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Cryptocurrency holdings concentration in Russia offsets risks for the national financial system

Cryptocurrency market and financial stability in Russia

- **Cryptocurrencies perform none of the money functions in full scope yet.** Volatility in crypto markets is high and comparable to price movements in the food commodities (the most volatile of all markets), which disqualifies cryptocurrencies as a means of payment.
- **According to ACRA estimates, market capitalization of cryptocurrencies and cryptocurrency holdings in Russia amounted to USD 7.5–14 bln, or 1–2% of M2 money supply, in 1Q2018.** In addition, the entire volume is held by the small number of owners, which offsets the risks for the Russian financial system. If cryptocurrencies were as popular among Russian residents as foreign currencies, the volatility demonstrated by cryptocurrencies would affect the Russian economy's stability.
- **The interest rate on internal borrowings may periodically increase by 1 ppt on the typical volatility of cryptocurrencies,** in case the amount of cryptocurrencies in the debt of residents (corporates and sole entrepreneurs) becomes as high as RUB 4 tln.
- **If cryptocurrencies become widespread, CBR's cryptocurrency policy may be similar to foreign currency regulations.** In case cryptocurrency transactions are transparent and may be traced back, the CBR will treat them as a foreign currency cash equivalent, otherwise, as an equivalent of cashless foreign currencies.
- **Growing cryptocurrency holdings have not pushed down transaction costs yet.** Energy inefficiency, absence of economies of scale in cybersecurity (the total costs borne by e-wallet holders may be higher than bank costs), slow transacting — all these factors impair the potential benefit from the lesser number of intermediary banks in settlements.

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Crypto currency is a digital financial asset, i.e. property in electronic form created using encryption means (a unit of cryptocurrency is coin). A record of ownership of an asset, as a rule, is stored in a distributed ledger (blockchain). The distributed storage and the connectivity of ledger entries are intended to increase the cost of possible malicious rewriting of the ledger to economically unprofitable levels.

ICO (Initial Coin Offering) is a way to raise funds (cryptocurrency or traditional) by a company in exchange for a digital entry (token) confirming the right of a purchaser to receive some goods, services, cash flow in the future, and/or the right to participate in the decision-making process in the company. Tokens can be transferable or not, similar to traditional securities. The boundary between the concepts of "coin" and "token" is not always obvious, but tokens are generally less liquid.

Cryptocurrencies perform none of the functions of money in full scope yet

The average monthly trading volume in all cryptocurrencies is USD 0.5 trillion, or 31% of the global commodity trading volume (as at January 2018). Already today, cryptocurrencies could service trade in specific commodities; however, in view of their high price and purchasing power volatility (annual volatility index of bitcoin¹ is 92% and that of ethereum, the second popular crypto after bitcoin, is 121%), cryptos cannot fully perform such functions of money as a unit of account and a medium of circulation.

Exchange-traded soft commodities exhibit volatility comparable to that of cryptocurrencies. According to Food and Agriculture Organization of the United Nations data, the annualized volatility of USD prices in 2017 was 202% for dairy products, 227% for sugar, and around 170% for meat (for reference, the USD price volatility for crude oil equaled 28% in 2017).²

Today, cryptocurrencies perform none of the functions of convertible currencies in full. For implementation of this feature, a cryptocurrency must be capable of preserving its value over time, or be backed by a real asset that can be monetized in future without loss of value (tokens in some ICOs (initial coin offerings) are pegged to actual commodities or services generating value), or provide a guarantee for its demand and value in future (for instance, be recognized by governments as a means of payment for taxation purposes).³

Comparing cryptocurrencies to fiat and commodity money (with intrinsic value) one can discover that the principle difference of cryptocurrencies is that its current market value mainly rests upon expectations of investors' willingness to sell it in future at higher prices. In view of the uncertain formal status and lack of any government guarantee (as to its stability as well as use as a means of payment), acting as a store of value is largely dependent on current investors' expectations. The estimated velocity⁴ of bitcoin is currently low but comparable with the velocity of money in the leading global economies, regardless that cryptocurrencies are mainly used as investment assets rather than as a means of payment. The weight of cryptocurrencies in the global payment system and in the global trade turnover is negligible.

