy Center. “Blockchain could give banks and regulators access to far more detailed transactional and cross-institutional data than is currently available, allowing them to peer deeper into financial networks to identify bad actors. Furthermore, the distributed nature of blockchain technology makes it difficult for criminals to falsify transactional data to cover their tracks. All of this could take place in real-time, giving law enforcement the precious time they need to identify terrorist plots before they happen. However, this additional speed would need to be balanced against privacy concerns that could arise depending on how such a system were implemented.”<sup>5</sup>

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Given the technology’s enormous potential, regulators should fully explore how blockchain can improve the current anti-money laundering system. There should also be room for experimentation. For example, the UK Financial Conduct Authority’s [Project Innovate](#) has created a “regulatory sandbox”<sup>6</sup> to allow institutions to test new products and services.<sup>7</sup> A new report from the United Nations Economic Commission on Latin America and the Caribbean argues that, with the appropriate enabling environment, there are blockchain-based solutions that might be used to address the problem of de-risking in Caribbean countries.<sup>8</sup>

### The use of blockchain for remittances

Blockchain might also be used to conduct transactions between two fiat currencies. A local currency can be converted to bitcoin and transferred between customers across countries in a manner that is cheaper and more secure than traditional methods of sending and receiving remittances.

Seamus Cantillon of Marino Software Insights argues that blockchain combined with biometric ID can lower Know Your Customer costs. He outlines six steps by which financial institutions can identify customers and/or transactions:<sup>9</sup>

1. A customer is onboarded to the blockchain
2. A customer’s personal information, Know Your Customer documents and biometric data is added to the blockchain with appropriate encryption
3. A customer’s biometric data along with a PIN would act as a key for transactions
4. A customer’s transaction is recorded and validated by a consensus algorithm on the peer-to-peer network
5. With customer authorization, a financial institution can access a customer’s record for verification
6. Further changes to the record would be validated by the network

Cantillon paints an optimistic picture, yet there are concerns about storing personal identification information on a blockchain. Nonetheless, blockchain-based businesses are emerging, including Kenya’s BitPesa, a remittance service that allows customers to send money across countries using the cryptocurrency bitcoin.

Customers can send money in a fiat currency (such as Kenyan shillings) to BitPesa, which converts it to bitcoin and transfers it to designated mobile money accounts, to then be converted back into another fiat currency. BitPesa charges a 3 percent remittance fee for this service. By contrast, BitPesa’s main competitor M-Pesa charges fees up to 30 percent for registered users and 66 percent for unregistered users. BitPesa’s website says that it can now transfer money from Nigeria, Tanzania, and Uganda to any bank in China.

BitBond, a German firm that offers peer-to-peer loans using bitcoin blockchain, announced that it is teaming up with BitPesa to provide financing for small businesses in Kenya, Nigeria, Uganda, and Tanzania. New borrowers can have financing from BitBond paid into a local currency mobile money account or bank account in as little as 20 minutes.

### The use of blockchain for trade finance

While many financial institutions are embracing blockchain, others remain skeptical. Some are opposed to making large investments in a technology that they argue may not be profitable.<sup>10</sup> Others are making significant investments in building blockchain-based networks. Hyperledger, an open source collaborative effort created to advance cross-industry blockchain technologies, is an example. Hosted by The Linux Foundation, it includes ABN-AMRO, ANZ Bank, Deutsche Borse Group, BNP Paribas, BNY Mellon, State Street Bank, Wells Fargo, and other financial institutions.

In October 2016 the Commonwealth Bank of Australia, Wells Fargo, and international cotton producer Brighann Cotton announced the first global trade transaction between two independent banks combining blockchain with smart contracts and the Internet of Things. The transaction involved financing a shipment of cotton from Texas, in the United States, to Qingdao, China, using a distributed ledger algorithm known as the Skuchain’s Brackets system.

