

Virtual Currencies & Beyond — Initial Considerations

By Dong He, Karl Habermeier, Ross Leckow, Vikram Haksar, Yasmin Almeida, Mikari Kashima, Nadim Kyriakos-Saad, Hiroko Oura, Tahsin Saadi Sedik, Natalia Stetsenko & Conception Verdugo-Yepes

Japan SPOTLIGHT Introduction

Virtual currency was defined in 2014 by the European Banking Authority as a digital representation of value that is neither issued by a central bank or a public authority but is accepted by natural or legal authorities as a means of payment and can be transferred, stored or traded electronically. *Japan SPOTLIGHT* noted it as one of the critical consequences of the digital economy led by the new technologies of network computing that constitute the Fourth Industrial Revolution. We will certainly need to address the issue of new technologies starting to affect the monetary world. This IMF Staff Discussion Note describes comprehensively the benefits and risks brought about by virtual currency and provides an excellent overview of this issue. With the permission of the authors, we are happy to introduce the essence of this paper in a slightly condensed form.

The rapid spread of Internet-based commerce and mobile technology — supported by advances in encryption and network computing — has driven the development of several innovative technologies. Companies such as Uber and Airbnb have developed radical new business models. Secure online payments systems (for example, PayPal) and mobile payments and transfer solutions (for example, M-Pesa) are changing the ways in which payments for goods and services are made.

An important development in this process of transformation has been the emergence of virtual currencies (VCs). VCs, in principle, question the paradigm of state-supported fiat currencies and the dominant role that central banks and conventional financial institutions have played in the operation of the financial system. VCs are issued without the involvement or backing of a state. Some VC schemes make use of “distributed ledger” technologies that provide complete and secure transaction records without using a central registry. These technologies therefore allow for direct peer-to-peer transactions and eliminate the need for central clearing houses. It is therefore not surprising that private sector interest in these new technologies has been growing, and that attention from regulators and policymakers has not been far behind.

This article discusses the potential benefits and risks posed by VCs and how financial regulators could approach them, drawing from the Staff Discussion Note published in January. The Staff Discussion Note was intended as a first step and a platform for further research and analysis, assuming that it is not possible to fully predict the future direction since the VC landscape is still new and rapidly changing.

Potential Benefits of Virtual Currencies

VCs are digital representations of value, issued by private developers and denominated in their own unit of account. VCs can be obtained, stored, accessed, and transacted electronically, and can be used for a variety of purposes, as long as the transacting parties agree to use them. The concept of VCs covers a wider array of “currencies” ranging from simple IOUs of issuers (such as Internet or mobile coupons and airline miles), VCs backed by assets such as gold, and “cryptocurrencies” such as Bitcoin.

While e-money is a digital payment mechanism for (and denominated in) fiat currency, VCs are not denominated in fiat currency and have their own unit of account.

VC schemes comprise two key elements: (i) the digital representation of value or “currency” that can be transferred between parties; and (ii) the underlying payment and settlement mechanisms, including the distributed ledger system.

Computing technology has made possible decentralized settlement systems built on distributed ledgers distributed across individual nodes in the payment system. In a distributed ledger system, multiple copies of the central ledger are maintained across the financial system network by a large number of individual private entities. The network’s distributed ledgers — and hence individual transactions — are validated by using technologies derived from computing and cryptography, most often derived from the so-called blockchain technology. These technologies allow a consensus to be achieved across members of the network regarding the validity of the ledger.

Distributed ledger technologies have the potential to change finance by reducing costs and allowing for wider financial inclusion. In principle, they could be applied independently of a VC to any area

that requires fast, accurate, and secure record keeping (for example, land and credit registries, and payment and settlement infrastructure for transactions in existing currencies, securities, and other assets). In particular, it is possible to design distributed ledgers for transactions denominated in fiat currencies, instead of in VCs (Chart).

Distributed ledger technology could reduce the cost of international transfers, especially remittances. The international transfer of funds is usually intermediated by correspondent banks. Through correspondent banking relationships—agreements between banks to provide payment services to each other — banks can access financial services in different jurisdictions and provide cross-border payment services to their customers. The costs of sending international remittances, however, are notoriously high: as of 2015, the global average cost of sending small remittances (e.g. \$200) is 7.7%, though this has declined from just below 10% in 2008. In contrast, the cost with Bitcoin is estimated to be about 1% (Goldman Sachs, 2014). Recognizing the role of migrant remittances for home country growth and development, the G-20 has committed to reducing the costs of international remittances. Indeed, a blockchain-based remittance system has already emerged in some economies.

