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The authors examine what impact blockchain technology—a decentralized and distributed digital ledger that records transactions across many computers to prevent transactions from being altered retroactively—might have on transfer pricing as well as on customs valuations and indirect taxes.

International

Blockchain, Transfer Pricing, Customs Valuations, and Indirect Taxes: Transforming the Global Tax Environment

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Blockchain is a technology based upon immutable records of transactional data that are written onto distributed ledgers cryptographically secured by various parties in a network. This technology has enormous potential. Its proponents envision a world of peer-to-peer (P2P) transactions where the technology will overcome the lack of trust between unrelated parties and build use-cases around the complete disintermediation in commerce from traditional banks to new economy aggregators such as Uber Technologies Inc. and Airbnb Inc. Among other applications, this technology could revolutionize the current approaches and solutions to numerous tax issues, both domestic and cross-border.

This article examines the possible impact the blockchain will have on some transfer pricing topics, as well as on customs valuations and indirect taxes.

Trust issues in transfer pricing, customs valuations and indirect taxes

The very existence of internal and external tax audit functions highlights a lack of trust all around. Individuals don't trust governments and governments in turn don't trust individuals. Shareholders don't trust corporations and vice versa. Corporations don't trust governments and in turn, governments need to audit corporations. Information asymmetries fuel ostensible or presumed conflicting interests, and are at the core of this lack of trust, which also shapes international relations—countries and nations often don't trust one another.

This lack of trust among corporations, shareholders, governments and countries manifests itself in many ways. Shareholders rely on boards to oversee management and on intricate governance structures to control their firms, including the engagement of external auditors seeking to ensure that financial statements are reliable and fair. Governments regulate the conduct of the firm to protect shareholder and public interests, as the commercial drive toward maximizing profits can encourage undesirable corporate behavior—including tax avoidance that is inconsistent with the law.

Furthermore, transactional costs triggered by the absence of trust constitute key reasons for firms to exist, as Ronald Coase's 1937 article "Nature of the Firm" points out, as undertaking collective activities within a firm reduces, among other things negotiation and transaction costs. That is, transactions between economic agents and units within a firm are based on a higher level of trust than are transactions with third parties. Consequently, it is not surprising that up to a third of world trade is estimated to take place within multinational enterprises. An increased level of trust between actors and entities within a multinational often exists, notwithstanding that intra-group transactions take place across entities in different jurisdictions.

However, each government has its own set of tax rules and regulations; hence, the trust issue vis-à-vis governments in these intra-group transactions does not disappear. This lack of trust between multinational entities and governments is often highlighted by the existence of legal measures to prevent tax avoidance—for example, general anti-avoidance rules (GAARs) or specific anti-avoidance rules (SAARs)—whereby tax administrations are empowered to reassess the tax base of taxpayers located in their jurisdictions. Transfer pricing rules represent the most common kind of SAAR and have increasingly been introduced into countries' laws around the world in recent years. One of the aims of transfer pricing rules is to prevent multinationals from shifting taxable profits out of a country's jurisdiction through intra-group transactions. Therefore, transfer pricing rules are premised upon governments not trusting transactions between related parties.

Most of these rules use the arm's-length principle to require that terms and conditions of related-party transactions are similar to those between unrelated parties. In other words, the arm's-length principle is designed to ensure that terms and conditions of transactions between associated enterprises aren't distorted by the special relationship between them as members of the same related group. Ultimately, the application of this principle by tax administrations should ensure that profits (and their taxation) realized by multinational companies are aligned with value creation.

Similarly, customs authorities seek to eliminate the effects of any potential distortion on the transaction value declared for customs duty by importers. For various reasons, importers of goods may be tempted to vary the actual cost of goods imported or exported. Based on the lack of trust on the value of goods declared for customs purposes, the World Customs Organization (WCO) developed the WTO Valuation Agreement, formally known as the Agreement on Implementation of Article VII of the General Agreement on Tariffs and Trade (GATT) 1994. The agreement aims to provide a single system for valuing imported goods for customs purposes that is not only fair, uniform and neutral but also aligns with the commercial reality of the transaction while outlawing the use of arbitrary or fictitious customs values.

