



## Blockchain and International Trade

Innovations in technology have the potential to enable and disrupt international commerce (e.g., online shopping and drone delivery services). Along with emerging technologies such as artificial intelligence and the Internet of Things, blockchain may change the conduct of international trade, including how it is financed, how companies manage supply chains, and how border officials vet imports. Congress may face questions about the potential benefits and risks of this new technology and whether, or how, blockchain should be regulated.

### What Is Blockchain?

Blockchain is a distributed record-keeping system (each user can keep a copy of the records) that uses encryption to provide for auditable transactions. Using blockchain, each transaction is traceable to a user, each set of transactions is verifiable, and the data in the blockchain cannot be edited without user's knowledge. These blockchain features allow two or more parties without a trusted relationship to engage in reliable transactions without relying on intermediaries or central authority (e.g., a bank or government).

Blockchain technology could potentially yield time and cost savings in tracking business transactions. It has the potential to simplify business processes, reduce transaction costs, and allow companies to compete more efficiently. Some governments are similarly seeking to use blockchain.

### International Trade Uses

#### Finance

Blockchain has many potential financial applications. For example, blockchain is the technology underlying Bitcoin and other cryptocurrencies that can be used to make payments without banks or other third-party intermediaries. While cryptocurrencies potentially could create a more efficient payment system, they involve risks (there have been instances of compromised exchanges) and security concerns. Certain federal agencies have claimed regulatory authority over aspects of the cryptocurrency industry, but the patchwork regulatory regime involving multiple agencies at times creates regulatory ambiguity.

Traditional financial services firms are also experimenting with blockchain technology. For example, Fidelity's new digital assets division will provide custodial services for cryptocurrency trading. By using blockchain technology, banks could settle cross-border transactions in seconds, rather than days, with fewer steps and less complexity.

Multiple banks have developed trade finance pilots using blockchain platforms. For example, 14 European banks built a trade finance platform to offer services to enable international trade by small and medium enterprises (SMEs). These blockchain-based platforms may include smart contracts that automatically execute according to a set of business rules. The SMEs, shippers, and other firms in the blockchain would be able to track individual orders and use smart contracts to trigger payments automatically when

specific conditions are met, such as receipt of a delivery, without requiring manual intervention. These platforms may also open up new markets, including in developing countries where trade finance is not as readily available.

### Logistics and Supply Chain Management

A company may use a closed blockchain to manage supply chains within a company. The company may use a separate blockchain to manage outside vendors and suppliers with permissions set according to a user's role. "Permissionless" blockchains, in contrast, are open to any user.

By improving workflow efficiency and visibility, blockchain enables companies to better track goods, including inputs, intermediate goods, and finished products. A blockchain platform can also include associated documentation, like certifications, provenance, and payment information as products move through a complex global supply chain, with greater fidelity than with current technologies. With blockchain, participants in the supply chain, from the smallest vendor to the end consumer, can track and verify specific goods.

#### Tracking Conflict Diamonds

To reduce theft and counterfeiting, Everledger built a blockchain platform to track and trace individual diamonds as they move along the supply chain according to the Kimberley Process Certification Scheme for conflict-free diamonds. Blockchain partners include insurers, financial institutions, and diamond certification houses that are each able to track a diamond over its lifetime. The blockchain (shared ledger) operates according to rules set by smart contracts, and regulators gain visibility into and provide oversight of the entire supply chain.

To monitor the quality of the goods, such as perishable agricultural shipments, a blockchain could include data gathered by devices such as an embedded sensor in a shipping container to track location, and another sensor to ensure that a good is not tampered with or to monitor a shipment's temperature. Being able to track individual shipments could facilitate a recall, if needed, or could help authorities identify where along a supply chain a product was potentially tampered with or where adulteration occurred, but would not preempt the malicious action.

For example, the Walmart Food Traceability Initiative, launched in September 2018, tracks the firm's supply of fresh leafy greens. Walmart aims to increase consumer trust and food safety for a product that has been the subject of multiple U.S. foodborne illness outbreaks. The company plans to expand its blockchain efforts to other food products sourced both domestically and internationally. Walmart is part of an industry consortium seeking to align the blockchain infrastructure (e.g., establishing common data elements), to create scalability for suppliers such as small farmers distributing products to multiple companies.

