THE OPERATIONAL CHALLENGES OF CRYPTO-INVESTING

With crypto-markets soaring this year, there have been a rush of cryptocurrency hedge funds being launched. However, there are a number of operational challenges and headaches for managers looking to move into the new "Wild West" of the financial markets.

BY JAMES HARVEY

The explosion of the cryptocurrency market has been one of the most remarkable technology and finance stories of 2017. On 23 August, the total market capitalisation for digital assets such as Bitcoin, Ethereum, Ripple and Dash surpassed $150bn for the first time, marking an astonishing 1,020% increase in the past year, although there has been some contraction since then. As recently as February, the whole market for cryptocurrency was less than $20bn.

The buzz around cryptocurrency has led to a huge number of new coins – as of July, there were over 900 cryptocurrencies available online. Even Burger King has got in on the action, with Russian outlets now offering "Whoppercoins" as rewards with the purchase of each Whopper.

Naturally, the crypto-frenzy has caught the eye of the hedge fund industry, and a small but growing number of funds have been launched.

Over the summer, HFMWeek reported on a string of new funds focused on cryptocurrencies, managed by a mix of established managers and fresh-faced tech entrepreneurs.

While most new funds have been small – typically launching with $10m to $15m, or even less – there have been a few cases of funds hitting (or surpassing) $100m. Pollinate Capital, founded in April by Chris Dover, expects to launch with $100m, while Olaf Carlson-Wee’s Polychain Capital currently manages around $200m.

The rise of the asset class has been met with a mixture of bewilderment and scorn from traditional financiers. JP Morgan CEO Jamie Dimon, for example, recently called Bitcoin a "fraud", adding that he would fire any trader found to be trading it.

Industry sources suggest only 10% to 15% of service providers will work with cryptocurrency funds, which come with a unique set of legal and administrative issues. Given the regulatory grey area surrounding cryptocurrencies, no large banks provide accounts or prime brokerage services to these funds.

In the first of a two-part series, we spoke with some of the managers and servicers about the back-office challenges – administration, audit and custodianship – facing hedge funds working with cryptocurrencies.

ADMINISTRATION

While the role of fund administrator is the same when working with a cryptocurrency hedge fund – namely, books and records, investor reporting and accounting
- the logistics of administering these funds can provide headaches.

An anecdote from one manager provides an amusing insight into the operational hiccups associated with digital assets.

"Unlike FX prices, which are quoted to four decimal places, cryptocurrencies can be quoted to nine or 10dp," he explains. "When our administrator entered these trades into their computers, the whole system crashed. It was something of a Y2K moment for cryptocurrency."

While some traditional players such as SS&C Technologies have worked with cryptocurrency funds, the asset class is dominated by smaller players, such as Gemini Hedge Fund Services, Tower Fund Services and MG Stover.

Denver-based MG Stover has established itself as the leading player, having broken into the cryptocurrency market in 2014. Today, the firm provides administrative services to 16 cryptocurrency hedge funds, with a total of $300m in assets.

According to the company’s founder, Matt Stover, the biggest challenge for administrators in the space is the need to work with the huge number of cryptocurrency exchanges to obtain accurate trading data.

According to Coinmarketcap, there are at least 175 active cryptocurrency exchanges, with more than 30 of these trading at least $10m a day.

"While there’s nothing specific to prevent an administrator doing business with cryptocurrency funds, it can be a lot of work," says Stover. "Every exchange reports its trades slightly differently, so there is a lot of room for improvement in standardisation and automation of the data flow."

Vincent Sarullo, co-founder of Tower Fund Services in New York, agrees. "Unlike in traditional asset classes, there’s no centralised source of data. We have to put a lot of work into verifying trades."

However, there are signs that the market may be changing in response to growing demand. Coinmarketcap and Cryptocompare are beginning to emerge as the “market standard” providers of third-party pricing, easing the burden on administrators when the time comes to strike a NAV.