The preferred valuation method for customs purposes is the transaction value method—the price actually paid or payable for the goods at the point of export when sold for export to the country of importation, with some adjustments to take into account the reality of the transaction. To provide more predictability, stability and transparency for trade, the agreement also provides for alternative methods, which must be applied in a hierarchical order where the transaction method doesn't apply.

Tax administrations and customs authorities encounter a number of relevant challenges when applying the arm's-length principle and customs valuation principles: the asymmetry of information between multinational companies and government officials and the lack, or limited availability, of data on transactions between unrelated parties, especially in some regions. Thus, the compliance burden related to the assessment of these principles might increase the above-mentioned mistrust between taxpayers and tax administrations. The significance of these issues is also highlighted by the considerable volume of guidance provided by the Organization for Economic Cooperation and Development, the United Nations, and the World Bank Group on how to implement transfer pricing rules, and by the WCO on how to implement customs valuations.

Furthermore, these issues concern indirect taxes as well. Indeed, in cases involving indirect taxes, the lack of trust is manifest in the prevalence of carousel frauds designed to deprive governments of value-added tax. These frauds typically involve more than one enterprise selling goods or services in a chain of trade—the carousel—for a sum including VAT and not passing the VAT on to the tax authorities—or, alternatively, claiming VAT credits when no VAT was paid. This type of fraud was estimated to cost Europe 50 billion euros ($56 billion) annually. An instance of fraud prevalent in developing countries involves mis-invoicing or using counterfeit invoices to claim excessive VAT refunds. Cross-border transactions are particularly susceptible to this type of fraud. As a result, tax administrations invest heavily in nationwide systems to verify invoices and match VAT returns and reports, as discussed further below.

Blockchain and trust

Blockchain was first thrust into public view as the technology underlying Bitcoin, which addresses the lack of trust in the financial system following the 2007-08 financial crisis. In 2015, the Economist dubbed it the "trust machine," saying it "lets people who have no particular confidence in each other collaborate without having to go through a neutral central authority." How can the trust machine help to overcome the lack of trust between governments and multinationals in transfer pricing and custom valuations? The answer lies in the key features that underlie the blockchain, which include:

- **A distributed ledger.** In a blockchain, no single entity or party controls data or information; all the participants collectively keep the ledger up to date. Similarly, each party to a transaction can individually access the entire database including the complete history of a transaction and also verify the records of its transaction partners without going through an intermediary. Additionally, there is no loss of records in case of a crash as the ledger is distributed among different participants and computers on the network.

- **Immutability.** As soon as a transaction is entered into the blockchain and the accounts are updated, the records cannot be altered because they are linked to every transaction record that came before it. The records are irreversible through the deployment of complex computational algorithms that ensure that records are permanent, chronologically ordered and available to all others on the network. In the event that a party wishes to alter the record, it will have to pass a new entry that will be added to the old block, and this will be evident to all participants. This ensures that the transaction is permanent and unalterable.

- **P2P transmission.** All communication in a blockchain occurs directly between peers instead of through a central node. Each node stores and forwards information to all other nodes.

- **Computational logic.** The digital nature of the ledger means that blockchain transactions can be tied to computational logic and in essence programmed. Hence, users can set up algorithms and rules that automatically trigger transactions between nodes.

- **Transparency.** Every transaction and its associated value are visible to anyone with access to the system. Blockchain might give more transparency to parties who conceptually have a lack of trust in each other.

- **Smart contracts.** These contracts are coded into computer language and are self-executing upon the fulfillment of certain conditions. The potential benefits include low costs associated with contracting, enforcement, and compliance, which may make it more appropriate for low-value transactions. Although the development of smart contracts is still at the nascent stages, it presents opportunities for automating payments.

The transparency provided by blockchain as well as its immutable nature and ability of all participants to access it in real time might, therefore, considerably increase the level of trust between any parties involved as well as remove the need for reconciling each transaction with the various counter-parties.

Potential impact on transfer pricing

Blockchain as a "trust protocol" can help overcome the above-mentioned issues and mistrust between taxpayers and tax administrations and enhance the implementation of transfer pricing rules and application of the arm's-length principle in a number of ways. The approach can apply to documentation, comparable data, service charges, the functional analysis, and other aspects of transfer pricing.