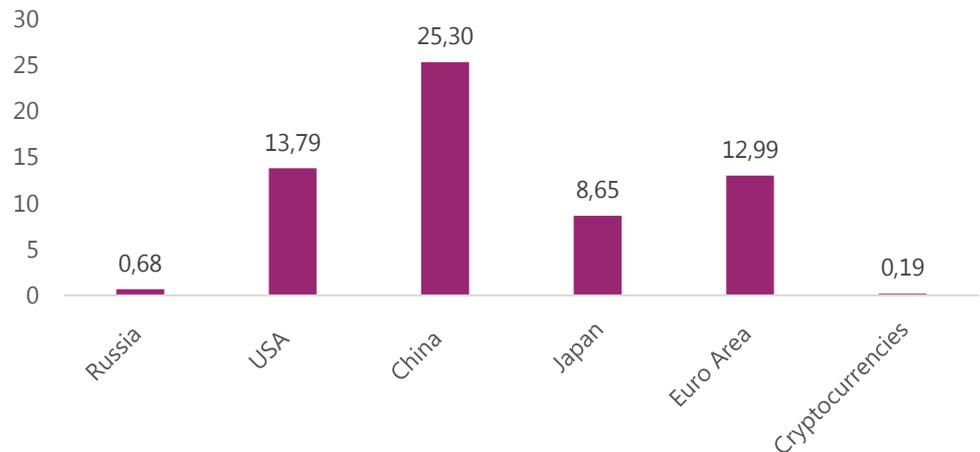
¹ Realized volatility is estimated as the standard deviation of yield on the yearly interval.

² High volatility of dollar prices for food is caused by low elasticity of demand/supply in different types of goods, high dependence of prices on weather conditions and lower liquidity of such markets as compared to oil market.

³ Examples: Arizona has drawn a bill allowing for paying taxes in cryptocurrencies. In Japan, cryptocurrencies are officially recognized as legal tender.

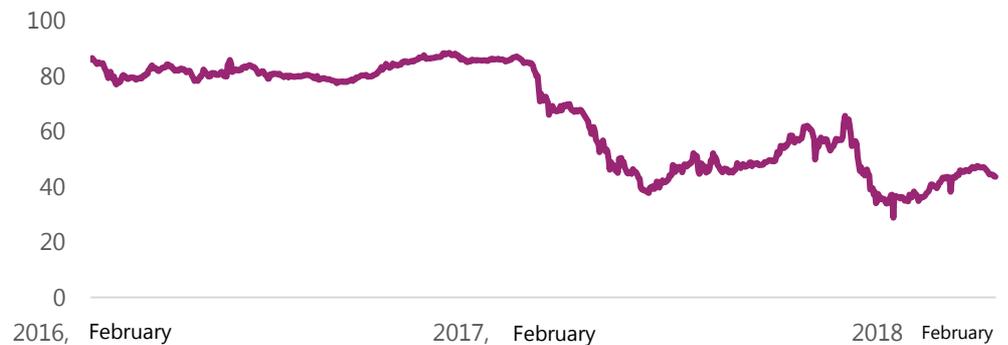
⁴ A comparable estimate may be found at <http://charts.woobull.com/bitcoin-velocity/>.

Figure 1. M2 money supply in select countries and cryptocurrency market cap as at November 1, 2017 (USD trillion)



Source: <https://coin.dance/stats/marketcap/historical>, IMF website

Figure 2. Bitcoin share in total cryptocurrency market cap (%)



Source: based on <https://coin.dance/stats/marketcap/historical>

Share of cryptocurrencies in the Russian market is 1–2% of money supply

The share of cryptocurrencies in the global financial system is still insufficient for them to perform a universal money function. The total cryptocurrencies capitalization to M2 money supply ratio is 0.5% (17% for USD money supply). It is quite difficult to estimate the share of cryptocurrencies by country. Any detailed estimates are limited due to market non-transparency, user anonymity, cross-border cryptocurrency payments.

