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The Crypto Issue



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The Crypto Issue

You don't need to own a Bitcoin or a Bored Ape to know that digital assets have seized hold of the public imagination in a surprising—and sometimes absurd—fashion.

Crypto has achieved mainstream attention. Whether that attention is universally positive or even deserved is another thing entirely, and very much the consideration at the heart of this issue of *Bloomberg Markets*.

The war in Ukraine has illuminated the philanthropic potential of cryptocurrencies—and raised questions about potential sanctions evasion. The world has experienced a crypto winter, a crypto Super Bowl, and an Oscars ceremony that featured frequent commercials for Crypto.com and at least one joke about nonfungible tokens.

As the market capitalization for the universe of assets we call crypto has crept into the trillions, we've seen a proliferation of jargon, in-jokes, memes, influencers, haters, and subcultures.

And we're seeing a growing number of crypto billionaires.

Institutional investors are even coming to a slow and sometimes grudging realization that there might be slightly more to this whole thing than ransomware and money laundering. While the less-than-lawful applications of digital assets have become a less important part of the market, they haven't disappeared entirely. Hacks and frauds still abound.

In this issue, we aim to explore crypto in all of its complexities—the opportunities and the risks, the people and the technologies—to give you a better understanding of this often contradictory world. To see the biggest news every day, try out {TOP CRYPTO <GO>}.

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Crypto In Wartime

By AKAYLA GARDNER

IN THEORY, CRYPTOCURRENCIES allow payments to flow across borders anonymously, free from banking intermediaries and state oversight. Proponents are inspired by the promise of privacy, freedom, and community. But the war in Ukraine is testing crypto's anarchic culture. As governments harness the global financial system to punish the Kremlin, crypto has come under scrutiny for its potential to allow Russians to avoid sanctions. At the same time, digital currencies have shown they can play a role in helping the war's victims.

Why does war matter for crypto?

As Russia's ruble and Ukraine's hryvnia collapse, some crypto advocates see the war as an opportunity for digital coins to prove their worth as a refuge for ordinary citizens. But if they provide a way around sanctions, calls for tighter controls on the industry are likely to grow. Governments are already cracking down on digital tokens' use in money laundering. They're wary of crypto's potential to undermine the effectiveness of monetary policy, capital controls, and other national interventions. If regulators force digital platforms to undertake the kind of oversight and costly compliance expected of banks, crypto's utopian vision of "borderless" and "stateless" money may fade away.

How can crypto be used to evade sanctions?

Russian individuals and entities targeted by sanctions could use digital currencies to shield their wealth from governments and financial institutions such as banks that could track and freeze their assets. Cryptocurrencies can change hands without intermediaries via a peer-to-peer network; it can be hard to tie an address—a string of numbers and letters that functions as a digital identifier—to the person behind it. Some users have multiple digital wallets (accounts that store encrypted payment information), making it easier to conceal undeclared crypto transactions. Massachusetts Senator Elizabeth Warren has called crypto a "shadow world" that Russia and other countries could use to help "sanction-proof" themselves.

Early in the invasion there was a spike in the amount of Bitcoin being traded in rubles, but some observers attributed that to Russian investors seeking an alternative to the plummeting currency.

Can anything be done to prevent crypto from being used to undermine sanctions?

It's possible to identify digital currency addresses associated with sanctioned people. The U.S. Treasury Department's Office of Foreign Assets Control did that in 2018 when some Iranians were accused of ransomware schemes. Law enforcement can use blockchain analytics to trace illicit money flows, even on the dark web. And banks can raise flags when crypto is converted back into traditional currencies. "It's very difficult to move millions—tens, hundreds of millions—of dollars in and out of crypto without touching a legacy financial institution," Meltem Demiros, chief strategy officer of crypto-fund-provider CoinShares, told Bloomberg Television in early March.

Do crypto exchanges police their networks?

Yes, but oversight can be patchy. Exchanges licensed in the U.S. or the U.K. must comply with local laws similar to those that banks follow, including sanctions. So-called know-your-customer rules in those countries require banks to obtain some form of official identification from clients and to establish where their money came from. Coinbase Global Inc., the largest U.S. crypto exchange, said it's blocked 25,000 addresses from its platform related to Russian people or businesses that may be engaging in illicit activities, though most were identified prior to the Ukraine invasion. Other major exchanges, including Binance, Circle, and FTX, have pledged to comply with government-issued sanctions.

Some exchanges operate in countries that haven't imposed sanctions on Russia, and some don't require detailed customer identification, making it harder to impose curbs. Some aren't even sure how to comply with the restrictions. Circle's chief executive officer, Jeremy Allaire, acknowledged there's not always complete information to spot when people are circumventing them.

Finance ministers from the Group of Seven nations and the European Union are working on a "maximum" sanctions toolkit that includes crypto assets. On March 9, U.S. President Joe Biden signed an executive order to probe the national security and economic impact of digital assets and explore potential changes to regulations around crypto.

How is crypto helping war victims?

Ukraine's government set up digital wallets to receive crypto donations. As of mid-March the Kyiv government and nongovernmental organizations had received the equivalent of \$63 million, according to analytics company Elliptic Enterprises Ltd. Suppliers of goods ranging from food to bulletproof vests have accepted crypto to help Ukraine's military make purchases quickly, according to the country's deputy minister of digital transformation, Alex Borynyakov. The ministry has worked on a collection of nonfungible tokens to raise money for the war effort, he said. Coinbase CEO Brian Armstrong said ordinary Russians have used crypto as a "lifeline" after their currency collapsed.

Gardner reports on cryptocurrencies for Bloomberg News in New York.

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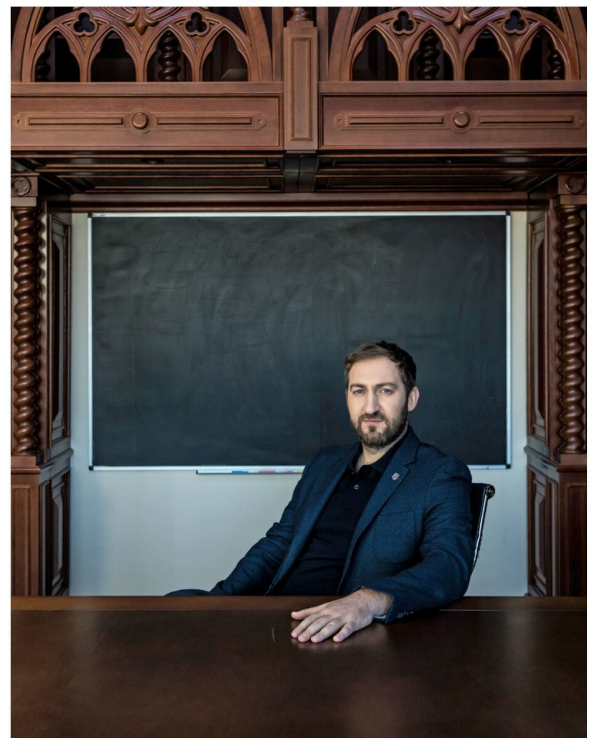
By ALASTAIR MARSH

Turning Bitcoin Into Bulletproof Vests

Like most Ukrainians, Michael Chobanian is reaching for weapons to defend his country from the Russian invasion. Instead of rifles, he's taken up something much more modern: crypto. Chobanian, 38, oversees the country's growing digital currency war chest, which exceeded \$60 million in late March, the result of an international outpouring of support. ¶ For the past six years Chobanian led Ukraine's biggest cryptocurrency exchange, KUNA, and became known as the father of his country's crypto scene. Now he's tasked with converting and spending those tokens to help equip Ukrainian forces. Alex Bornyakov, Ukraine's deputy minister for digital transformation, said in mid-March that crypto donations had enabled the army to buy 5,500 bulletproof vests, 500 helmets, night-vision goggles, and medicine. ¶ Chobanian replied to questions from *Bloomberg Markets* through voice recordings on the messaging app Telegram on March 12 and March 18. The interview has been edited for clarity.

Tell me what life was like for you before the invasion.

- ▶ I am the founder of an exchange. Before the war we had between \$1 million and \$4 million of volume per day. I am also the head of the Blockchain Association of Ukraine, which was created back in 2016 to protect the businesses in crypto because at that time we ran the risk of the government raiding the offices of crypto companies. And we had some problems with the special services.



I have heard you described as the father of Ukraine's crypto scene. What did you do to earn that moniker?

- ▶ I was the first guy who started publicly speaking about crypto. There's actually a lot of stuff that I did first: the first ATM, the first public trade, the first crypto company, first exchange, first OTC firm. I was also the loudest and most public one, so I was the first crypto guy whose apartment was raided by the police. The first time I got into crypto was 2011, and I have been full time in crypto since 2013.

What was Kyiv's crypto scene like before the invasion?

- ▶ It was wild. Ukraine is, per capita, the No. 1 crypto country in the world [according to the Chainalysis 2020 Geography of Cryptocurrency Report], and Kyiv was the center of it. We had probably a couple of thousand developers. A lot of big companies in the crypto space had offices in Kyiv. We have big gatherings of crypto guys—hackathons or just general meetups—pretty much on a weekly basis. Before Covid there were literally thousands of people at the meetups.

Ukraine is really, really big on crypto, and now it is even bigger. Now everyone knows about it.

I read that you met President Volodymyr Zelenskiy before and have spoken to him about crypto. Can you tell me about the conversation?

- ▶ Yes, I met with the president before he was the president. At the time I was the president of the blockchain association. He was only a candidate. Now we're both presidents.

I was at a meeting with other IT companies, and we were talking with him about what is needed in Ukraine for IT and crypto. He didn't know much about crypto then, but now he knows a lot about it because **crypto is saving our country**. I haven't spoken with him since then so I don't know what his opinion is right now, but it's probably very positive.

What do you remember about Feb. 24? Where were you when you heard that Russia had invaded Ukraine?

- ▶ I can recall every single hour of the day, unfortunately. I woke up at 5 a.m. like most of my fellow citizens because of the really, really loud noises. I immediately went online to check the news. I knew that there was a big risk that this could happen, so I evacuated most of my team two months prior to the war. I was just sitting staring at the monitor, analyzing what's happening. At about midday, when I saw that everything was escalating, I just said "OK, that's it, we're going." We had a plan that if something happens my team—whoever is left in the country—would come to my house. So by three o'clock in the afternoon, everyone came. We just packed our stuff, threw it in the cars, and we immediately shot off to the western part of Ukraine to safety with all our children and wives.

How are you coping?

- ▶ I'm OK, considering the rest of the population, **I'm actually probably really good**.

What are you doing now? Have you joined the army?

- ▶ I didn't join the army because I am not really a good army man. My job is being a crypto banker for the government. So I'm in charge of collecting, fundraising, and storing crypto, and also exchanging crypto to crypto and crypto to fiat, opening bank accounts for intermediaries or for the government, and then buying whatever is required by the Ministry of Defense. We also find the suppliers who are willing to sell us humanitarian goods, or helmets, or bulletproof vests for crypto. So I'm in charge of this virtual government crypto fund.

My role is to supply my people with all the necessities that they require and make sure that we can pay as fast as possible. It takes 10 minutes for a Bitcoin block to close [average confirmation time for a Bitcoin payment]. And it takes about three days to do the same thing through the banking system, because first we have to receive U.S. dollars in a bank account, that's at least one day. On the second day, the bank makes sure that they have received the monies on the account and then it takes another day

for the SWIFT [Society for Worldwide Interbank Financial Telecommunication, the message system used by most of the world's financial institutions] payment to actually reach whoever the supplier is. So **three days vs. 10 minutes**—therefore, we prefer crypto. And you can understand that time is money for my country right now. So if we can save a minute, it means that we can save at least someone's life, so we are trying to speed up the process and crypto is helping us here.

How has daily life for you changed since the war began?

- ▶ The most notable thing is probably that time flows totally differently. So I can't really recall whether something was two weeks ago, two days, or two years ago. The other thing that I feel is that if something loud bangs around me I immediately go to stress. You know, it reminds me of that day, of that morning. And the same happens to all my family members. So loud noises are not good for our stress.

Are you in Kyiv? What is life like in the capital now?

- ▶ I can't tell you where exactly I am. I can't disclose that—that's classified, but I'm not in Kyiv.

Have you been surprised by the amount of crypto donations and variety of tokens donated?

- ▶ I knew that people would help. I know a lot of rich Ukrainian crypto guys who live abroad, so I definitely knew they would help. A lot of the locals are helping, and we are now united. Yesterday we were competitors, **now we are all one big family**. I knew that a lot of big crypto billionaires from around the world would definitely help us because they knew us personally. I'm sure more donations will come because it's quite obvious that this is just the beginning.

Has this experience changed your view at all on the usefulness or utility of crypto?

- ▶ No. You could say that I was preparing for

this. I knew that there would be a time in the future when crypto would play a vital role. I never imagined it would be because of a war, that was definitely not my plan. I had hoped there would be a more peaceful way. We have a saying here: "You can't stop an idea, the time of which has come." So I think crypto is exactly like this.

What have been your frustrations?

- ▶ In crypto you're always prepared for the worst. You're prepared for the hackers or for police raids, or something like that. Health issues, stress, and internet access—for me personally—was the hardest. The rest was just business as usual.

The state of the crypto market obviously has changed a lot. Cash, U.S. dollars, in Ukraine are pretty much useless. No one wants them. Prior to that, dollars were the main payment method for the OTC market. Now considering that you **can't really move cash** outside of the country and you cannot store it securely, no one really wants it.

Now the most valuable form of money in Ukraine is crypto. Everyone wants crypto because this is the fastest, the most flexible, easiest, and least bureaucratic way to store and spend your money. Crypto is the new king of money in Ukraine.

One of the reasons crypto adoption has been so high in Ukraine is the history of instability of the late Soviet era, corruption, and a weak currency. What do you think will be the long-term legacy of this war?

- ▶ The fundamental change is that, before the war, there were a lot of skeptics, especially in the government, in the banks, and in the military. Now there is no skepticism because they understand that we save lives every single minute with crypto. You can try to ignore it, but you cannot ignore when their families are actually fed with crypto, or when the soldiers are dressed in bulletproof vests and helmets with crypto.

You cannot ignore that, especially considering that there is nothing you can do with the cash. So all the skeptics now understand that crypto is here to stay and it's really convenient. So I guess that's the biggest fundamental change. ●

Marsh writes about ESG investing for Bloomberg News in London. He previously covered cryptocurrencies.

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Web3 Is Useless If It's Not User-Friendly

By PARMY OLSON

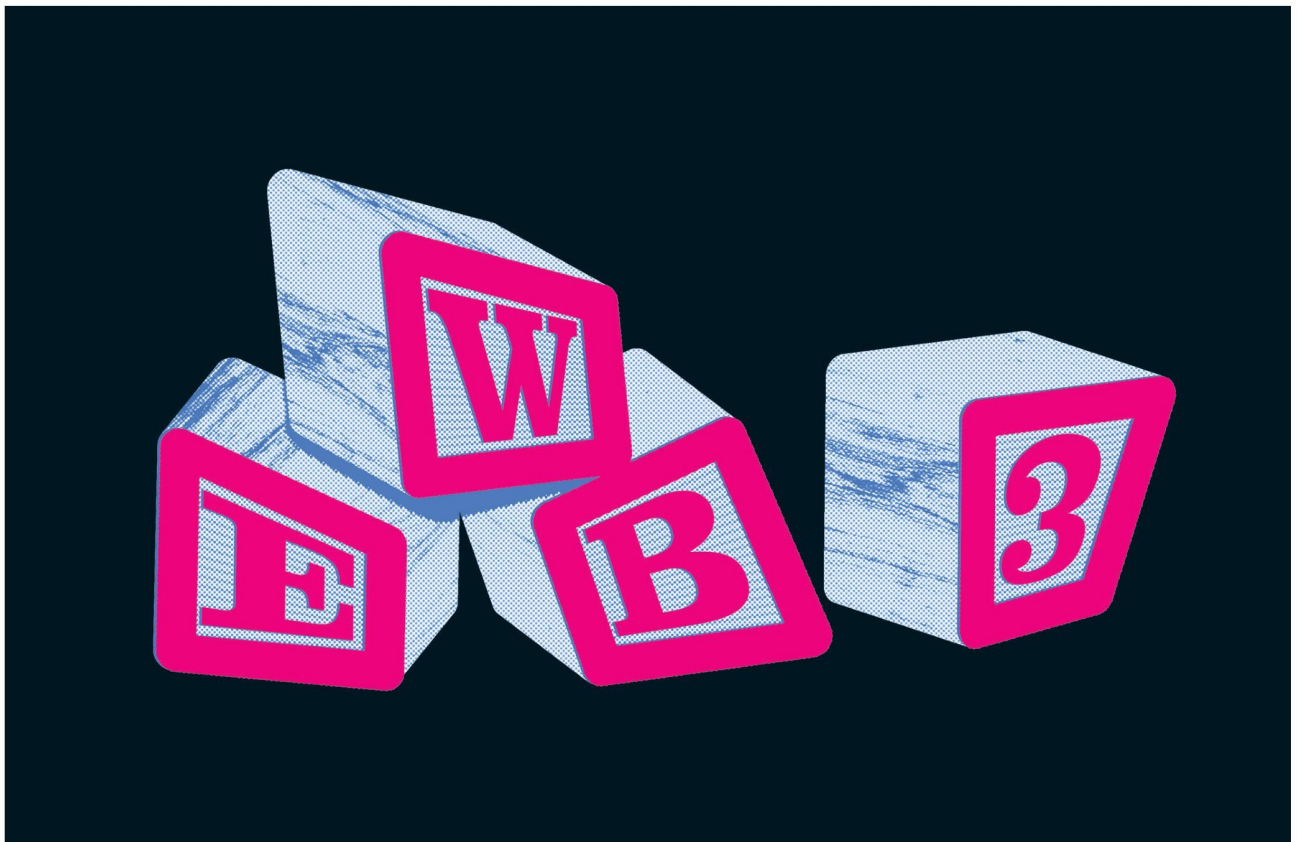
ILLUSTRATION BY MATT CHASE

SEEMINGLY OUT OF nowhere, web3 has become one of the biggest technology trends of 2022. It's captivated investors, the technorati, and Paris Hilton. But the number of people who've heard of it well outnumber those who understand what it really is: essentially just a rebrand of blockchain, the software at its heart.

Blockchain was an ultra-hot investment sector that started to lose momentum with venture capital investors about three years ago. Then, last year, the

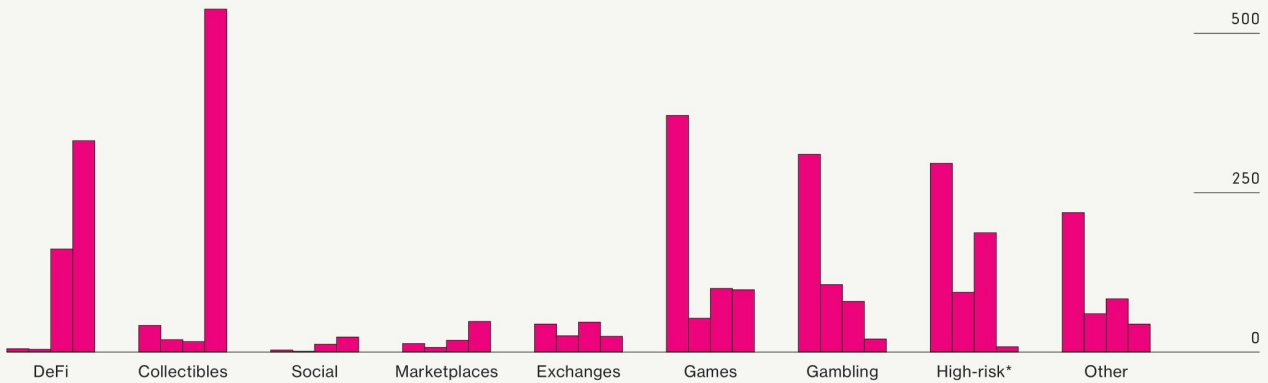
idea of "decentralized ledger technology" soared back into popularity under a new name, claiming to be the next chapter of the entire internet. But concerns about how blockchain technology works under the hood, which bogged down investors' interest before, remain real and aren't going away.

Web3 enthusiasts posit that the internet of websites and blogs dominated by a handful of trillion-dollar technology companies is the past: web2. The future ►



Changing Landscape

Number of decentralized apps launched annually on the Ethereum blockchain, 2018 to 2021



*Dapps that have the bearings of a pyramid or Ponzi scheme.

Source: DappRadar, an online store for dapps that tracks their prevalence on different blockchains

is a far more decentralized and equitable internet underpinned by cryptocurrencies and tokens. How far away is that future? Much farther than is justified by the investment being made in web3 assets and companies today; venture capitalists put \$18 billion into web3 startups in 2021 alone, according to Crunchbase, a research firm that tracks the technology industry.

A web3 internet may never find mainstream adoption, because so far it's been unable to host apps and services that are user-friendly and developer-friendly. In short, web3 is clunky. Attempts to popularize decentralized apps, or dapps—software applications that run on blockchain-enabled smart contracts instead of on the internet's current protocols—have struggled to gain traction.

One example is a Twitter clone called Peepeth, a dapp that picked up a few thousand users when it launched in 2018. Posting a “peep” (instead of a tweet) required paying a fraction of a cent in Ether—the cryptocurrency that underpins Ethereum—by using a cryptocurrency wallet and browser plugin such as MetaMask. (Plugins or dedicated browsers, including Brave and Opera, are the primary means for interacting with web3.) A few months after Peepeth was launched, the controversial American podcast host Joe Rogan talked about the app on his show, praising it as a censorship-proof tool because data on the blockchain can't be altered. Analysts that year also said mainstream adoption of dapps was just a year or two away.

Despite the fanfare, San Francisco-based Peepeth and other distributed apps struggled to attract a big audience. Active user numbers languished in the thousands or even the hundreds. One reason: The services were hard to use. It took about a day to post a single peep, for instance, compared to a split second with Twitter, and buying and spending tokens with MetaMask was cumbersome. Peepeth creator Bevan Barton didn't respond to a request for comment.

In 2018 the most popular dapps on Ethereum enabled speculative trading of crypto assets. *CryptoKitties*, for instance, allowed you to collect and “breed” digital cats on the blockchain, sometimes at a cost of thousands of dollars. The number of dapps has grown from 1,500 in 2018 to almost 10,000 today—but the most popular services are still limited to financing and trading, with some games dotted into the mix. The most popular dapps are marketplaces for nonfungible tokens (NFTs) with names such as OpenSea and PancakeSwap, according to DappRadar UAB, a Lithuania-based online store for dapps.

Web3's other challenge is actually living up to its decentralized ideals. So far, it's not very distributed.

With his dreadlocks and freewheeling sailor's lifestyle, Moxie Marlinspike is among the world's best-known cryptographers. Marlinspike, who once led Twitter's security team, created the encrypted messaging app Signal and co-authored the encryption protocol that

underpins WhatsApp, Facebook Messenger, Google Messages, and Skype. Marlinspike caused a stir when he wrote in a January blog post that web3's fundamental principles have fallen by the wayside in practice. Web3 has, for a start, surprisingly little cryptography for a technology that's supposedly “built on ‘crypto,’” Marlinspike wrote. In fact, popular web3 services, such as the NFT marketplaces, still rely on web2-style processes to link to blockchains, he wrote.

APIs, or application programming interfaces, are a cornerstone of web2. They connect different software programs, allowing online businesses to communicate with one another. Amazon.com Inc., for instance, charges customers of its cloud-computing business, Amazon Web Services, by tallying up the number of times they “call” its APIs.

Marlinspike noted that popular web3 services such as OpenSea and MetaMask, the browser plugin for accessing web3 apps, are using APIs to access the Ethereum blockchain through a third party. That means people utilizing these services aren't accessing the blockchain directly either. Marlinspike, by way of example, created an NFT on Ethereum, which was stored in his MetaMask crypto wallet and displayed on the OpenSea marketplace. But when OpenSea took his NFT down from its marketplace, it also disappeared from his crypto wallet.

Imagine uploading a photo to Facebook and then discovering the image

has been deleted from your computer hard drive after being removed from the social network. That's similar to what happened to Marlinspike's NFT. In theory it should have continued to appear in his MetaMask crypto wallet, but MetaMask couldn't interact with the blockchain directly. It had to make API calls to at least one other company, essentially acting as a gatekeeper, to show the NFT. It didn't matter that Marlinspike's NFT was indelibly on the blockchain, because his crypto wallet needed to use OpenSea's API to display it. MetaMask was acting more like a window than a wallet. (Dan Finlay, MetaMask's co-founder, confirms that his service relies on the OpenSea API to display NFTs in users' MetaMask wallets. "We know that hitting a centralized index for your possessions is a flawed strategy and have ways of moving off it," he adds.)

The ideals of distributed and transparent data are moot when individuals with mobile phones and computers aren't able to plug directly into a blockchain, because those networks are connected by servers, powerful computers that are generally controlled by companies. As it consolidates around platforms, web3 is taking on the centralized look of web2, and far from disrupting the power of gatekeepers, web3 is cultivating them.

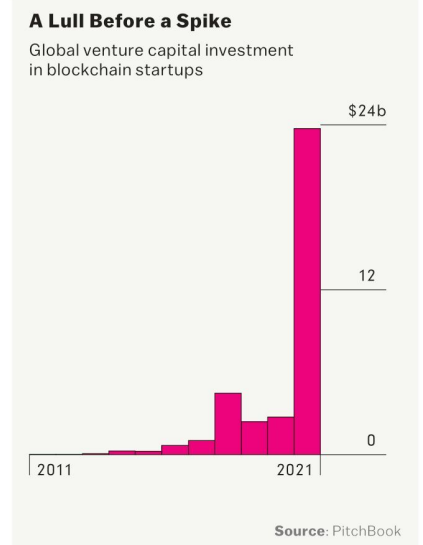
It's easy to take for granted the standardization that underpins the internet today, built on 30 years of experimentation, implementation, and slow-moving steps to achieve consensus by organizations such as the World Wide

Web Consortium or WC3 (not to be confused with web3). So well-oiled and interoperable is today's infrastructure that we almost never notice it. The exception might be when, for instance, an Android phone can play a high-quality video but an iPhone cannot because its browser hasn't implemented a new standard.

The traditional web works on a mass, global scale because almost all sites and services use TCP/IP (transmission control protocol/internet protocol), an architecture that stemmed from research conducted by the U.S.'s Defense Advanced Research Projects Agency in the late 1960s. It also relies on HTTP (hypertext transfer protocol), another critical set of rules for transferring files including text, images, and video. If the internet is a landscape that we're all traversing, TCP/IP is a series of roads, and HTTP is a particular kind of truck on those roads. There are other protocols that act like HTTP—different cars and trucks—but HTTP "trucks" are the most popular and all drive on the same roads.

Blockchains like Bitcoin and Ethereum lack a unified "road system" and a similar series of "trucks" to handle data. Without unifying standards and with no obvious contenders in the pipeline, web3 is still a disjointed series of networks. As a result services remain difficult to build, scale up, and interact with.