Transfer pricing documentation

Information asymmetry usually exists between multinational companies and tax administrations, often in favor of the companies. This asymmetry can also exist, sometimes inadvertently, between group entities within the same multinational, as well as between tax administrations in different countries. The consequences of information asymmetry within the multinational may be a lack of understanding of the supply or value chain, poor documentation for billing—for recharging as well as for transfer pricing documentation purposes—and the lack of fulfillment of regulatory and compliance requirements.

As more intra-group transactions migrate onto blockchains, the transparency that is an inherent virtue of blockchain as distributed ledgers will lead to a much greater clarity and better understanding of the supply or value chain. This will enhance companies' ability to trace, analyze, articulate, and document the functions, assets, and risks across their supply and value chains. This would greatly facilitate transfer pricing policy setting and more effective documentation. The ability to trace via immutable records in the blockchain can reduce the compliance and audit defense burden as it often relates to the possibility of retrieving and producing documentation. The transparent records of financial flows on these distributed ledgers can also facilitate reconciliation both in accounting and in relation to the underlying intra-group transactional flows, which may be different from the billing and payment financial flows.

The recent development of transfer pricing rules under Action 13 of the OECD's Action Plan on Base Erosion and Profit Shifting (BEPS) has increased transparency by requiring multinational companies to maintain a documentation master file and local files that are much more descriptive of the overall value and supply chains, various types of related-party transactions (such as intangibles, financing, and services) and the attendant transfer pricing policies. This massive increase in the compliance burden for multinationals, however, doesn't immediately lead to increased trust between tax authorities and the companies, nor does it shed further light on the transactional level details that in turn depend on companies' financial and accounting systems and databases. Blockchain technology may play a significant role in bringing resolutions down to the transactional level and enhancing trust by providing contemporaneous records of transactions that are immutable, which would help substantiate what is described in the master file, local files and the country-by-country report of global taxes paid and profits earned.

Availability of comparable data

The lack of comparables has hampered the efforts of many tax administrations, particularly in developing countries, to analyze multinational companies' transfer pricing arrangements. This issue has been analyzed under the work of numerous international organizations—the International Monetary Fund, the OECD, the UN, and the World Bank Group as well as the

European Union. In many instances, comparable data exists, but the comparables aren't public and significant variability in the transaction means that adjustments have to be made to take into account of both transactional and region-specific factors before they can be used in a transfer pricing analysis. Generally, tax administrations in developing countries are resource-constrained and can't afford the commercial databases from which they could obtain comparables.

The increasingly widespread adoption of blockchain will result in more and more transparent, retrievable ledgers of transactional records. The resulting transaction-level data, if made available to both governments and taxpayers, can address the lack of comparables as well as enhance comparability, given the tendency of blockchain transactions to be standardized. This will reduce the need for tax authorities to resort to secret comparables. Further, the use of smart contracts in a distributed manner to impose or enforce standardized contractual terms means more standardization at the micro-levels that will enhance comparability. British singer and composer Imogen Heap proposes using smart contracts to allow artists to bypass studios in releasing their work, control terms under which the work is released, and determine the sharing of revenue, among other things. Smart contracts can be used to impose standardized license or lending terms on the end-user, which must accept the terms in intra-group transactions before it gains rights to, for example, use software.

Authenticating services rendered and costs recharged

In some instances, it is onerous for tax administrations, especially those from developing countries, to verify whether services were rendered and to verify the actual cost recharged. Management and service fees were cited in the OECD's BEPS project as a major source of base erosion for developing countries. The allowable markup or profit margin attributed to these services often isn't the contentious aspect—rather, the controversy stems from the uncertainty about whether services were actually performed and at what cost. Blockchain technology can ensure that transactions between related parties took place, and smart contracts can ensure that the parties' conduct when executing intra-group contracts was fundamentally consistent with those contracts.

Functional analysis

Information asymmetry across the supply or value chain may hamper effective functional analysis across multiple countries. Blockchain technology could be used to track the movement of goods and services as well as use of intangible property worldwide, across the supply or value chain. The availability of trusted transaction-level data can lead to an efficient functional analysis. For example, the technology can track where a software code is written, as well as where it is downloaded and used. This could support the DEMPE analysis (of "development, enhancement, maintenance, protection, and exploitation" of intangibles) by identifying where the value is created, enabling more accurate allocation of intangible-related returns to key people functions. The DEMPE analysis is considered a significant factor in determining both the arm's-length price of a controlled transaction and the determination of the reward due to an entity as a result of the exploitation of an intangible owned by the group. With smart contracts, this allocation can even be automated to follow the transfer pricing policy of company across its entities globally.