**Examples/Goals of Blockchain Uses****Supply chain management**

- Quality control and efficiency
- Product or shipment tracing
- Fraud or tampering detection
- Smart contracts (self-executing)

**Finance**

- Payments, settlement, and clearance
- Trade finance letters of credit and insurance
- Real estate title transactions and registries
- Royalty payment for creative work distribution

**Regulators**

- Oversight of supply chain
- Customs documentation
- Border enforcement

**Customs and Border Control**

Keeping supply chain information together in a blockchain assists with tracking and compliance with regulatory reporting requirements. Authorities can review a blockchain record that contains information about ownership, provenance, authenticity, and price of goods. With the data in the blockchain, regulators can evaluate risk, target, and track the flows of goods and/or funds. Electronic transmission allows officials to conduct risk assessments in advance and speed border clearance. Compared to traditional database technologies that rely on a central hub, using blockchain could increase speed and security of gathering and tracking relevant information while decreasing costs and reducing fraud through heightened transparency.

Some see a potential for blockchain to facilitate trade flows, enabling companies to more easily send—and regulators to receive—customs and other documentation as well as payment of any fees before a shipment reaches the border. According to some observers, blockchain can help countries implement the World Trade Organization (WTO) Trade Facilitation Agreement (TFA) that entered into force in February 2017, including its provisions on transparency; the use of automated rather than paper-based systems; and the establishment of a single portal for traders to submit documentation and other data requirements. Some port authorities are testing blockchain for managing cargo flows.

U.S. Department of Homeland Security (DHS) Customs and Border Protection (CBP) is considering several options for applying blockchain, including for international trade documentation processing and as an alternative to paper-based official records. One CBP blockchain effort aims to protect intellectual property rights and facilitate trade by tracking and authenticating licenses, while another project tracks oil through the pipeline to ensure it qualifies for free trade agreement preferences. DHS is also testing ways to better secure U.S. borders by piloting programs to store data from cameras and other sensors using blockchain technology to maintain data integrity even if devices become physically damaged.

**Selected Policy Issues**

The growth in blockchain applications related to international trade raises multiple issues of interest to Congress, including trade barriers for cross-border data flows, international standards, privacy and security concerns, and regulatory implications. In a letter to the Administration, several Blockchain Caucus Members encouraged building a national blockchain vision even as some states move forward with their own policies.

**Cross-Border Data Flows**

Data localization requirements limiting the ability to move data across national lines can pose significant barriers for the success and growth of blockchain use in international trade. Cross-border data flows are needed to share and store blockchain data with global partners. Mandates to store data within a country's borders or otherwise limit cross-border data flows could limit the application of blockchain. Under Trade Promotion Authority (TPA), Congress established a U.S. trade negotiating objective to ensure that nondiscrimination principles apply to cross-border data flows. Obligations in the proposed United States-Mexico-Canada Agreement (USMCA) enable nondiscriminatory data flows, protect encryption, and support development of privacy regimes. USMCA provisions on a single-access window system to enable electronic submission and transparency procedures support the use of blockchain for global supply chains. Ongoing WTO negotiations on e-commerce provide a forum for these issues.

**International Standards**

U.S. trade policy, and the WTO, have historically promoted the use of international standards to eliminate trade barriers. Public and private consortia and alliances aim to promote interoperability and limit the use of disparate or local standards, but current blockchain applications lack global standards or a common protocol. This may especially be a concern for SMEs that supply multiple companies, each operating a separate blockchain.

TPA negotiating objectives on regulatory practice include seeking convergence of standards-setting processes, global standards cooperation, and encouraging the use of international and interoperable standards. The WTO, G-20, and similar forums present opportunities to establish international guidelines for interoperability and data governance structures. Capacity building under TFA could help developing countries build policies for the free flow of data to enable blockchain, while safeguarding information.

**Regulatory Oversight**

Congress may conduct oversight or hold hearings on regulatory uses of blockchain for increasing the efficiency and security of customs and border control, food and product safety supply chain traceability, or other applications. Congress may also conduct oversight to review how regulatory agencies are applying existing laws and regulations to blockchain or to study how other countries are applying and regulating the use of the technology. Congress may review existing legislation to identify barriers to the technology, such as statutory requirements for paper documentation.

Rachel F. Fefer, rfefer@crs.loc.gov, 7-1804

IF10810