"It's complicated for the developer, and it's complicated for the user," says Dan Hughes, founder of Radix Tokens Ltd., a British company building its own



decentralized networking technology. Hughes started designing his own distributed ledger system a decade ago, a few years after Bitcoin creator Satoshi Nakamoto published the famous white paper. He has also been researching the possibility of designing a single protocol to host distributed finance, or DeFi services, to help solve the fragmentation problem. Hughes doesn't know how long it will take to build a workable web3 infrastructure, though he does believe the technology will achieve mainstream adoption within the next 10 years.

"If there is no possible way for a single protocol to handle all this data and transactions, [web3] will take longer to mature," he says. Without standardized protocols, the system is vulnerable to hacks and bugs. "Normal users will say, 'This is too complicated,'" he adds.

Blockchain already has a reputation for befuddling even experienced technologists. The web3 rebrand has helped people outside the world of crypto to grasp the ramifications of distributed technology for the internet. But if its disjointed infrastructure continues to hamper developers and users, the primary beneficiaries will be a few big companies that have jumped in as early gatekeepers. For everyone else, web3 will be a faded promise. ●

Olson is a Bloomberg Opinion columnist in London covering technology. This column doesn't necessarily reflect the opinion of Bloomberg LP and its owners.

<GO>

Sotheby's
EST. 1744

PUNK IT!
104 CRYPTOPUNKS. 1 LOT.





A Punk Start

THE AUCTION AT SOTHEBY'S in New York was supposed to demonstrate the strength of the market for NFTs, or nonfungible tokens: blockchain-based smart contracts tied to digital images. In February buyers had the chance to gather in the salesroom (shown here before the event) to learn about a collection of NFTs called CryptoPunks, which are designed to look like pixelated images of heads. The auction house would sell 104 of them, live.

Created in 2017—ancient history in the NFT world—the pieces in the CryptoPunks series are coveted as among the first of their kind. To highlight their significance, a panel discussion on “the history of NFTs and CryptoPunks” preceded the sale, which was expected to yield \$20 million to \$30 million.

The Sotheby's auction, at least in theory, had all the ingredients for crossover success: a compelling market rationale combined with the gold-plated imprimatur of Sotheby's itself.

But it wasn't enough.

About 20 minutes after the sale was supposed to begin, a loudspeaker announced that it had been canceled. Sotheby's declined to say what went wrong. The most plausible explanation is that traditional art collectors didn't show up. Instead, the bidders were likely seasoned crypto professionals looking for a bargain they didn't find. For now, the whole debacle serves as a cautionary tale about the broader acceptance of NFTs.

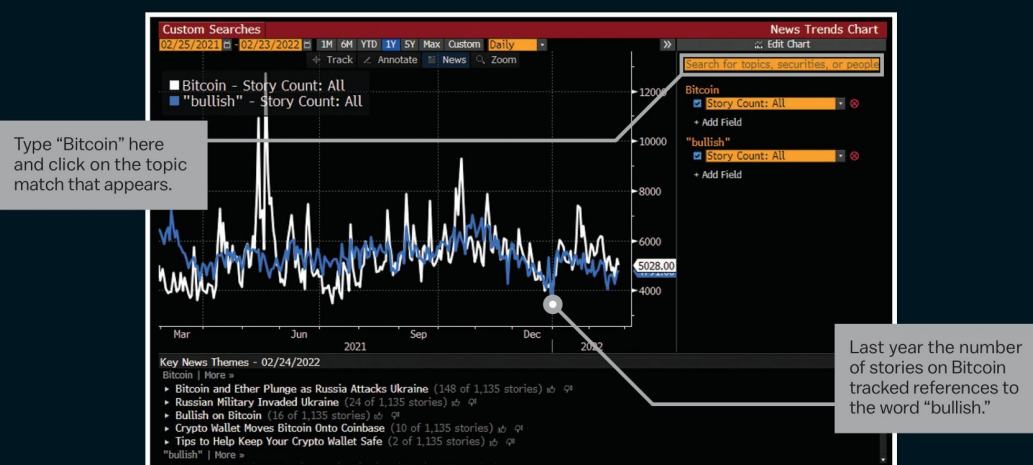
For news on NFTs, run [{NI NFT <GO>}](#).
—James Tarmy

PHOTOGRAPH BY DOLLY FAIBYSHEV

Explore How Allocations to Crypto Would Affect Returns and Volatility

By GRETCHEN BEDNARZ and JOHN DAVIS

Fig. 1 Run `{NT <GO>}` to chart the number of articles on Bitcoin against the number of pieces that include the word "bullish."



BITCOIN SOARED 1,281% from its March 2020 low to its high last November. The rise was volatile, of course: The cryptocurrency had one-day drops of as much as 12.7% along the way.

For portfolio managers, this variability poses an interesting challenge: Can you capture Bitcoin gains while keeping overall portfolio volatility low?

TO ANSWER THAT QUESTION, you can use Bloomberg’s Portfolio & Risk Analytics suite of tools. Copy your holdings into a model portfolio and then add allocations to Bitcoin (and perhaps a hedging instrument) to see how a crypto allocation would affect your performance and risk.

To show how this works, we built three model portfolios—one with a substantial allocation to Bitcoin, one to gold, and one with a mix of the two—and compared them.

First, we set out to identify negatively correlated assets as our building blocks. Bonds and stocks were an easy place to start: The Bloomberg US Aggregate Bond Index and the S&P 500 Index had a -0.15 correlation this year through Feb. 18. (A correlation of -1 would

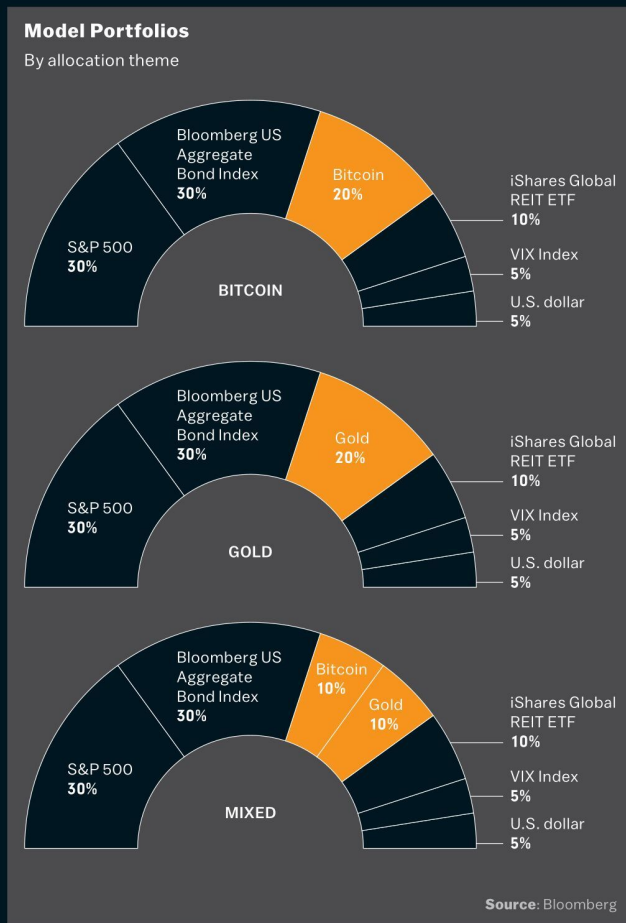
indicate assets that move in opposite directions in perfect sync.)

For Bitcoin, finding a negatively correlated counterpart was a little less obvious. Bitcoin generally swings with the broader equity market and is volatile in times of uncertainty. A News Trends graph suggests the relationship: Run `{NT <GO>}` and chart the number of news articles on Bitcoin and the number of news pieces that include the word “bullish” (**FIG. 1**).

So one potential proxy for that relationship could be equity market volatility. To investigate the correlation of Bitcoin and the Cboe Volatility Index, or VIX, run `{XBT <Currency> VIX <Index> HS <GO>}` and tick the box to select Corr. This year through Feb. 18, Bitcoin and the VIX had a mean correlation of -0.46. That means we could potentially offset some of the drops in Bitcoin with an allocation to the VIX or some investable version of equity volatility.

The weightings of our three portfolios are shown on the next page (**FIG. 2**). To create these—or your own model portfolios—simply type “portfolio” on the command line of a terminal screen and click on the PRTU match. The shortcut is `{PRTU <GO>}`. Click on the Create button on the red toolbar. In the window that appears,

Fig. 2



on the Basic tab, give the portfolio a name such as BITCOIN_PORT. Set the Asset Class to Balanced and the Portfolio Currency to USD. For Position Type, select Fixed Weight. This means the portfolio constituents will be expressed as a percentage of the total. Once set, the security weights remain the same until changed.

In the main screen, set the Date to 01/02/12 so you can analyze 10 years of data. Enter "XBT Curncy" below Security and set the weight to 20. Then repeat for the other assets in the portfolio (FIG. 3). When you're done, click on the Save button.

NOW YOU CAN LOAD the portfolios into PORT to track performance and analyze risk. To load the Bitcoin portfolio, open it in PRTU and click on the Analyze button. To compare it to the GOLD_PORT portfolio, use the vs drop-down to select [More Sources...]. In the window that appears, click on Portfolios, then on the gold portfolio, and hit the Select button.

To track performance metrics, click on the Performance tab and then on the Statistical Summary subtab. The screen shows statistics for three months and six months and year to date. The drop-down to the right lets you see statistics for custom periods such as five years (FIG. 4). In this case, the Bitcoin portfolio outperformed, with a total return of 108%, vs. 97% for the gold portfolio. What's more, the Bitcoin portfolio had a slightly higher Sharpe ratio, a measure of risk-adjusted returns, than the gold portfolio.

Next, compare the Bitcoin portfolio with the mixed portfolio by using the vs drop-down to select it. Here, the mixed portfolio had a five-year return of 104%, better than the gold. In addition, the Sharpe ratio for the mixed portfolio is the highest of the three, indicating higher returns per unit of risk than the Bitcoin portfolio.

FINALLY, ANOTHER important analytic tool is tickerization: Assign a ticker to your portfolio and you can analyze it in other functions and Bloomberg Query Language, or BQL. To do that, open the ▶

Fig. 3 Go to {PRTU <GO>} and hit the Create button on the red toolbar to create a model portfolio.

To tickerize a portfolio, click here, select Portfolio, and click the Tickerization tab in the window that appears.

Security	ID	Weight	Current Price	PCS	Cost Price	Cost Date
		100.0000				
11 XBT	XBT	20.0000	5.22	EXCH		01/02/12
12 LBSTRUU	LBSTRUU	30.0000	1769.79	EXCH		01/02/12
13 SPX	SPX	30.0000	1257.61	EXCH		01/02/12
14 REET US	REET	10.0000		EXCH		01/02/12
15 VIX	VIX	5.0000	23.40	EXCH		01/02/12
16 USD	USD	5.0000	1.00	EXCH		01/02/12
17						

Here the portfolio holds a 20% weight in Bitcoin.

Fig. 4 Click the Analyze button in PRTU to load the portfolio into PORT.



Fig. 5 Once you've tickerized portfolios, you can chart them with technical studies such as Maximum Drawdown, which identifies the largest drop in the charted period and the time it took to recover.



portfolio in PRTU, click on the Settings button on the red toolbar, and select Portfolio. In the window that appears, click on the Tickerization tab. Enter a ticker of as many as nine characters in the ticker field. You can specify a custom inception date, but make sure your portfolio has at least one rebalance date within the past year. Once you've set the details for your ticker, click on Save. Then click the Actions button and select Schedule Portfolio Ticker History Generation. (Calculating history can take 24 hours to complete.)

Once you've generated tickers, you can run `{G <GO>}`, for example, to build custom charts of your portfolio. We charted the three model portfolios and added a Maximum Drawdown study, which marks the largest drop during the period covered

by the chart, as well as how long it takes to recover (FIG. 5).

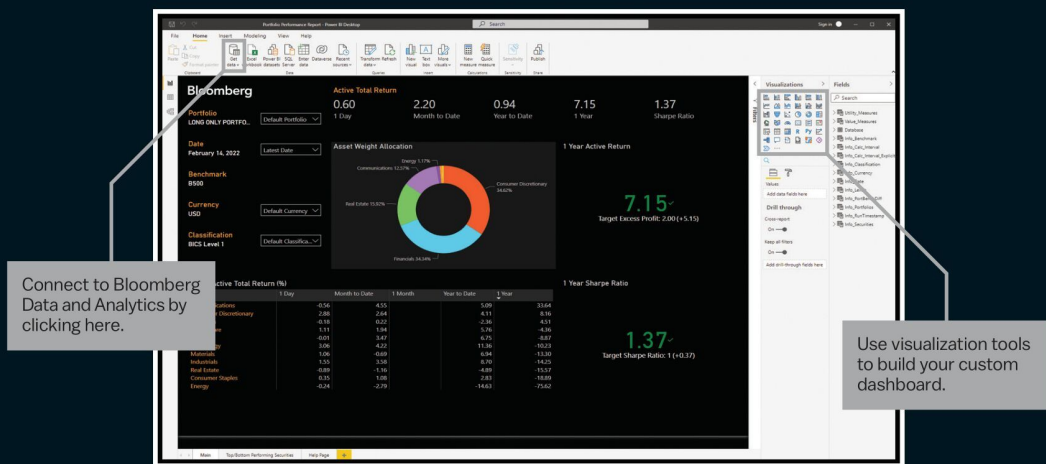
Here you can see that the biggest drop over the past five years came with the early spread of the pandemic in March 2020. The Bitcoin portfolio plunged 16%, and the gold portfolio dropped 11.5%. Recovery was faster for the Bitcoin portfolio, though, taking 36 days to return to its preplunge level, whereas the gold portfolio took 47 days. The more diversified mixed portfolio, as you might expect, split the difference, with a 13.6% drawdown and 40 days to recover. ●

Bednarz is a portfolio and risk specialist and Davis is a commodities and fixed-income specialist at Bloomberg in New York.

Visualize Portfolio Performance and Risk With Microsoft Power BI

By CONSTANTIN COSEREAU, NELSON YU, and MALKIE ZWEIG

Fig. 1 PORT Enterprise now enables you to create portfolio report dashboards in Microsoft Power BI that you can share with your team or clients.



VISUALIZATIONS CAN BE crucial for effectively sharing information with your team, or clients, about what’s happening with your portfolio. They can also potentially help you make timely investing decisions.

PORT Enterprise now enables you to create portfolio reports in Microsoft Power BI, which you can share as PDFs or dashboards (**FIG. 1**). Power BI desktop is available for free and can be downloaded from Microsoft’s website (www.microsoft.com/en-us/download/details.aspx?id=58494). All versions starting with April 2021 come with the Bloomberg Data and Analytics connector preinstalled. For more details on the connector, go to **{DOCS 2098238 <GO>}**.

Underpinning this new reporting flexibility is BQL for PORT Enterprise. In effect it enables PORT Enterprise users to generate portfolio reporting datasets, hosted in the Bloomberg cloud, that can then be analyzed in Excel, BQuant, Power BI, and Tableau.

SO HOW does it work?

Let’s say you’ve loaded your portfolio via the Portfolio Administration (PRTU) function or automated uploads. Run **{PORT <GO>}** for the Portfolio & Risk Analytics function, and click the Workspace button on the red toolbar (**FIG. 2**). Workspace is a new comprehensive portfolio analysis tool that lets you create reusable

environments for performance analysis and risk forecasting.

Great, so you’re a PORT Enterprise user and you’ve got your portfolio in PORT. Now you want to run a report. Go to **{PREP <GO>}**. Click the Create button on the red toolbar, and give your report a name. Use the Report Type drop-down to select a type such as PORT Performance, which lets you analyze historical performance and ex-post, or realized, risk of your portfolio and a benchmark. Use the Format drop-down to select CSV, for comma-separated values (**FIG. 3**). Click the Create button to bring up the Portfolio Reporting: Editor screen, in which you will specify the details of your report template.

A series of steps, which you navigate using the sidebar on the left, lets you specify the particulars of your report. Click on the Analysis Context step. Here you can select a portfolio, a benchmark, a classification, and the period covered by the report. Click on Report Settings to specify how the report will display information, and choose settings for how it will handle look-through of funds and indexes.

The Fields step lets you choose the fields, including custom data items, that you want to generate in your report. When you’re done, hit Save and Close. Now you can run the report by clicking the Run button next to its name.

Once you’ve set up a report, the next step is to use the ▶

Fig. 2 Run {PORT <GO>} and click on the Workspace button on the red toolbar for the new comprehensive portfolio analysis tool.

Workspace lets you use top-level tabs for fast comparisons between different universe-benchmark pairs.

Long Name	Market Value (%)	Px	Close	Div	Yld	P/E	P/CF	P/B	Debt/Equity	Current Ratio	Best Div	Div Yld	RDE
AMERICAN AIRLINES GROUP INC	0.29	14.59				12.92					0.91	0.034	
AMETEK INC	1.96	130.99	0.6130	98.26	0.07	4.42		39.59		1.36	0.666	15.44	
APPLE INC	4.49	163.17	0.5422	105.24	0.03	37.07		170.71		1.04	0.992	145.57	
BOSTON SCIENTIFIC CORP	1.73	43.96		39.35	33.44	3.77		57.31		1.48	0.000	6.16	
CADENCE DESIGN SYS INC	2.55	154.69		59.44	38.42	15.62		17.51		1.77	1.404	26.60	
CDPARF INC	1.58	418.41		22.22	26.94	6.88		12.85		5.24		21.01	
COSTCO WHOLESALE CORP	28.91	525.50	0.6041	05.24	34.12	0.00		47.62		1.03	0.704	31.44	
DOLLAR GENERAL CORP	2.49	210.98	0.8020	66.18	35.79	7.90		227.68		1.08	0.842	37.11	
ECOLAB INC	1.72	168.11	1.1637	84.23	35.66	6.68		126.74		1.32	1.238	16.88	
ELLI LILLY & CO	3.10	292.87	1.3433	57.32	887.92			188.04		1.22	1.486	76.35	
ESTEZ LAUDER COMPANIES-CL A	2.69	285.69	0.7939	44.29	54.16	51.51		127.95		1.73	0.887	55.92	
HEICO CORP-CLASS A	1.84	123.13	0.1264	03.48	49.87	8.78		10.29		3.56	0.126	14.72	
IBS MARKET LTD	108.61	0.74	68.00	29.34	4.57	52.24		0.68		0.769	15.20		
INTERCONTINENTAL EXCHANGE IN	2.13	135.70	0.9730	06.24	44.33	6.22		62.72		1.01	1.105	19.23	
LAM RESEARCH CORP	2.07	525.78	1.0716	38.16	58.11	3.39		77.12		3.13	1.167	76.64	
MCDONALD'S CORP	0.93	235.81	2.2625	43.19	30.00			11.57		1.78	2.299		
META PLATFORMS INC-CLASS A	3.92	200.96		14.50	9.95	4.39				3.15	0.000	31.10	
MICROSOFT CORP	1.48	289.86	0.8133	22.25	99.13	5.59		50.22		2.25	0.883	49.05	
NIKE INC-CL B	2.27	131.18	0.8834	21.28	92.13	9.91		85.25		3.07	0.998	48.26	
PANPAL HOLDINGS INC	1.57	99.91		28.51	18.49	5.27		40.55		1.22	0.000	19.97	
PROLOGIS INC	2.85	150.84	1.6773	00.37	22.34	3.44		54.44			1.863	8.99	

Fig. 3 To create a report, go to {PREP <GO>} and click on the Create button on the red toolbar.

Click here to select PORT Performance, for example, a report that lets you analyze historical performance and ex-post—or realized—risk for a portfolio and benchmark.

Select CSV here.

Click here to open the report editor screen.

Create Port Report

Report Name: Firm Portfolio Performance Report

Report Type: PORT Performance

Model: MAC Performance Model

Currency: USD Language: English

Format: CSV

Owner Role: America Internal PORT+ Port+ Administrators

Run As: Myself Report Owner Role

Fig. 4 To set up a batch job for your report, go to {JMGR <GO>} and click on the Create button.

Use the Job Manager: Batch Editor screen to set the details of your job.

Select BQL as the delivery destination here.

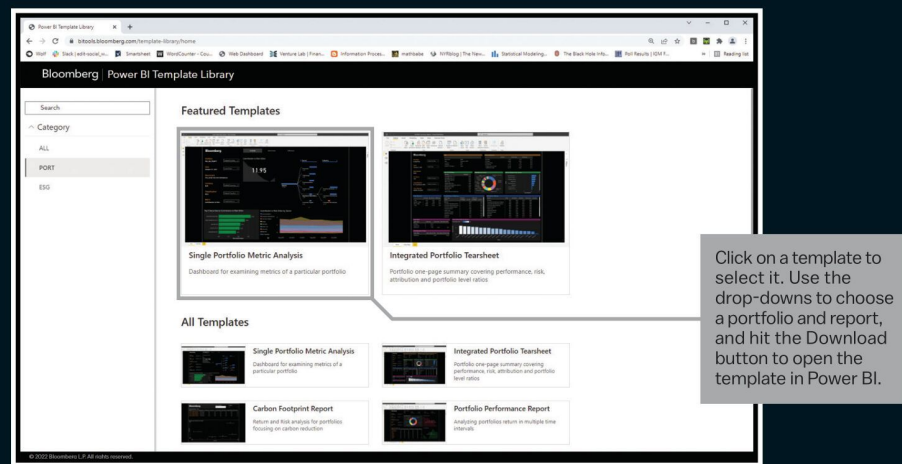
Job Manager: Batch Editor

Delivery Destinations: SFTP, BCS, BQL, PORT WS (HPA)

Email Notifications:

Name	Access Level	Completion	Alert
JONN SCHNEIDER	Admin		
JON ASMUNDSON	Admin	<input checked="" type="checkbox"/>	
JONAS POBLADOR	Admin		
JONATHAN CRICHTON	Non-admin		
JONATHAN FUSS	Admin		
JONATHAN GOES	Admin		
JONATHAN LAZARE	Non-admin		
JONATHAN MICUCCI	Admin		
JORGE RIVERA SEGURA	Non-admin		
JOSE ANTONIO MARTINEZ DE LA VEGA	Non-admin		
JOSE MENCHERO	Non-admin		
JOSE RODRIGUEZ	Admin		
JOSEF KIRKLAND	Admin		
JOSEPH BACCI	Non-admin		
JOSEPH CHAHINE	Admin		
JOSEPH FILOCAMO	Admin		
JOSEPH GALTMAN	Admin		

Fig. 5 Run **{BITL <GO>}** for the Bloomberg Power BI Template Library, a collection of curated templates you can download and customize.



Job Manager (JMGR) function to generate a reporting batch job in BQL. To do that, run **{JMGR <GO>}** and click Create. The Job Manager: Batch Editor lets you set up the details of your batch job, which is a set of steps that automates the running of your report. Give the batch a name and hit Next. Choose Report from the Add drop-down, and select your report in the window that appears. Click on Schedule to specify when you want to run your batch. Click on Delivery, and tick the BQL checkbox to ensure that data in your report will be delivered in a format compatible with BQL (FIG. 4). Once you're done, click on Save and Close. To run your job, click the play button in JMGR.

OK, NOW THAT you've generated a batch job in BQL, how do you tap into it in Power BI? Let's look at some Bloomberg-curated templates for Microsoft Power BI. Run **{BITL <GO>}** to launch the Bloomberg Power BI Template Library in your browser (FIG. 5). Click on a template

to select it. To open it in Power BI, use the drop-downs to select a portfolio and report, then hit the Download button.

In Power BI, hit the Refresh button. Click on Sign in in the Bloomberg Data and Analytics pop-up window, and enter your credentials in the subsequent Login screen. Then click the Connect button. Your PORT data will now be imported into Power BI. Once the data is fully imported, you will be able to use the visuals in the dashboard to analyze your portfolio.

This brief walk-through only scratches the surface of what you can create with BQL for PORT Enterprise data. For more info, contact your PORT Enterprise representative. ● — *With Michael Reifel*

Cosereanu is a portfolio and workflow specialist at Bloomberg in New York. Yu and Zweig are on the Reporting Apps engineering team, also in New York.

Track Correlations to Help Understand Drivers of Crypto

By JOHN LAGMAN

LAST YEAR DIGITAL ASSETS—cryptocurrencies, decentralized finance, and nonfungible tokens—assumed a more prominent role in finance. Bitcoin, Ether, and many so-called alt coins reached record highs in November.

But 2021 ended with a drop across the board. And then January and the start of February were brutal for crypto. Inflation led to a rethink. Bitcoin, once touted as an inflation hedge, showed little resilience as consumer and producer price levels jumped.

Although the adoption of digital assets accelerated, the correlation between crypto and equities—especially technology stocks—climbed last year. Bitcoin and Ether declined as bond yields surged. Expectations for as many as seven Federal Reserve rate hikes this year dented the allure of tech stocks that price in earnings many years ahead. After Russia invaded Ukraine in late February, the crypto-equities correlation dropped a bit on the possibility that crypto would become a “currency” of choice in the region.

You can analyze the relationships that influence cryptocurrency performance with these Bloomberg tools: CORR, CFND, and HS.

FIRST, TO CREATE a correlation matrix for cryptocurrencies, type “correlation” in the command line of a terminal screen and choose CORR from the autocomplete matches. The shortcut is **{CORR <GO>}**.

Click the Create New button on the red toolbar. Change the Date Range to 12/31/2021 – 03/22/2022 or the current date. Set the Period to Daily and the Calculation to Correlation. Hit Next.

In the amber <Add new security> field, type “Bitcoin” and click on the XBTUSD Curncy match. Do the same for “Ether” (XETUSD Curncy); “gold” (XAU Curncy); “Bloomberg Dollar Spot Index” (BBDXY Index); “S&P 500” (SPX Index); “Nasdaq composite” (CCMP Index); and “Nasdaq 100” (NDX Index), which tracks the 100 largest nonfinancial stocks listed on the exchange. Click Next. Enter a Title and hit Finish (**FIG. 1**).

Bitcoin and Ether show significant positive correlation with the S&P 500, with readings around 0.6 this year through March 22. (Correlations range from -1 to 1, with 1 indicating the assets move in lockstep.) The cryptocurrencies are even more correlated with the tech stocks in the Nasdaq composite. The most significant readings in the matrix are shown in white, with the least in dark amber. Gold shows no significant linkage to cryptocurrencies.

Change the dates to 12/31/2020 – 12/31/2021, and you can see that crypto-equity index correlations were only about 0.3 last year.

Since the crypto peak last year, Bitcoin and Ether have dropped a similar amount, while the Nasdaq composite fell more than the S&P 500.

To chart the cryptocurrencies, you can use the natural-language capabilities of the Line Chart function. Type “GP Bitcoin Ether since 11/09/21” and press <GO>. To add lines for the equity benchmarks, enter “SPX” in the Add Data field and click on the match. Repeat with “CCMP” for the Nasdaq composite (**FIG. 2**).

