

# Where Bullion Meets Blockchain

By Tom Coghill, Commercial Director, RM Assets Ltd



greater and greater challenges as they seek to avoid operational and settlement risks. Failures in ensuring the provenance of supply or the continued security of commodity inventory have damaged both reputations and bottom lines in recent years.

### A new digital asset class

Against this backdrop, a whole new digital asset class has been born in less than a decade. The cryptocurrency has emerged from the shadows of a hobby activity, shrouded in obscurity and misunderstanding, but currently enjoying front page coverage due to a meteoric price performance. Price action has been volatile too, as the threat of regulation continues to drive sentiment. This was notable in Bitcoin's slide on 5 September in response to the announcement of a PBOC ban on Initial Coin Offerings in China.

**2017 has seen a significant rise in the profile of the cryptocurrency. Yet, given the regulatory scrutiny of crypto markets and Initial Coin Offerings (ICOs), together with the continuing notoriety over Bitcoin's use case, the mainstream adoption of the crypto market is unclear. Nonetheless, the technology underlying these digital assets is paving the way for an evolution of both commodity and financial markets.**

*“The challenges facing the precious metals industry are in part driven by these technological gains and have in turn driven the need for innovation in a number of sectors.”*

Blockchain's implementation for gold is just the start of the wider adoption of distributed ledger technology, which is set to transform how the world does business. Now the gold market can benefit from an innovation in digital asset financial technology that promises to transcend conventional market barriers.

ways to communicate, transact and fund an evolving market have required regulators to scrutinise participants to a greater degree and restrict activity. This oversight coincides with the potential impact from reforms to Banking Supervision of the Net Stable Funding Ratio (NSFR), which may impact cost-income ratios for many liquidity providers. The physical markets are also being held to ever greater standards over the quality of the supply chain as demands for provenance and traceability are increasing. Commodity businesses throughout the sector, from base metals warehousing, agricultural trading, energy utilities to metals refining, as well as the physical commodity markets, are facing

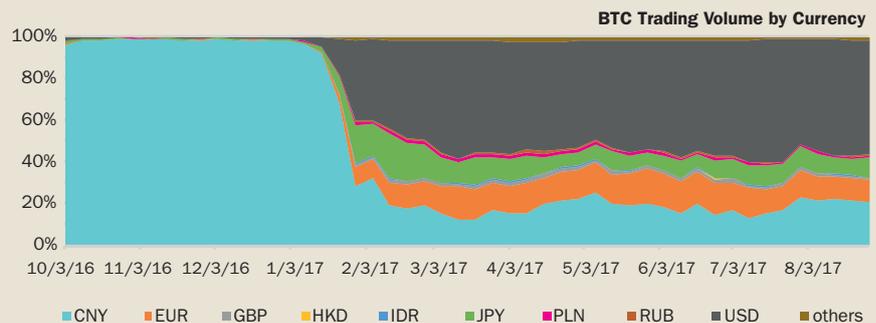
The wholesale gold market may feel like there is an increasing number of new trading venues and products vying for liquidity, clamouring to be adopted and endeavouring to be set apart from more established peers. So why would the gold market need another product?

Indeed, given the promise that rapidly developing financial technology offers, the idea of broadening the number of platforms that deal gold often seems counterintuitive. With the advent of high-velocity trading networks and aggregated liquidity pools, the converse effect might be anticipated and our expectation of what technology delivers should be of consolidation, rather than of yet more choice. Ironically, the challenges facing the precious metals industry are in part driven by these technological gains and have in turn driven the need for innovation in a number of sectors.

Financial markets are contending with an expanding regulatory framework, which is focused on transparency and stability, as regulators react to behaviours and practices enabled by a leap in technical capability. New

Clearly, it has been a dramatic bull market, which many have likened to an investment 'mania'. When Charlie Morris wrote in this publication in October 2015, the Bitcoin price was below \$300. Two years later, the price has reached over \$5,000. At the time of writing, the cryptocurrency tracking website CryptoCoinCharts.info identifies 110 exchanges trading in 4,406 cryptocurrencies.