Distributed ledgers can also shorten the time required to settle securities transactions. Currently, settlement could take up to three days since trade date (called T+3) for most securities, including stocks, corporate bonds, municipal securities, and mutual funds shares. Many foreign exchange settlements continue to require two days (T+2). Even US Treasury bonds require at least one day (T+1). Major financial institutions have been investing substantially in distributed ledgers. For example, Goldman Sachs applied for a patent on its blockchain-based settlement system (SETLCoin) in late 2015.

Together with other developments in financial technology, distributed ledger modalities could portend important structural shifts in the financial industry. Already, a growing number of blockchain-based financial services are being provided by non-bank startups, and some e-commerce firms are actively exploring the technology. At the same time, large global banks are also investing. Historically, large technological changes have led to significant adjustments in market shares, with new firms often gaining at the expense of established ones. At the very least, the internal structure and staffing of traditional financial intermediaries is likely to place an increasingly heavier weight on technology skills.

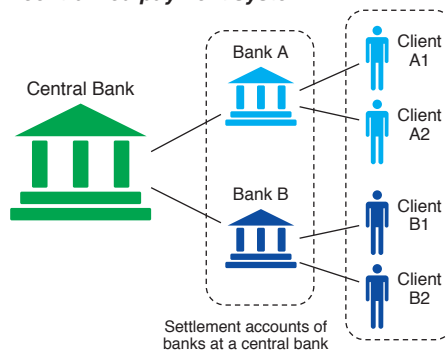
Regulatory & Policy Challenges

The potential for rapid change in the financial industry engendered by VCs is a challenge for financial regulators and

CHART

Distributed ledger system — how does it differ from centralized payment system?

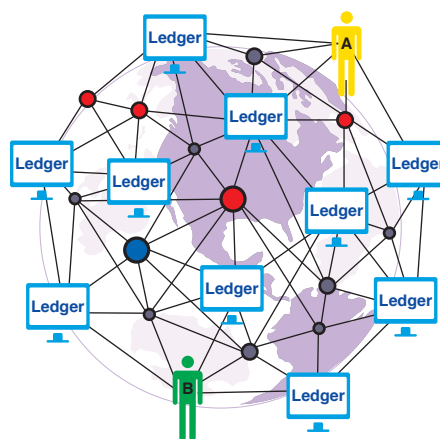
A centralized payment system



Payment from A1 to B1 :

- Money is deducted from A1's account in bank A.
- The central bank moves money from bank A's settlement account to B's.
- The central bank maintains central record (ledger) of interbank transactions, by validating transactions and safeguarding against double-spending and counterfeit.
- Bank B adds money to B1's account.
- Banks A and B maintain the ledger of transactions for their clients A1 and B1 respectively.

An illustrative example of distributed ledger system (Blockchain)



Payment from A to B :

- Copies of transaction records (ledgers) are kept in multiple computers in the network and visible to anyone.
- The transaction is settled by a multitude of individual nodes (miners), providing computing resources to the network.
- Miners solve a cryptographic puzzle as part of validation process. Miners need to show proof of doing this work to the network (called a "proof-of-work" system), which is costly (computing and energy resources).

Source: IMF STAFF DISCUSSION NOTE — Virtual Currencies and Beyond: Initial Considerations

supervisors. VCs are a relatively novel phenomenon and have emerged in the absence of effective regulation. This has contributed to their potential benefits, such as low transaction fees and processing time, but has left unaddressed the risks that VCs pose. VC schemes pose risks to the financial system in a number of different areas. The risks are most serious with respect to cryptocurrencies but are not limited to them. Risks fall into a continuum, with immediate and pressing concerns about financial integrity (anti-money laundering/combatting the financing of terrorism (AML/CFT)), consumer protection, tax evasion, and the regulation of capital movements. Concerns about financial stability, or the implications for monetary policy, are less immediate but will require further analysis and monitoring.

The effective regulation of VCs poses, in some ways, unique challenges:

- 1) VCs combine properties of currencies, commodities, and payments systems, and their classification as one or the other will often have implications for their legal and regulatory treatment — in particular, in determining which national agencies should regulate them. Finding a consistent classification for VCs even within the same jurisdiction has

proven difficult, as different competent authorities may classify them according to their own policy priorities. For example, the US tax authority, the IRS, has classified VCs as “property” for the purpose of federal taxation, whereas the Treasury Department’s FinCEN has classified VCs as “value” for the purpose of AML/CFT obligations. Other jurisdictions have taken a different approach, avoiding a formal classification and focusing instead on the nature or type of transaction being conducted. This disparity of treatment within and among jurisdictions may hamper coordination and may lead to inconsistencies.