As of March 22, Bitcoin and Ether were 37% below their peaks. The S&P 500 had declined 3.7%, while the Nasdaq composite slid 11%. From the start of Russia’s invasion, on Feb. 24, through March 22, Bitcoin jumped 13%—possibly because of expectations that the conflict and sanctions would increase crypto use.

Bitcoin was envisioned as a peer-to-peer system for making real-world payments, but Ether is largely a token to pay for decentralized-finance applications built on Ethereum or related blockchains. Many proponents of Bitcoin saw it as a hedge against inflation caused by central bank monetary expansion. Yet it could be argued that the multiyear rally in cryptocurrencies was partly driven by quantitative easing’s flood of cash and a lack of fairly valued assets.

TO CHECK FOR OTHER Bitcoin correlations, you can use the Correlation Finder function. Type “Bitcoin” in the command line and select XBTUSD Curncy. Then type “correlation finder” and choose CFND. The shortcut is **{XBTUSD <Curncy> CFND <GO>}**. Use the vs dropdown to select Global Macro Movers, then choose All. Set the boxes at the top right to Daily, 40, 1Y, and Greatest Value (**FIG. 3**).

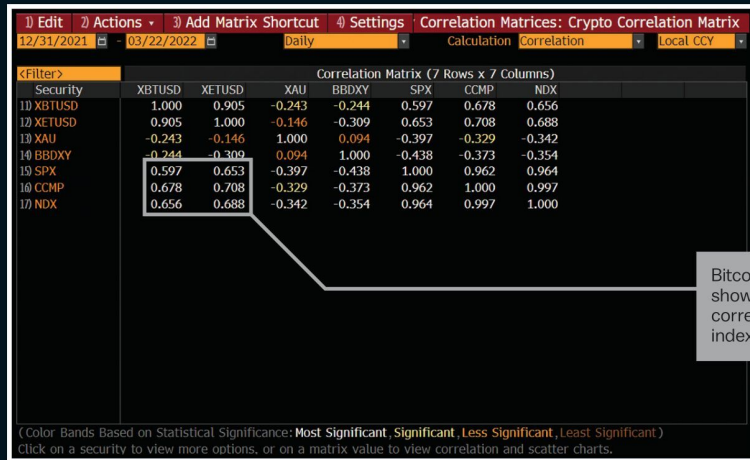
As of March 22, Bitcoin showed significant correlation with stock indexes such as the S&P 500 and Brazil’s Ibovespa. In addition, it had strong inverse correlation with currencies of Ukraine’s neighbors Romania and Poland. The sparkline charts in the tiles show that this relationship strengthened recently.

To chart the Bitcoin-Polish zloty relations in the HS function, click the tile. The recent jump in correlation seems to have followed the Russian invasion of Ukraine. For a monitor of cryptocurrency pricing and news, run **{CRYP <GO>}**.

Whatever your view of crypto, it’s worth watching how correlations develop. ●

Lagman is an FX and crypto derivatives specialist at Bloomberg in Singapore.

Fig. 1 To build a correlation matrix, go to {CORR <GO>} and click the Create New button on the red toolbar.



Bitcoin and Ether showed significant correlation to equity indexes early this year.

Fig. 2 To chart crypto assets since their 2021 peak, type "GP Bitcoin Ether since 11/09/21" and press <GO>.



To add a line for the S&P 500, enter "SPX" here and click on the match.

Bitcoin and Ether were down 37% from their peak last year.

Fig. 3 To check Bitcoin correlations, go to {XBTUSD <Currency> CFND <GO>}.



Use the drop-down to select Global Macro Movers.

Click on a tile to get further insight into correlation trends in the HS function.

Geneviève Léveill  wants to help farmers control their sales with blockchain

By EMILY NICOLLE

PHOTOGRAPH BY TATIANA FERNANDEZ GEARA

GENEVI VE L VEILL  was born in Haiti and has spent more than 45 years living in the U.S. and U.K., advising on projects around the world for Royal Bank of Scotland (RBS), Hewlett-Packard, General Electric, and other companies. She was working for IdenTrust, which provides digital certificates, when she discovered blockchain and embarked on a new entrepreneurial path.

Cryptocurrencies make headlines, yet it's the underlying technology that really intrigues banks, companies, and institutional investors. So-called blockchain networks provide a source of truth, ensuring every phase of a process can be verified on an accessible ledger.

In 2016, L veill 's passion for food led her to start AgriLedger, a business that uses the blockchain to give farmers more direct control of logistics and finances. Working in partnership with the World Bank and the government of Haiti, an AgriLedger pilot project helped mango farmers retain more profit by cutting out intermediaries. Now she says AgriLedger is embarking on new projects in Haiti and Tanzania.

It hasn't been an easy journey, and L veill , 58, says she's seeking funding to expand beyond the pilot software. She spoke with *Bloomberg Markets* in late February about her career and her insights into startup life and crypto culture. The interview has been condensed and edited for clarity.

EMILY NICOLLE: Tell me about your career journey into blockchain.

GENEVI VE L VEILL : I have always been tasked with trying to find: How do we change the status quo? How do we make it better?

[IdenTrust] asked me if I could go to South Africa and look at this thing called blockchain that Barclays was looking at in 2015, at the beginning of the craziness.

The one thing I wish I had done is actually bought Bitcoin. Somebody told me about it, and I was confused and couldn't be bothered. It was less than maybe \$100, and you could actually mine it yourself very easily. But I started looking at technology as a mechanism for getting things done, removing intermediaries to check what was going on. I decided, hell, why don't I start my own thing?

Whatever I did, it had to be something I was passionate about. There had always been two passions in my life—food and

travel—and while travel is not an inherent human need, food is basic to survival.

The AgriLedger concept was born out of a hackathon. Usually things coming out of hackathons don't have a long life. But I had too many people telling me this couldn't be done. I felt I had to prove it could be, that it wasn't just a technical breakthrough.

EN: How does AgriLedger help farmers?

GL: A streamlined value chain, powered by blockchain, is value-accretive for all the stakeholders. This cuts out noncontributing players and ensures that the essential service providers work collaboratively with producers as partners and provides them a more direct access to markets. By tracking information, recording financial transactions in an immutable ledger, and implementing smart contracts, we can work with banks to put in place a security structure that then allows them to provide these communities with working capital facilities. Currently, smallholders rely on other intermediaries, such as the agents and brokers, for their financing needs, which is extremely inefficient. Providing a direct interface between the farmers and the financial institutions is a paradigm shift and has the potential of unlocking significant value and efficiencies.

EN: How does startup life compare with working for a big company?

GL: I can change something on the fly. The risk is greatly minimized when you're in a startup vs. in a big bank.

I used to love working for Hewlett-Packard because I could have this crazy idea of a technology and then search within the organization to find out who had knowledge about it and could help implement it. Now you may only have very few people on your team. That doesn't mean they're not brilliant, but you can't overwork them in the same way.

At AgriLedger, the cash is not flowing in. I've been told it's because I'm not bothering to market it in the right way. But then a lack of funding means you don't have the right people, and yet we expect in the startup world to pay people less. That's not sustainable, because if you don't raise your staff to the market value very soon, they will walk away.

We cannot afford from a moral standpoint to fail to deliver, not only to our partners but also to those communities they seek to uplift by collaborating with us in delivering this technology.

Léveillé



EN: How do your challenges compare with traditional finance?

GL: I ran a project at RBS where we ended up with over 400 people working on it. There, you are using a prevetting process, either hiring through an agency or another company. In the blockchain space, there are a lot of people who, I hate to say, are just very good talkers and not really good at action.

It's a gold rush, and the challenge I find is that a lot of the good people don't need to come to a startup anymore. Now the game is on with corporates trying to get in the space. A lot of people are going into roles as consultants. India has been going crazy with the startup world. So the salary expectations have now tripled. We lost a major developer because he got offered a job we couldn't even match.

EN: Is innovation getting priced out of the market?

GL: Innovation used to be done at the corporate level. Now [research and development] is mostly done by acquiring because it's cheaper. But I'm finding that in this space, corporates are realizing you can't just acquire, because you may acquire a shell of nothing. There's now a bit of going back to actually having a team internally.

It's not just crypto. Even with central bank digital currencies, you need to be aware of this new way of doing business, these new data sources you're going to need to consume or data you're going to need to provide. It's like those companies that decided they didn't want to get on the internet: They faded away very fast.

EN: What's your opinion of cryptocurrencies?

GL: I don't use crypto or tokenization in my solutions, because crypto is still in the process of creating a new economy and will go head-to-head with regulators and financial services. But if I work with someone and they cannot send me fiat money, I will take Bitcoin now. What people have to realize is that what you receive is the value at the time of the settlement, but within 10 minutes it can go either up or down.

In 2020, I needed some cash, and I had a friend I could exchange my Bitcoin with. What I gave him was [worth] about £500 (\$659), but a few months later, the damn thing tripled. But that's the risk you take.

I find the concept of decentralized finance—or DeFi—very interesting. For example, yield farming, where you use part of your

crypto holdings to lend to others and receive interest back, is a very interesting concept on a peer-to-peer level. There's no KYC [know-your-customer checks]. You're just staking your coins and then getting them back at some point. I can see those ideas becoming mainstream, but they're going to have to have KYC at some point if they're going to continue and start being regulated.

Now that China has launched a digital currency, let's say you are a company in the U.K. but you have individuals working for you or clients in China. You become exposed to this new way of transacting. Financial departments are going to need to understand how to retrieve that transaction information.

EN: How will the industry mature over the next decade?

GL: I think we have a couple more years of mayhem before crypto settles down, but settling down means it will likely be taken over by established brands and organizations. There is a trust mechanism that has come into play. I liken it to the evolution of cellphones. In the '80s, they were just for people in emerging markets who traveled. Large organizations are now going to start understanding what it is they need to do to be able to reach customers faster.

I'm also not sure how long governments are going to allow this to continue. You can already see some regulations coming in and others trying to sort of keep tabs on what's going on through various exchanges. The purpose of crypto is getting lost because those exchanges are really becoming like the banks.

Blockchain still has a certain level of digitalization that means some individuals may not have the comprehension or the ability to use it. Unlike many of the digital transformations we're looking at, there's no thought of really how to be inclusive.

At ETHDenver [a major crypto gathering in February], I heard only 3% to 5% of the crowd were women. There are a lot of organizations across the world looking at creating more inclusiveness of women, either in trading or through being part of technology solutions. But when you then go to these conferences, it's still a big party. An even bigger challenge is inclusion for anyone who is physically impaired. Current solutions do not allow them to use that technology, and there isn't any thought of how they can be included. ●

Nicolle covers cryptocurrencies for Bloomberg News in London.

White Paper: Using News-Related Signals To Generate Medium-Term Returns

By DANIEL LAM and SHAUN WATERS

HOW DOES THE VOLUME and tone of news about companies relate to stock returns?

Bloomberg uses machine-learning models powered by 4 billion stories collected over the past decade from the terminal's premium sources, social media, and the web to provide a wide range of analytics related to news. Among these analytics are data on publication heat (the volume of news flow compared with historical norms) and sentiment (the tone of news coverage).

Let's explore how this data may be used to aid stock selection among U.S. equities with a medium-term horizon of several months. (This article excerpts our 2022 white paper, which is available on the terminal with additional graphics and results. To download a copy, run `{BPS <GO>}`, click on Audience Specific in the left-hand navigation panel, then on Quant Research, and finally on News-Related Characteristics & Medium-Term Stock Returns White Paper.)

Previous research has uncovered news-related regularities in the cross section of stock returns. A 2009 paper by Lily Fang and Joel Peress found that stocks with no coverage in major newspapers earned higher average returns than those with a lot of coverage. The effect was concentrated among smaller stocks and persisted for long holding periods—at least 12 months. A 2016 Bloomberg white paper titled “Embedded Value in Bloomberg News and Social Sentiment Data” found that news sentiment can predict stock returns at very short horizons of one day or less. By contrast, we focused on returns over medium-term horizons of several months and on a broad universe of U.S. stocks of all sizes.

Data and Signal Construction

We used two company-specific, news-related data items in our studies:

- “Daily News Publication Heat” (NW013, “NEWS_HEAT_PUB_DAVG”) is a daily score measuring the volume of news flow about a company over a 24-hour period in comparison with the average daily volume over the last 45 days. The publication heat calculation is based on another data field that returns nominal counts of story volume (NW014, “NEWS_HEAT_PUB_DNUMSTORIES”).

- “Daily News Sentiment Score” (BQL field “SENTIMENT_SCORE”) is a daily measure of the average sentiment of news flow about the company.

We hypothesized that periods of increasing relative news flow should be associated with episodes of relatively higher returns for a stock. Fang and Peress's finding that low-coverage stocks have higher expected returns suggests that when news coverage of a company increases, its expected stock return declines. A lower expected return means a higher price and thus a period of higher-than-expected realized return, holding future cash flows constant. Thus, to the extent that the relationship between news coverage and expected returns is due to variation in investor attention rather than any news about fundamentals, we would expect stocks experiencing increasing coverage to outperform for a time. To capture this, we constructed a monthly Publication Heat signal by taking the three-month moving average of the raw Daily News Publication Heat for each stock.

Stock prices reflect other factors in addition to news flow. We may expect that some equities are relatively more driven by news and that these are the stocks where investors pay the most relative attention to news coverage. We sought to quantify this “attention to news” by measuring the trailing correlation between the daily average news sentiment score and the daily stock return over the past six months.

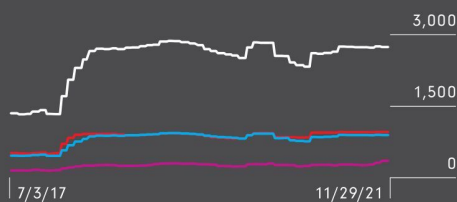
This Sentiment Impact signal should help to identify stocks

News Heat and Impact Signals

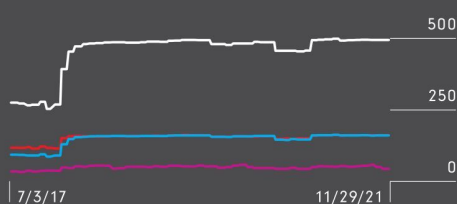
Number of stock index members with data for Publication Heat and Sentiment Impact signals

▬ All ▬ High-heat group ▬ High-impact group
▬ Stocks in both the high-heat and high-impact groups

Bloomberg US 3000 Index



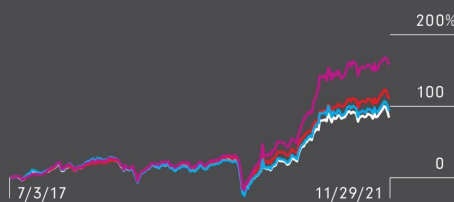
Bloomberg US Large Cap Index



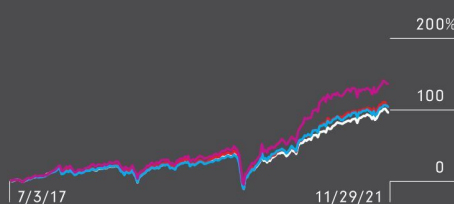
Cumulative return since June 30, 2017

▬ All ▬ High-heat group ▬ High-impact group
▬ Stocks in both the high-heat and high-impact groups

Bloomberg US 3000 Index



Bloomberg US Large Cap Index



Average annual equal-weighted excess return of index groups, in percentage points, June 30, 2017, to Nov. 30, 2021

Bloomberg US 3000 Index

		Heat		
		Low	Med.	High
Impact	Low	-2.0	+1.4	-1.9
	Med.	-4.4	+0.8	+2.4
	High	-3.7	-0.1	+7.3

Bloomberg US Large Cap Index

		Heat		
		Low	Med.	High
Impact	Low	-0.7	-0.5	-2.0
	Med.	+1.3	-1.0	+0.9
	High	-0.5	-1.5	+4.5

Source: Bloomberg

that are most driven by news flow rather than by other factors. We hypothesized that stocks that rank highly on both Publication Heat and Sentiment Impact are the ones gaining the most increased market attention and therefore will tend to experience a period of relatively high returns. To summarize, we constructed two monthly signals for each stock:

- Publication Heat—or “heat”—is the trailing three-month average of Daily News Publication Heat.
- Sentiment Impact—or “impact”—is the trailing six-month correlation between the Daily News Sentiment Score and the daily open-to-open stock return.

Results in U.S. Universes

We conducted tests on a broad universe of U.S. stocks—the Bloomberg US 3000 Index **{B3000 <Index>}**—to gauge the extent to which any effects are confined to small stocks that may be difficult to trade. We also repeated each test with the Bloomberg US Large Cap Index **{B500 <Index>}**. Each month starting June 30, 2017, and ending Oct. 31, 2021, we sorted all stocks in the universes by their Publication Heat and Sentiment Impact.

We then divided the universe into thirds based on each: high-, medium-, and low-heat and -impact stocks, respectively. We further divided the universe simultaneously across these two signals, getting 3x3=9 groups in total. We tracked the equal-weighted returns of stocks within all these groups through Nov. 30, 2021, focusing especially on high-heat stocks, high-impact stocks, and those that are both high-heat and high-impact.

First, we plotted the number of stocks in each of these groups, including only those with data for both signals (see above). The charts show that coverage has been reasonable and consistent since mid-2018, while data were somewhat thinner during

the first six months of the sample period in 2017.

Next, we charted the cumulative total returns of stocks in each of these groups. From these charts it's apparent that stocks that are both high-heat and high-impact have outperformed the most. This strongly suggests that the interaction between high heat and high impact has delivered the highest returns. As a summary of the main results, two tables show the relative returns of all nine groups from the 3x3 sort.

To get an idea of which specific individual high-heat and high-impact stocks have been most responsible for driving the outperformance of these equities, we analyzed the cumulative contribution to outperformance of the top individual stocks. Among the B3000, the top contributor was GameStop Corp. during its frenzied runup in January 2021. Among large-cap stocks in the B500, the top contributor was Tesla Inc., which had steadily outperformed the market since early 2020.

BLOOMBERG'S STOCK-LEVEL news data present opportunities for investors. While previous work has demonstrated short-term predictive power in the raw news sentiment data, we aimed to construct signals that add value over the medium term. We did this by constructing a derived signal, Sentiment Impact, based on the trailing six-month correlation between daily news sentiment and stock returns. This allowed us to identify stocks where the market is focusing relatively more on news flow compared with other factors. Stocks that have relatively high Sentiment Impact and relatively high Publication Heat have displayed a marked tendency to outperform since 2017, and especially in 2020. ●

Lam is on the quant research team and Waters is a news core product manager at Bloomberg in New York.

Three Arrows Capital's Su Zhu Wants A New 'Freedom-Centric System'

By JOANNA OSSINGER

PHOTOGRAPH BY JULIANA TAN

WHEN SU ZHU CO-FOUNDED Three Arrows Capital with Kyle Davies a decade ago, it seemed like a risky bet for two derivatives traders in their 20s. But the bet paid off. Today the company's investments include Bitcoin, Ether, Avalanche's AVAX, and Solana's SOL, as well as decentralized finance (DeFi) projects like Neon, funds such as Multicoïn Capital, and the play-to-earn project *Axie Infinity*, according to its website. Its blockchain holdings alone are worth close to \$10 billion, estimates analytics firm Nansen. (Zhu would only say that the firm's assets are in the "multibillion-dollar" range and wouldn't provide data on the fund's returns.)

Zhu, who turns 35 in April, was born in China, moved to the U.S. at age 6, and has been a citizen of Singapore since 2016. He's proud of having called the bottom of the yearlong "crypto winter" with his Dec. 21, 2018, tweet: "We will pump off the bottom extremely quickly, leaving most sideline investors stuck in fiat." Bitcoin, worth about \$3,850 at the time of his tweet, surged to around \$47,000 at the end of March this year.

Zhu spoke with *Bloomberg Markets* in late February about his career and his investment philosophy. The interview has been condensed and edited for clarity.

JOANNA OSSINGER: How did you get into finance?

SU ZHU: I did a pretty typical pre-GFC [global financial crisis] route. Majored in mathematics at Columbia, did a summer internship at an investment bank that turned into a full-time analyst role. In 2008, I started in equity exotic derivatives trading at Credit Suisse in

Tokyo, got laid off during the financial crisis. Then I was fortunate enough to find a junior trader role at Flow Traders, a Dutch ETF [exchange-traded fund] market-making firm which was expanding in Singapore. Did a couple years there, then worked in Hong Kong for a year at an investment bank, and finally partnered with my high school and college classmate Kyle Davies to start Three Arrows Capital to trade emerging-market foreign exchange. Think we were 25 at the time, and back then it was extremely uncommon to start your own fund at that age, but we saw a lot of market structure disruptions coming in FX—electronic vs. voice, listed vs. over-the-counter—and felt the risk-reward was there.

JO: What drew you to crypto?

SZ: I first started dabbling in Bitcoin in early 2013. The main activity was focused on the Chinese exchanges, and there were various arbitrage trades you could do. In late 2017 it became extremely clear to me, just from the caliber and energy of young people involved in the space, that crypto was going to follow the dot-com cycle of creative destruction and then eventually become a paradigm shift across finance, technology, culture, and politics.

JO: What are your key areas of focus at Three Arrows?

SZ: Derivatives trading has been our bread and butter and always will be a huge component of what we do, and it also ties into our venture investing. Crypto trading firms have done well since 2018, because they have the resources to invest in stellar talent whether market conditions are good or bad. We don't have any external investors, which has afforded us the ability to make very good



decisions on market timing, which we then parlay into continual reinvestment into the overall ecosystem. Making sure that we capture revenues from market volatility and continue to invest in teams is my No.1 priority.

JO: What areas have the most potential?

SZ: I'm a believer in Amara's law, which is that technology is overestimated in the short run and underestimated in the long run, especially when applied to crypto. The areas of most potential are likely not even thought of as crypto use cases today. That said, I'm excited about what scalable L1s [Layer 1 blockchains, which run independently of other blockchains] like Avalanche can enable for users and application developers. We do not even know what kinds of network effects and emergent behaviors are possible when user counts begin entering the millions, tens of millions, and hundreds of millions. Most apps that people use today and think of as the domain of web2 will eventually be disrupted by lightweight and community-owned web3 technologies.

I also think we are entering an era where the potential of Bitcoin to become one of the key reserve currencies of people and nations is becoming clearer than ever. It will not be a smooth ride, but it will be a highly meaningful one for those who take the journey.

JO: What are the worst things about crypto?

SZ: The tribalism and bitter competition between crypto communities. [Austrian economist Ludwig von] Mises predicted open competition of private monies and technologies, and I think we're seeing that play out in a high-stakes way now. Nonetheless it's

unavoidable that tensions run high when people have a high percentage of their net worth in these assets, and in a way it does also show the resilience of communities and what stuff people are truly willing to fight for.

JO: What has the war in Ukraine revealed about cryptocurrencies?

SZ: The power of crypto to protect individuals' rights. Ukrainians are using it to protect their wealth from war, and Russians are using it to be able to flee the country and retain some level of assets. Moreover, crypto is enabling the global community to interact intimately with what's happening.

JO: You frequently mention history and philosophy. How do those topics inform your work?

SZ: To really get crypto, you must understand what it's a reaction against and what it's a movement toward. For me, crypto represents several convergent trends:

Away from centralized control, toward decentralized decision-making.

Away from closed-source walled gardens, toward open-source discussion.

Away from institutional ownership, toward individual ownership.

Away from permissioned assets, toward self-sovereign bearer assets.

Away from crony capitalism, toward collective capitalism.

Away from platforms capturing value from creators and fans, toward creators sharing value with fans. ▶

“I’m a believer in Amara’s law, which is that technology is overestimated in the short run and underestimated in the long run, especially when applied to crypto. The areas of most potential are likely not even thought of as crypto use cases today”

●

I am a libertarian, but with that I am also a voluntarist. What that means is I do not wish to convert everyone to my own way of thinking—I simply wish to help bring about a world where a parallel freedom-centric system exists, and at later points in time anyone can partake in this system as they see fit.

The first major victory for individuals was the advent of the internet, and the second was the development of open-source peer-to-peer encryption technology in the 1990s. At the time, the existence of end-to-end encryption for individuals was so alarming that the U.S. government attempted to deem its dissemination as the unlawful exportation of military-grade technology.

Since then, we’ve learned that these were in fact inalienable human rights that we’ve had all along. Technology re-enables behaviors as natural as handing someone cash or having a simple conversation in the physical world. I refer to the idea of crypto as a revanchist technology, because it is a critical step in reclaiming key ground that individuals have given up over time.

JO: What investments are you proudest of, and least proud of?

SZ: Investing in Deribit, the leading crypto options trading exchange, during the bear market. Investing in Layer-1s, like Avalanche, Solana, Polkadot, during the bear market, especially via the over-the-counter market. All of these felt really contrarian at the time, but obvious in the sense that going against the grain and backing hardworking, tech-oriented teams would pay off.

I don’t think there’s anything I’m not proud of. Even the ones that lose money, it’s important that those projects were attempted, and founders tried things. Too often people look at something that fails and try to make some broader conclusion, while not recognizing the probabilistic and unknowable nature of all things. To give you an example, our best venture investment to date was *Axie Infinity*, a project so undersubscribed in its seed round that people thought they were donating. The most crowded investment thesis I saw was probably Facebook’s Libra nodes, which everyone set up SPVs [special purpose vehicles] for and thought would become the future of crypto. [Facebook, now Meta Platforms Inc., planned to revolutionize global finance with a crypto initiative called Libra, later renamed Diem, but it never got off the ground.

All the assets were sold to Silvergate Capital Corp. early this year.]

JO: Which person do you most admire in history or philosophy?

SZ: If you look at someone like [Singapore’s late founding prime minister] Lee Kuan Yew, what he managed to accomplish via the Singapore separation from Malaysia was incredibly futuristic. Essentially, Singapore was the first startup city. It had to undergo multipronged challenges of nation-building: security, energy, economy, and culture—all in a perilous geopolitical environment. I see a lot of analogies to crypto community-building itself. You have to believe in the power of community and collective will to action, as well as in the importance of nonstop transparency and honesty and the ability to win in the battlefield of ideas.

JO: What does the future hold for you? For Three Arrows?

SZ: I’m looking to support the development of whole-systems thinking wherever I can. I see important parallels to how we as a society think about futurism itself—many technologies sound futuristic but are in fact regressive, while many that seem clunky are in fact powerful humanity-enhancing innovations.

I am a big proponent of nature-based, grassroots solutions to key agricultural problems and look forward to making more of an impact there. My commitment to that is an extension of the same ethos and philosophy that underpins my commitment to crypto. Nature-based food systems, or agroecology, decentralize our access to nutritious food and clean water. They move us away from dependence on global supply chains. If we build farming alternatives at a community level, then people can choose to participate in this more local parallel food system. Community-supported market gardens, especially in cities, expand our freedoms. They will be another major victory for individuals as they will give us more control over our own health and nutrition whilst regenerating the Earth.