Cooperative compliance

One of the attributes of a blockchain is its ability to provide auditors with an immutable audit trail that can establish where a related-party transaction originated, exactly when it occurred, and the terms under which it occurred. This ability to verify underlying transaction-level data can increase the trust between taxpayer and tax administrators, paving the way for more cooperative compliance and reducing the number of disputes.

Dispute resolution

Trusted transaction-level data could lead to better dispute resolution where the dispute arises from factual data. International Business Machines Corp. recently built a blockchain for its global financing unit (IBM Global Financing) and reportedly saved up to 75 percent of the time it used to spend on transaction disputes within its own network of more than 4,000 partners and suppliers. According to IBM, within months of deployment, the dispute-resolution time dropped from 40 days to 10 days on average. At a competent authority level, it is conceivable that more and better data

could aid in negotiations, make dispute resolution more efficient or even avoid disputes altogether. Blockchain technology can also be adopted in the sphere of information exchange in enhancing trust between enterprises and multiple tax administrations across different jurisdictions as sensitive taxpayer information is shared.

With the proliferation of blockchains, it is conceivable that the vastly increased availability of comparable transactions could allow more transaction-based, as opposed to profit-based, methods to be applied. In recent decades, transfer pricing has moved away from traditional methods such as the comparable uncontrolled price method and toward profit-based methods such as profit split and the transactional net margin method (a profit-based method despite its name), which looks at transactions in the aggregate. Moreover, access to transaction-level detail can reduce the need for tax authorities to recharacterize transactions or look beyond the contract to the conduct of parties. In the future, the use of smart, self-executing contracts could ensure that the conduct of the parties is consistent with the contract. These developments could return the transfer pricing analysis to its roots, allowing prices to be set based on actual third-party transactions instead of on aggregated data.

Potential impact on customs valuation (and classification)

As mentioned above, customs authorities seek to eliminate the effects of any potential distortion on the transaction value declared for customs duty purposes that might be generated in related-party transactions. In this context, a blockchain could be applied by customs administrations to help them arrive at the correct value for declaration.

Customs valuation is a regulated procedure applied to determine the dutiable value of imported goods. The WCO prescribes six methods that can be used under different circumstances. The starting point is usually the transaction value method largely based on documentary input from the importer. However, customs administrations have a right to "satisfy themselves as to the truth or accuracy of any statement, document or declaration." Maintaining transactions in a blockchain may obviate the need for a customs administration to satisfy itself about the truth or accuracy of the declaration as there will be a transparent, immutable record of the value across the supply chain. The blockchain could also provide a rich source of transaction-level data for comparison.

Additionally, the Harmonized Commodity Description and Coding System—popularly known as the Harmonized System or simply HS—for classifying imported and exported goods determines the rates of tariffs and serves to collect international trade statistics. Importers and customs administrations often disagree on the HS code and corresponding tariff rate for a given product, which can lead to fact-intensive disputes. Blockchain technology can help in this case. Product specifications and characteristics that drive HS code classification can be reliably identified, leading to higher compliance with import and export rules and tariffs and with regulations pertaining to safety and counterfeit measures. Indeed, some organizations are already employing blockchains to track foods from farm to fork. For instance, Wal-Mart Stores Inc., IBM and Tsinghua University in Beijing are working on a blockchain to follow the movement of pork in China. Australian mining company BHP is already using technology to track mineral analysis done by outside vendors.

In another use case, IBM and AP Moller–Maersk Group are working with a network of shippers, freight forwarders, ocean carriers, ports, and customs authorities to build a new global trade digitization solution. The project will greatly reduce the cost and complexity of trading by using a blockchain to establish transparency among the parties as well as to reduce fraud and errors. The blockchain is intended to provide all the participants, including the customs administration, end-to-end visibility based on their level of permission and enable them to view the progress of the goods through the supply chain as well as the status of customs documents, bills of lading, and other data. More importantly, the solution is intended to give real time visibility to customs administrations, significantly improving the information available for risk analysis and increasing safety, security, and efficiency in border inspection clearance procedures. These blockchains present a rich potential for assisting importers, exporters, and customs administrations in correctly classifying goods within the HS system based on their history within the blockchains.