- 2) Their opaque nature makes it difficult to gather information, including statistical data, or to monitor their operation.
- 3) Asserting jurisdiction over a particular VC transaction, market participant, or scheme may prove challenging for national regulators in light of the cross-border reach of the technology. National authorities may also find it difficult to enforce laws and regulations in a “virtual” (online) environment.
- 4) Their decentralized nature does not fit easily within traditional regulatory models. Through the use of distributed ledger technologies, cryptocurrencies eliminate the role of a central intermediary, such as an issuer or a payment processor, that would normally be the focal point of regulation. In such circumstances, the question then becomes who to regulate — for example, the individual VC users or other parties within the system.

Different regulatory responses have emerged to address the risks posed by this new technology, while reflecting the policy priorities of each jurisdiction. The challenge for policymakers has often turned on finding a balance between addressing the risks and vulnerabilities posed by VCs while not stifling innovation. The responses have varied greatly among jurisdictions. Some countries have decided to ban the use of VCs. Other countries have addressed some of the immediate risks posed by VCs (financial integrity, tax evasion, consumer protection), in particular, by amending or clarifying the interpretations of existing laws and regulations, or by issuing consumer warnings. A number of jurisdictions have yet to adopt a formal position on VCs.

In determining who to regulate, national authorities have mostly targeted VC market participants and financial institutions that interact with them. While the issuance and transfer of VCs between users are less likely to pass through an intermediary, the interface between VCs and the broader economy — payments for goods and services and exchanges with fiat currency — will often go through a VC exchange or other VC service provider. In addition, in light of the limited size of the VC network, it is generally accepted that VC users will have to “cash out” at some point — that is, convert their VCs into fiat currency. Recognizing these features of the current market, regulators have targeted “gatekeepers”. In practice, this has been done in two ways: (i) by regulating VC market participants that provide an interface with the broader economy (for example, VC exchanges); and /or (ii) by restricting the ability of regulated entities (for example, banks) to interact with VCs and VC market participants.

The effectiveness of emerging regulatory initiatives will depend on how the VC market evolves. While the approach of regulating VC

“gatekeepers” is in line with the current characteristics of the market, a more widespread use of VCs may call for a more comprehensive regulatory response. For example, if the system becomes more operative purely on a peer-to-peer basis, regulating VC “gatekeepers” may not be enough. For this reason, a few regulators have gone further and are regulating a broader range of VC market participants (for example, VC wallet service providers) that operate entirely *within* the system. More broadly, the changing nature of the technology requires that regulation be flexible and can be adapted to evolving circumstances.

Regulatory responses are also being developed at the international level. International efforts have focused on achieving consensus on the potential benefits and risks of VCs and identifying areas for future cooperation. A number of international bodies have both provided a forum to discuss issues related to VCs and contributed to the debate through the issuance of reports, guidance and manuals in their areas of expertise. In particular, the Financial Action Task Force (FATF) — the AML/CFT standard-setter — and the United Nations Office on Drugs and Crime (UNODC) have focused on the prevention and law enforcement response to the money laundering risks posed by VCs. The Committee on Payments and Market Infrastructures (CPMI) has considered the implications of VCs as a means of exchange and of distributed ledger technologies for central banks. Other institutions that have contributed to the debate include the OECD, the European Banking Authority (EBA), and the Commonwealth Secretariat.

More could be done at the international level to facilitate the development of appropriate policy responses. As experience is gained, developing international standards and best practices could be considered to provide guidance on the most appropriate regulatory responses in different fields, thereby promoting harmonization across jurisdictions. Such standards could also set out frameworks for cooperation and coordination across countries over such questions as the sharing of information and the investigation and prosecution of cross-border offenses.

Conclusion — The Way Forward

The Staff Discussion Note on which this article is based has been a first attempt by IMF staff to describe the principal features of VC schemes and their implications for regulation and policy. The discussion set out above supports the following broad conclusions:

- 1) VCs are rapidly evolving and the contours of the future landscape are difficult to predict.
- 2) VCs offer many potential benefits, including rapidly increasing speed and efficiency in making payments and transfers, and deepening financial inclusion. The distributed ledger technology underlying some VC schemes offers benefits that go well beyond VCs themselves.
- 3) At the same time, VCs pose many risks and threats to financial integrity, consumer protection, tax evasion, exchange control enforcement, and effective financial regulation. While risks to the conduct of monetary policy seem unlikely at this stage given VCs’ very small scale, it is possible that risks to financial stability may eventually emerge as new technologies come into

more widespread use.