As for Three Arrows, we will continue doing what we do best, which is invest in cryptoassets and support crypto-builders and communities for the long term. ●

Ossinger covers cryptocurrencies in Asia for Bloomberg News. She is based in Singapore.

What Are Companies With Crypto Exposure Talking About? Here's How to Find Out

By ALEX WISCH, ROWAN DAIKSEL, and KAI BLATNICKY

BEFORE RUSSIA INVADED Ukraine in February, the topics that companies exposed to digital currencies talked about the most in earnings calls were cloud computing, mergers and acquisitions, partnerships, regulation, and China. References to China remained relatively stable last year, while cloud computing saw a spike in the fourth quarter. Regulation has also seen a steady increase in mentions: It appeared more than 200 times in the fourth quarter of 2021, up from 60 times in the fourth quarter of 2020.

How do you find this data? Simple. Take any list of crypto-related companies and plug it into the new Document Search function, which features a transcript trend analyzer.

TO BEGIN, BLOOMBERG MAKES it easy to create a list of crypto companies if you don't already have one: Use the Worksheet

Sample Library to find thematic lists of companies you can save and customize. Just type "Worksheet Sample Library" in the command line of a Bloomberg screen and select WSL from autocomplete. The shortcut is **{WSL <GO>}**. Type "crypto" in the amber field and click on the worksheet titled Crypto: Indirect Exposure Securities. (This list includes miners, exchanges, and companies that own Bitcoin as part of their corporate treasury policies. By contrast, the Crypto: Direct Exposure Securities list includes futures and funds.) To save a copy of the sheet, click on the Export button on the red toolbar and select Export as My Security Worksheet. Give the sheet a name and hit Update.

Next, to analyze those names, type "document search" in the command line and select DS from autocomplete. The shortcut is **{DS <GO>}**. (Click the yellow Upgrade button if you haven't upgraded ►

Fig. 1 To analyze how often key concepts appear in the transcripts of a selected list of companies, go to **{DS <GO>}**.



Fig. 2 To create a list of companies recently mentioned in stories about crypto, go to **{NCAT <GO>}**.



yet.) DS enables you to search 200 million company documents, harnessing artificial intelligence algorithms to extract insights.

To load your worksheet, click on More Filters >>. Click on Security Lists under Primary Filters in the navigation menu on the left. Then click on the Browse Security Lists button. In the window that appears, click on Security Worksheets. Use the scrollbar to navigate to your saved worksheet, select it, and hit the Pick button.

Once your list is loaded, specify the types of documents for your analysis. Click on the button to the right of Source and then on Recommended if it isn't already selected. Here we want to focus on transcripts, so delete all the other types of documents, such as filings and presentations. Hit the Apply button and then the Run Search button.

That loads a list of transcripts related to the companies on

your list. To display trending themes over the past few years, click on Trends in the upper left of the screen (FIG. 1). The topics are sorted by total mentions during a selected period, such as the past two years. You can then track how mentions change quarter to quarter.

LET'S SAY YOU'D LIKE to analyze an alternative list of companies based on mentions in recent articles on crypto. You can use the News Categories function to create such a list. Type “news categories” in the command line and click on the NCAT match. The shortcut is **{NCAT <GO>}**. The function allows you to extract tickers related to a news theme such as crypto.

When NCAT loads, click on the x to eliminate anything already in the amber search field. Then type “crypto” and select the FRXDIGITAL match, the NI code for crypto-related news (FIG. 2).

Fig. 3 Click on the Custom tab in WATC to create a custom template using the metrics that matter to you.

Type keywords such as “revenue growth” for your metrics here and select from the autocomplete matches.

Name	% Wt	B/Est P/S BF12M	Rev - 1 Yr Gr:Q	Rev - 1 Yr Gr:Y	Return: BTC Drawdown	Return: BTC 2022 Bounce
Investable Universe (26)		5.33	479.14%	56.57%	-21.56	4.38
31 MARATHON DIGITAL HOLDING...		2.99	6091.15%	207.65%	-71.01	31.44
32 RIOT BLOCKCHAIN INC		3.91	2532.33%	76.70%	-62.38	31.04
33 CRYPTO CO/THE			1265.65%		-78.10%	-33.74
34 COINBASE GLOBAL INC -CLAS...		5.00	327.01%	513.66%	-46.29	
35 TESLA INC	1.90	9.71	64.92%	70.67%	-7.78	
36 NVIDIA CORP	1.62	17.28	52.77%	61.40%	-23.75	
37 ALPHABET INC-CL A	2.19	6.94	32.39%	41.15%	-12.47	
38 BLOCK INC		3.50	29.11%	85.95%	-48.83	
39 SPOTIFY TECHNOLOGY SA		2.19	24.03%	22.69%	-29.85	
40 WARNER MUSIC GROUP CORP...		3.01	20.90%	18.78%	-18.24	
41 MICROSOFT CORP	6.03	10.25	20.09%	17.53%	-11.72	
42 META PLATFORMS INC-CLASS...	1.34	4.20	19.95%	37.18%	-9.60	
43 ROBINHOOD MARKETS INC - A		5.40	14.23%	89.31%	-64.63	
44 BHARTI AIRTEL LTD	2.61	2.92	12.63%	14.94%	-2.75	
45 APPLE INC	6.94	6.63	11.22%	33.26%	7.69	

You can filter by any of the columns. Here we’re looking at the companies with the largest revenue growth in the latest quarter. The column to the right lets you compare revenue growth in the latest annual filing.

As of Feb. 28, NCAT showed that in the preceding week almost 14,000 articles about crypto were published. Of them, 2% mentioned Coinbase Global; 1% mentioned Block, and another 1% mentioned JPMorgan Chase.

To take a deeper dive into the relative performance and metrics of the most-mentioned companies, you can easily export them into the Watchlist Analytics (WATC) function. Click on the Export button on the red toolbar and select WATC.

WATC lets you analyze the companies with ready-made templates covering a range of metrics. In addition, you can create a custom template with the metrics you care most about. To do that, click on the Custom tab. (If you’ve already saved a template, click on Add to add a new one.) Type keywords for your metrics in the amber Add Column field and click on the match. For example, to add a metric that will calculate the return of each stock during the period from Nov. 9, 2021, to Jan. 23—when Bitcoin plunged 48%—type “total return” and click on the matching item in auto-complete. In the drop-down menu that appears to the right, click on Customize Period. In the window that appears, give the metric a name such as “Return: Bitcoin Drawdown.” Select By Exact Date and enter “11/09/21” and “01/23/22.” Hit the Update button.

We added columns for some custom metrics that let you quickly compare valuation, growth, and volatility to help you evaluate which companies meet your overall risk-return investment thresholds (Fig. 3). The valuation metric is price to blended forward 12-month estimates of sales. Two other columns show revenue growth, enabling you to see which companies had larger growth

in the latest quarter relative to the growth in the latest annual filing, which would suggest accelerating business.

Finally, we added a Return: Bitcoin Drawdown column and a Return: Bitcoin 2022 Bounce column, which let you see how the companies performed during the drop through Jan. 23 and the subsequent period through Feb. 9, when Bitcoin rallied 26%. To save a template you’ve created, click on the Save Template button.

You can also save your list of companies for further analysis by clicking on the Export button and selecting Worksheet, for example. Running these companies through DS reveals a thematic evolution similar to that of our original list, with mentions of revenue, cloud computing, and guidance dominating transcripts.

TO TRACK REPORTING related to these themes, you can use natural language to build bespoke news feeds. For example, type “news on crypto and financial regulation” on the command line and press <GO>. For a component that you can add to your Launchpad, run **{LLP <GO>}**.

To subscribe to *Bloomberg Crypto*, a twice-weekly look at the world of tokens, blockchain, and more, go to **{NSUB <GO>}**, type “crypto” in the amber field, select Crypto Newsletter, and hit the Subscribe button. ●

Wisch is a market specialist for news, Daiksel is a hedge fund account manager, and Blatnick is an equity market specialist at Bloomberg in New York.

Use BQL to Expand the Reach Of Your Research

By ANIBAL ARRASCUE

CRYPTOCURRENCY HEDGE FUNDS have outperformed all other categories in recent years.

Go to **{HF <GO>}** for the Bloomberg Hedge Fund Indices function, which lets you benchmark the performance of different strategies and styles. The Bloomberg Cryptocurrency Hedge Fund Index was up 3.4% in the year through March 18, slightly ahead of the Bloomberg All Hedge Fund Index. Over five years, however, the crypto index had returned an average of more than 50% a year, far outstripping any other category.

When you consider that Bitcoin has been around for only 14 years and crypto hedge funds for about a decade, it suggests that new investment areas may hold particular potential for hedge funds.

If you're running a newish strategy, one powerful tool that you and your analysts can tap is Bloomberg Query Language, or BQL.

BQL has been a game changer for Princeton, N.J.-based Bayard Asset Management LLC, says Chief Investment Officer Deepinder Bhatia. "Having the ability to seamlessly import the Bloomberg terminal's granular, company-level financial and non-financial data across thousands of companies into sortable Excel spreadsheets has made our research process more accurate, efficient, and focused," he says. "We not only use BQL spreadsheets to screen and generate ideas focusing on sectors and geographies of specific interest but also to track 13F filings, insider buying and selling, and numerous other quantitative and qualitative metrics, all in one spreadsheet."

HERE'S A QUICK overview of some helpful BQL resources.

First, the BQL Builder makes it easy to retrieve the data you want. Let's say you've seen a news story about Goldentree Asset Management embarking on a crypto play, and you want to pull down the firm's reported holdings for your research. Simple. Open an Excel spreadsheet, click on the Bloomberg ribbon, and then on BQL Builder. Click on Standard View if it isn't already selected. Next, in the Securities field, type "Goldentree" and click the 700436Z US Equity match to load it. To the left of the firm's ticker there's an fx drop-down. Click that and select Holdings Of. In the

Fields field, type "id" and click on the match. Hit the Insert and Run button to download the data (**FIG. 1**).

For more information on using BQL for Holdings, you can download a spreadsheet tutorial. Go to **{BQLX <GO>}**, which is the home-page for information about using BQL to find data and perform analysis in Excel. In the sidebar on the left, click on BQL for Institutions/Funds under Asset Class Reference. Scroll down to the Institutions/Funds Tutorials and Workflows section and click the Institution and Fund Holdings sheet to download it. The sheet includes both a basic introduction to using BQL and more advanced information about topics such as aggregating holdings data (**FIG. 2**).

In addition, you can also use a ready-made template to download the holdings of a selected institution. Type "Excel template" on the command line of a Bloomberg screen and click the XLTP match. Enter "13F" in the <Search> field, press <GO>, and click the 13-F Holdings Analysis. The shortcut is **{XLTP XFLNG <GO>}**. Hit on the Open button to download a copy.

Next, let's say you've gone to **{COIN US <Equity> MODL SOURCE <GO>}** to check consensus estimates for Coinbase Global Inc.'s transaction revenue. To download the template into Excel, click the Export button on the red toolbar and select Export (Template). Each of the cells in the spreadsheet contains the BQL formula for that data item: When estimates change, your spreadsheet will display updated data (**FIG. 3**).

Another helpful sample sheet lets you compare risk and return metrics for a selected fund and benchmark. To download a copy, go to **{BQLX <GO>}** and click BQL for Institutions/Funds again. Scroll down to Institutions/Funds Tutorials and Workflows section and click on Risk Return Metrics to download it. Click the Risk Metrics Factsheet if it isn't already selected. Enter "BHCRYP Index" in the Ticker cell and "BHEDGE Index" in the Benchmark Override cell, then press <GO>. As of March 18 the crypto index had returned 54% a year over five years, compared with just 5.1% a year for the wider hedge fund index. ●

Arrascue is on the hedge fund data team at Bloomberg in Princeton, N.J.

Fig. 1 The BQL Builder makes it easy to retrieve data, such as the reported holdings of a hedge fund, in Excel. Click on the Bloomberg ribbon and then on BQL Builder.

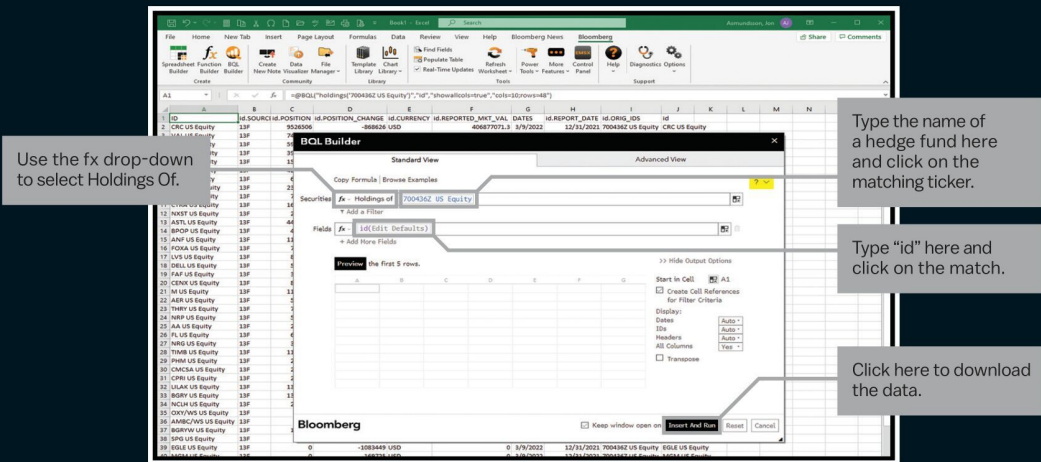


Fig. 2 For a tutorial on retrieving and analyzing holdings data in Excel, go to {BQLX <GO>} and click on BQL for Institutions/Funds. Scroll down and click on Institution and Fund Holdings.

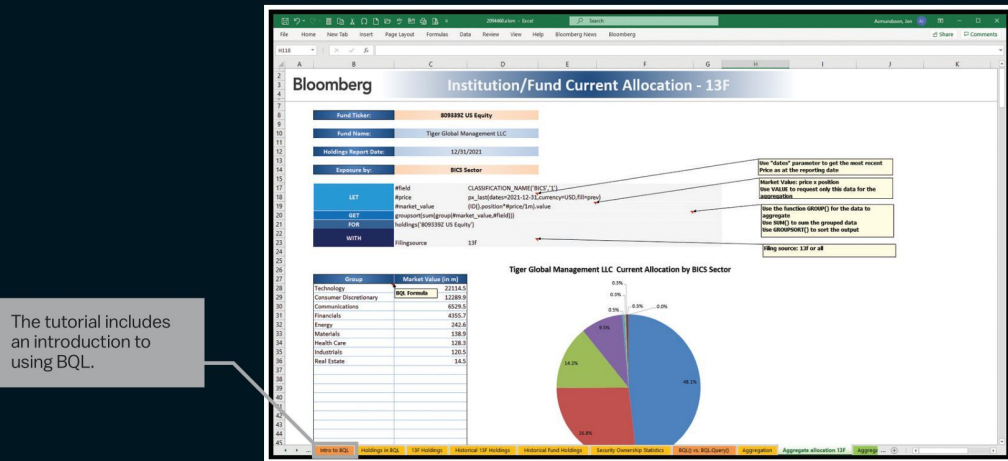
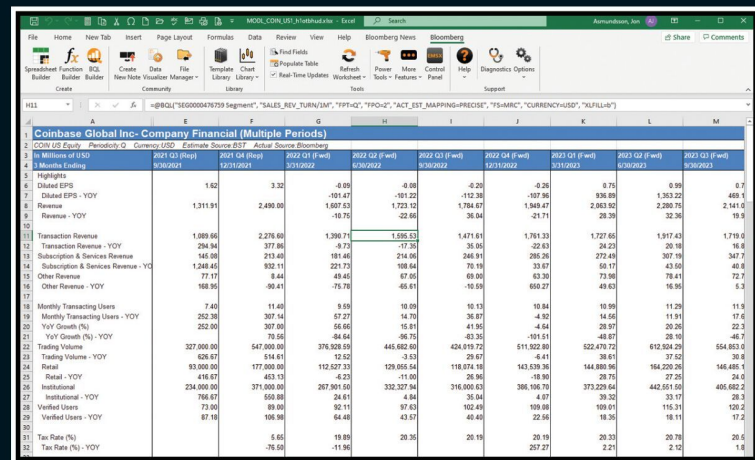


Fig. 3 From MODL you can download templates loaded with BQL formulas that update your spreadsheet when estimates change.



Here's a Solution to Potential Headaches From the EU's New Settlement Regulation

By JOHN MORTON

THE SETTLEMENT DISCIPLINE chapter of the European Union's Central Securities Depository Regulation (CSDR) went into effect on Feb. 1. Unlike much legislation, this chapter can be boiled down to a single sentiment: Settle your trades on time—or else!

The rest of CSDR, which covers regulation and supervision of the bloc's central securities depositories—specialized institutions that hold financial instruments and settle trades—went into force in 2014. The aim of the regulation, which was drafted in the wake of the global financial crisis, was to increase the safety and speed of securities settlement, in part by harmonizing practices across the EU. The Settlement Discipline element of CSDR, however, became subject to a myriad of consultations, delays, and, finally, a review.

Threat vs. Headache

The review was a relief to much of the financial markets, turning what was viewed by many as an existential threat into, at worst, an administrative headache.

CSDR introduces penalties for settling trades after the Intended Settlement Date (ISD) for any trade (with some exceptions) that's settled via an EU-located CSD. These penalties are similar to late settlement charges introduced by the Treasury Market Practices Group (TMPG) in 2009 covering U.S. Treasuries and agencies.

The EU went further, though, placing a time limit of 4, 7, or 15 days (the extension period) after the ISD for the trade to settle. This is where the existential threat comes in. Following the

expiration of the extension period, the failed-to-counterparty was required to launch a mandatory buy-in (MBI)—a process in which an appointed buy-in agent takes over the trade and fulfills it with any costs being borne by the nondelivering counterparty. The implications of selling short to satisfy the trade were obvious. The likely result of this would've been a reduction in immediacy services from market makers, with traders having to weigh the probability and cost of an MBI prior to providing a quote.

Now a Headache

Following an extensive review process, the EU has decided to delay the imposition of the MBI regime while going ahead with late settlement penalties. Relieved, market participants are now focused on penalties, not an insignificant burden.

Even an extremely low rate of late settlements will result in daily income and payment charges that will need to be reconciled and assigned to the various desks and clients. Although the penalties are calculated on a daily basis, each CSD will levy a net figure on a monthly basis.

A Sting in the Tail

Beyond exhorting investment firms to take measures to settle their trades on time, the Settlement Discipline chapter of CSDR deals only with the consequences of untimely settlement—with one exception. Article 6 requires investment firms to exchange information sufficient to settle the trade on a timely basis. The

Avoid Failed Settlements

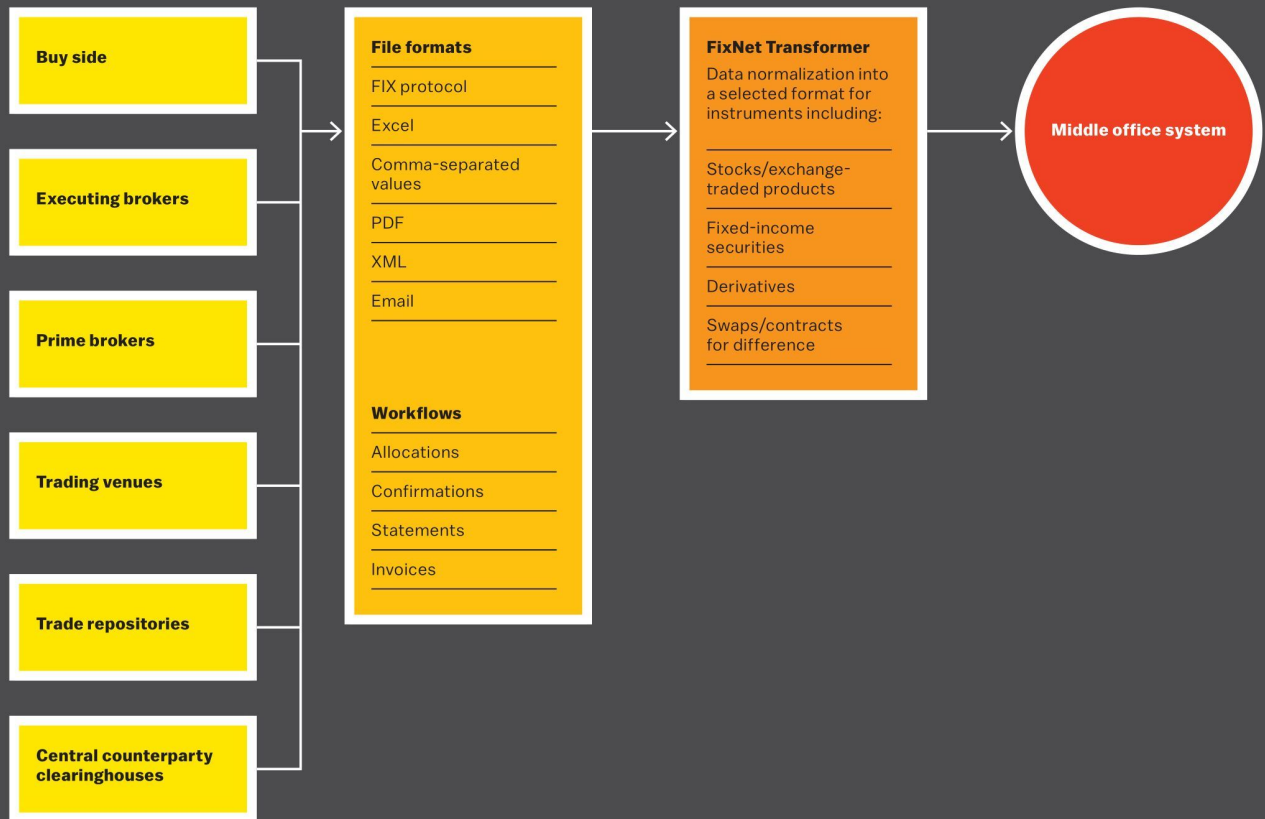
FixNet Transformer, a suite of data normalization tools, converts disparate file types and workflows into a format that can be delivered directly into your middle office system.

A trade may involve several parties...

...generating data in disparate forms.

FixNet Transformer normalizes that data into a format...

...usable by middle office processing and risk systems.



Source: Bloomberg

European Securities and Markets Authority (ESMA) provides more detail, asking investment firms to obtain allocation-level information within the trading day and acknowledge receipt within two hours. This process is seen as the first line of defense against late settlement.

Should the settlement performance of a firm come into question, the firm's record of compliance with Article 6 may draw attention. This process is already automated for the majority of trades. There are gaps, however, with allocation-level information being returned via an assortment of nonautomated channels. Dealing with this tail poses an administrative burden and potential regulatory risk.

FixNet Transformer

Disparate middle-office data and workflows present a burden that both buy- and sell-side firms continue to struggle with. To alleviate these issues, the Bloomberg Professional Service and Bloomberg

FixNet offer many middle-office integration and connectivity choices seamlessly integrated with Bloomberg's electronic- and voice-trading franchises, venues, execution, and order management systems, as well as third-party or proprietary systems. As a natural extension of those solutions, FixNet Transformer handles less-traditional, manual workflows.

Given allocation instructions that are provided in a repeatable fashion, Transformer converts data into a standardized, machine-readable format of the subscriber's choosing. Additionally, it can help provide an automated acknowledgment of receipt. An audit trail of this process can be stored to provide as evidence of a firm's compliance with the Article 6 provisions. A diagram gives more detail of the differing formats and workflows that Transformer can work with (see above). For more information, contact your Bloomberg representative. ●

Morton is a financial regulation specialist at Bloomberg in London.

Worldcoin's Global Ambitions Hit Snags

By ELLEN HUET

WORLDCOIN—THE BILLION-DOLLAR STARTUP that wants to give cryptocurrency to every living human—halted operations in at least seven countries after a host of logistical hurdles prompted the company to redraw its launch plans.

Co-founded in 2020 by former Y Combinator chief Sam Altman, Worldcoin aims to photograph the irises of everyone on Earth so it can distribute its new digital money fairly. The company has collected images of the eyes of hundreds of thousands of people in about 20 countries. But the process has been bedeviled by problems such as uneven smartphone access, confused users, and fraud attempts.

Worldcoin suspended work in multiple countries after local contractors departed or regulations made doing business impossible. Technical challenges led the company to start requiring that participants have a smartphone—limiting the project's reach in developing nations, which have been a key part of the startup's vision. Worldcoin has also repeatedly delayed its target launch date, which is now set for later this year.

Co-founder and Chief Executive Officer Alex Blania says the setbacks are the natural result of "very aggressive testing" for a young startup. The company has grown from 10 employees to 100 in the past year, Blania says, and it's experimenting as it hones its operations. "You're still talking to a Series A company, not an Uber. Things are not perfect."

Worldcoin may have raised only one round of institutional funding, but it already has the billion-dollar-plus valuation and responsibilities of a more established company. Its backers are a

who's who of Silicon Valley, including Andreessen Horowitz, LinkedIn co-founder Reid Hoffman, and the venture capital arm of Coinbase Global Inc. (Bloomberg LP, which owns *Bloomberg Markets*, has invested in Andreessen Horowitz.) The startup is also now the custodian of sensitive biometric data on about 450,000 people.

Worldcoin has drawn criticism from privacy experts concerned about a fledgling company using so much personal information. Its departure from some regions has also put its on-the-ground contractors in a stressful position, according to three of the workers, who asked not to be named because they aren't authorized to speak publicly about their jobs. In some countries where Worldcoin has stopped operations, contractors were left to deal with confused and angry users worried that the crypto startup had scanned their eyes and disappeared, the workers say. Blania says the company plans to open-source much of its hardware designs and protocol, a step it believes will "allow anybody to verify our dedication to user privacy and security."

At the crux of Worldcoin's plans is a shiny, chrome-surfaced sphere about the size of a volleyball. Called the Worldcoin Orb, the device weighs about 5 pounds, costs around \$2,000 to \$3,000 to make, and can take a detailed picture of a person's eyes in a matter of seconds. The team developed the device after Altman in 2019 came up with the idea for a cryptocurrency accessible to everyone in the world. To ensure that no one signed up for Worldcoin more than once, Altman and Blania decided to identify people by their irises.



The Worldcoin Orb

The company started building and distributing the orbs in secret, but Bloomberg News broke the story in June about its hardware and its eye-imaging plans. By last fall, Worldcoin said it had already imaged 130,000 people's eyes in countries including Benin, Chile, France, Indonesia, Kenya, Nigeria, Norway, South Africa, and Sudan. The imaging is operationally complex and has to be done in person by one of Worldcoin's contractors, whom the company calls "Worldcoin distributors" or, more colorfully, "orb operators." The orb is held up to someone's face while they gaze into its camera.