Stover says that his firm is also in talks with exchanges about setting up application programming interfaces (APIs) to speed up the process of data collection.

"I expect that the industry will evolve over the next three to six months to become more accommodating of hedge funds," he says.

AUDIT

As with fund administration, cryptocurrency audit is typically the preserve of smaller firms.

While the Big Four are not averse to working with cryptocurrencies – KPMG is the auditor for UK-based crypto fund Bitspread – they are not the main players in the market. Instead, most digital assets hedge funds have opted to work with Baltimore-headquartered auditor Arthur Bell.

According to Corey McLaughlin, managing member at Arthur Bell, cryptocurrency markets provide unique challenges to auditors.

"Cryptocurrency is a new asset class, and there is a lack of established best practices," he says.

Unlike more traditional asset classes, asset managers often self-custody the digital assets which can make verifying assets different compared to a traditional hedge fund.

"In a traditional hedge fund, you simply confirm trade records with the fund’s prime broker," says McLaughlin. "In a digital assets fund, you need to dig through blockchains to make sure a client isn’t making an illegitimate claim to a coin."

Fortunately, McLaughlin says, blockchain technology is robust, with digital assets such as bitcoin having miners that provide third-party verification to ensure transaction validity.

‘Mining’ of cryptocurrencies is the use of sophisticated software to verify every transaction on the blockchain. Miners are rewarded with a transaction fee, paid in cryptocurrency, for the service.

CRYPTOCURRENCY AUDIT REQUIRES A UNIQUE SKILL SET – IT REPRESENTS THE CONVERGENCE OF TRADITIONAL AUDIT WITH COMPUTER SCIENCE

COREY MCLAUGHLIN, ARTHUR BELL

Alongside an in-depth understanding of blockchains, McLaughlin says that cryptocurrency audits require an extensive assessment of cyber-security – both for exchanges and fund managers.

"Cryptocurrency audit requires a unique skill set – it represents the convergence of traditional audit with computer science," he says.

THE CUSTODY BATTLE

While administering and auditing blockchain-focused hedge funds can be a tricky business, market participants are quickly getting to grips with the asset class.

However, one operational issue is proving much more difficult for fund managers: custodianship.

Unlike stocks, bonds or cash, cryptocurrencies are virtual assets, stored on blockchains – public ledgers which record all transactions in a given currency.
ANALYSIS CRYPTOCURRENCY

Each user is given a public address for where coins may be sent and withdrawn, and a unique private key, which is the only way to generate a valid signature for any cryptocurrency transaction.

As such, the true “assets” in cryptocurrency funds are the private keys, and secure storage of these keys is paramount. Cryptocurrency exchanges and wallet providers are targeted by hackers almost constantly, and the loss of a private key would spell disaster for a fund manager: without it, there is simply no way of accessing the fund’s assets.

As a result, private keys must be kept in “cold storage” – i.e. held offline – to prevent hacking attempts. Because of the extensive cyber-security requirements involved, very few dedicated custodians have emerged who are capable of handling digital assets with any level of expertise.

Two firms – Xapo and Gemini Trust – have established themselves as leaders in institutional custody of digital assets, but both have limited offerings: Xapo only provides custodianship for Bitcoin, while Gemini only works with Bitcoin and Ethereum.

Xapo’s president, Ted Rogers, says that Xapo uses multiple layers of cryptography, coupled with physical vaults located deep underground in three different continents, for Bitcoin cold storage.

“We are constantly asked about support for other cryptocurrencies. But security is an arms race; it requires a perpetual commitment of resources,” he says. “We will only support other currencies if we can meet and surpass the same high standards that we set with Bitcoin.”

This level of security does not come cheap: one cryptocurrency fund manager told HFMWeek that his fund was quoted a fee of 1% per annum for custody with Gemini.

By contrast, a recent HFM Insights survey found that most established hedge fund custodians typically charge around 10 basis points per annum for ‘traditional’ assets.

