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## Blockchain and International Trade

Innovations in technology have the potential to enable and disrupt international commerce (e.g., online shopping and drone delivery services). One such technology, called 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 provides for auditable transactions and secures those transactions with encryption. 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 each user's knowledge. Compared to traditional technologies, blockchain allows 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 seeking to use blockchain in similar ways.

### 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. However, cryptocurrencies are not completely safe, as their exchanges have been compromised. Security concerns and other issues have led to regulatory actions. In June 2017, the Securities and Exchange Commission ruled that Initial Coin Offerings (ICOs) with cryptocurrencies are considered securities and thus subject to applicable law and regulation. In contrast to the U.S. regulatory approach, China's ban on ICOs led to the closure of some cryptocurrency exchanges.

Traditional financial services firms are experimenting with blockchain technology on a broad scale. Some observers estimate that 80% of banks expect to launch blockchain pilots by the end of 2018. For example, by using blockchain technology, banks could settle cross-border transactions in seconds, rather than days, with fewer steps and decreased complexity. Multiple banks have developed trade finance pilots using blockchain platforms. For example, HSBC processed a letter of credit with ING Bank for an

international soybean shipment for Cargill using a platform that allows for repeated transactions between the parties.

Such blockchain-based trade finance platforms may include smart contracts that automatically execute according to a set of business rules. For example, seven European banks aim to create a cross-border finance platform to enable international trade by small and medium enterprises (SMEs). 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.

#### 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, open blockchain to manage outside vendors and suppliers with permissions set according to a user's role.

By improving workflow efficiency and visibility, companies likely can better track goods, including inputs, intermediate goods, and finished products. The blockchain may include associated documentation, provenance, and payment information as products move through a complex global supply chain, decreasing the need for paperwork.

#### 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.

With blockchain, participants in the supply chain, from the smallest vendor to the end consumer, can track and verify specific goods. For example, IBM is working with Walmart to track importation of pork from China into the United States using blockchain, and with Maersk to manage and track shipping containers and their cargo globally.

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.

#### 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. Regulatory authorities can review a blockchain 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 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, including the Port of Rotterdam, are testing blockchain for managing cargo flows.

U.S. Department of Homeland Security (DHS) Customs and Border Protection (CBP) is considering several different use cases for applying blockchain, including for international trade documentation processing and as an alternative to paper-based official records. 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 questions of potential interest to Congress, including on trade barriers for cross-border data flows, international standards, and potential regulatory implications. 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.

#### 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. Language included in the proposed Trans-Pacific Partnership, from which the United States withdrew in January 2017, would have prohibited localization requirements, ensured cross-border data flows, and protected source code and encryption technologies. Congress has held hearings on trade barriers to cross-border data flows, but not specifically with respect to blockchain.

#### International Standards

U.S. trade policy, and the WTO, has 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 development processes, global standards cooperation, and encouraging the use of international and interoperable standards. The European Commission has started to analyze blockchain and has set up the European Blockchain Observatory and Forum.

#### 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 blockchain applications. Congress may review existing legislation to identify barriers to implementation of blockchain, such as statutory requirements for paper documentation that could potentially be replaced digitally with blockchain technology.

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