The act of imaging can make for an unsettling scene: The silver sphere speaks in a calm female voice and says, "Initiating scan. Open your eyes." Sometimes the machine advises, "Move a bit closer." For the reading to work well, the person getting scanned has to stare into the camera with eyes wide open, showing as much of the eye's white as possible, for about 10 seconds or longer. Once it's complete, the registered person can choose to have a small amount of Worldcoin added to a digital wallet as a reward for signing up.

Worldcoin's operators, who are paid for each person they register, are often local entrepreneurs interested in the promise of a global currency that could, for example, help people send money to their families overseas without paying middlemen or wire fees. Some distributors used their local connections to advocate on behalf of Worldcoin to government officials or authorities wary of crypto. Taking the orb out to schools and gathering places, they also persuaded thousands of people to stretch their eyes wide to sign up for a newfangled project.

Early progress was uneven. The biometric-data system is designed to block fraud, but people still tried. Someone attempted to scan the eyeballs of a Chihuahua, Blania says. And there were technical difficulties, too. Initially, distributors were signing up people even if they didn't have smartphones or email addresses, but that proved too complicated. Now, Worldcoin is signing up only users who have smartphones, which in January led the company to stop operations in Zimbabwe and Benin, where such phones are less common. "Later on we will figure out ways that, even if you don't have a smartphone, you can sign up," Blania says.

Each region has posed unique challenges. In Sudan and Turkey, Worldcoin is no longer imaging eyes, for regulatory and legal reasons. And in countries such as France, Ghana, and South Africa, the company has stopped operating because its local contractors found the work too demanding, so the orbs were deployed to another region for more testing.

Meanwhile, Worldcoin's start date has been serially delayed. Last year its app said it would premiere "around the end of summer." Then it said "around the start of 2022," according to screenshots reviewed by Bloomberg. Most recently the target date was updated to sometime later this year.

Still, Blania's ambitions for the project are immense. Worldcoin has about 30 orbs in circulation, but the CEO estimates that by the end of 2022 it will have 6,000. The company has collected images of the eyes of almost half a million people so far. Blania expects it will have 20 million to 30 million registrants by the end of the year.

Although it's not unusual for startups to overpromise and blow past deadlines, Worldcoin's various delays and withdrawals have left some of its contractors feeling angry and fearful. They'd already been fending off questions from people who'd gotten their eyes imaged and were wondering when the currency would finally make its debut. "You can't play around with such personal information," one user wrote to a distributor after hearing that the company had changed its plans. "I'm coming after you if I don't see any benefits from whatever you made us sign up for."

Asked about the complaints, Blania says some operators were unhappy that the company would no longer be paying them, adding that some "did questionable things or didn't perform well." He also notes that the operators can have "very misaligned incentives" with the larger startup.

Early adopters may have some reason to be concerned about privacy: They're actually handing over more sensitive data than future users will. When pre-launch registrants have their irises imaged, they sign a release form acknowledging that high-quality images of their face and eyes will be stored by the company and used to train its iris-distinguishing algorithm. In the future, new users' eye images won't be stored, but the startup needs to collect lots of data to get to that point.

Launching any startup, particularly one as mind-bogglingly ambitious as Worldcoin, is an exercise in refinement and experimentation, Blania says. It's a common mantra for Silicon Valley entrepreneurs: Fail fast, try again. "You test all kinds of things," he says, "different app features, different functions of the orb, incentive mechanisms, how much you pay an operator." Then at the end, if you're lucky, you get to bring your product to everyone on Earth. ●

Huet covers venture capital for Bloomberg News in San Francisco.

Why Ethereum's Coming 'Merge' Matters for Crypto

By OLGA KHARIF

SOMETIME LATER THIS YEAR, Ethereum is set to make the biggest change in its near-decade history, an event that's certain to ripple through the entire ecosystem of cryptocurrencies and digital assets. Think of it this way: The most important commercial highway in crypto is about to be completely repaved.

Ethereum is essentially computer software that uses so-called blockchain technology to provide a digital ledger for recording transactions. It's become the most popular basis for a growing array of commercial crypto assets and applications, including lending products, nonfungible tokens (NFTs), as well as its native token, Ether. Ethereum isn't owned by anyone but built and refined by a community of developers, and it runs on a network of data centers throughout the world. These data centers operate as "miners" on the network, ordering transactions that are posted to the digital ledger. In return they get paid in Ether. This system has been dubbed "proof of work."

Developers who work on refining the Ethereum software roll out periodic upgrades, but none has been as major as the one expected this year. Named "the Merge," it will replace miners with so-called stakers. Miners order transactions by solving complex calculations using millions of powerful servers—a system that's been criticized for its heavy use of electricity. Stakers, by contrast, will order transactions by putting up their own Ether on a new system, which has been in testing since December 2020. People can already use their digital wallets to stake Ether on this test system, called the Beacon Chain; after the Merge they will start to be selected at random to become what are known as validators, ordering transactions on the Ethereum digital ledger into blocks and getting paid with new Ether. This is called "proof of stake."

ETHEREUM'S \$405.4 BILLION market capitalization depends on the Merge going smoothly, but so do the thousands of businesses that operate on the blockchain, plus millions of users. Some \$118 billion of capital is locked in Ethereum's decentralized finance (DeFi) apps, according to tracker DappRadar. Most NFTs—also with a total value in the billions—use Ethereum.

"There's never been, in the history of blockchain networks, a change on the scale of Ethereum's transition from proof of work to proof of stake," says Chase Devens, an analyst at researcher Messari.

The Merge will be a nail-biter because a lot could go wrong. There could be software bugs or hacks, or miners could create an alternative Ethereum network. During a 2020 network upgrade, a bug split Ethereum in two, wreaking havoc on its nascent DeFi ecosystem, the apps that let people trade, borrow, and lend without intermediaries like banks.

Most centralized crypto exchanges are expected to pause Ether withdrawals and deposits around the Merge as a precaution. DeFi apps may pause, too, if something goes wrong.

"With all technical upgrades of all these large chains, you need to use caution," says Katie Talati, director of research at digital asset manager Arca. "At the end of the day we are dealing with unknown technology."

THE MINERS ARE causing the most worries. Many may quit the network right before the Merge, figuring they can make more money by selling their gear than by waiting to get the last of the rewards. Too steep a drop in the network's mining power, or the "hash rate," could weaken Ethereum's security, spelling disaster for its token and the various apps using the network. Ethereum's core developers have planned for that scenario. "If we see the hash rate dropping, we could pull the Merge forward," says Tim Beiko, a computer scientist who coordinates Ethereum developers. "All the software is built with an emergency option."

Miners may also choose to fork Ethereum, by taking the existing proof-of-work software and continuing to support it. That would create two different versions of Ethereum that run in parallel: proof of work and proof of stake.

"We believe POW and POS will coexist for a period of time after the switch," says Danni Zheng, vice president of BIT Mining, a mining provider that's also expanding its staking services.

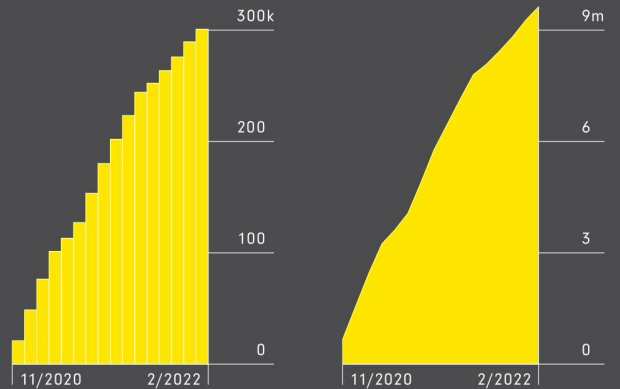
In this scenario, crypto exchanges and users could become confused about which chain's Ether they're holding or trading.

Turn Signals

A new method for ordering Ethereum transactions commands new resources

Daily active validators
at month's end

Staked Ether
at month's end



Source: beaconcha.in

Two networks will mean more work for app developers, says Dieter Shirley, chief technology officer at Dapper Labs, the maker of an Ethereum-based cat-breeding game, *CryptoKitties*.

"A contentious fork, it's likely it would hasten our departure from the Ethereum ecosystem," Shirley says. Dapper may consider moving *CryptoKitties* to its own blockchain, Flow, he says.

A fork, or at least a lot of public criticism, is exceedingly likely because many Ethereum miners don't seem to know the Merge is coming. Ethereum developers communicate about the Merge on Discord and Telegram, messaging apps that many miners don't use, Beiko says. Mining pools, which provide most of the transaction-ordering on Ethereum today, take a percentage of the miners' earnings, and it's in their interest not to notify their members of the Merge so that mining continues at least until the network upgrade, he says.

"I am more concerned about the people who don't even know this is happening, and they buy this \$3,000 miner, and three months later it stops working," Beiko says. "It would be a bad idea to start mining today."

And some miners just don't believe the Merge is really coming, because it's been delayed in the past.

"There's a lot of skepticism because Ethereum has promised proof of stake for five years," Beiko says. "It's hard to convince people that this time it's for real."

SHUTTING ETHEREUM'S old chain will send shock waves through the cryptomining industry. Scrambling to find other uses for their equipment, miners will migrate their machines to other, similar chains such as Dogecoin, Litecoin, and Monero. The hash rate on those other chains will balloon by 5 to 10 times overnight, says Sam Doctor, chief strategy officer at Bitooda, a digital asset fintech company. Overall revenue for this type of mining could drop as much as 90%, pushing many miners out of business, he says.

U.S. miners will pursue clients outside the crypto industry, in areas such as artificial intelligence and genome sequencing, Doctor says. "But none of them have customer-acquisition experience."

INVESTORS MAY BENEFIT from the Merge. The number of new coins issued on Ethereum as rewards for ordering transactions should decrease 50% to 90%, as the proof-of-stake chain will offer lower rewards, Beiko says.

In the next two years the amount of Ether that's used for staking will probably increase from 8% to 80%, according to staking services provider Staked. That will reduce the Ether in circulation, potentially pushing up its value.

Stakers will be able to use the Ether they receive as rewards for ordering transactions, but not the Ether that they stake—at least not until another software upgrade, expected six months or so after the Merge. Stakers are more likely to hold their Ether for the long term than miners, who often need to sell some to cover electricity costs, says Kyle Samani, co-founder of Multicoins Capital.

After the Merge, the energy consumption of Ethereum's network should drop more than 99%. To order transactions on the new proof-of-stake network, a validator can use a high-end laptop instead of a server farm. The entire proof-of-stake Ethereum is expected to consume around 2.62 megawatts—about as much as a small town with 2,100 American homes. By contrast, current proof-of-work setup gobbles up the energy of a midsize country.

"Even my daughter has picked up the 'NFTs are boiling the oceans' hysteria," says Ben Edgington, lead product owner at ConsenSys, which builds infrastructure for the Ethereum blockchain. "I expect that freeing ourselves from the negatives of proof of work will definitely help make applications like DeFi and NFTs much more socially acceptable, leading to significantly accelerated adoption."

Much will depend on whether the Merge goes smoothly, of course. "If we do our jobs well, nobody will notice the moment that Ethereum moves from proof of work to proof of stake," Edgington says. ●

Kharif covers cryptocurrencies for Bloomberg News in Portland, Ore.

Gaming's 'Das Kapitalist' Sees A Lot of Hype in NFTs, DAOs, And the Metaverse

By YUEQI YANG and MAX ABELSON

PHOTOGRAPH BY ADRIENNE GRUNWALD

SAM PEURIFOY SITS at the forefront of financial innovation, but he doesn't move around a lot. The chemistry Ph.D. and Goldman Sachs Group Inc. alum, who turns 28 in May, spends most of his days at his computer in an apartment in Manhattan's Financial District. He's the chief executive officer of Playground Labs, a company that blends video gaming and cryptocurrency, and the head of interactive for Hivemind Capital Partners, a \$1.5 billion venture firm focused on crypto investments, where he leads a strategy called play-to-earn.

Peurifoy spoke with *Bloomberg Markets* in early March about how skeptical he is of Big Tech's definition of the metaverse, the nonfungible token fad, and some of the groups that call themselves decentralized autonomous organizations. While he remains on guard against crypto poseurs, he does believe crypto could help reshape the world—from Russia to gaming to payday. Peurifoy, who's known in gaming circles as "Das Kapitalist," says he eats the same meal every day and is lucky if he plays a few hours on the weekends these days. The interview has been condensed and edited for clarity.

BLOOMBERG MARKETS: Your wife's family is Russian. Do you see Russia's invasion of Ukraine changing crypto?

SAM PEURIFOY: It's going to boil down to two competing forces. Are government bodies evading sanctions using these tokens? The other force is: With a local currency that's being devalued by the hour, almost, at what point do citizens turn to more stable digital currencies? Citizens using a more stable currency is obviously a plus, but sanctioned countries evading sanctions is obviously a minus. It's a very difficult line to tread. Maybe we run know-your-customer on every single person who installs a crypto wallet.

BM: You left Goldman Sachs last year. When do you think bankers will warm up to crypto?

SP: When the market was superfrothy, I was having financial professionals reach out to me on a daily basis asking me how to get into crypto. And these were not people from low-ranking firms,

either. They were very serious financial professionals, with genuine interest from across the board. Perhaps they feel like they're not making enough in their current position, but I actually think that's not really what's going on. I think they're genuinely just bored.

BM: Do you see a pattern among these financial professionals in terms of work history or demographics?

SP: You have managing directors to portfolio managers, vice presidents, analysts, equity analysts, investment bankers. It's everything.

BM: What does Hivemind do?

SP: We provide capital and specific blockchain expertise to projects building in the crypto space. We aspire to being the Blackstone of crypto.

BM: How many people are there?

SP: We aim to have more than 30 employees by the end of the year. We've just ramped up hiring extremely substantially.

BM: What do your returns look like?

SP: The recent market downturn provided a large number of excellent buying opportunities for coins and companies. I don't think I can give you anything more specific than that.

BM: The idea of Playground Labs, and your "Das Kapitalist" gaming identity, is that you seed other players with money. How?

SP: If they have joined with the intention of trying to play these play-to-earn games, then what happens next—assuming there's no waitlist, because there's usually a gigantic list of people trying to play these things—we basically issue them assets, they play the assets, and if they do a good job they can continue playing the assets and keep half of what they make. There's no risk to the player, no capital responsibility on the player at all. There's only upside. It's constrained by how much cash we can deploy into it, which is partially determined by private investors and partially by the earnings of the ecosystem itself.

BM: How many hours of video games are you playing these days?

SP: I need to be playing more, because I need to go interact with

my community more. If I do two to four hours generally on the weekend, I'm doing a good job.

BM: Do you network through video games?

SP: You're playing *World of Warcraft*, you engage in a certain activity with other people, you realize you've enjoyed playing with them, probably because they've done a good job, you message them, you talk about the game, you talk about life, you get to be friends, you start calling, and now they're in your Discord. And that's the cycle of life right there.

BM: The crypto industry has been dominated by men. Is that changing?

SP: It begs the question, OK, if it's so fair and open, why is it not more diverse? And ultimately it hasn't reached an education threshold whereby most of the world could really see and know

what to engage with next. We're getting there. You're seeing builders come online from all different parts of the world, but it's not this tsunami.

BM: Besides inclusion, what are your biggest worries about the industry?

SP: I don't think you can talk about crypto right now without bringing up NFTs, which are the elephant in the room. It is undeniable that NFTs have caused a lot of commotion. There have been a ton of scams. People poorly understand the technology. People are throwing money and FOMO-ing into things that they don't understand. They think all pictures of monkeys are going to go to the moon. It's not a good situation. It's a mess.

BM: What are the use cases that excite you the most?

SP: You can reduce the friction on micropayments down to such a low amount that you can imagine streaming Netflix in real time and paying for each individual megabyte of data. That's the level of granularity. Instead of waiting two weeks for my paycheck, maybe my salary is streamed to me in real time, and then I can immediately go down and buy a coffee.

BM: Where do you see decentralized autonomous organizations going as organization structures and fundraising mechanisms?

SP: A lot of people are coming out with DAOs that are not DAOs. There is a difference between governing a community using smart contracts vs. governing a community by using what basically is a Facebook poll. Unfortunately, the end user cannot read the smart contract and cannot vet the tokens. The issue is, people are basically being told they have control over some organization when, in truth, they don't.

BM: Are there real use cases with wide appeal for the metaverse, in the current iteration of the internet or the decentralized version called web3?

SP: A lot of people sitting on both sides of the fence, web2 and web3, have completely different conceptions of what the metaverse will look like. The web3 side, the crypto builders, they see a metaverse as an area where economics and utility are fairly distributed among the users and the platforms are ultimately owned by the users. In web2, the core thesis is virtual reality is the metaverse. And it's not! Virtual reality has been around for a long time. It's not a huge game changer.

BM: You mentioned that you were recently diagnosed with Covid again and that you only went out twice during the pandemic and got sick both times. Is that true?

SP: I really don't go outside very much. That's not a joke. Two times is probably a little bit of an exaggeration, but I really don't leave this desk. That's partially because I enjoy it—I love being here. I'm attached to this screen for 16 to 18 hours a day. I do my one hour of exercise each day, and that's it.

BM: How often do you sleep?

SP: I sleep at exactly 10:30 p.m. every single night, I wake up somewhere between 4:30 and 5:30 in the morning, and then I do take a 15-minute nap at almost exactly 12:30 almost every single day.

BM: You seem very disciplined.

SP: I eat here. I really like these chicken cordon bleus, that's usually what I eat. I eat two chicken cordon bleus a day. They're really good. It's like two little logs. Don't worry, I'm having tons of fun. ●

Peurifoy



Yang covers crypto market structure and Abelson covers finance for Bloomberg News in New York.

Dash to Digital

By OLGA KHARIF

Investor interest in crypto surged during the pandemic, and few asset classes have ever been so volatile. Born in 2008 with a white paper that led to the creation of Bitcoin, crypto today includes more than 18,000 tokens and coins with a combined market cap of \$1.93 trillion, according to CoinMarketCap. Interest in nonfungible tokens (NFTs), an even newer type of blockchain-based asset, has also grown rapidly.

A Wild Ride

Following the bull market of 2021, which saw Bitcoin reach an all-time high, cryptocurrency prices have dropped, raising fears of another crypto winter.

Change in price or index level since March 13, 2020, weekly (Fridays)

Cryptocurrencies (relative to U.S. dollar)

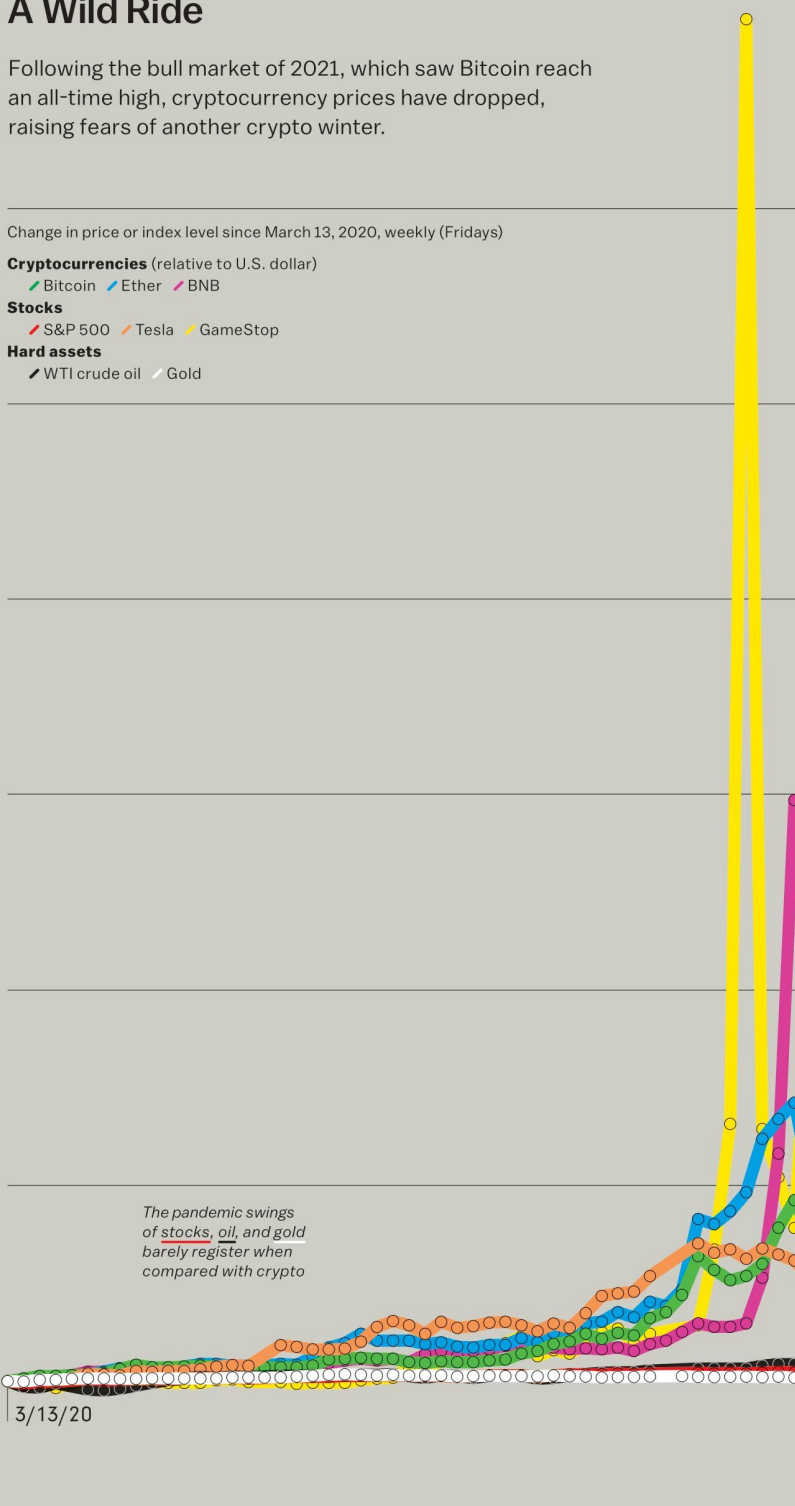
Bitcoin Ether BNB

Stocks

S&P 500 Tesla GameStop

Hard assets

WTI crude oil Gold



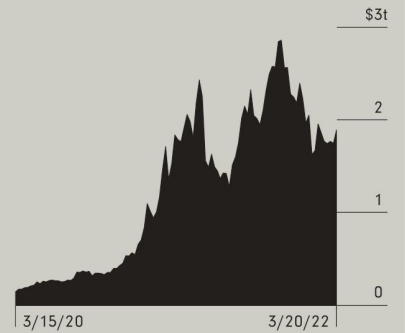


Sources: {XBTUSD Curncy}, {XETUSD Curncy}, {SPX Index}, {TSLA Equity}, {GME Equity}, {CL1 Comdty}, {XAU Curncy}, CoinMarketCap

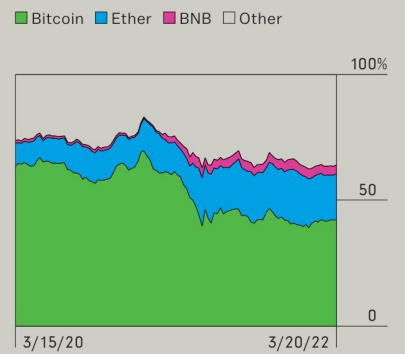
Measuring the Market

Cryptocurrency and nonfungible token metrics

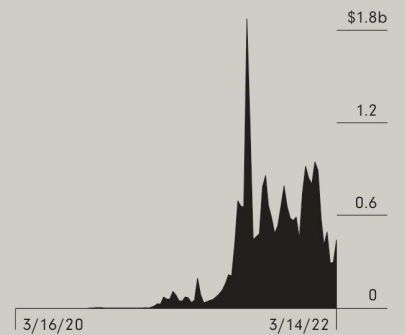
Value of total cryptocurrency market cap, weekly (Sundays)



Share of total cryptocurrency market cap, weekly (Sundays)



Value of global NFT sales on the Ethereum and Ronin blockchains, weekly (full week)*



*Full weeks starting Mondays. Includes the primary and secondary markets, as well as royalties, but no gas fees.

Sources: CoinMarketCap, NonFungible

By ZEKE FAUX

Doing Good

By Doing

Crypto billionaire Sam Bankman-Fried drives a Corolla, sleeps on a beanbag, and says he only got rich to give it away.

Really,

Really,

Really,

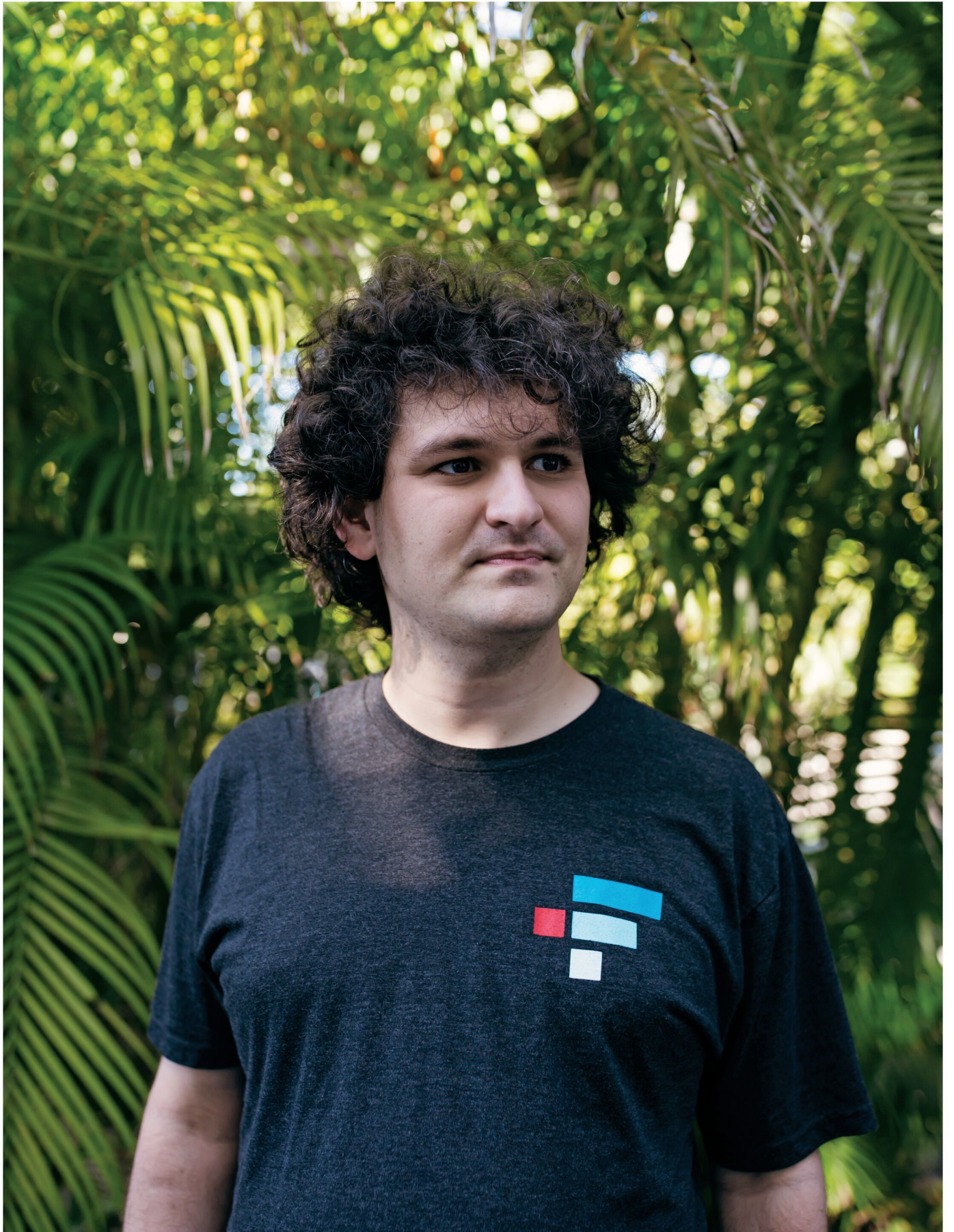
Really,

Really,

Will he?