**Table 1: Traditional process vs blockchain proof of concept**

Category	Traditional process	Blockchain, Internet of Things & Smart Contracts
<b>Transparency:</b> All supply chain partners update data in real time within one system.	No	Yes
<b>Cost efficiency:</b> No physical documents or transportation. No risk of duplication or loss.	No	Yes
<b>Customizable:</b> Tailored, individual insurance policies	No	Yes
<b>Convenient:</b> All parties work off same ledger, all online and instant	No	Yes
<b>Secure:</b> Verifiable and immutable data to reduce fraud risk	No	Yes

Source: Commonwealth Bank of Australia

According to the Commonwealth Bank’s press release, this trade “involved an open account transaction, mirroring a letter of credit, executed through a collaborative workflow on a private distributed ledger between the seller (Brighann Cotton US); the buyer (Brighann Cotton Marketing Australia) and their respective banks (Wells Fargo and Commonwealth Bank).”<sup>11</sup>

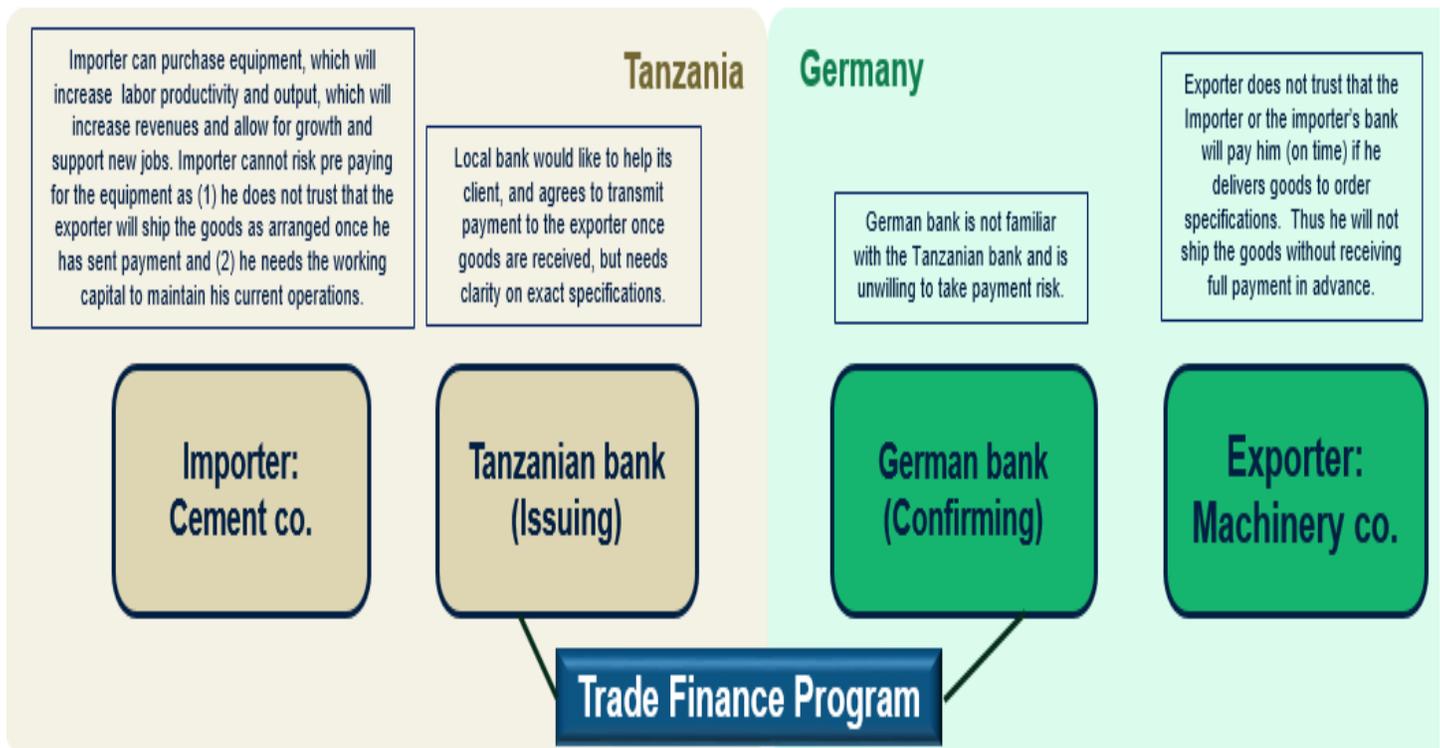
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The parties involved in this transaction introduced a physical supply-chain trigger to confirm the geographic location of goods in transit before a notification was sent to allow for release of payment. This tracking feature provided all parties with greater certainty compared with traditional open account and trade instruments such as letters of credit, which focus on documents and data.<sup>12</sup>