Governments may also impose local content requirements (LCRs), policies requiring firms to use domestically manufactured goods or domestically supplied services to operate in an economy.

Some trading blocs require LCRs be met before goods can be imported. With an ambitious plan of providing complete transparency over the entire supply chain, London-based company Project Provenance Ltd., a provider of blockchain technology, is testing the technology for tracking the origin of food. Where a customs administration has access to such data, proving that a shipment is compliant with local regulations could be automatically solved. In another use case, Everledger Ltd., another London-based blockchain provider, is working on a ledger system that will help jewelers comply with regulations against blood diamonds (diamonds mined in a war zone and used to finance an insurgency). All these present possibilities for customs administrations to tap into blockchains to overcome common problems posed by lack of trust in counter-parties.

Potential impact on indirect taxes

More and more countries are introducing indirect taxes and with them, cumbersome "bespoke" compliance systems. China's Golden Tax System (GTS) reqiures VAT payers to report the absolute output and input VAT data from their GTS records. The expectation is that numbers recorded in the GTS are factual. Rwanda has taken the traditional digital invoice security model and connected it to a central security portal at the Rwanda Revenue Authority. Rwanda will now be able to securely monitor transactions in something close to real time.

One of the challenges of these systems is that they aren't built with taxpayers' circumstances or systems in mind. On the taxpayer's side, the compliance burden is substantial. A typical indirect tax process flow within a multinational enterprise involves the following elements:

- recording invoices and purchase order information from suppliers, vendors, and related parties, including seeking amended invoices if the information in incorrect (these records can reside in multiple systems across a global entity);

- extracting the relevant information from these systems, often into Excel, in a format that allows sorting and analysis;

- further sorting the information and computing the indirect tax based on individual country rules;

- complying with the reporting formats of each tax administration;

- arranging for the treasury or external banks to make payments; and

- collating each tax administration's confirmation.

Upon audit, reconciling and tracing the various steps above to prove veracity to the auditor becomes a resource-draining challenge at best and is further complicated where cross-border transactions involve reporting and systems requirements that differ country to country. It is well-nigh impossible for multinationals to undertake transactional testing and investigations to detect variances and close any reconciliation gap, as is often recommended by their advisers as a best practice given that VAT filing deadlines can be short and transaction volumes high.

A blockchain solution would involve having the various stakeholders agree on common templates for capturing the invoice and purchase order information on the blockchain and on common terms of acceptance and approval that can be written onto the blockchain in smart contracts and ultimately accessed by the tax administrators. This would require agreement among external and internal vendors, suppliers, partners, and internal parties including accounting, finance, settlements, treasury, and other functions on the one hand and tax administrators, including cross-border and state-level indirect tax administrations, on the other. The end-to-end traceability and ability to sample-test trusted transactional records mean that both internal compliance resources and external audit teams can be reduced and their efforts redirected to other areas or to improving dispute resolution. The transparency afforded by blockchain offers further possibilities for applying big data analytics to detect patterns of systematic error or fraud.

Applying blockchain technology largely within a multinational entity's supply or transactional chain would be a somewhat novel approach, different from the prototypical use case, which

contemplates resolving the trust issues between unrelated parties. The authors submit that this use of a blockchain, while challenging to implement, would be no more difficult than, for example, the nationwide VAT system that is being designed and implemented across India. And a system built on blockchain technology offers a number of advantages over more conventional solutions such as central databases in that it is immutable and there is no central point of failure.

Evolution, not revolution—hybridity most likely way forward

The use cases described above for using blockchain technology in taxation and customs are still at their nascent stage. The technology itself faces some challenges and may not solve everything. Unique identifiers, data privacy, and confidentiality in the context of public blockchains are among the key concerns. Scalability and data transfer and integration with existing systems are further concerns. Moreover, there are practical difficulties that come with the disruption of replacing current intra-group arrangements and information technology systems, which are particularly important for tax and customs administrations. Furthermore, the many current initiatives that are private or public blockchains need a common standard or platform in order to operate effectively. There will be a need for internationally agreed standards. The law will also need to accommodate the digitally defined, dematerialized, automated, and denationalized nature of blockchains and smart contracts. There will be a need for regional collaboration to ensure coordinated regulatory response across jurisdictions.