Really Well

PHOTOGRAPH
BY MELISSA ALCENA



THE ECONOMIC CLUB of New York has hosted kings, prime ministers, and presidents, as well as Amazon.com Inc.'s Jeff Bezos and JPMorgan Chase & Co.'s Jamie Dimon. Central bankers' comments at the 115-year-old organization have moved markets. Sam Bankman-Fried, a 30-year-old cryptocurrency billionaire, is probably the first person to play a computer game while giving a talk.

As the featured guest one morning in February, Bankman-Fried looks schlubby as usual, reclining on a gaming chair in blue shorts and a gray T-shirt advertising his cryptocurrency exchange, FTX, his mop of curly hair flattened by his headphones. He's speaking by Zoom from his office in the Bahamas.

Off camera, the detritus of someone who more or less lives at work litters his desk: crumpled bills from the U.S. and Hong Kong, nine tubes of lip balm, a stick of deodorant, a 1.5-pound canister of sea salt labeled "SBF's salt shaker," and an open packet of chickpea korma that he had for lunch the day before. The beanbag where his assistant says he sleeps most weekdays is so close he could practically roll onto it.

As he fields questions about how the U.S. should regulate his industry, he pulls up a fantasy game called *Storybook Brawl*, chooses to play as "Peter Pants," and prepares for battle with someone who goes by "Funky Kangaroo."

"We're anticipating a lot of growth in the United States," Bankman-Fried says as he casts a spell on one of the knights in his fairy-tale army.

The novelty of appearances like this has long since worn off for Bankman-Fried, who's testified before Congress twice since December. The previous weekend, he watched the Super Bowl from box seats just in front of NBA star Steph Curry—an FTX endorser. There was lunch with basketball legend Shaquille O'Neal and a party DJ'd by the head of Goldman Sachs Group Inc. The singer Sia invited him to a dinner at a Beverly Hills mansion with Bezos and actor Leonardo DiCaprio, where Kate Hudson sang the national anthem and he chatted about crypto with pop star Katy Perry. The next day she told her 154 million followers on Instagram, in an unsolicited endorsement, "im quitting music and becoming an intern for @ftx_official ok 🍀"

Bankman-Fried is so blasé that he lets me watch his six screens over his shoulder as he fields the kind of messages that most executives protect like state secrets. Just that morning he appeared on NPR and emailed with reporters for *Puck* and the *New York Times*. His top Washington strategist wrote at one point to say that Senator Cory Booker, a Democrat from New Jersey, would sign on to his preferred

approach to regulation. Bankman-Fried got a message saying MoneyGram International Inc. was for sale and spent a few seconds considering whether the company could be a good bet. An assistant informed him that the head of an investment bank was in the Bahamas and wanted to visit him for five minutes. "Meh," Bankman-Fried wrote back. That evening he planned to fly to the Munich Security Conference for a meeting with the prime minister of Georgia.

Given the insane speed and riskiness of his climb to the top echelons of the financial world, almost anything else must seem low stakes by comparison. Five years ago, Bankman-Fried was working for a charitable organization that promoted the then-fringe idea of "effective altruism": using scientific reasoning to figure out how to do the most good for the most people. Then he spotted a seemingly too-good-to-be-true pricing anomaly in Bitcoin and decided that, for him, the right path would be making tons of money to give away. Now, Bankman-Fried is one of the richest people in the world, with a fortune of more than \$20 billion, according to the Bloomberg Billionaires Index, after venture capitalists recently invested in FTX and its U.S. arm at a combined \$40 billion valuation.

For all his wealth, Bankman-Fried tells me his core philosophy remains the same. He'll keep enough money to maintain a comfortable life: 1% of his earnings or, at minimum, \$100,000 a year. Other than that, he still plans to give it all away—every dollar, or Bitcoin, as the case may be. He's a kind of crypto Robin Hood, beating the rich at their own game to win money for capitalism's losers. Yet he's now part of the power structure that causes the problems he says he wants to fix. He makes big political contributions and pushes his company's agenda in Washington. And so far he's donated less to charity than he's spent on naming rights for the Miami Heat's arena (cost: \$135 million over 19 years) and airing a Super Bowl ad with comedian Larry David portraying a curmudgeonly crypto skeptic (an estimated \$30 million). He sees no inconsistency; he's investing to maximize the amount of good he does, eventually, even if he's risking what he's already made in crypto.

As by far the richest person to emerge from the effective-altruism movement, Bankman-Fried is a thought

experiment from a college philosophy seminar come to life. Should someone who wants to save the world first amass as much money and power as possible, or will the pursuit corrupt him along the way?

THE WAY BANKMAN-FRIED'S PEERS describe him, he sounds like a strange sort of capitalist monk. One says he worked so hard in the early days that he rarely showered. Another says he swore off relationships because he doesn't have time. It seems like he views even sleep as an unnecessary luxury. "Every minute you spend sleeping is costing you X thousand dollars, and that directly means you can save this many less lives," says Matt Nass, a colleague and childhood friend.

These days, Bankman-Fried lives in Nassau, the capital of the Bahamas. FTX is planning to build a 1,000-employee campus overlooking the ocean. For now it's headquartered in a one-story red-roofed building near the airport. Desks are still labeled with names written on sticky notes, as if the roughly 60 people who work there haven't had time to unpack. The day before his prestigious talk *Storybook Brawl* gaming session, as I'm talking to his assistant in the break room, Bankman-Fried shuffles in shoeless, wearing white crew socks. "Oh, hey," he says. We sit down later in a conference room. I ask him about his trip to the Super Bowl. "I don't know if 'fun' is exactly the word I would use to describe it," Bankman-Fried says, scratching an itchy patch on his arm. "Parties are not my scene."

Bankman-Fried lives like a college student perpetually cramming for finals. He drives a Toyota Corolla, and when he's not at the office, he crashes at an apartment with 10 or so roommates, though it's a penthouse at the island's nicest resort. Bankman-Fried figures as many as five of his co-workers are also billionaires. All are around his age. Friends say he calmly assesses the odds in any situation, whether it's in the middle of a board-game marathon or after he's been nudged awake on his beanbag to weigh in on a tricky trade. He tells me that, while he doesn't like to waste time by economizing, he doesn't see much value in buying things.

"You pretty quickly run out of really effective ways to make yourself happier by spending money," Bankman-Fried says. "I don't want a yacht."

The crypto industry might seem like an odd choice for a do-gooder: It's facilitated endless scams, turned ransomware into an industry, and sucks up tons of energy—as much as the country of Malaysia, by some estimates. Bankman-Fried

doesn't see it that way. He says FTX is running an honest market, checks customers' backgrounds, buys carbon credits to offset its emissions, and is more efficient than the mainstream financial system. But it's clear the main appeal for him is getting rich quick.

He smiles as he shares a chart that shows FTX growing faster than his largest competitors, such as Binance. The market is huge. FTX is only the No. 3 crypto exchange by volume yet handles \$15 billion of trading on a good day. Instead of shares of Microsoft Corp., users are buying and selling Bitcoin, Ether, Dogecoin, and hundreds of other weird cryptocurrencies.

Bankman-Fried has set his sights on the U.S. market, which is dominated by Coinbase Global Inc. He wants to offer cryptocurrency futures, swaps, and options, which he sees as a potential \$25 billion-a-day market. If he succeeds in taking over crypto, the mainstream finance industry is next. "We're sort of playing in the kiddie pool," Bankman-Fried says. "Ideally, I would want FTX to become the biggest source of financial transactions in the world."

THE ME-FIRST ETHICS of the novelist Ayn Rand have been the inspiration of ruthless entrepreneurs from Uber Technologies Inc.'s Travis Kalanick to tech mogul Peter Thiel. Bankman-Fried's capitalist muse is the utilitarian philosopher Peter Singer, a professor at Princeton and an animal-rights advocate. Bankman-Fried first came across Singer's work when he was a teenager living in Berkeley, Calif. His parents are both Stanford law professors. His mother also runs an influential data-driven Democratic donor group, and his father trained as a clinical psychologist.

In writings since the 1970s, Singer has posed a deceptively simple ethical question: If you walked by a child drowning in a shallow pond, would you stop to pull her out, even if it would muddy your clothes? He then argued that if you'd do that—and who wouldn't?—you have no less of a duty to save a faraway person from starvation by donating to an international aid group. Not giving large sums of money away is as bad as letting the child drown.

Bankman-Fried agrees, though he wasn't always sure what to do about it. "It is very demanding, if you take it seriously," he says. "But I do think it's basically right. Like, if that's the right thing to do, then I don't want to deny that because it seems hard." By 2012, when he was a junior studying physics at MIT, he described himself as a utilitarian like Singer and had become a vegan. He joined a coed fraternity called Epsilon Theta, where, instead of throwing keggers, members stayed up all night playing board games and slept in an attic full of bunk beds. Bankman-Fried recruited other "Thetans" to hand out pamphlets for an anti-factory-farm group.

That year, Bankman-Fried went to a talk by Will MacAskill, a 25-year-old doctoral student at Oxford who was trying to turn Singer's ideas into a movement. He and his collaborators aimed to use mathematical calculations to figure out how individuals could do the most good with their money and time. They dubbed it "effective altruism."

Over lunch, MacAskill told Bankman-Fried more about another one of his ideas: "earning to give." He said that for ▶

Philosopher Peter Singer





FTX Arena in Miami

someone of Bankman-Fried’s mathematical talents, it might make sense to pursue a high-paying job on Wall Street, then donate his earnings to charity. GiveWell, an effective-altruism group based in Oakland, Calif., says each \$4,500 spent on insecticide-treated bed nets to fight malaria in Africa can save one life. MacAskill estimated at the time that a successful banker who donated half her income could save 10,000 lives over the course of a career.

MacAskill’s ideas are controversial. Some say the ends don’t justify the means—that Wall Street perpetuates inequality and undermines whatever good might be done by donations. (MacAskill argues that while altruists shouldn’t take jobs that harm society, much of finance is neutral.) Others say the movement flatters the rich by painting them as heroes and fails to address the root causes of poverty. “Effective altruism doesn’t try to understand how power works, except to better align itself with it,” Amia Srinivasan, an Oxford philosophy professor, wrote in a 2015 review of a book by MacAskill.

But MacAskill’s pitch appealed to the young utilitarian. MacAskill, laughing, remembers Bankman-Fried’s matter-of-fact response: “He basically said, ‘Yep, that makes sense.’”

Another MacAskill acolyte had gone to work for Jane Street Group, a high-frequency trading firm in New York. Bankman-Fried got a job there, too, and for three years after graduation, he worked as a trader and every year gave away about half of his six-figure salary to animal-welfare groups and other effective-altruism-approved charities. But he grew restless. He left for MacAskill’s Centre for Effective Altruism. Then he happened upon a cryptocurrency website and noticed something odd.

IT WAS 2017, AND CRYPTO was in the middle of its first boom. The price of Bitcoin spiked 10 times that year, and investors sank almost \$5 billion into hundreds of “initial coin offerings,” or ICOs, many of them barely concealed scams. Bankman-Fried, like many on Wall Street, didn’t understand crypto. What caught his attention was a page on CoinMarketCap.com that quoted prices from exchanges around the world.

Despite crypto proponents’ talk about a decentralized

financial revolution, most activity relies on private exchanges to match buyers and sellers. People who want to buy Bitcoin or Litecoin or Ether simply send their dollars, yen, or euros to an exchange, trade back and forth for a while, and then withdraw their cash.

Bankman-Fried saw that certain coins were selling for way more on some exchanges than others. This was the kind of buy-low, sell-high arbitrage opportunity he’d learned to exploit at Jane Street. But there he’d built complex mathematical models for trades that aimed to make money off tiny price differences. On crypto exchanges, the discrepancies were hundreds of times bigger. “That’s too easy,” Bankman-Fried recalls thinking. “Something’s wrong.”

Some of the data were false, and some of the trades were impossible to pull off. Capital controls prevented traders from sending cash home from South Korea, where Bitcoin sold for 30% more than in the U.S. But in Japan, which didn’t have those rules, Bitcoin still traded at a 10% premium. In

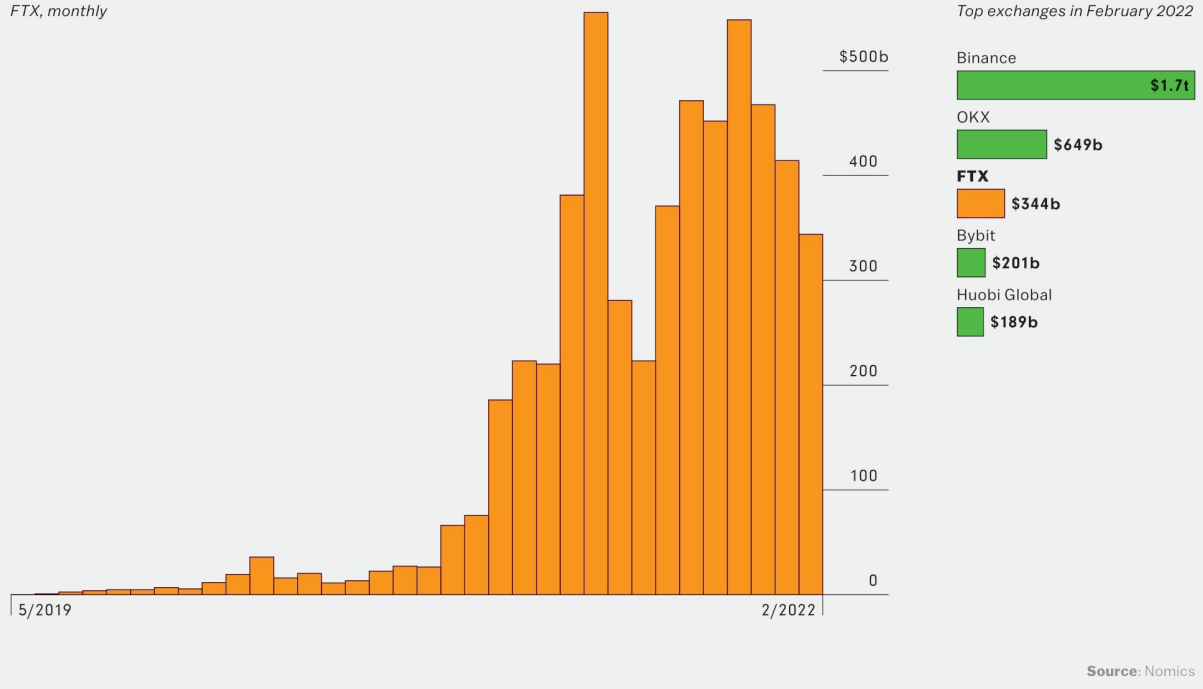
Comedian Larry David in the FTX Super Bowl ad



Booming Business

Crypto exchange volume

FTX, monthly



theory, someone could earn 10% every day by buying Bitcoin on a U.S. exchange and sending it to a Japanese one to sell. At that rate, in a little more than four months, \$10,000 would turn into \$1 billion.

Bankman-Fried recruited a few friends to help him with the project. There was Gary Wang, a housemate from MIT then working on flight data for Google; Caroline Ellison, a trader from Jane Street; and Nishad Singh, a friend of his younger brother's who was then an engineer at Facebook. All were effective altruists who bought into Bankman-Fried's pitch that this was their best chance to make and give away a lot of money. They moved into a three-bedroom house in Berkeley and dug into the arbitrage.

The obstacles to the trade were mainly practical. Bankman-Fried named his company Alameda Research to sound harmless. But U.S. banks viewed cryptocurrency as so sketchy that some wouldn't let him open an account. Japanese exchanges would allow only Japanese people to withdraw money in yen. So he opened a subsidiary in Japan and hired a local representative. Still, the business sounded fishy, and bank tellers would raise questions about his overseas wire transfers. He had so much trouble sending the money that he started calculating whether it made sense to charter a plane, fly to Japan, and have a planeload of people withdraw cash and bring it home. (It didn't.)

Once Bankman-Fried found willing banks, each day became a race. If they didn't wire the money out of Japan before the branch closed, they'd miss out on that day's 10% return. Completing the cycle required the precision logistics of a heist movie. A team of people spent three hours a day in a U.S. bank

to ensure money transfers went through, and another team in Japan waited for hours at the front of the teller line when it was time to wire the money back. At the peak, Alameda was sending \$15 million back and forth daily and generating a \$1.5 million profit. Within a few weeks, before the price difference disappeared, the company had earned about \$20 million.

FEW BETS PAID OFF as easily, but there were others that came close. Compared with the stock market, crypto offered fat targets because ordinary investors were piling in, and only a handful of smart-money players were hunting for arbitrages. In 2018, Bankman-Fried went to a Bitcoin conference in Macau where he met some of the other big players in the market and decided to stay at the center of the action. He told his colleagues on Slack that he wouldn't be returning to Berkeley. Eventually, many of them joined him in Hong Kong, which has more permissive regulations than the U.S.

By 2019, Alameda was throwing off hundreds of thousands of dollars of profit a day, enough, by effective altruists' logic, to save a life every hour if Bankman-Fried had chosen to give the money to the right charities. Instead, he and his colleagues decided to reinvest their winnings, partly into building their own crypto exchange.

The marketplaces were in a sorry state. They were buggy, frequently crashing when prices plummeted or spiked. Some charged Alameda fees to compensate the exchanges for their own losses on margin loans to customers—a practice unheard of on the New York Stock Exchange. One of the largest, BitMEX, was under U.S. investigation. (Two of its founders ▶

pleaded guilty in February to violations of the Bank Secrecy Act and face potentially yearslong prison sentences.)

It took Bankman-Fried's crew four months to write the code underlying a new exchange, which opened for business in May 2019. FTX catered to big traders, offering dozens of different coins to bet on, complex derivatives like tokens with built-in leverage or index futures, and even bets on elections and stock prices. It offered margin loans, so traders could ramp up their returns—and risk. Customers could borrow up to 101 times their collateral—slightly higher leverage than offered by the competition. (FTX cut the limit to 20 times last year after criticism.) And, crucially, traders could put up cash as collateral to borrow any coin they wanted, which some rivals didn't allow.

It was a hit, in part because so many people wanted to use the exchange to trade with Alameda. Daily trading volume reached \$300 million by July of that year and an average of \$1 billion in 2020. FTX takes a cut of two basis points (a basis point is one one-hundredth of 1% in Wall Street jargon) on most orders—that's about \$9 in fees to buy one Bitcoin for \$45,000, the price in late March. That added up to revenue of \$1.1 billion for the exchange last year, and about \$350 million in profit, Bankman-Fried says. (Alameda, which he no longer runs day to day, made an additional \$1 billion in profit in 2021 alone.) Dan Matuszewski, co-founder of the crypto investment fund CMS Holdings, says Bankman-Fried handled customer service at all times of day and solicited ideas for new things to trade. "They have colossal risk appetite," says Matuszewski, who trades on FTX and also invested in the exchange. "They'll try things that fail constantly. It's calculated, and it's smart."

IF BANKMAN-FRIED HAD STAYED in Berkeley, many of the bets FTX offered would've been not quite, well, legal. Gary Gensler, chair of the U.S. Securities and Exchange Commission, says most cryptocurrencies should be regulated like stocks and exchanges such as FTX like traditional markets. Those that ignore the rules aren't following the law, he says. "This asset class is rife with fraud, scams, and abuse," Gensler said in a speech last year. "Right now, we just don't have enough investor protection in crypto."

FTX, incorporated in the Caribbean country of Antigua and Barbuda, initially barred Americans from trading, though many professionals such as Matuszewski were able to access it because they already controlled offshore companies.

But the U.S. market for crypto is huge. Rival Coinbase generates more than \$600 million a month in revenue, even though it offers only coins it argues don't fall under SEC rules. In 2020, Bankman-Fried opened a U.S. exchange with a limited menu of tokens to trade. He's been on a marketing blitz for it since. On top of the Super Bowl commercial and naming the FTX Arena in Miami, he's spent \$210 million to sponsor a video-gaming team and signed up endorsers including quarterback Tom Brady, former Red Sox slugger David Ortiz, and tennis star Naomi Osaka. (FTX in March also acquired the company behind *Storybook Brawl*.) He's now pushing Congress for new rules that would allow him

to offer more coins and crypto derivatives.

He says the SEC should share oversight for crypto with the Commodity Futures Trading Commission, generally viewed as more friendly to the industry. He's hired a former CFTC commissioner as head of regulatory strategy, bought a derivatives exchange licensed by the agency, and made the maximum \$5,800 donation to about a dozen members of Congress from both parties. (In 2020 he donated \$5 million to a committee supporting Joe Biden, becoming one of the president's biggest donors.) Perhaps unsurprisingly, he's gotten a friendly reception when he's gone to Washington. "I'm offended you have a much more glorious Afro than I once had," Booker, the New Jersey senator, joked at a February hearing. Bankman-Fried says he's trying to lay out a framework for federal oversight and move the debate away from extremes such as "ban it or let it go wild."

Rohan Grey, a law professor at Willamette University who's worked with Democrats to develop crypto regulations, says the market needs strict rules to protect consumers from fraud and prevent its swings from destabilizing the broader financial system. In his view, lobbying like Bankman-Fried's hinders those efforts. "Anytime people propose stronger regulations, people like him go out and try to prevent it from happening," Grey says. "And, of course, big money talks."

YOUNG TECH ENTREPRENEURS like Bankman-Fried have turned the effective-altruism movement into a force in philanthropy. More than 7,000 people have pledged at least 10% of their career earnings through a group run by the Centre for Effective Altruism. Dustin Moskowitz, a Facebook founder, donates hundreds of millions of dollars a year to charities the movement has identified as effective. Tesla Inc.'s Elon Musk enlisted a pro-poker-player-turned-effective-altruist to advise him on giving.

"We're sort of playing in the kiddie pool. Ideally, I would want FTX to become the biggest source of financial transactions in the world"





Bankman-Fried testifies at a U.S. Senate committee hearing in February

Bankman-Fried tells me he gave away \$50 million last year, including to pandemic relief in India and anti-global-warming initiatives. This year he says he'll donate at least a few hundred million and up to \$1 billion, as much as the largest foundations. Like other effective altruists, Bankman-Fried has been drawn to threats that could lead to humanity's extinction. In his view, something that has even a tiny chance of saving the lives of the trillions of people who might live in future generations can be more valuable than alleviating suffering today. Some dangers sound like science-fiction plotlines: rogue artificial intelligence, deadly bioweapons, and warfare in space. MacAskill, the effective-altruism movement founder, says Bankman-Fried was momentarily excited by the idea of buying up coal mines—both to prevent emissions and to keep fuel on hand in case it's needed in a post-apocalyptic scenario. (He decided it wasn't cost-effective.)

Bankman-Fried now says his top priority is pandemic preparedness. A future disease outbreak, he says, could be as lethal as Ebola and as contagious as Covid-19. He's funding an advocacy group headed by his younger brother that's pushing governments to spend more, and he gave \$5 million to the nonprofit investigative journalism group ProPublica to cover the topic. "We should expect that pandemics will get

worse over time and more frequent, just because of the possibility of lab leaks," he says. "This has a nontrivial chance of destabilizing the world if we don't get prepared for it."

I ask Bankman-Fried whether he ever has any doubt about dedicating his life completely to making money and giving it away. He presses his face in his hands for a few seconds before answering. "It's not a decision that I constantly reevaluate, because I think it just doesn't do me any good to be constantly reevaluating anything," he says. "It doesn't, minute to minute, feel to me like a decision anymore."

Around 5 p.m. the day of the Economic Club talk, Bankman-Fried crashes, passing out first in his gaming chair, then curling up on the blue beanbag next to his desk, his elbow cradling his curly hair. The office is quiet, other than the clicking of employees chatting on Slack. Behind Bankman-Fried, a programmer examines some code, his feet up on his desk and his shorts stained with soy sauce. After about an hour, Bankman-Fried stirs, eats a package of Nutter Butters, then closes his eyes again. During his catnap, traders will swap about \$500 million of Bitcoin, Ether, and other cryptocurrencies on his exchange, and FTX will skim off an additional \$100,000 or so in fees. ●

Faux is a senior reporter on the investigations team in New York.

Central banks are designing their own virtual currencies



to compete with crypto, aid the unbanked, and even evade sanctions.



By
JOANNA OSSINGER and
CAROLYNN LOOK

ILLUSTRATION
BY STEVEN WILSON

Here's a tour of six that are worth watching

In Digital They Trust



When the U.S. and its allies decided to punish Russia for its invasion of Ukraine,

they used their power over the global financial system to isolate the nation, crippling its economy and crushing the value of the ruble. But what if, in the future, countries don't need those U.S.-dominated payment networks?

That's one of the big questions also being asked now about China's digital yuan and the European Central Bank's plans for a digital euro, just two of the many so-called central bank digital currencies (CBDCs) that are being tested or studied around the world. CBDCs have emerged amid the rise of thousands of cryptocurrencies, which are quickly disrupting traditional payment systems and pushing central bankers to innovate to compete.

It's not the first time. Consumers and businesses used to transact in numerous privately issued banknotes until central banks ended the chaos by monopolizing currency issuance in the 19th and early 20th century. Today, policy-makers face a similar challenge of trying to maintain their footprint in global money supply.

CBDCs aim to make payment systems safer, faster, cheaper, and more reliable. Digital money also can give governments in poor nations an alternative to underdeveloped banking systems or help authorities provide lifesaving funds to citizens quickly during a crisis.

The International Monetary Fund estimates that about 100 countries have either rolled out CBDCs or are considering them. The U.S. is among those with a project that's still on the drawing board, though an executive order by President Joe Biden in March sought to prioritize the study of a digital dollar.

But isn't money already digital? For most of us, our savings or debts are just numbers on a computer or smartphone screen. We perform most transactions without ever touching paper currency or coins.