Below we list a few factors affecting the amount of cryptocurrencies held by residents in different countries:

- Scope of illegal economic activities in the country (for instance, according to the Bank of Russia⁵, cryptocurrencies are widely used by Chinese businessmen active in the Russian consumer goods markets to transfer money to China and to avoid taxes);
- Capital mobility, financial market maturity, central bank's policies, domestic currency stability, inflation, and costs of savings in foreign currencies;

⁵ https://www.kommersant.ru/doc/3600899?from=four_finance.

- Intellectual capital of the country, including the standard of living and education level of the population, financial literacy, and propensity to risky market behavior;
- Level of economy's technological advancement and the degree of venture investments development (willingness to innovate in a particular country promotes the use of cryptocurrencies as a new technology);
- Strictness of state regulation in the banking sector.

According to ACRA estimates, the market value of cryptocurrencies attributable to the Russian economy⁶ is in the range of USD 7.5–14 bln (1-2% of the country's M2 money supply) based on the Russia's share in the global economy, the exchange trading profile, the global money supply, and the above-mentioned factors.

The below factors can drive up the share of cryptocurrencies in the Russian economy:

- Growth of the global market capitalization of cryptocurrencies;
- Recognition of cryptocurrencies by the regulator as a unit of account in Russia or in other countries;
- Regulatory environment liberalization with respect to ICOs and cryptocurrency settlements.

Factor that can curb the growth of cryptocurrencies' share in Russia and globally:

- Technology specifics of the crypto-market;⁷
- Limited competition against the traditional currencies due to lack of backing as well as existing strict regulations;
- Increased vulnerability of holders of crypto to hacking; high protection costs.

Cryptocurrency volatility has no effect on interest rates in Russia

The particular feature of cryptocurrencies that creates risks for the Russian financial system is their high volatility against traditional currencies. The volatility can have an effect on the economy through debt revaluation and the wealth effect (the Pigou effect). However, for this effect to be significant, the share of cryptocurrencies in liabilities and assets of Russian residents should be high.

The impact of the cryptocurrency exchange rate volatility on interest rates may be similar to that caused by sharp changes in the exchange rate of Russian ruble. Ruble depreciation leads to revaluation of debts denominated in foreign currencies, which pushes up debt repayments not secured by cash flows. Additional demand for borrowed funds, growing inflation expectations and counterparty risk drive the equilibrium rates on the debt market. Similar mechanics applies in case of cryptocurrency revaluation. In addition, if some imported goods or services with cryptocurrency costs are paid in a cryptocurrency, revaluation will also affect inflation expectations, which, in turn, are also included into nominal interest rates.

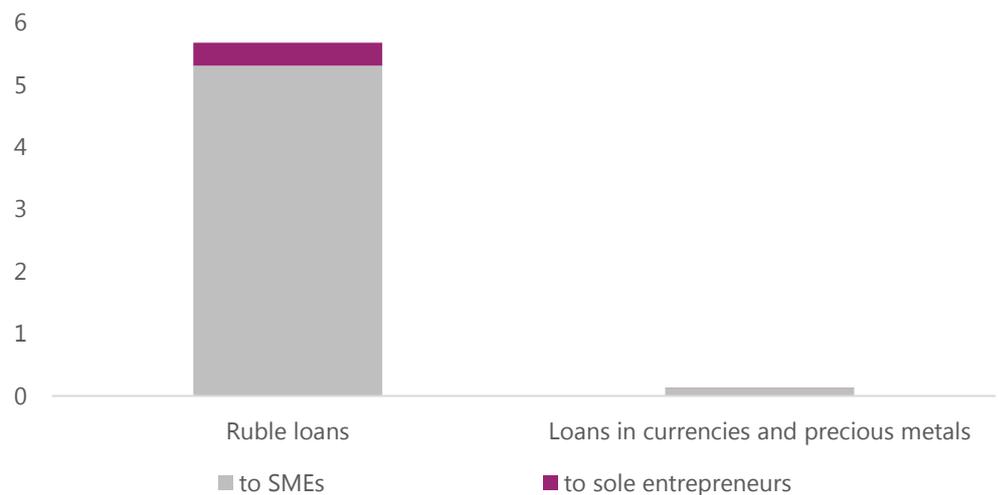
⁶ The volume of cryptocurrencies owned by Russian residents.