Nevertheless, the potential of blockchains to transform transfer pricing, customs valuations (and classifications), and indirect taxes is palpable. Because of the limitations described above, the authors believe that hybridity, rather than a blockchain revolution, is the more likely evolutionary outcome as the use of blockchains spreads.

This evolution will be characterized by hybridity in three senses. First, blockchain technology may be deployed alongside, rather than replacing, existing arrangements and systems. Those with experience dealing with accounting systems changes will appreciate that unless one has the luxury of building a new blockchain system from the ground up, as the Gulf Cooperation Council appears to be doing with its VAT introduction, it is extremely difficult to transition from entrenched systems to a blockchain as a complete substitute. In addition, there may be issues of data confidentiality where a multinational is unwilling or unable under the law to disclose or put sensitive information in the blockchain. It is much more feasible to have the blockchain sit above and across pre-existing multiple databases to record the transaction-level information without radically changing existing processes. Hence, many Blockchain solutions in large multinationals likely will complement and co-exist with current systems rather than replace or disintermediate entire functions.

Secondly, for tax and customs purposes or a combination of both, the authors expect to see more permissioned, private blockchains rather than a burst of Bitcoin-type public and open blockchains, as both governments and taxpayers are unwilling, or unable by law, to disclose certain data.

Third, but not least, the history of the internet has proven time and time again that the power of monopolies and regulations and the capabilities and greater resources of large multinationals are not to be scoffed at. Napster's evolution is instructive: The P2P technology of an earlier internet generation evolved and subsequently became co-opted by the industry incumbents it threatened to disintermediate, such as Apple Inc.'s iTunes business. Large multinationals have deeper expertise and the resources to out-compete or absorb new technologies, rendering changes from such technology evolutionary and improvements incremental rather than revolutionary. There will be many successful use cases of P2P models that completely disrupt traditional businesses, but equally, large multinationals have an equal chance of adapting, incubating start-ups, or out-maneuvering their upstart competitors. Ultimately, Coase's rationale for organizing economic activities within the firm rather than in the free market (because production and transactions within a firm can be more efficient due to, among other things, vertical and horizontal integration and savings on transactions costs, such as that incurred in negotiations between independent parties) cannot be fully substituted with blockchain. Therefore, wholesale disintermediation of intercompany transactions by a P2P world, in the authors' opinion, won't happen in the foreseeable future.

Conclusion

Blockchain will have a significant impact on transfer pricing, customs valuations, and indirect taxes in overcoming the above-mentioned mistrust between taxpayers on the one hand and tax administrations and customs authorities on the other. In recording and enabling verification of P2P transactions between related parties, blockchain holds great promise to enhance trust, reduce VAT fraud, and even restore the arm's-length principle to its roots. The optimist may even point to the tantalizing prospect of unifying the three major areas of taxation, which have developed separate principles, systems, and administrations: direct tax, indirect tax and customs. An example of this is where the capture of "nature of service" information on an invoice for VAT purposes can help determine the appropriate withholding rate to apply, whether the transfer pricing markup is correct, and whether the intercompany services need to be included as "value for duty" for customs purposes. More broadly, however, blockchain has its limitations, and, wonderful as its characteristics may be, it has to coexist with the firm and with Ronald Coase. Blockhain will not bring about the utopia of a world of P2P and trusted transactions between third parties, but it certainly has the potential to transform the transfer pricing and customs valuations of today.

For More Information

A list of sources for this article is available at http://src.bna.com/pmq.
The issues described in this article are currently being examined through a multi-stakeholder project by the WU Global Tax Policy Center and the New Economy Taxation. The first meeting in this new series was held in Vienna, Austria, March 15-16. The next meeting will be in Singapore Aug. 15-16, with the global series continuing at the New York University School of Law May 22, 2018. Please contact Maeve Nic Samhradain at maeve.nic.samhradain@wu.ac.at for more details or info@netax.org for registration. Apart from transfer pricing, customs valuation, and indirect taxed perspectives, the series is targeting payroll taxes and registries of land and beneficial ownership as potential areas where distributed open-ledger technology could transform the operation of tax systems.