**Figure 1: Impact of Trading Currency, Following Increased Regulation of Chinese Exchanges in Early 2017**



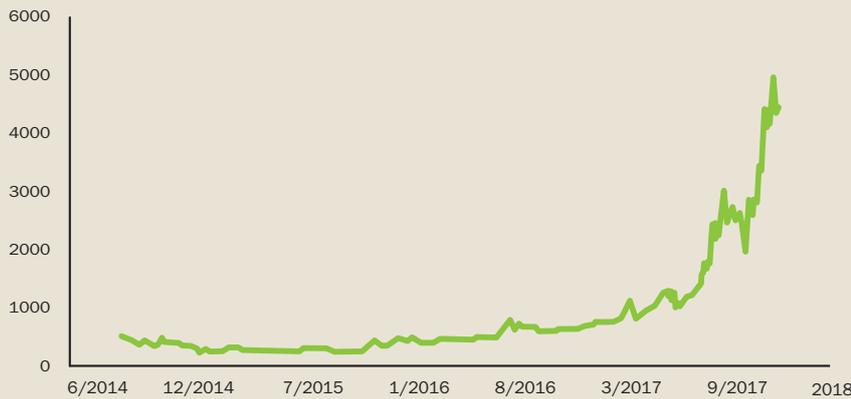
Source: Bitcoin.org

**Figure 2: Cryptocurrencies with Market Capitalisation greater than \$5bn, as of 5 September 2017**

Symbol	Name	Supply	Price USD	Price BTC	Volume BTC	Marketcap
BTC	Bitcoin	16,455,037	\$4,425	1.00	331,017.40	\$72,811,729,500
ETH	Ether	93,371,199	\$317	0.07	417,139.92	\$29,614,041,491
BCH	Bitcoin Cash	16,482,113	\$558	0.13	56,033.13	\$9,203,968,996
XRP	Ripple	38,291,387,790	\$0.22	0.05 mBTC	82,699.11	\$8,276,908,197

Source: <https://cryptocoincharts.info/coins/info>

**Figure 3: Change in the Bitcoin Price has Been Dramatic** Bitcoin Close Price US\$



Source: [www.coindesk.com](http://www.coindesk.com)

While Bitcoin is the largest by market capitalisation, other emerging coins are catching up, notably the Ethereum network's Ether which has on occasion seen greater daily volume by value, than Bitcoin.

**It's not all shiny and new**

New financial market products often evolve over many years, if not decades, to reach this scale. By comparison, the 'crypto' asset class has arrived overnight, building a market capitalisation of over \$200 billion since the mining of Bitcoin's genesis block on 3 January 2009.

From that first day of the Bitcoin genesis block, it took two years for the next alternative coin to emerge. By far, most of the thousands of these 'altcoins', such as Dogecoin, are simply based on the original Bitcoin code, with some small tweak added. These altcoins offer minimal material innovation to distinguish them from the original Bitcoin.

Others however, such as Ether, offer real technical differences such as 'smart contract' features that yield functionality above and beyond that of digital money. They operate on their own blockchain, which has been designed for a broader application than use as currency alone.

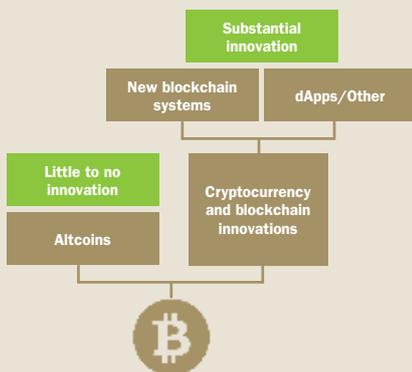
**An Internet of 'value'**

It is the innovation of the blockchain solution itself that is the genuine marvel that this infant digital asset class has given the world. A blockchain allows for the prescription of an identity to a thing, it gives a mechanism to allocate that property to an owner and allows that property to change hands, in full view of a community through its consensus agreement, with no possibility of corruption or confusion.

If Internet v1.0 was an 'Internet of information', for the sending and receiving of information, then Internet v2.0 can be considered the 'Internet of value', allowing us to send and receive assets digitally. The ownership of an asset will no longer need to be recognised solely by the authority of a central product 'governor', according to its individually maintained record, but by the consensus of a community with access to a distributed ledger, collectively confirmed and instantly open to inspection.

Blockchain provides this distributed network for transferring value, where identical copies of its participants' transactional history, encrypted for 'pseudonymity', are kept in an irrefutable and immutable record. It's not anonymous – every transaction details the movement from one wallet to another (which provides the certainty that the wallet does in truth hold that value). But the identity of the holder of any and every wallet is privately known and is only revealed at the will of the holder.

**Figure 4: Where Innovation has Followed from the Advent of Bitcoin**



Source: *Global Cryptocurrency Benchmarking Study, Dr Garrick Hileman & Michel Rauchs, 2017*

This is where innovation is taking place – in the development of asset-specific blockchains – and where the precious metals market has an opportunity to benefit from financial technology that can transcend numerous terminal markets, both broadening its base and deepening its offering. Blockchain-based gold ownership has the potential to address the challenges of NSFR, market opacity, accounting treatment, balance sheet impact and high cost-income ratios for liquidity providers, by providing an efficient mechanism for the immediate transfer of title to physical assets between parties.

**Figure 5: Distributed Ledger Technology Allows Market Participants to Avoid Intermediaries when Transacting**



Source: *RM Assets Ltd*

## Physical gold, digitally traded

At The Royal Mint, we've put this technology to work by establishing a Royal Mint Gold blockchain and by creating a digital asset token to represent an ownership of physical gold.