⁷ 80% of bitcoins have been mined already; the distributed nature of blockchain technology requires high power consumption to record a new transaction, and each new record requires long computations, which limits the speed of payments.

According to ACRA estimates, for the average rate on the internal debt to go up by 1%, the revaluation should increase the temporary unsecured debt of corporate residents and sole proprietors by minimum of 10% of non-ruble denominated debt. For this to take place under the current volatility of cryptocurrencies, the initial volume of cryptocurrency (prior to the revaluation shock caused by a sharp deviation in the exchange rate) in the debts of corporate residents and sole proprietors should be as high as RUB 4 trln. In other words, the share of cryptocurrency in the total debt of corporates should be at least 6%. In 2017, the total amount of funds raised through ICOs (not always in cryptocurrencies) worldwide was close to USD 6 bln, which is 10 times lower than the level sensitive for Russia.

In the future, cryptocurrency denominated debts (raised though ICOs) may become attractive to small and medium businesses, because of less strict terms and conditions of such loans (as compared to bank loans). According to the most optimistic estimates, the segment's potential may amount to 10% of the GDP (the volume of bank loans issued to SMEs was RUB 5.4 tln or 6% of the GDP as of December 01, 2017).

Figure 3. Bank loans issued to SMEs, RUB trln



Source: CBR, as of December 01, 2017

Possible drivers to raise debts in cryptocurrencies (though ICOs):

- Lower interest rates (as compared to bank loans of similar risk) due to a lower interest margin of intermediaries;
- Softer requirements to borrowers due to a lack of regulation of lenders;
- Unsatisfied demand for high-yield risky investments (as venture funds may be unavailable or less liquid, especially in countries with a weak venture market);
- Availability of lending to a wide range of households (c2c, crowdfunding) in case of a more uniform distribution of cryptocurrency in the structure of household savings.

Cryptocurrency holdings concentration offsets risks for the economy

Cryptocurrency rate volatility may result in financial stability risks through negative shocks (caused by revaluations) affecting the total expenses and GDP (provided that the share of cryptocurrencies in household savings is substantial).

The variation in the total amount of liquid household savings (denominated in all types of currencies) caused by the cryptocurrency revaluation shock should be equal to 6% to induce the consumption drop of 1%. In current prices, such variation may amount to RUB 1.5 trln. The volume of cryptocurrency in the household savings able to cause such variation amid typical exchange rate volatility (92% for bitcoin) should be around RUB 1.5 trln (6% of the total amount of liquid savings).

The above figure is 1.8 times higher than the volume of cryptocurrency (upper boundary of the estimated range) circulating in Russia. Such volume of cryptocurrency savings distributed uniformly among households would pose a threat for the financial stability of the Russian Federation. But, as cryptocurrency assets are distributed unevenly, the exchange rate volatility shocks do not affect consumer expenses. The wealth effect is much lower for households having cryptocurrency savings, because, in general, such households have comparably high wealth, and their propensity to consume is much lower than average.

In the short term, the distribution of cryptocurrency among Russian households is unlikely to become uniform, which is caused by a strict regulation posture of the Central Bank, high investment risks, small number of companies ready to accept cryptocurrency payments, high concentration of companies in specific industries, and high risk of loss.

The following factors may drive cryptocurrency investments and increase the uniformity of cryptocurrency distribution in Russia:

- Lower yields on the common forms of savings (bank deposits, foreign currency savings) and higher wealth driving the propensity to save;
- Stricter sanctions amid growing world political and economic tension, higher risk or costs of dollar settlements;
- Wider use of Internet (according to VCIOM⁸ and Yandex⁹ estimates, in early 2017, the Russian Internet audience was 75–78% of the population), higher level of economic and technical education;
- Increasing number of ICOs in Russia or by Russian residents (in 2017, Russian based companies raised USD 310 mln in ICOs, 2nd–3rd place in the world by volume);¹⁰
- Propensity of progressive young people to invest some of their savings into digital assets.

⁸ <https://www.kommersant.ru/doc/3266511>.

⁹ https://yandex.ru/company/researches/2016/ya_internet_regions_2016.