CBDCs are different in one important respect. The traditional dollars or euros or yuan on our screen today are actually the liabilities of a commercial bank or other financial institution, which makes them vulnerable to that company's financial health as well as to actions taken by governments. But CBDCs, like physical cash, are direct liabilities of the central bank. In theory, a CBDC would allow a central bank to transfer currency directly to the digital wallet of an individual, corporation, or other counterparty without needing any other bank or intermediary. In practice, most central banks aren't willing to cut out the private financial sector completely.

As with most innovations, there are pluses and minuses. Governments will be able to track the movement of central bank digital currencies easily. That will help policy-makers better understand how the economy is functioning. But it could also help in the surveillance of citizens. And given the enormous impact that CBDCs could have on economies, they have to work flawlessly if they're to be trusted. In their early days, that hasn't always been the case.

Some of the most-motivated nations are smaller, less-developed countries that aren't worried about sanctions—they're just trying to solve real-world problems for their people. Those issues include the high number of citizens without bank accounts, the costly system for sending money around the world, and even simple geographic isolation. For example, Palau, a cluster of tiny islands in the Pacific that use the U.S. dollar, sometimes runs out of pennies, so merchants have been known to give out pieces of candy as change instead.

What follows is a closer look at six key projects that are up and running, being tested in pilot programs, or close to being rolled out.

CHINA**Digital Yuan (e-CNY)**

STATUS	In testing since 2020
USERS	140 million people, more than 1.5 million merchants

Although the digital yuan is still in the pilot phase, the numbers are staggering: The virtual currency has been tested in about a dozen regions since 2020, with the number of individual users surging by late last year to 140 million, or about one-tenth of the population. More than 1.5 million merchants accept it, according to official data. China hasn't officially set a timeline for a national rollout, but more cities are expected to join the trial.

The central bank adopted a two-tier system for the digital yuan, officially known as the e-CNY. The People's Bank of China first issues e-CNY to commercial banks, which then distribute it to the public. In trials, banks have become partners with merchants, promoting use by handing out free digital cash and consumption vouchers and offering discounts on purchases in digital yuan. China tested the e-CNY during the Winter Olympics in Beijing, though the scope was limited because the games were open to only a small domestic audience because of the Covid-19 pandemic.

Despite making the fastest progress on a digital currency among major economies, China is taking a measured approach in its promotion of the e-CNY. It faces overseas scrutiny and criticism over the possibility that the government may track users' transactions. Domestically, it also needs to overcome challenges posed by WeChat Pay and Alipay, mobile-payment platforms operated by the nation's tech giants that the vast majority of the public relies on for day-to-day transactions. Officials from the PBOC said e-CNY wallets would actually collect less transaction information than private platforms.

Although some U.S. lawmakers worry that the digital yuan could be used to help a nation like Russia avoid sanctions, officials from the PBOC have stressed that the e-CNY is meant primarily for domestic retail transactions. The goal is to allow more people in rural areas to enjoy digital payments while providing a backup to private platforms and making the payment system more efficient.

EURO AREA**Digital Euro**

STATUS	Being investigated
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In 2018, European banks faced a dilemma. U.S. President Donald Trump's administration had reinstated sanctions on Iran against the wishes of European governments. One by one, Europe's banks pulled the plug on payments linked to trade with the country, defying the wishes of their own governments in an effort to comply with U.S. sanctions. European governments imposed a blocking rule against Trump's "secondary sanctions," which pressured banks into not cooperating with them, and tried to create a special-purpose

vehicle for payments. Still, thousands of businesses were ultimately forced to cut ties with Iran.

The episode showed the leverage that Washington can wield over banks almost anywhere in the world. The European Central Bank took note. Concern over the sovereignty of the euro zone's payment infrastructure was a key reason it began to accelerate efforts to introduce a digital euro when the Covid pandemic struck about a year and a half later.

"We have a responsibility to ensure that our citizens have choice and cannot be excluded from the payments ecosystem due to the unilateral actions of others," ECB President Christine Lagarde said in a September 2020 speech. A digital euro would "ensure that sovereign money remains at the core of European payment systems."

The digital euro would also help bring down costs linked to electronic payments. Although cash use declined somewhat during the pandemic, the share of electronic payments is considerably lower in the euro zone than in other parts of the world—in part because vendors say they're expensive. The ECB doesn't want to let foreign service providers or cryptocurrencies take the lead in technological improvements.

Like other central banks, the ECB is toying with Bitcoin-like distributed ledger technology for its digital currency, but it already has an instant payments system called TIPS, short for Target Instant Payment Settlement, which could be expanded to allow retail use. Unlike the blockchains used by Bitcoin and other cryptos, it's a centralized ledger—and that makes it faster and likely more environmentally friendly. Officials say the plan is to have a functioning digital euro by the middle of this decade.

BRAZIL**Digital Real**

STATUS	To begin testing in 2022
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Latin America's largest economy is set to test its digital currency in parts of the country by the second half of this year. To Brazil's central bank chief, Roberto Campos Neto, a digital real is the natural next step in the country's evolution toward a faster, cheaper, and more inclusive payment system.

"We hope it will be part of everyday life, to be used in tandem with bank accounts, payment accounts, credit cards, and physical money," he said in late November at an online event.

Brazil's ambition for the digital currency in its initial phases is to promote investment and innovation rather than to serve as a traditional means of payment. Proposals are rolling in from companies in Brazil and around the world for projects that could be facilitated with digital money. Examples include creating digital tokens to represent ownership of vehicles and real estate and financing small businesses and projects in rural areas that would be more expensive or even unfeasible with traditional currency.

"We want to add services that don't yet exist in Brazil, such as new ways of payments and settlements—we see ►

the digital real as the foundation of a smart-payment platform,” says Fabio Araújo, who oversees the digital real working group at the central bank.

The digital real would build on existing projects, including Brazil’s instant-payments platform Pix and open banking, a data system for financial institutions in which clients can share their personal information. Pix has been a success, with more than 113 million Brazilians and 8 million companies using it to make instant payments or transfers. But the government has ruled out allowing Brazilians to hold accounts directly with the central bank instead of commercial banks.

“We want to maintain the partnership we have with the financial system and open the door to new business and fintechs,” Araújo says.

Allowing conversion from digital to physical money is a goal, meaning Brazilians could hold CBDC in their bank accounts or e-wallets and still withdraw cash from an ATM. That won’t happen before 2024, because it requires changes in legislation to allow the circulation of digital money.

As of now, the central bank is collaborating with private companies on a set of projects to be implemented in small cities and other locations around the country.

“We want Brazilians to have a very natural relationship with the digital real,” Araújo says. “It’s not about saying ‘now I’m using digital reais.’ It’s about allowing citizens to do transactions that were very difficult to implement in the past.”

NIGERIA

eNaira

STATUS	Introduced in October 2021
USERS	About 700,000 at the end of January

Nigeria hopes its CBDC will bring basic financial services to more of its citizens, but so far it’s been slow going. The eNaira went into circulation in October 2021 with the goals of improving monetary policy, boosting financial inclusion, allowing residents to increase remittances from Nigerians living abroad, and completing transactions more efficiently, according to the country’s central bank. The regulator accelerated the project last year after banning financial institutions from transacting in cryptocurrencies, which it said posed a threat to the financial system.

The West African nation has been failing to meet its goal to bring more citizens into the regulated financial system. At the end of 2020, almost 36% of adults in Nigeria didn’t have a bank account, according to Enhancing Financial Innovation & Access, a development organization that tracks the data. The government’s 2013 goal was to cut that proportion to 20% by 2020.

The eNaira has also struggled to meet its objectives. Not enough people know about it, especially in rural areas. And as of now it’s only available to bank customers, while the central bank monitors how secure it is before deciding when to extend it to the unbanked. Users need a smartphone and a biometric verification number (BVN) from their bank

**“If you want innovation,
you have to have a payment
platform that supports
innovation”**



for the platform's security. Even those who qualify aren't always able to link the e-wallet with their BVN.

The scarcity of individual users has slowed merchant enrollment. About 700,000 customers from a population of 200 million were in the program at the end of January, according to Lagos-based *ThisDay* newspaper. Fewer than 10% of transactions were person-to-person or person-to-merchant and vice versa, while about 90% involved banks, Central Bank Governor Godwin Emefiele said in January.

For the eNaira to succeed, it "needs more consumers to download and fund the wallet, and the wallet needs to have multiple-use cases that appeal to customers and merchants," says Adesoji Solanke, director for frontier and sub-Saharan African banks and financial technology at Renaissance Capital.

Nigeria is working with banks to resolve the technical issues and make it easier to enroll, including enabling Nigerians who don't have smartphones to use the currency, according to Emefiele. The central bank is working to get more people to understand the eNaira and also engaging fintechs to create products on the virtual platform to increase payments and broaden penetration, the governor said.

EASTERN CARIBBEAN

DCash

STATUS	Pilot launched in 2021
USERS	More than 4,000 people, 120 merchants

In April 2021, La Soufrière volcano erupted, covering many of the islands of St. Vincent and the Grenadines in ash and forcing more than 20,000 people—almost one-fifth of the population—to leave. Evacuees waited in line for hours for money transfers that could take days to clear and came with hefty fees.

The Eastern Caribbean Central Bank, issuer of the Eastern Caribbean Dollar used by eight island nations, had a solution. A month earlier, the bank had become the world's first currency union to mint CBDC. So it expedited its plan for St. Vincent, and by July it was offering suffering residents access to DCash. With DCash, anyone with a mobile phone and a digital wallet could receive e-money immediately at no charge. No bank account, no problem.

The influx of money—particularly from relatives on neighboring islands—helped jump-start recovery efforts. DCash allowed people to pay for services remotely when they were cut off from their communities, says Sharmyn Powell, chair of the Fintech Working Group at the ECCB. As with other central banks, the ECCB's prime reason for introducing DCash was to bring more people into the financial system and to boost the regional economy, Powell says.

"If you want innovation, you have to have a payment platform that supports innovation," she says. "If you want to support competitiveness and trade within countries, you need a payment method that gives people confidence that they can get quick, real-time settlement."

That's especially true during an emergency. When the

Bahamas introduced the world's first CBDC, the Sand Dollar, in 2020, one motivation was to be able to get money to far-flung islands after hurricanes. Jamaica and Haiti have similar ambitions for their own CBDCs.

DCash's initial rollout hasn't been smooth. Although more than 4,000 people have downloaded wallets and more than 120 merchants accept DCash, Covid and technical glitches have hampered its adoption, Powell says. In January the currency platform crashed, and it took the ECCB almost two months to fully restore it.

Even so, the e-currency is being used in Antigua and Barbuda, Dominica, Grenada, Montserrat, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines. Anguilla, the final currency union member, is expected to come online soon. That will be followed by a broader marketing and education push, Powell says.

"In the next six months or so we will see a whole new picture in terms of penetration of DCash across the currency union," she predicts. "We are going to come out of this much stronger than before."

MARSHALL ISLANDS

Sov

STATUS	Made legal tender in 2018, still under development
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It's not easy for people—or money—to flow around the Marshall Islands. A population of about 68,000 is spread over 1,100 islands and islets scattered across 750,000 square miles of the Pacific.

The nation passed a law in 2018 making the blockchain-based Sov—short for "sovereign"—legal tender. Supply growth is meant to be limited to 4% each year to keep a lid on inflation. "It's as close to Bitcoin as it gets if you want a decentralized cryptocurrency issued by government," says Henri Arslanian, PwC's crypto leader.

Other countries in the Pacific with dispersed and isolated populations are working on their own projects.

"We've run out of pennies, run out of quarters," says Surangel Whipps Jr., the president of Palau. Sometimes, people even "get a piece of candy as a replacement for a coin."

The Pacific archipelago has formed a partnership with crypto firm Ripple to develop a digital currency strategy. Whipps sees potential for a stablecoin—a cryptocurrency meant to track the value of a traditional currency or other asset—based on the U.S. dollar.

"Innovation is coming from economies that need to create these things," says Josh Lipsky, director of the Atlantic Council's GeoEconomics Center. "Larger economies are looking at them to see whether they could apply that." ●
—With assistance from Yujing Liu in Beijing; Jim Wyss in San Juan, Puerto Rico; Maria Eloisa Capurro in Brasilia; and Emele Onu in Lagos

Ossinger covers cryptocurrencies in Singapore, and Look reports on the European economy and central bank in Frankfurt.

18+

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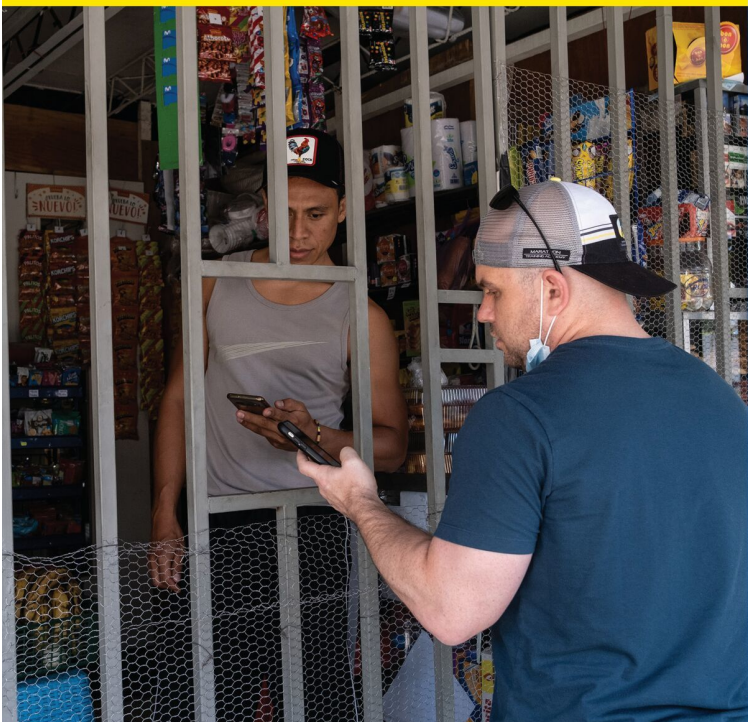
El Salvador On



The author at a store in Antiguo Cuscatlán, near San Salvador

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With Diego Ruano at the Antiguo Cuscatlán store



In the world's most crypto-friendly country, what happens when you try to pay the cabbie, the waiter, and the peanut vendor?

By MICHAEL MCDONALD
PHOTOGRAPHS BY CRISTINA BAUSSAN



At Brutto restaurant in San Salvador, with assistant manager Natalia Avilés

Bitcoin

With peanut vendor Oscar Atilio Lopez, along the road to the future Bitcoin City



A
Day



The sign at El Salvador International Airport beckons like a message from the future. “Chivo,” it reads in slick blue script. Slang for “cool,” the word signals that Bitcoin are welcome at passport control, along with the almighty dollar and credit card. ¶ So begins my journey—and experiment. For five days, I’m trying to pay my bills only in Bitcoin. El Salvador is the ideal laboratory. In September it became the first country to declare Bitcoin legal tender, which means all businesses should accept it as a form of payment.

On this Monday in February, the airport cashier stands before me, ready to accept the \$12 entry fee. On her shirt she wears the El Salvador coat of arms, which features its famed volcanoes and motto: “God, Union, Liberty.” It’s a fitting image for the dream of cryptocurrency, which seeks to disrupt the world financial system.

I wave my iPhone, packed with Bitcoin ready to show their value as an honest-to-goodness medium of exchange. Then the official interrupts my reverie. “I’m sorry, sir,” she says. “Only cash or credit.”

It turns out that Chivo, El Salvador’s Bitcoin-processing system, isn’t so cool after all. Its point-of-sale device, a white gizmo that looks like a credit card reader, isn’t working. Something about the internet signal. I charge the fee to my Visa card. Score one for international banking, zero for the digerati.

It’s disappointing, because the trip took some serious prep. Bitcoin and other cryptocurrency, of course, live on the web; they’re merely lines of code, recorded on that grand public online ledger known as the blockchain.

But you can’t leave home without the digital equivalent of a billfold. I’d loaded up my Wallet of Satoshi, which bills itself as “the world’s simplest Bitcoin lightning wallet.” It’s a phone app that stores digital currency information, including the secret key that unlocks the coin, enabling me to transfer

it to others in exchange for actual stuff. I also have backups: digital wallets from other companies—Coinbase Global, Muun Wallet, and Strike.

Each Bitcoin is trading for \$37,000. I’d taken 0.027 Bitcoin, the equivalent of \$1,000. Or you can break it down into the smallest cyberunit, the Satoshi, named after Satoshi Nakamoto, pseudonym of Bitcoin’s presumed developer. There are 100 million Satoshis, or Sats, to a Bitcoin. How many did I bring? Do the math, and it comes to about 2.7 million. (For extra credit, convert into euros and pounds.)

Crypto, of course, has wild price swings. I arrived in El Salvador the same week that Russia invaded Ukraine. If I’d gone the following week, my 0.027 Bitcoin would’ve been worth \$1,200.

As a Bloomberg News correspondent in Latin America, I’m on familiar ground. I’ve been visiting El Salvador for work and leisure for more than a decade. Since 2001 the country has used the U.S. dollar as its currency. Now, President Nayib Bukele, a 40-year-old populist, is promoting crypto-friendliness to spur travel and investment. He’s even been betting public money by trading Bitcoin on his phone. (By some accounts, he’s been losing.)

The Latin American country of 6.5 million—about the size of Massachusetts, in geography and population—may seem an odd choice for any kind of digital gamble. It’s long

been known for its poverty and violence. On a single Saturday in March, street gangs killed 62 people, leading the government to declare a state of emergency. One of the bloodiest days in decades, it marked a major setback in a previously successful effort to lower the country's infamous murder rate.

For my itinerary, I'll spend two days in the capital of San Salvador, then drive the Pacific coastline to the Gulf of Fonseca, known for its wildlife and mangrove swamps.

There the government wants the region to become the new home of Bitcoin City, a jurisdiction free of income and capital-gains taxes, the "Singapore of Latin America." The spectacular Conchagua volcano will provide electricity for Bitcoin "mines," the vast server farms where coders create coins and verify and track transactions for the online ledger. Also, the beaches are spectacular, and I'm on an expense account.

OUTSIDE THE AIRPORT, I approach a dozen cab drivers who are chatting and waiting for fares. I pop the question: "Will you take my Bitcoin?" Two throw up their arms and walk away. One says he knows a guy who does, but he's not here. The rest ignore me and continue their conversations.

I go with a driver in a white Toyota van. He'll take me to my hotel for \$30—actual, not digital dollars. "Most people prefer cash, and almost no one asks if they can pay in Bitcoin," says Saul Escobar, 55. "The system fails a lot, and lately it's been really slow. There was a lot of enthusiasm last year, but it's died down."

In the hour it takes to exit the airport and reach my hotel, the Bitcoin in my phone falls 2% in value. I decide to stop checking.

The Barceló hotel seems promising. It's in the Zona Rosa, an area known for its cosmopolitan restaurants and nightlife. Wendy Lopez, the receptionist, has been using cryptocurrency since 2018 on the advice of her brother, an information tech pro in Uruguay. Her crypto gains even helped her pay for an online course in financial markets.

Lopez fetches the Chivo point-of-sale device. She types in what I owe—505,842 Satoshis, or \$185—for two nights. A square QR code appears. I open my wallet, enabling access to my camera, and run the lens by the code.

My phone's screen turns green with a check mark, the universal symbol for success. "Payment Sent," a message reads. Or is it? The device doesn't print a receipt. A bad sign. Check back tomorrow, Lopez tells me. (About 24 hours later, the transaction will go through.)

For lunch the following day, I meet photographer Cristina Baussan, who works in San Salvador and Port-au-Prince, Haiti. She'll be documenting much of my journey. We head to Brutto, a chic new Asian fusion restaurant popular with politicians, investors, and business executives.

Near a balcony with a view of rolling green mountains, I order an Alaska roll and crispy Brussels sprouts doused in a soy and maple sauce; my colleague asks for salad with watercress, falafel, and quinoa. It sets us back \$60, or 163,821 Satoshis.

Natalia Avilés, the assistant manager, comes for our bill. She grew up in San Salvador, speaks fluent English, and studied

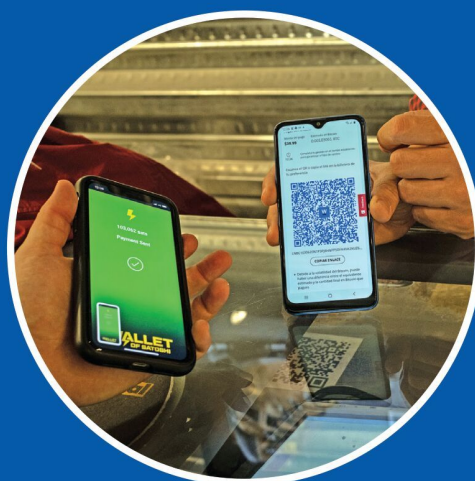
hospitality in Switzerland and Spain. She lets on that a recent, swanky party paid a \$1,000 tab in crypto. "A lot of people come to the restaurant to pay with Bitcoin, and it's exciting to see them excited," she tells us. "Having Bitcoin in your restaurant opens doors and gives people a reason to come."

Avilés brings the Chivo point-of-sale gadget to our table. As in the hotel, I scan it and get the all-clear check mark on my phone, but no receipt. I try again. No luck. I pay with my Visa card. Avilés and I exchange phone numbers, in case there are further issues.

Then I hit the automatic teller machines, some of the hundreds of blue-and-gray Chivo-brand Bitcoin ATMs across the country that convert Satoshis from my app into cash, and vice versa.

In the Plaza Salvador del Mundo, home of an iconic monument showing Jesus atop the world, I walk up to an ATM. Like many of the busiest ones, it has an attendant, who tells ▶

A Bitcoin purchase in San Salvador's Multiplaza mall



Success buying a T-shirt at the Caterpillar clothing store

“I want dollars. If you get paid \$25 in Bitcoin, it might be worth \$20 tomorrow. A dollar has never failed me”

●

me it’s out of cash. I call an Uber and head to Multiplaza, a Latin American mall chain that would look at home in Westchester County or on New York’s Long Island, with its Carolina Herrera, Forever 21, and Victoria’s Secret outlets.

Just inside, the Chivo ATM near a Starbucks has no cash, the ATM attendant tells me. She shares a tip: Check out the underground parking garage. I head into the bowels of the mall. The ATM screen’s blue light illuminates a dark corner near a doorway. It’s locked and loaded with cash, the attendant says.

I tap the screen, enter my phone number, and verify my identity with a text. A QR code pops up. I scan it with my phone. And wait. The attendant tells me transactions can take more than an hour. Two people lined up behind me hear her and walk away.

My phone’s screen turns green, and I see the lovely check mark. “Sell complete,” reads the message on the screen. “0.00105188 Bitcoin sold, and 40 USD dispensed. We appreciate your patronage and look forward to your next transaction.” I grab my two \$20 bills, as if I’d won a slot machine jackpot.

AT A STREET MARKET in downtown San Salvador, workers push wheelbarrows through traffic as steam rises from the hot pots and sizzling grills of food vendors. Hundreds of merchants hawk mobile phones, gym shoes, and other bric-a-brac in outdoor booths.

Sunrise in La Unión, near the future home of Bitcoin City



My Crypto Tour



Source: Bloomberg reporting

On that Wednesday morning, Julio Rosales, 76 and wearing tinted shades, sits inside his eyeglass repair booth. It's called *Aquí Está Don Julio*, or "Here Is Mr. Julio." In his personal digital wallet, he tells me, he has \$30 worth of Bitcoin. The government gave it out gratis in September as part of its national experiment.

But Don Julio doesn't accept crypto for repairs. "People lost interest in it because the price fell," he says, taking a break from fixing a pair of mangled glasses. "It's not promoted well, so people don't know how to use it. No one has ever asked me if I accept Bitcoin, and few businesses around here do."

Shortly after noon, I head through the swinging saloon doors of Club La Dalia, a pool hall alive with salsa music. A dozen men, most over 60, shoot games of 15-ball pool on the tables lined up around the bar. Under a clock with Roman numerals, a collection of photos, most in black and white, captures generations of pool and card sharks doing their thing. Around since 1937, La Dalia has a cash-only vibe.

And, yet, Carla Barrios, a 5-foot-tall dynamo darting from the bar to the back office, stops to tell me otherwise. Not only does La Dalia accept Bitcoin, but Barrios and her nephew are also creating their own line of nonfungible tokens, or NFTs. These one-of-a-kind digital images, which can be bought and sold like crypto, will reproduce the period photos on the wall.

I play an hour of pool with a retired schoolteacher and pay 5,500 Satoshis, \$2.20, for two sodas. The transaction from my iPhone to La Dalia's clears almost instantly. "What a crazy world, this crypto stuff," says Barrios, 34.

As I walk out, my phone vibrates. It's a WhatsApp message from Natalia Avilés, the restaurant manager from Brutto. It turns out I triple-paid for lunch, twice with Bitcoin and once with Visa. It came to \$180 for a \$60 meal. She's working on reversing the Bitcoin transactions.

That afternoon, I head to the wilds of Conchagua, future home of Bitcoin City. The two-lane road from

San Salvador winds for 130 miles, past volcanoes and pastures that climb up slopes, meeting scorched fissures where lava once flowed.

It's 90F at 4 p.m. when, on a lark, I stop at a food stand with a thatched roof held up by tree branches. A young man in sandals and jeans approaches my car. He's selling cashews and sugar-coated peanuts, while a boy plays in the dirt yard in front of his tin-panel house.

"By chance, do you take Bitcoin?" I ask.

"Yes, I do," he replies. "Normally I have a sign out, but I forgot to put it up today."

I'm sure he's joking. Next, he'll offer to sell me a Tesla. "Seriously?" I ask.

"Yes, seriously," he says.

I buy a half-pound of cashews and a half-pound of peanuts for the equivalent of \$7. The future-minded nut vendor, Oscar Atilio Lopez, 26, pulls out the Chivo Wallet app on his phone and shows me a QR code. I scan it. Seconds later, 0.00018836 Bitcoin leave my wallet and enter his.

Lopez tells me he's already made an extra \$300 by holding on to crypto from his sales and unloading it when the currency rallies. That's roughly equal to the average monthly per capita income in El Salvador.

In the future Bitcoin City, my hotel—the Comfort Inn Real La Union—accepts crypto. But the system is down, so I head to El Mirador de Conchagua, a barbecue restaurant nestled in the foothills beneath the famed volcano.

Owner María Orbelina, 79, chops ribs on a plastic sheet draped over a wooden table, while chickens run around outside. "Bitcoin has no future here," says one of her sons, Alex Zelayndia, a 57-year-old retired engineer who helps run the place. "I want dollars. If you get paid \$25 in Bitcoin, it might be worth \$20 tomorrow. A dollar has never failed me."

I drive 15 miles to a small village where several dozen families fish for crabs and clams to eat and sell. A middle-aged couple rock in hammocks strung from the ceiling of their ▶



Orbelina prepares ribs at her barbecue restaurant in La Unión

Villalobos and Bautista Villa with daughter Darlin Bautista in La Unión



cinder block home, situated on a rocky road that leads to a mangrove swamp. Clelion Villalobos and her husband, Salatiel Bautista Villa, say government officials came to appraise their home, which could be part of a site for a new airport in Bitcoin City.