However, some fund custodians – such as Trident Trust and Kingdom Trust – have expressed a willingness to work with cryptocurrencies, particularly if digital assets form a small bucket in a large multi-strategy fund.

Kingdom Trust, which specializes in hard-to-value assets, works with some of these funds. The firm’s president, Charles Hees, says it is also in talks with some crypto-only funds about providing custodial services.

“We’ve had a huge increase in inquiries from cryptocurrency funds in the past year,” he says. However, using Xapo, or an institutional custodian, comes with its own issues. Since custodians keep hold of a fund’s private keys, putting on trades becomes an arduous process. In some cases, turnaround times can be as long as 24 hours – an incredibly long time for assets as volatile and illiquid as cryptocurrencies.

Given the costs, and limited nature of institutional custodianship, most fund managers in the space have opted for self-custody, which is a mammoth undertaking.

“Custodianship is a nightmare,” says Kyle Samani, founder of Austin-based crypto hedge fund Multicoin Capital. “We have spent over 100 hours designing, configuring, redesigning and reconfiguring our system, and it still takes over an hour to execute a small number of trades.”

Samani describes Multicoin’s setup as a “bunker” consisting of air-gapped computers (i.e. permanently offline computers, unconnected to any devices with internet access) which are used to sign off transactions with the fund’s private keys.

The keys themselves are split up, with each founder holding a portion of the key to protect the fund from potential fraud. Samani says that he and co-founder Tushar Jain have had to draw up wills to provide a third party with access to the keys in the event of serious incapacitation or death.

Using this system means that individual trades can be incredibly cumbersome: first, a transaction must be created online; then, the transaction record is transferred to an air-gapped computer using a USB stick to sign it with a private key. Finally, the signed transaction is transferred back to an online computer and broadcast to the blockchain.

On top of this, since each exchange operates differently, Samani says fund managers must send several test transactions before putting on a trade, to ensure that a trade will be credited and executed properly.

On a bad day, this whole process can take hours. However, Samani says his firm is building in-house custodianship and trading infrastructure to speed the process up. In keeping with cryptocurrency tradition, this software will be made open source.

