INTER-BANK CALCULATIONS WITH THE USE OF BLOCKCHAIN

INTRODUCTION
Interest in virtual currencies appeared immediately after the crisis of 2008, and until now they have attracted close attention (see, for instance: [Trachuk A.V., Kornilov G.V., 2012; Savinsky S.P., 2017; Sazhina M.A., Kostin S.V., 2018]). State authorities, central banks and researchers around the world are carefully studying the implications of the use of digital currencies for the economy, the financial system and regulators.

PROSPECTS OF CENTRALIZED INTER-BANK CALCULATIONS WITH THE USE OF BLOCKCHAIN

Central banks are interested in issues related to the possible regulation of decentralized crypto-currencies, such as bitcoin, the prospects for issuing their own digital currencies. The purpose of this article is to consider the essence of the cryptocurrency and to assess the appropriateness for central banks to use this tool.

CRYPTO-CURRENCIES: THEIR TYPES, PECULARITIES AND LEGAL REGULATION
A crypto-currency is a special kind for exchange, for the existence of legal system, as a rule, does not provide for the issue of a private currency and its wide (including cross-border) turnover. Therefore, the search for optimal ways of regulating decentralized currencies, issued by private individuals, continues. There are three points of view:
• total ban (Viennet, Ecuador);
• free circulation of cryptocurrency of any private issuer on an equal basis with the national currency (Japan, Switzerland) [Legal status of bitcoin, 2017];
• issuance by the national central bank of its own virtual currency and a ban on circulation of other countries' crypto currencies.

The main risk of circulation of private virtual currencies is the restriction of the monopoly of central banks on the issue of money [Logachev E.A., Kuznetsov V.A., 2016], which means a decrease in the manageability of macroeconomics. In our opinion, this risk seems to be insignificant: the turnover of private virtual currencies is larger, and they are used mainly for financial speculation and do not replace the state currency in calculations.

The growth of interest in digital currencies since the beginning of 2010 is due to the emergence of decentralized crypto-currencies. The most famous is bitcoin, it has more than 200 analogues, among them are litecoin, etherum, peercoin, etc. A distinctive feature of decentralized crypto-currencies is their decentralized emission and decentralized confirmation of operations with the help of a blockchain, which is a distributed registry technology. Decentralized emission of virtual currency implies that users themselves generate “coins”. The rate of emission fixed in advance, which differs from the traditional approach to the issue of money. There is no central issuer that could suspend or, conversely, increase emissions. The users themselves also check sufficient of the sender’s funds (confirmation of transactions), fix the transaction and put it into their copy of the register of all transactions performed in the network. Thus, a high degree of trust is achieved: operations are confirmed collectively, therefore, unlike in traditional centralized systems, an intruder cannot receive the system by gaining control over the central counterparty. The reliability of the decentralized scheme is that there is no vulnerability, like in card systems, where an accident at the processing center actually stops all cards operations. For obvious reasons, financiers are trying to transfer these benefits of distributed registries to the regulated financial sector. In particular, commercial financial institutions are testing technology to record transactions at the securities market [Five ways, 2017]. The central banks also show interest in it, trying to understand whether it can optimize their functions of issuers and payment system operators somehow.

As a rule, the current model of internal and cross-border settlement systems is rather cumbersome and expensive. Banks that do not trust each other are forced to use services of a central counterparty, and in cross-border settlements, a whole chain of correspondent accounts. This makes transfers long and relatively expensive. It is assumed that distributed registry technology will be able to eliminate these drawbacks [New paper examines 2017].

The central bank becomes the operator of a “closed” blockchain. According to the contract, banks get access to the blockchain (for comparison: anyone who wants to join the system providing the turnover of bitcoin can do that). Each participant gets access not to the full copy of the registry, but only to the data that he needs in correspondence with banks. For example, participants have access only to information on balances on correspondent accounts of counterparties and their own history of operations. The central bank has access to the full version of the registry, necessary to make it to the operations register if, for example, an error or illegal transaction occurred. In transactions with private virtual currencies, no participant can make such changes, i.e. operations are irreversible.