- 4) The development of effective regulatory responses to the development of VCs is still at an early stage. Regulators in some areas (for example, AML/CFT) have made considerable progress in developing effective responses. However, a great deal of work remains to be done to put in place effective frameworks to regulate VCs in a manner that guards against the risks while not stifling financial and technological innovation.

The following principles could guide national authorities in further developing their regulatory responses:

- 1) **Regulatory responses should be commensurate to the risks without stifling innovation.** In this context, an outright ban may, in some cases, be unduly blunt while a more targeted approach (for example, regulating VC intermediaries) may be preferred.
- 2) **Regulatory responses should adapt to the changes in the VC landscape.** Regulators should remain flexible in their approach so that challenges can be addressed as they arise.
- 3) **Regulators should design approaches that take into account the novel business models inherent in VC schemes.** For example, in the absence of central authority in a cryptocurrency scheme that would normally be the subject of regulation, regulators need to focus on other VC market participants. Some countries are presently focusing on the “gatekeepers” (for example, VC exchanges) that serve as the bridge between a VC scheme and broader economy but this approach may need to be reconsidered if the VC market expands. In particular, other VC market participants that operate entirely *within* the network (for example, VC wallet providers) may eventually need to come under the regulatory framework.
- 4) **Regulation may need to address not only market conduct issues (for example, AML/CFT, fraud) but also the financial soundness of VC intermediaries.** The failure of an intermediary may have implications for the protection of consumers and the stability of the payments system. Accordingly, regulators may need to consider imposing prudential regulatory requirements on VC intermediaries (as New York has already done).
- 5) **Due consideration should be given to the degree of integration between the conventional financial system and the VC market.** Regulators should consider the potential implications of financial institutions (i) having VC intermediaries as clients; (ii) holding VCs as an investment; and (iii) performing the functions of VC intermediaries. In this context, regulators should consider whether to:
 - Prohibit any interaction between the financial institutions and the VC market;
 - Allow a certain degree of integration; or
 - Allow full integration.

More can be done at the international level to help develop an effective international framework for the regulation of VCs:

International bodies have a role to play in strengthening the international community’s understanding of VCs more broadly. Several international bodies have already issued reports on VCs and have served as international fora for discussion (for example, the

Financial Action Task Force (FATF), the Committee on Payments and Market Infrastructures in Basel, the European Commission, the European Central Bank, and the World Bank).

More work is needed at the international level to study the evolution of VCs and their potential effects on the traditional banking and payments system, to understand the risks they pose, and to identify the most effective regulatory responses taking into account country circumstances.

In the longer term and as experience is gained, consideration could be given to developing standards and best practices to provide guidance on the most appropriate regulatory responses to VC schemes in different fields. Some international standard-setting bodies have already initiated this process by providing guidance on the applicability of existing standards to VC schemes: the FATF has issued guidance to member jurisdictions on the manner in which national AML/CFT frameworks should be applied to VC schemes under the FATF standard. Similar initiatives could be explored for other international standard-setting bodies. Beyond clarification, the development of new principles may eventually become necessary. The establishment of international standards that take into account the specific features of VC schemes may promote harmonization in regulation across jurisdictions, and facilitate cooperation and coordination across countries over questions such as the sharing of information and the investigation and prosecution of cross-border offenses.

An important process will need to involve ongoing monitoring and analysis of the manner in which VCs are evolving and the policy challenges that they pose. Many questions require further consideration. In particular, further work will be necessary in the following areas:

- 1) How VC schemes and their underlying distributed ledger technologies will change existing business models in the financial sector, and what types of risk may arise from these developments.
- 2) Whether the application of distributed ledger technologies in the mainstream financial system will evolve in a manner that gives rise to new specific risks that require a regulatory response.
- 3) What potential implications VC schemes may have for the IMF now and in the future.

(“IMF STAFF DISCUSSION NOTE — Virtual Currencies and Beyond: Initial Considerations” *was originally published by the IMF in January 2016, and this article has been edited by the JEF Editorial Department.*)

J S

Dong He is deputy director of the Monetary and Capital Markets Department (MCM), Karl Habermeier is assistant director of MCM, Ross Leckow is deputy general counsel of the Legal Department (LEG), Vikram Haksar is division chief of the Strategy, Policy and Review Department (SPR), Yasmin Almeida is research officer at LEG, Mikari Kashima is senior consulting counsel at LEG, Nadim Kyriakos-Saad is senior counsel at LEG, Hiroko Oura is senior economist at SPR, Tahsin Saadi Sedik is senior economist at MCM, Natalia Stetsenko is counsel at LEG, and Conception Verdugo-Yepes is an economist at LEG.