In partnership with the Chicago Mercantile Exchange, we've already built a distributed network to record changes in the ownership of Royal Mint Gold (RMG), which is allocated gold held in our vault at The Royal Mint in Llantrisant, South Wales. Our network is privately permissioned, which means you have to ask our permission to join, as The Royal Mint is the administrator of the network. All transfers effected on the network are published in the public domain at a transactional level, with all identities encrypted by the underlying RMG blockchain.

For the first time, it is now possible to own physical gold, vaulted by The Royal Mint, and receive proof of that ownership as a digital asset that is held in a digital wallet. Every new purchase of gold results in London Good Delivery gold being allocated in our vault alongside the simultaneous credit of RMG to the buyer's RMG account. So every 1g holding of RMG represents 1g of 9999 fine gold that is secured in our vault. An owner of RMG is then able to prescribe their holding to any other wallet on their network. The CME is developing a Digital Asset Trading platform where customers can deal RMG, which is due to launch later in the year.

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## Transformational benefit

The traditional commodity markets, whether spot, future or physical, have developed over time according to the specific requirements of their dominant end user. In our universe, these would include the unallocated gold interbank spot market in London, the various financial and physical futures markets around the world, the Exchange Traded Fund (ETF) and commodity instruments, and the varying physical formats, including the LBMA's own London Good Delivery standard.

While all these products seek to serve a broad user base, very few of them have the ability to transcend the market sectors that group together end users, whether miners, refiners, wholesale traders, financial institutions, investors or the consumer markets.

Striking a balance between a commoditised product and the cost of entry for market access

often creates a bias that steers end users to a favoured channel, with the market needing to pick between highly commoditised and cost efficient on one hand, versus variety of choice but at a price on the other. Even within the commoditised markets – unallocated gold, futures, physical bars, equity exchange listed instruments – each appeals to a varying corner of the market.

Digital assets have the potential to transcend this segregated nature, allowing the same ownership structure – physical gold digitally traded – to be shared throughout the value chain, the investment space and the risk-management community.

This innovation does not threaten to diminish the liquidity of existing marketplaces, but raises the profile of the investment opportunity for gold, reinforcing the argument for the safe, secure, physical ownership of gold in an efficient digital market providing transparency and provenance.

The technology offers obvious synergies with the other initiatives that the global gold market is undertaking as an industry. These include efforts to ensure provenance, to provide transparency of liquidity, to ensure timely settlement, to expedite capital allocation and to provide proof of collateral. Blockchain can offer a complementary solution that will benefit the gold market as a whole.

While the crypto markets may well face uncertainty from a lack of regulation and disbelief as to their tangible value, there is no doubt that the technology of digital assets can redefine future financial markets, and in the case of Royal Mint Gold, that technology is already here.



**Tom Coghill** is the **Commercial Director of RM Assets**, a subsidiary of The Royal Mint, and is

responsible for the business development and commercial success of Royal Mint Gold.

He joined RM Assets in June 2015, following a career in commodity derivative sales and trading, working with public sector, global corporate and financial institution clients, where he supported clients with their risk management, financing and physical supply requirements, with a focus on metals and mining.

Prior to working at RM Assets, he was Head of Precious Metals Sales for Standard Chartered Bank. Prior to SCB, he worked at Deutsche Bank, and initially joined the financial markets at Citibank, where he held a number of development roles in interest rate, foreign exchange and equity derivative products, before joining the Global Commodities team as a gold trader.

## Blockchain Basics

A blockchain is a continuously growing list of records, called blocks, which are linked and secured using cryptography. It is a digital distributed ledger, tracing the movement of funds or other assets from issuance to current owner, chaining transactions together from sender to receiver in a sequential and time-ordered manner. It is nothing more than a way of recording a financial transaction.

In the past, transactions were recorded in a simple accounting book and, more recently, as entries on a spreadsheet or database held on large IT systems contained within a given institution. Unfortunately, such systems are vulnerable in a number of ways: there is a single point of failure, transactions may not always be secure and could even be tampered with or deleted, and they are also not always completely up to date. For these reasons, digital distributed ledgers were invented.

Digital distributed ledgers are not stored on any single server or database but on a number of computers across multiple networks and even geographic locations by the validators of the blockchain. Each validator has an identical copy of the blockchain's entire transaction history and any changes are reflected almost instantaneously in all copies.

## Advantages of Blockchain

The duplication of digital distributed ledgers keeps them safe from accidental or deliberate destruction and the use of cryptographic proofs lock, in perpetuity, the transaction order. As there can be no debate about the sequence of events, the ledger cannot be manipulated to show different versions of the truth. Blockchain creates immutable records, which makes it the perfect medium to record ownership of assets such as gold.

Public verification of the blockchain is enabled through a graphical interface, but the validators can be relied upon to perform this checking – they do it automatically every time they undertake an action. This high degree of visibility ensures that there is consensus over transactions within the ledger, eliminating the need for a sole central authority to manage the ledger. By being public, decentralised and cryptographic, compromising the blockchain becomes virtually impossible – one would have to not only manipulate a chosen block, but the entire chain of preceding blocks in the history of the blockchain.