¹⁰ <http://www.ey.com/ru/ru/newsroom/news-releases/ey-news-ico-survey-2017>.

CBR's cryptocurrency policy may be similar to foreign currency regulations

The CBR's monetary policy will depend on the transparency of private cryptocurrency transactions. In case the CBR is unable to monitor such transactions and, consequently, they are not reflected in balance sheets and statistical reports, then cryptocurrencies may be regulated similarly to foreign currency cash.

Therefore, in case cryptocurrencies become widely used, it would be difficult for the CBR to keep the purchase capacity of ruble due to the lack of correct data about money supply and money velocity. The regulator may engage inflation targeting tools similar to those used today, namely, short-term ruble interest rates, banking regulation, open market operations, interventions, however, such tools may turn out to be less effective. The potential ineffectiveness of the traditional monetary policy induces cautious and rather negative attitude of the CBR to cryptocurrencies.

Possible economic factors diverting from settlements and savings in cryptocurrencies, similar to foreign currencies, may be higher ruble deposit rates and lower ruble transaction costs.

In case the CBR elects a less strict cryptocurrency regulation regime and allows banks and companies to reflect cryptocurrency transactions in their balance sheets, ruble and ruble instruments will be used as an alternative to foreign and crypto currencies, including for savings and lending purposes. In such case, the CBR's attitude to cryptocurrency may be similar to that in respect of cashless foreign currencies. The regulator may use such tools as open market operations, ruble and foreign and crypto currency deposits, and loan interest rates, as well as standards and ratios applicable to financial market participants.

Today, the regulation regime is not formalized in Russia. In the draft laws "On Digital Financial Assets" and "On Alternative Methods of Attracting Investments (Crowdfunding)", crypto currency is defined as a financial asset, the proceeds of which are subject to personal income tax or profit tax. According to the drafts, coins and tokens may be exchanged for traditional money by the companies eligible under the laws "On the Securities Market" or "On Organized Trading". Any ICO will require relevant reports to be submitted to repository, which, in case of a court trial, will issue printed versions of such reports. In addition, the CBR will set a limit on funds that can be invested by a nonqualified investor into tokens in a single ICO (the proposed limit is RUB 50,000).

But for the current technology level, cryptocurrency settlements would cut transaction costs in the economy

Cryptocurrency settlements would push down the transaction costs by eliminating intermediaries (e.g. banks in cashless settlements). However, regardless the significant potential of the block chain technology, the economic feasibility of its cryptocurrency application is questionable in view of technology specifics:

1. **Energy inefficiency.** The distributed ledger technology ensures sound data security, but computing and storage costs are much higher than similar bank account costs. For comparison: according to our estimates, the annual electric power costs of the entire world banking sector is 100 billion kW*h, while the similar cryptocurrency mining costs may approach 140 billion kW*h¹¹ in 2018. Visa payment system that processes 500 times more transactions consumes 25 times less electric power.
 - a key data protection feature of the technology is high costs of introducing changes in the ledger, as the ledger change cost is higher than the potential gain from a fraudulent change. The situation may be improved by making blockchain computing publicly beneficial.
 - Another option is to exclude duplicate computing (migration from proof-of-work to proof-of-stake or other model). However, this may impair data security to some extent.
2. **No economies of scale in asset protection.** When making cryptocurrency payments, a user operates with long e-wallet numbers, which may be vulnerable to computer viruses. Phishing may result in a loss of control over an e-wallet. In order to protect their data, users are forced to spend more on anti-virus software or special data storage devices. Moreover, no reverse transaction is possible in case of an error or fraud. Data protection requires each user to bear own costs, and in view of the absence of economies of scale, the aggregate costs of e-wallet holders may be higher than the bank costs. The world cybersecurity costs amount to about USD 100 billion¹² (USD 30 per a bank user annually). To be competitive, personal cybersecurity should be less expensive and no less secure than that of banks.
3. **Low payment processing capacity.** Each new record in a blockchain requires prolonged computations, which limits the throughput of payment system.

¹¹ According to <http://fortune.com/2018/01/10/bitcoin-miners-electricity-argentina/>

¹² According to <https://www.gartner.com/newsroom/id/3784965>.

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