CRYPTOCURRENCY HEDGE FUNDS

<table>
<thead>
<tr>
<th>Name</th>
<th>Founder</th>
<th>Location</th>
<th>AUM ($m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crypto Asset Fund</td>
<td>Tim Enneking</td>
<td>La Jolla</td>
<td>400.0†</td>
</tr>
<tr>
<td>Polychain Capital</td>
<td>Olaf Carlson-Wen</td>
<td>USA</td>
<td>200.0</td>
</tr>
<tr>
<td>Bletchley Park Asset Management</td>
<td>Lewis Felle</td>
<td>Grand Cayman</td>
<td>200.0†</td>
</tr>
<tr>
<td>Crypto Currency Fund LLP</td>
<td>Pavlo Sandrik</td>
<td>USA</td>
<td>200.0</td>
</tr>
<tr>
<td>Polytile Capital</td>
<td>Chris Dover</td>
<td>USA</td>
<td>100.0</td>
</tr>
<tr>
<td>Panther Bitcoin Fund</td>
<td>Dan Morehead</td>
<td>USA</td>
<td>90.0</td>
</tr>
<tr>
<td>Blocktower Capital</td>
<td>Matthew Goetz</td>
<td>USA</td>
<td>50.0</td>
</tr>
<tr>
<td>Metastable Capital</td>
<td>Lucas Ryan</td>
<td>USA</td>
<td>45.0</td>
</tr>
<tr>
<td>Crypto Lotus</td>
<td>Joshua Goldbard</td>
<td>USA</td>
<td>40.0</td>
</tr>
<tr>
<td>Multicoin Capital</td>
<td>Kyle Samani</td>
<td>USA</td>
<td>25.0</td>
</tr>
<tr>
<td>Panther Capital's ICD Fund</td>
<td>Dan Morehead</td>
<td>USA</td>
<td>23.4</td>
</tr>
<tr>
<td>Colorado Blockchain Capital</td>
<td>Josh Finkelman</td>
<td>USA</td>
<td>20.0</td>
</tr>
<tr>
<td>Aury Capital</td>
<td>Sean Henning</td>
<td>USA</td>
<td>12.5†</td>
</tr>
<tr>
<td>Block View Capital</td>
<td>Marko los Vareta</td>
<td>Unknown</td>
<td>10.0</td>
</tr>
<tr>
<td>Crypto Assets Fund</td>
<td>Robert Percey</td>
<td>British Virgin Islands</td>
<td>10.0</td>
</tr>
<tr>
<td>Blockstack</td>
<td>Manoel Alli</td>
<td>USA</td>
<td>5.4</td>
</tr>
<tr>
<td>Alphabet Fund</td>
<td>Liam Robertson</td>
<td>Grand Cayman</td>
<td>3.0</td>
</tr>
<tr>
<td>Coinshares 1 LLP</td>
<td>Global Advisors</td>
<td>Jersey</td>
<td>5.0</td>
</tr>
<tr>
<td>Coincheck Investment Group</td>
<td>Koki Wada</td>
<td>Tokyo</td>
<td>0.5</td>
</tr>
<tr>
<td>AirPro Capital</td>
<td>Joel Kardar</td>
<td>USA</td>
<td>0.4</td>
</tr>
<tr>
<td>Brian Kelly Capital Management</td>
<td>Brian Kelly</td>
<td>USA</td>
<td>undisclosed</td>
</tr>
<tr>
<td>General Crypto</td>
<td>Logan Kugler</td>
<td>USA</td>
<td>undisclosed</td>
</tr>
<tr>
<td>Grasshopper Capital</td>
<td>Ali Lewis</td>
<td>USA</td>
<td>undisclosed</td>
</tr>
<tr>
<td>SuperBloom Capital</td>
<td>Emmie Chang</td>
<td>USA</td>
<td>undisclosed</td>
</tr>
<tr>
<td>Source: HFM research</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Target asset size
†Target asset size

GETTING READY TO TRADE

So, you’ve set up your cryptocurrency fund, signed up an administrator and an auditor, and think you have worked out your approach to custody. What happens next?

In part two (which will appear in the next issue of HFMWeek), we will discuss the front-office side of running a crypto hedge fund: working with exchanges, the OTC brokers involved in the space, the mechanics of going short and using leverage, and the thorny topic of investing in ICOs and derivatives.
In the second part of a series, HFMWeek explores the front-office issues facing hedge fund managers in this market.

**BE READY TO TALK TO A LOT OF EXCHANGES**

As we mentioned in part one, almost all large banks steer well clear of cryptocurrencies, and no traditional prime brokers work with cryptocurrency funds. However, reports suggest Goldman Sachs is expecting a new bitcoin trading operation.

"There’s simply no need for prime brokerage when trading cryptocurrencies," says Tim Enneking, founder of Crypto Asset Fund in San Diego. "Any value they might add would be extremely limited."

Without a prime broker, the first order of business for a newly-established cryptocurrency hedge fund is establishing relationships with several exchanges. Different exchanges may specialise in different trading pairs, or come with certain restrictions – Coinbase’s GDAX, for example, offers ditocon, ethereum and litecoin, and accepts US dollars, euros and pounds. Meanwhile, Bittrex – one of the largest exchanges in the world by trading volume – supports dozens of currencies, but does not accept any fiat currency.

And, given the inherent inefficiency of the cryptocurrency market, different exchanges may quote different prices for the same assets, opening up opportunities for arbitrageurs. Cedric Jeanou’s Bitspread does exactly this: the fund’s "market-neutral liquidity" strategy has returned 102.6% since inception in 2014, purely by focusing on cryptocurrency exchange arbitrage trades.

