



The SEACEN Centre

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Cryptocurrencies: Implications for Monetary Policy

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Outline

- Some definitions upfront
- A central bank-issued cryptocurrency for PNG
- Monetary policy under different scenarios:
 - Scenario 1: the status quo;
 - Scenario 2: BitKina rules supreme
 - Scenario 3: the middle ground
- Other benefits
- Conclusions

Some definitions upfront (1)

- There are some important differences between digital, virtual and cryptocurrencies:
 - a **digital** currency is any currency stored and transferred electronically (e.g., PayPal);
 - a **virtual** currency is a digital representation of value, not issued by a central bank, credit institution or e-money institution, which in some circumstances can be used as an alternative to money; and
 - a **cryptocurrency** is a digital and virtual currency protected by cryptography
- Cryptocurrencies are both money and technology at the same time

Some definitions upfront (2)

- In discussing cryptocurrencies and monetary policy, we need to differentiate between:
 - **privately-issued cryptocurrencies**; and
 - a state- or **central bank-issued cryptocurrency** (legal tender)
- Note that these cryptocurrencies can co-exist, meaning that privately-issued cryptocurrencies can circulate concurrently with legal tender in the form of a central bank-issued cryptocurrency
- In other words, a central bank-issued cryptocurrency will most likely have to compete with private-sector alternatives

A central-bank issued cryptocurrency for PNG (1)

- Let us assume that the Bank of Papua New Guinea introduces its own cryptocurrency called the BitKina, which co-exists with the traditional Kina in physical notes and coins form
- BitKina would be an universally acceptable, electronic and interest-bearing central bank liability, implemented *via* distributed ledgers that may – for the time being – compete with bank deposits as a medium of exchange

A central-bank issued cryptocurrency for PNG (2)

- Creating BitKina ‘simply’ means offering digital account services to a wider group of entities
- There are several ways of introducing BitKina ([Positive Money \(2016\)](#)):
 - **direct** access via accounts at the central bank; or
 - **indirect** access via an intermediate system (of digital cash accounts) controlled by the central bank

Monetary policy under different scenarios

- We can now try to imagine the possible shape of monetary policy under different scenarios:
 - **Scenario 1:** a world of fiat money with several privately-issued cryptocurrencies (i.e. the world right now);
 - **Scenario 2:** a world where cash has been officially abolished, a central bank-issued cryptocurrency is sole legal tender and all privately-issued cryptocurrencies have withered away because of competition with BitKina; and
 - **Scenario 3:** an intermediate scenario of cash, privately-issued cryptocurrencies and BitKina

Scenario 1: the *status quo* (1)

- Both the extent and the distribution of usage of privately-issued cryptocurrencies are of relevance in evaluating any risk to – and effect on – monetary policy
- If a relatively small share of payments were to be made *via* a cryptocurrency such that many people conducted some transactions in that currency, but made the bulk of their purchases via traditional, national currency-based payment systems, then the central bank would retain its ability to influence the level of aggregate demand across all segments of the economy and thus achieve its monetary stability objective

Scenario 1: the *status quo* (2)

- The more the domestic economy becomes ‘Bitcoinised’ – where everybody sought to conduct the totality of their day-to-day transactions entirely with the privately-issued cryptocurrency and switch into the national currency only when strictly necessary – the more the central bank’s ability to influence price-setting and real activity would be impaired

Scenario 2: BitKina rules supreme (1)

- At one extreme, we can imagine a world where the Bank of PNG has completely replaced physical currency by BitKina (either in one go or over a transition period), which is both legal tender and a technology protocol
- (The advantages of a state-backed BitKina have led privately-issued cryptocurrencies to disappear)
- In Scenario 2, the central bank needs the ability to conduct monetary policy, so it would need a protocol whereby it could easily adjust the money supply at will

Scenario 2: BitKina rules supreme (2)

- If the Bank of PNG employs a distributed ledger technology (DLT), BitKina can only be created by ‘solving’ a block in the blockchain or DLT (i.e., processing transactions)
- While it may not be necessary to use DLT for a central bank-issued cryptocurrency, it might still be desirable to do so ([Scorer \(2017\)](#))
- Remember that cryptocurrency miners, who verify the legitimacy of transactions and record them in the blockchain, get rewarded by receiving new units of cryptocurrencies