According to the Commonwealth Bank, the use of blockchain technology created transparency between buyer and seller, a higher level of security, and the ability to track a shipment in real time. Advancing from paper ledgers and manual processes to electronic tracking on a distributed ledger reduced errors and transaction times from several days to a few minutes.

Commonwealth Bank and Wells Fargo indicate that they will continue to collaborate with trade finance clients, financial institutions, fintech companies and consortiums, and businesses in the insurance and shipping industries to explore the potential of distributed ledger technology. Table 1 above shows a schematic of costs and benefits of traditional processes versus blockchain, as seen from the perspective of the two banks.

**Figure 1: Traditional Model of Trade Finance**



Source: Susan Starnes, *A review of IFC's trade solutions - impactful, strategic, profitable, learning from experience, capacity to grow*. IFC 2016 (internal document)

A blockchain system allows individuals to undertake instant and transparent global transactions, and quickly correct documentation errors, while avoiding delays for the importer receiving the original bill of lading.

Barclays Bank provides an additional example. In 2016 it enlisted Wave, an Israel-based fintech, to develop a blockchain-based system for settling trades. A letter of credit was generated between Seychelles Trading Company, a food distributor, and Ornua, an Irish agriculture co-operative, through Wave's blockchain platform, guaranteeing the shipment of dairy products worth nearly \$100,000 from the Seychelles to Ireland. The transaction was settled using smart contracts.<sup>13</sup>

Traditional trade finance requires an enormous amount of paperwork—in bills of lading, insurance certificates, certificates of origin, letters of credit, bills of exchange, and invoices—to transport goods around the world (see Figure 1 below for an example of a traditional transaction between institutions located in Tanzania and Germany).

The most inefficient step, according to Jeremy Wilson, vice-chairman of corporate banking at Barclay's Bank, is the bill of lading, which he notes "can take weeks to get to the other side of the planet."<sup>14</sup> A standard bill of lading (of which there are over 12 common types), includes the description of goods, quantity, weight, freight details, port of loading and discharge, final destination, shipper name, and so on. If issued incorrectly, the forwarder could lose the shipment.

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small businesses using blockchain.<sup>15</sup> Alfa Bank and S7 Airlines have also tested blockchain technology by recording a letter of credit on a blockchain platform and settling the transaction using a smart contract.<sup>16</sup>

Although examples of NGOs using blockchain to transfer money are not readily available, it is not difficult to see the potential of a platform such as BitPesa. There remains, however, the problem of ensuring transparency when the cryptocurrency is converted to fiat currency. But in the interim there is scope for business-to-business transactions in the NGO sector. Blockchain-based applications are currently being tested by NGOs for purposes other than financial transactions.

### Can blockchain be truly transformational?

Blockchain and distributed ledger technology have tremendous potential in various sectors. There are several examples of blockchain technology being used in the electricity sector, including a startup called Grid Singularity, which explores "pay as you go" solar power with financial transactions recorded on a blockchain.

It is still too early to tell if blockchain will become a widely used technology. Marco Iansiti and Karim Lakhani at Harvard Business School argue that blockchain is a *foundational technology*, similar to TCP/IP technology that was introduced in 1972 and powers the Internet as we know it today.<sup>17</sup> They argue that "single use" applications that are low in novelty and complexity, such as payments made with bitcoin or blockchain-based Know Your Customer credentials, are already appearing in the financial sector and will likely spread across at least some parts of the sector. Innovation that is quite novel but needs only a few users—such as private distributed ledgers or peer-to-peer

networks—appears to be underway. As discussed above, some banks are testing blockchain technology as a new way to process transactions in trade finance and cross border settlements.