Managers who spoke with HFMWeek say that a fund typically trades with 10-15 different exchanges. Ari Paul, CIO of crypto fund BlockTower Capital, tweeted in August that his fund has order flows with 20.

Besides the different product offerings, and arbitrage opportunities, working with several exchanges is necessary as a way of limiting counterparty risk. If hedge funds are vulnerable to hacking attempts, cryptocurrency exchanges are even more so: by spreading assets across exchanges, the fund can limit the potential damage caused by hackers.

Alistair Milne, CIO of Altana Digital Currency Fund, says that limiting trading to one exchange would be irresponsible. "It’s essential that managers open numerous exchange accounts, and do their due diligence on the various exchanges," he says. "While the major exchanges have invested very heavily in cybersecurity, they are not invulnerable."

For example, in July, South Korean cryptocurrency exchange Bithumb – which accounts for three-quarters of that country’s cryptocurrency market – was the victim of a phishing attack, resulting in the loss of billions of won from customer wallets.

**LIQUIDITY PROVIDERS**

While exchanges are an essential part of a cryptocurrency trader’s toolkit, most are not set up for institutional trading: even the largest exchanges – Bitfinex, Bittrex and Poloniex – only trade around $500m each per day, according to Coinmarketcap. With this in mind, fund managers also need to work with OTC brokers. In the US, the leading market makers are Chicago-based Cumberland Mining, and New York-headquartered Genesis Trading.

"Cryptocurrency exchanges simply do not offer the kind of volume and liquidity that institutional funds expect,"
says Bobby Cho, a trader at Cumberland: “Even trades of $500,000 to $1m can be tough to execute via exchanges.” Cumberland and Genesis both offer institutional-sized cryptocurrency trades using a bid-offer spread model. Cumberland requires a minimum trade of $100,000, according to its website, while Genesis starts at $25,000. However, both have limited offerings: Cumberland trades primarily in bitcoin and ethereum, while Genesis supports six coins.

In addition to Cumberland and Genesis, some funds – including Las Vegas-based Cryptocurrency Capital – have opted to work with San Francisco-based SFOX, a regulated trade execution platform for bitcoin.

As we noted previously, exchanges are often inefficient and open to arbitrage opportunities. SFOX takes advantage of this with a variety of algorithms, which seek to optimise large bitcoin trades – either by selecting the best-priced exchanges, or breaking large orders up to avoid causing a move in the market. “A trade as small as 100 to 300 bitcoin can sometimes be enough to cause a significant price move, due to the lack of available liquidity,” says Danny Kim, VP of business development at SFOX. “Our platform and algorithms are designed to allow traders to minimise price movement and execute at the best price.”

SHORTING, LEVERAGE AND DERIVATIVES

Another consequence of the lack of prime brokers for cryptocurrency hedge funds is that their traditional roles – assisting managers with leverage or short selling – must be taken on by other players. For the most part, these services fall within the purview of larger exchanges like Bitfinex, Bitbns, Binance, Kraken and Poloniex, all of which offer customers the opportunity to go short and to take on leverage.

Some exchanges offer clients eye-popping amounts of leverage: BitMEX allows up to 100x, while SimpleFX offers margin trading up to 500x. But managers need to be careful: short-selling cryptocurrencies is typically not a cheap exercise. Owing to the limited supply and illiquidity of the bitcoin market, borrowing costs regularly reach 1% or more per day at times of high demand.

With this in mind, Binkken’s Crypto Asset Fund has created a share class dedicated to lending relatively large amounts of bitcoin for others to go short. The Class L shares receive returns based on the short-term lending rate for bitcoin, which can be very lucrative. “In some cases, we have been able to lend roughly $1m worth of bitcoin at an average rate of 350 basis points per day,” says Binkken.