Scenario 2: BitKina rules supreme (3)

- In the Bitcoin protocol, the block reward is arbitrary and can change to anything that the network agrees upon going forward
- Monetary policy in a world of a BitKina is relatively straightforward...
- ...as long as the Bank of PNG can set and adjust the block mining reward in its own blockchain at its discretion
- In this world, the central bank can conduct monetary policy by changing the block reward, which in turn changes the future supply of base money

Scenario 2: BitKina rules supreme (4)

- In particular:
 - **increasing** the block reward corresponds to **loosening** monetary policy – this is akin to decreasing transaction costs for every single transaction; and
 - **decreasing** the block reward corresponds to **tightening** monetary policy – this is akin to increasing transaction costs for every single transaction
- Just like paper currency, the central bank's cryptocurrency would be both decentralised (in transaction) and centralised (in supply)
- (One issue I note in passing is whether – and how – we allow non-residents to hold BitKina)

Scenario 3: the middle ground (1)

- Let us – to highlight some of the issues under Scenario 3 – imagine that there are two cryptocurrencies operating in the country:
 - a privately-issued cryptocurrency called Bitcoin; and
 - the central bank-issued cryptocurrency called BitKina
- More privately-issued cryptocurrencies would not change the picture materially (we then simply consider the sum total of all the privately-issued cryptocurrencies)

Scenario 3: the middle ground (2)

- In addition to the BitKina, which is assumed to be legal tender, there is also the remaining Kina in physical form (i.e., cash)
- In other words, depending on the extent of substitution between BitKina and physical Kina, the majority of transaction balances may still be held as deposits with commercial banks (...rather than in BitKina with the central bank)

Scenario 3: the middle ground (3)

- From the perspective of the Bank of PNG, the BitKina can be viewed as just another denomination of its currency...
- ...whose existence in no way inhibits the conduct of monetary policy
- Having BitKina, the quantity of which is designed to fluctuate in the same way as cash, as a third liability on the central bank's balance sheet has no impact on monetary policy
- The latter is concerned with managing the **total** supply of money and not its decomposition

Scenario 3: the middle ground (4)

- If the Bank of PNG has only partially replaced physical currency by BitKina, it needs to set an exchange (or conversion) rate between physical Kina and BitKina at which BitKina are redeemable in regular Kina
- This is most likely going to be one to one, but it does not have to be
- In fact, setting – and changing – the exchange rate between physical Kina and BitKina becomes one of the levers of monetary policy ([Motamedi \(2014\)](#))

Scenario 3: the middle ground (5)

- A drawback of Scenario 3 is that a co-existence of privately-issued and central bank-issued cryptocurrencies could have serious implications for the traditional business model of commercial banks and for the ability of central banks to shape monetary policy
- If lending were to take place increasingly outside the traditional banking system, the role that traditional commercial banks play in the standard money multiplier process (i.e., money creation), by which changes in open market operations and the quantity of reserves directly affect the amount of lending in an economy, could be severely diminished

Scenario 3: the middle ground (6)

- This may in turn hamper central banks' ability to control liquidity in the economy and the economic performance through standard monetary operations

Other benefits (1)

- A central bank-issued digital currency would make it easier to undertake **unconventional** monetary policies such as:
 - negative nominal interest, thereby overcoming the zero lower bound constraint; and
 - helicopter money(assuming agents in the economy held accounts either directly or indirectly with the central bank)

Other benefits (2)

- While a successful cyber-attack on a central bank implementing a **centralised** distributed ledger technology would still be catastrophic...
- ...under a **decentralised** DLT or blockchain protocol, the task of verifying transaction in BitKina could be outsourced to thousands of nodes, potentially located all over the world
- Even if all the nodes in PNG had been knocked out, there would still be nodes in Australia, Europe and the US that can operate the payments system

Conclusions

- Cryptocurrencies do not currently have significant implications for monetary policy
- But this would change if they become more widely used
- A central bank-issued cryptocurrency would not change the practice of monetary policy all that much, although it would widen the range of options for monetary policy
- Potential risks to monetary stability would only be likely to emerge once privately-issued cryptocurrencies had achieved substantial usage across the economy

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