A distributed register is essentially an alternative to a system of correspondent accounts. Like an electronic account, information on the account balance will be kept not by the central bank, but by each participant in the system. Unlike classical correspondent accounts, not fiat currency is taken into account, but special virtual money issued for this purpose. To organize such an accounting, central banks could issue their own virtual currencies, exchange them at the request of banks for ordinary money, at the rate one to one, at a constant exchange rate, take and bear the obligation of reverse exchange. These digital units can only be used in a distributed network and will not be available for individuals. Such a mechanism will allow banks to quickly exchange virtual units and, if necessary, turn them into fiat money [ThieleC.-L., 2017] (see the Figure below).

KEY WORDS
central bank, virtual currency, cryptocurrency, blockchain, distributed register, banks, interbank settlements, cross-border settlements

INTER-BANK SETTLEMENTS USING THE DISTRIBUTED REGISTRY
1 - banks - participants of the “closed” blockchain purchase virtual currency of the central bank - the issuer of the currency; 2 - banks
use the virtual currency of the central bank to seamlessly perform the necessary operations within the distributed network; 3 - if necessary, commercial banks can also freely sell virtual currency back to the central issuing bank.

ABSTRACT
В последнее время чрезвычайно актуальной стала тема цифровых денег: центральные банки разных стран стали задумываться о выпуске собственных виртуальных валют. Центральные банки могут выпускать собственную виртуальную валюту с целью облегчить и удешевить межбанковские трансграничные расчеты. Это возможно при условии, что централизованные и коммерческие банки будут признавать и принимать данную валюту, выпущенную другими центральными банками. В блокчейне хранится вся информация о цифровой валюте, а не о физических деньгах. В результате анализа выявлены риски, с которыми могут столкнуться центральные банки, выступающие в виртуальной валюте: необходимость конвертации и обеспечение устойчивого курса валюты. В ходе анализа рассмотрены существующие технологии распределенного реестра, чтобы уменьшить существующие риски, путем применения имеющихся технологий для центральных банков, возможные риски, предложены пути их предотвращения. Сформулированы технологические, правовые и другие аспекты, способствующие выпуску центральными банками цифровой валюты. Целесообразность выпуска виртуальной валюты центральными банками цифровой валюты. Целесообразность выпуска виртуальной валюты центральными банками цифровой валюты. Целесообразность выпуска виртуальной валюты центральными банками цифровой валюты. Целесообразность выпуска виртуальной валюты центральными банками цифровой валюты.
USE OF CENTRALIZED VIRTUAL CURRENCIES IN INTERBANK SETTLEMENTS

The issuance of a virtual currency by the central bank is fraught with risks. The central bank becomes the emitter of electronic money, therefore participants of the system should be sure that they can exchange digital money for a currency at a fixed rate, if necessary, and transactions recorded as decentralized, will have legal force. The central bank will need to ensure the confidence of the new system on the part of banks. As an issuer, he will have to develop an order of replenishment and return of money – still a long way to go. If banks will reduce their need for guarantee deposits, will allow for calculations in a mode close to the real one [Fantanatti D., Nigmatullin E.M., Sukhanovskaya V.N. and others, 2017].

Implementation of settlements using distributed registers also face the need to convert and ensure a stable exchange rate for this currency. Central banks need to commit themselves to providing a fixed rate of virtual currency to fiat money 1:1. In the blockchain, only information on the digital currency, not on fiat money, would be stored.

CONCLUSIONS

Central banks issue their own virtual currency only in order to facilitate and reduce the cost of interbank cross-border settlements. For this, commercial and central banks of countries must recognize this currency. By issuing a virtual currency, central banks may face the need to convert and ensure a stable exchange rate for this currency. Central banks need to commit themselves to providing a fixed rate of virtual currency to fiat money 1:1. In the blockchain, only information on the digital currency, not on fiat money, would be stored.

REFERENCES


15. Five ways banks are using blockchain (2017)/FT.com. URL: https://www.ft.com/content/615b3bd8-97a9-11e7-ab6d-cde3882dd7b.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Private virtual currency</th>
<th>Central bank issue</th>
<th>Money (cash / non-cash)</th>
<th>Virtual currency</th>
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<tbody>
<tr>
<td>Legal circulation</td>
<td>Depends on the country (in most countries of the world - no)</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Use as a Settlement Currency</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Amount</td>
<td>Depends on the system (for example in bitcoins is limited)</td>
<td>Limited</td>
<td>Limited</td>
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<tr>
<td>Stability of exchange rate</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Settlement rules</td>
<td>24/7</td>
<td>Depends on the global payment system</td>
<td>24/7</td>
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