However, as with other issues in blockchain investing, there are signs that this is changing. Althans Mline says that borrowing costs for bitcoin have steadily decreased in recent months.

“When shorting can get very expensive, it’s usually not too crazy,” says Mline. “It’s possible to borrow bitcoin at about 7-8% per annum in most circumstances.”

Furthermore, Enocking says that his fund is in negotiations to lend directly to various cryptocurrency exchanges, in return for a profit share from their retail lending, which would significantly increase lending capacity.

For managers looking to hedge their crypto exposure, but concerned about shorting costs, there are a handful of exchanges offering options and futures trading. OKCoin, one of the largest cryptocurrency exchanges, offers quarterly bitcoin and Litecoin futures, while BitMEX offers swaps and futures for bitcoin, ethereum, ethereum classic and monero.

As is the case with so much of the crypto market, most of these exchanges are unregulated, leading to sharp differences in opinion between managers on using derivatives.

While some funds, such as Princeton-based Serrado Capital, trade cryptocurrency derivatives, other managers are more hesitant. “The spot market for cryptocurrencies is still illiquid, so it’s a bit too early to dive into derivatives trading,” says Cedric Jeanson, founder of BitSpread. “Spot illiquidity might not accommodate hedging or final settlement of derivative contracts, creating market distortion.”

Jeanson adds that counterparty risk for cryptocurrency derivatives is higher than for more traditional contracts, such as commodities and equities. “Some crypto derivatives exchanges have introduced the concept of ‘socialised loss’ in the past, creating doubts about whether their derivative contracts will deliver the expected pay-off,” he says.

Indeed, most crypto hedge funds avoid derivatives and margin trading altogether. “The crypto markets are exotic enough as it is,” says Josh Finkleman, co-founder of Colorado Blockchain Capital. “We don’t want to spray gasoline onto a blazing bonfire.”

But managers looking to use derivatives as a hedging strategy should not despair. In the UK, Crypto Facilities, founded in 2015, is a CFA-approved derivatives exchange offering bitcoin and ripple futures. Meanwhile, across the pond, LedgerX and the Chicago Board Options Exchange recently won CFTC approval for their own bitcoin futures exchanges, both of which are expected to go live in the coming months.

TO ICO, OR NOT TO ICO?

A final consideration for managers working with cryptocurrencies is whether to wade into the murky waters of the ICO market. “The market for ICOs – whereby companies raise money by issuing cryptocurrency tokens – has taken off in 2017, with $2.2bn raised year-to-date,” the appeal of ICOs is obvious: cryptocurrency Nxt has returned a scarcely credible 430,297% since its ICO in 2013, and some ICOs launched this year have already recorded four-digit returns. As a result, some funds – such as Serrado Capital and Colorado Blockchain Capital – have set aside buckets for select ICO investments in their funds.

However, for every ICO offering stellar returns, there is a sponsor looking to make fast money from a worthless enterprise. Karl Cole-Frieman, co-founder of law firm Cole-Frieman Mallon in San Francisco, urges careful scrutiny.

“The problem with certain ICOs is the protocol presented in the white papers doesn’t make sense and there is no clear path to implementation of the protocol,” he says.

“Investors should evaluate carefully and proceed with caution.”

The huge increase in ICOs has attracted regulatory attention around the world: the SEC and FCA have both issued cautionary notes to investors, while Chinese authorities went so far as to ban ICOs entirely last month. In the US, the SEC’s recent report on ICOs concluded that most ICOs are subject to federal securities laws and should be registered accordingly. The agency subsequently shut down one ICO – Protostarr – for this reason.

While ICO sponsors are the focus of the SEC’s attention, it is unclear what consequences fund managers would face if they were found to have bought an improperly-offered ICO. However, Cole-Frieman says since securities laws are designed to protect investors from bad actors, managers would probably not be in the SEC’s firing line. “Our view is that a fund manager would not be held liable by the SEC unless they were found to be complicit,” he says.