But other applications, such as self-executing smart contracts, may take a while—perhaps decades—to gain wide use. Iansiti and Lakhani caution that as the scale and impact of blockchain transactions increase, adoption of the technology will require significant institutional change and will pose very real challenges to governments, regulators, and financial institutions.

### Conclusion

Blockchain is an exciting new technology that has the potential to reduce the costs of verifying customer transactions, thereby widening access to financial services in emerging markets. The examples discussed in this note describe significant changes in the way transactions are made and recorded. It is likely that the major players in the financial sector will continue to make investments in blockchain technology. We do not yet know whether blockchain will become a technology that is widely used. At the very least, this will take time and will involve significant changes to the regulatory regimes and institutions that govern economic activity.

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<sup>1</sup> Center for Global Development Working Group Report, *The Unintended Consequences of Anti-Money Laundering Policies for Poor Countries*, Center for Global Development, Washington DC 2015.

<sup>2</sup> Ramachandran, Vijaya, *Mitigating the Effects of De-Risking in Emerging Markets to Preserve Remittance Flows*, IFC, EM Compass Note 22, November 2016.

<sup>3</sup> Neocapita, *Blockchain use cases in international development*, Medium, March 14 2017.

<sup>4</sup> Thomson Reuters, *Thomson Reuters 2016 Know Your Customer Surveys Reveal Escalating Costs and Complexity*, ThomsonReuters.com, May 9, 2016;

<https://www.thomsonreuters.com/en/press-releases/2016/may/thomson-reuters-2016-know-your-customer-surveys.html>

<sup>5</sup> Readling, Kristofer and Justin Schardin, *Why Blockchain Could Bolster Anti-Money Laundering Efforts*, Bipartisan Policy Center, June 2, 2016.

<sup>6</sup> Financial Conduct Authority, *Regulatory sandbox*, November 2015.

<https://www.fca.org.uk/publication/research/regulatory-sandbox.pdf>

<sup>7</sup> Readling, Kristofer and Justin Schardin, *Why Blockchain Could Bolster Anti-Money Laundering Efforts*, Bipartisan Policy Center, June 2, 2016.

<sup>8</sup> Robert Crane Williams, *Prospects for blockchain-based settlement frameworks as a resolution to the threat of de-risking to Caribbean financial systems*. United Nations Economic Commission for Latin America and the Caribbean, April 2017.

<sup>9</sup> Seamus Cantillon, *Blockchain and Identity: Revolutionising KYC for Financial Institutions*. Marino Software Insights, November 3, 2016.

<sup>10</sup> Bain & Company/ Broadridge, *Blockchain in financial markets: how to gain an edge*. 2017.

<sup>11</sup> Commonwealth Bank of Australia. *Media Release: Commonwealth Bank, Wells Fargo and Brighann Cotton pioneer landmark blockchain trade transaction*. October 24, 2016.

<sup>12</sup> Commonwealth Bank of Australia. *Media Release: Commonwealth Bank, Wells Fargo and Brighann Cotton pioneer landmark blockchain trade transaction*. October 24, 2016.

<sup>13</sup> Carlo R.W. de Meijer, *Blockchain: accelerated activity in trade finance*, Finextra.com, January 26, 2017.

<sup>14</sup> Richard Kastelein, *Blockchain could be a new operating system for the planet says Jeremy Wilson, Vice Chairman of Barclays Corporate Banking*, Blockchain News, February 20, 2017.

<sup>15</sup> Oscar Williams-Grut, *Deutsche Bank, HSBC and five other big banks are collaborating on a blockchain project*, UK Business Insider, January 16, 2017.

<sup>16</sup> Oscar Williams-Grut, *Deutsche Bank, HSBC and five other big banks are collaborating on a blockchain project*, UK Business Insider, January 16, 2017.

<sup>17</sup> Iansiti, Marco and Karim R. Lakhani, *The truth about blockchain*, *Harvard Business Review*, January-February 2017.

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