Bautista Villa, 61, says they don't want to leave. "We're familiar with life here, and I know my kids can play safely," he says. "This is an honest town. We don't even have a town drunk." He uses a prepaid cellular flip phone, known as a *frijolito*, or "little bean," which wouldn't work as a Bitcoin wallet.

His wife doesn't endorse crypto, either. "I don't understand any of that stuff," says Villalobos, 55. "I don't even know how to read."

BACK IN SAN SALVADOR, as I wrap up my trip, Alamo Rent a Car would like a credit card for my Kia SUV. So does the gas station, because its Chivo is down. "I'm sorry, sir, only cash or credit," says an otherwise friendly hotel bartender when I try to pay for a \$3 beer in crypto.

But there's a bright spot. My now good friend, Natalia, the assistant manager at Brutto, has left me a WhatsApp message. She's scored me a refund for one of my two extra Bitcoin payments. My wallet shows a credit for 152,000 Sats, about \$56. I'm not whole, exactly. My wallet charges me about \$4 in fees.

Rather than ask Natalia to fight for more money back, Cristina the photographer and I return to Brutto, so we can put the last extra crypto payment toward our lunch. Natalia throws in a complimentary dessert: three heaping scoops of Oreo ice cream with cookie shavings, Nutella, and popcorn on top. We consider ourselves square.

By Friday the final tally looks grim for crypto fans. Only 10 of almost 50 businesses had taken Bitcoin, amounting to \$485 out of \$1,700 I've spent. And only four crypto transactions—at the pool hall, the peanut vendor, a Starbucks, and a Caterpillar-brand T-shirt store—had been entirely seamless. My experience isn't a fluke. In a recent Chamber of Commerce survey of 337 businesses, only 14% said they'd transacted in Bitcoin since September.

I'd also paid \$40 in Bitcoin fees, such as levies for transferring the currency between Coinbase and my digital wallet. My Visa, by contrast, is paying me—\$20 in cash-back rewards.

At the airport, on the way home to San José, Costa Rica, I see the familiar blue glow of the Chivo ATM. Figuring I could use some cash, I tap the screen, get a text, and punch in the numbers: QR code, scan, wait. "Payment Sent," my phone says. The \$40 has left my digital wallet. A blue orbit symbol appears on the ATM screen, blinking as it processes. I wait. And wait some more.

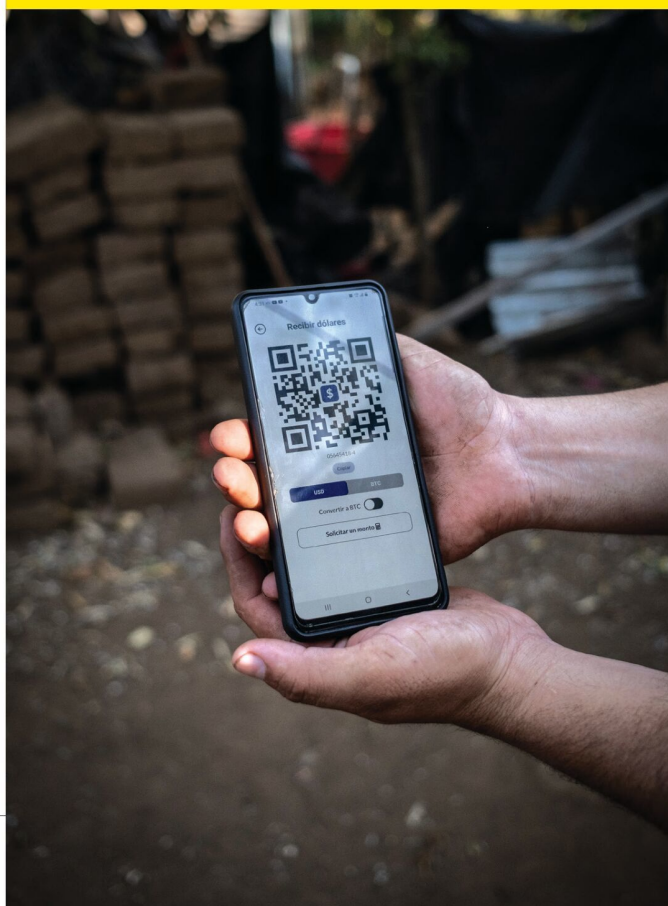
The machine spits out a receipt with a transaction number. Hooray, it's successfully taken my 0.00105 Bitcoin. But there's a catch. The Chivo machine has accepted my crypto, for sure. But it dispenses no cash. Zero. None. The Chivo has eaten my Bitcoin. I never see my \$40 again. ●

McDonald reports on Latin America for Bloomberg News. He's based in San José, Costa Rica.



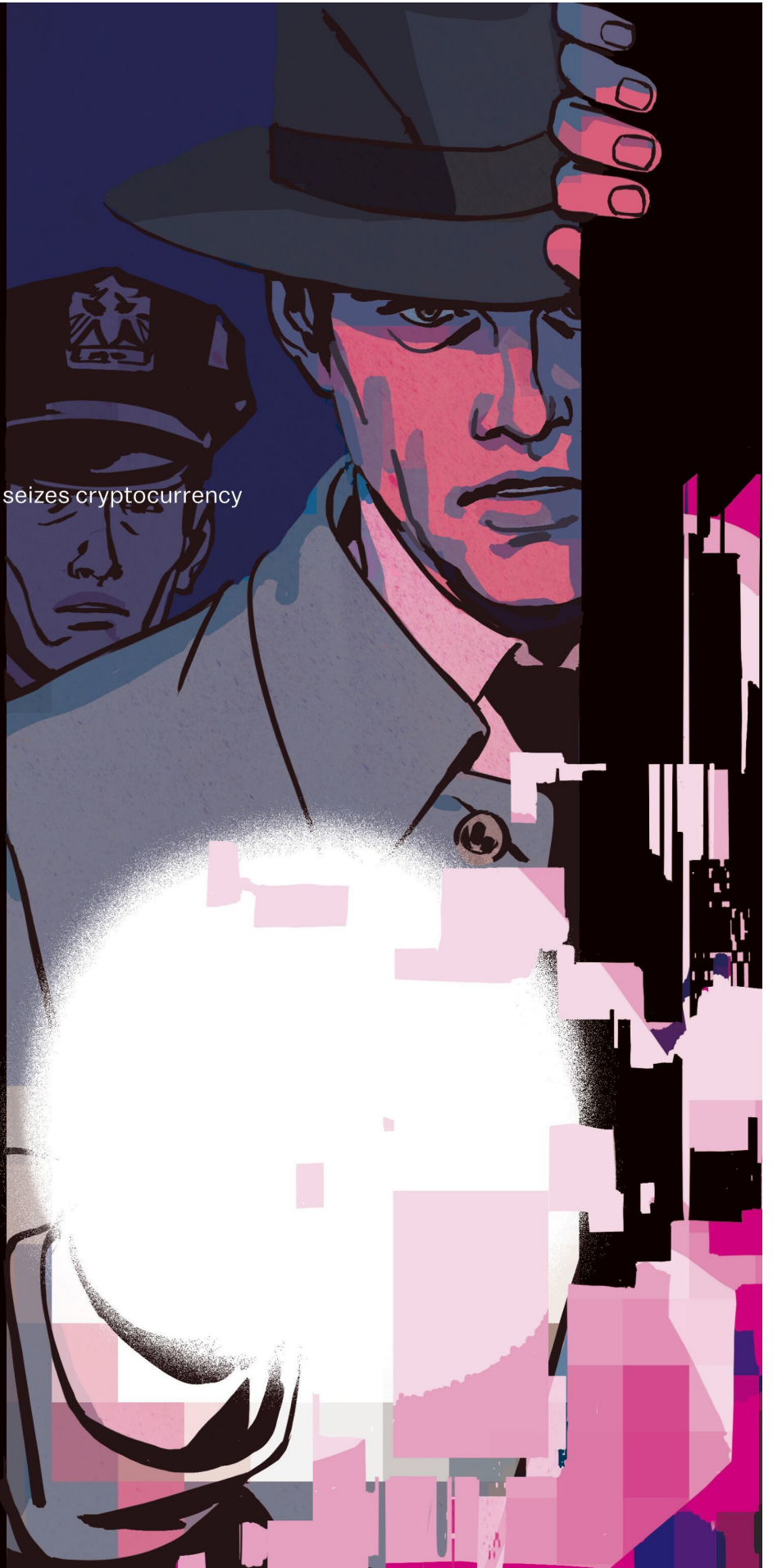
Lopez and his son near their home, by the highway peanut stand

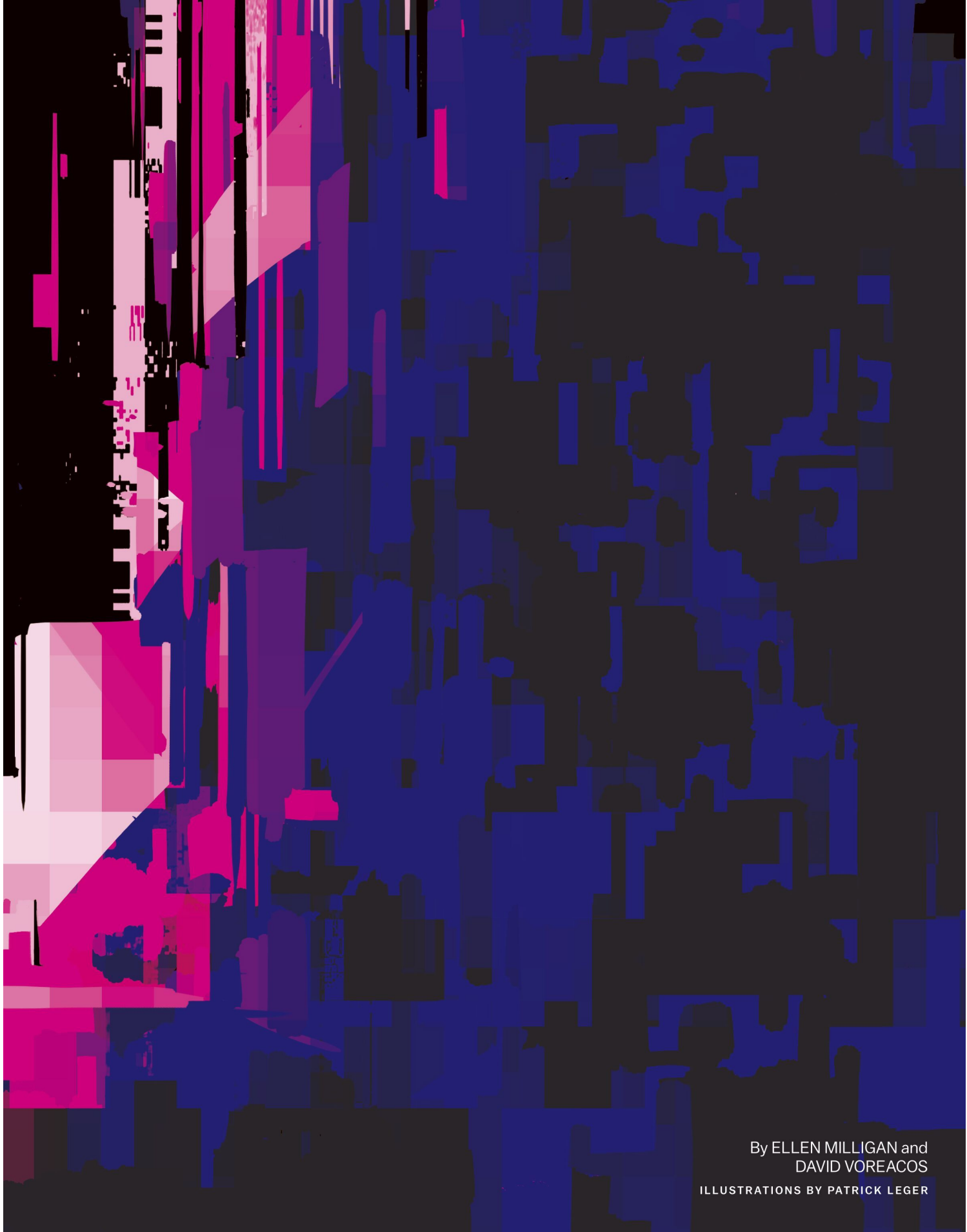
A Bitcoin wallet on Lopez's phone



'Police! Hands Up, Flash Drives Where We Can See 'Em'

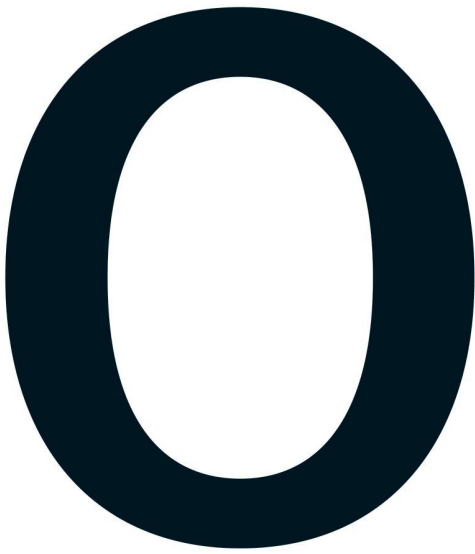
What happens when law enforcement seizes cryptocurrency





By ELLEN MILLIGAN and
DAVID VOREACOS

ILLUSTRATIONS BY PATRICK LEGER



One spring day in a village just west of London, residents saw a man being muscled into a car in front of a nearby house. He reappeared with cuts and bruises 13 hours later, but the cops had already discovered the house was a cannabis-growing operation. A separate search of the man's home in a nearby town turned up something more intriguing—some of the first cryptocurrency that would ever be seized by U.K. police. ¶ That era-defining 2017

case yielded a safety-deposit box containing jewelry, gold bars, £263,000 (\$345,000) in cash, and an item that flummoxed the lead investigator, Matthew Durkin, a 19-year veteran of the Surrey police. It was a USB device found in the suspect's study. The gadget was wrapped in a small notebook, which contained two strings of 12 random words. A young probationary officer recognized the device, a KeepKey, as a virtual currency holder and the words as seed phrases to access crypto wallets. Eventually, police discovered it held 295 Bitcoin.

"It meant nothing to me until someone said it was worth £900,000," recalls Durkin, 51.

In recent years, police departments such as Durkin's and law enforcement agencies around the world have had to learn quickly about how to deal with cryptocurrencies, often in amounts that eclipse traditional assets such as cash, gold, jewelry, cars, and real estate. In London, for instance, police seized almost £300 million of crypto linked to crime last year.

The U.S. Marshals Service held 22 cryptocurrencies valued at about \$919 million last December, according to spokeswoman Lynzey Donahue. In February the U.S. made its largest financial seizure ever: about \$3.6 billion in Bitcoin stolen during a 2016 hack of the Bitfinex currency exchange. And cryptocurrencies made up almost all—93%—of the assets confiscated by the Internal Revenue Service's Criminal Investigation Division in the fiscal year that ended Sept. 30.

"It's exploded since 2017," says Ryan Korner, head of the division in Los Angeles. "We're at a point where it touches almost every investigation that we work in one way or another. We're trying to make sure that all of our agents have the knowledge to work these cases."

The qualities that make cryptocurrencies attractive to criminals—some think they're easier to hide and transfer than many valuable assets—are challenging law enforcement.

To start, investigators have to learn to recognize a crypto wallet and then how to obtain the private key, or seed phrase, to unlock it. Months after the \$10 million hack of the GateHub platform in 2019, French investigative judge Pascal Latournald and his colleagues interrogated a suspect for 48 hours before he gave up the code that unlocked \$2 million in Bitcoin. The exhausted suspect, hoping for leniency, revealed he'd written it on a slip of paper inside a cookbook in his parents' living room in southern France, according to an officer involved in the investigation who spoke on the condition he wasn't named.

U.S. agents have discovered seed phrases hidden on a gum wrapper, inside a TV instruction manual, and on tiny pieces of paper stuffed in a suitcase in a closet, says Tigran Gambaryan, who was a special agent for the IRS's criminal investigation arm for a decade before joining crypto exchange Binance in September.

In 2018, U.K. police chiefs lobbied the government for funding to equip about 250 officers—dubbed crypto tactical advisers—and train them in how to investigate, seize, and realize the value of digital currencies.

The U. S. Federal Bureau of Investigation in February formed a crypto unit to provide equipment, training, and blockchain analysis to agents. The Department of Justice appointed Eun Young Choi as the director of a team dedicated to crypto crimes. Choi says her focus will include virtual currency exchanges and services, known as mixers or tumblers,

U.S. agents have discovered seed phrases on a gum wrapper, inside a TV instruction manual, and on tiny pieces of paper stuffed in a suitcase in a closet



that obscure funds. Speaking at a Munich conference, Deputy Attorney General Lisa Monaco said her prosecutors will work more with European partners on crypto enforcement.

Laurel Loomis Rimon, who worked on many money laundering cases during her 17 years as a federal prosecutor, says the value of the recent seizures is “staggering” and will have a big impact on prosecutors. “There’s a facility with this type of analysis that has been growing,” says Rimon, now at the law firm Paul Hastings. “You’ve got prosecutors getting more and more comfortable with it.”

As law enforcement becomes more sophisticated in identifying and accessing a suspect’s cryptocurrency, they’ve also had to navigate the challenges of securing it and, eventually, liquidating it. In the Surrey case, police quickly bought their own KeepKey and transferred the Bitcoin to it. They put the device and seed phrase in a safe, and only two officers knew the combination. Durkin had heard about two U.S. agents who went to prison for stealing Bitcoin while investigating the now-shuttered Silk Road underground virtual drug bazaar. “I was very conscious of security—people’s heads can be turned with a million quid,” Durkin says. “But most of all, I was worried about losing it—I didn’t want to stand in front of my chief constable and say £900,000 in Bitcoin had gone.”

Durkin’s team got a court order, the first of its kind in the U.K., that enabled them to convert the crypto into sterling. They sold it directly to a trusted international exchange for £1.25 million, the market rate at the time.

Once seized, it can take years for authorities to secure a forfeiture order letting them sell crypto and return the proceeds to crime victims or governments. In the U.S., seized property is subject to claims by people who say they have a right to it.

In 2018, authorities in Monmouth County, N.J., raided two locations used by a suspected drug dealer, Giddel Gonzalez-Estrada. They seized cocaine, cash, and a handgun, as well as Bitcoin, Litecoin, and Ether valued at \$57,000. Gonzalez-Estrada held the crypto in an account at Coinbase Global Inc. Monmouth authorities got a judge’s approval to seize the crypto from Coinbase, which transferred it to a wallet set up by detectives. They held it on a device in the evidence vault, says Michael Costanzo, a special deputy attorney general. Gonzalez-Estrada pleaded guilty in 2019 and was sentenced to 10 years in prison. When a judge finally approved the forfeiture in 2021, detectives transferred the crypto back to Coinbase, netting \$198,237 for the county’s law enforcement trust account.

Seizing and selling crypto is becoming less daunting for prosecutors and detectives, Costanzo says. Monmouth prosecutors are preparing for trial against a former tennis teacher accused of identity theft and other crimes. In 2017 they seized crypto valued at \$200,000. The value grew to \$1.25 million last year. “There were a lot of questions about it in 2018,” Costanzo says. “Now, in 2022, people have if not a full understanding, at least a rudimentary understanding.”

Around the world, stashes of confiscated crypto have been auctioned alongside Ferraris, watches, diamonds, and, in one case in Germany, a harp. Wilsons Auctions, the ►

largest independent auction house in the U.K. and Ireland, got involved in 2018 when the company realized that law enforcement didn't have a solution for selling seized crypto at the time. In February 2019 the company auctioned 315 Bitcoin for Belgian authorities. The sale, which took place online as well as in person, attracted bidders from more than 90 countries.

One middle-aged woman purchased half a Bitcoin along with some other items, says Aidan Larkin, who ran asset recovery for Wilsons at the time. When she insisted on taking the Bitcoin home with her in a bag, the auction team had to coach her on how to set up a digital wallet instead.

The U.K.'s National Police Chiefs' Council, the representative body for all forces, undertook a procurement process that enabled police to use a third-party custodian to store and sell its crypto. So Surrey Police and other forces now use Komainu, which is backed by Nomura Holdings, Ledger, and CoinShares. Larkin, who formerly worked as a criminal investigator for the U.K.'s tax authorities, left Wilsons to start a company called Asset Reality that aims to advise law enforcement on dealing with seized assets, including cryptocurrencies.

The U.S. Marshals Service, which disposes of assets like houses, cars, planes, boats, and artwork, has had a hard time finding a contractor to manage and sell forfeited crypto. From 2014 to 2020, the marshals auctioned crypto themselves. Billionaire venture capitalist Tim Draper was one bidder who cleared background checks and bought crypto at auction. In 2014 he picked up 30,000 Bitcoin for \$632 each, before the price plunged to \$180. He still holds those Bitcoin, now valued at more than \$40,000 each. He says he bought fewer Bitcoin in the next auction, investing about 40 of them in startups, but would consider buying more if the government auctions them.

He may not get the chance. As seizures ballooned, the marshals sought proposals from companies to store and sell crypto. In soliciting contractors, they posted 26 pages of questions and answers in May 2020. At that point, their portfolio was valued at \$145 million in more than 160 wallets, the agency said. Last April, BitGo Inc. won a \$4.5 million contract. But that award fell through because it was supposed to go to a company designated as a small business, and BitGo, now part of Galaxy Digital Holdings, was too big. In July, a \$6.6 million contract went to Anchorage Digital, which had received conditional approval for a national trust bank charter from the Office of the Comptroller of the Currency. The contract is on hold pending the outcome of a protest to the bid.

The U.S. Marshals Service now uses "a secure online platform for buying, selling, transferring, and storing cryptocurrency," says Donahue, the agency spokeswoman. "Our goal is to dispose of assets in a timely manner at fair market value."

The Justice Department's asset forfeiture policy manual last year spelled out how prosecutors and agents should proceed on crypto. Because multiple copies of a key may exist, "it is imperative that once authorization to seize the virtual currency is obtained, it be transferred to an agency-controlled wallet," the manual states. Seized crypto also must be held in cold storage, or a secure offline device, until



**Stashes of confiscated
crypto have been
auctioned alongside Ferraris,
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and, in one case in Germany,
a harp**





it's transferred to a government-controlled custodial wallet.

In Germany, prosecutors in each of the country's 16 states decide how to manage seized property. Frankfurt prosecutor Jana Ringwald's cybercrime unit uses Bankhaus Scheich, a small investment bank, to ensure that confiscated cryptocurrency in her home state, Hesse, is legally managed and sold in a way that creates minimum volatility. Prosecutors in Cologne, by contrast, auction cryptocurrency seized in North Rhine-Westphalia like other contraband. Buyers can pick up a physical wallet with the codes in person, or apply to have the coins transferred online.

Over time, German authorities have become more efficient in handling crypto, but delays aren't always a bad thing. In 2018, Berlin police watched the value of their cryptocurrency soar as they waited to clear bureaucratic hurdles before holding an auction.

To be sure, much of the crypto seized today stems from crimes such as the Bitfinex hack or frauds that occurred years ago. Investigators handling these cases are specially trained in crypto sleuthing, and they say it can be easier to trace money on the blockchain ledger that underlies cryptocurrencies than in the traditional banking system. "The blockchain of Bitcoin provides a lot more transparency than the legacy financial system," says Gambaryan, the former IRS criminal investigator who's now vice president for global intelligence and investigations at Binance. "This is coming from somebody who's worked both. If not for Bitcoin, a lot of cases I was working wouldn't be closed."

For instance, in November 2020, U.S. authorities confiscated Bitcoin that had been hacked from the Silk Road digital marketplace about seven years earlier. The Bitcoin were valued at \$1 billion when they were recovered from someone identified in court papers only as Individual X. The

IRS cracked the case after working with Chainalysis Inc., a cryptocurrency research firm. "That's a perfect example of the permanence and immutability of the blockchain, that crimes committed long ago remain relevant as soon as we can get some attribution," says Gurvais Grigg, Chainalysis's global public sector chief technology officer.

The proceeds from seized crypto sold by the U.S. government go to support law enforcement if the crypto was used to facilitate crime, according to Michael Sherwin, a former federal prosecutor. But if there were victims of the crime, they get the money as restitution, he says. For instance, the Justice Department has said it will return the Bitcoin hacked from Bitfinex to the victims—a process to be worked out in court.

The volatility of cryptocurrency can create thorny questions for courts to solve. "If you have 300 tokens stolen in 2018, what's the court going to give you? Are you going to get the value of the tokens in 2018, or are they just going to give you back your tokens, which had an exponential increase?" asks Sherwin, who's now at the law firm Kobre & Kim. "I think it should be the latter. You should get your property back, even if it increased in value."

As regulators and law enforcement agencies become savvier about seizing and disposing of crypto, so do the criminals trying to evade detection. "It's not easy for us, and it's still an extremely volatile market," says Durkin, the Surrey detective chief inspector. "It's an area of criminality that we've had to play catch-up on really quickly. But the police play cat and mouse, that's what we do." ● — *With Gaspard Sebag in Paris, Karin Matussek in Berlin, and Chris Strohm and Allyson Versprille in Washington*

Milligan and Voreacos cover legal news in London and New York, respectively.

Jenny Johnson

The chief executive officer is expanding 75-year-old Franklin Templeton into areas including wealth management and alternative assets. Here she divulges some off-duty habits and preferences to Bloomberg TV's Francine Lacqua, co-anchor of *Bloomberg Surveillance* and host of *Leaders With Lacqua*.



What's your morning routine?

Let the dogs out, make coffee, go back to bed and catch up on email and read the newspapers.

What's your typical workout?

Lately, it is rollerblading.

What is something that you've tried for the first time recently?

Pickleball.

Who's your favorite new emerging musical artist?

My daughter, Mary Bolt.

What's your favorite mode of transportation?

Bicycle.

What's the best book you've read recently?

The Code Breaker by Walter Isaacson.

What's the best show you've streamed recently?

Yellowstone.

What's your favorite vacation spot?

My ranch in Montana.

What living or historical person do you truly admire?

Benjamin Franklin.

What's the best advice you've gotten?

Persistence is omnipotent.

What's the best advice you've given?

Everybody falls down. The difference between success and failure is whether you can dust yourself off and try again!

If you were 20, what business would you get into?

Build a business leveraging the blockchain ecosystem.

What's your favorite city?

New Orleans.

What's your favorite museum or artist?

The National World War II Museum in New Orleans. Artist is Monet.

A Compendium of Functions— New or Featured In This Issue

FEATURED IN THIS ISSUE

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PORT	Analyze a selected portfolio	21, 22, 23, 24
G	Chart tickerized portfolios with technical studies	22
PREP	Enables PORT Enterprise users to design portfolio reports	23, 24
JMGR	Lets PORT Enterprise users schedule imports and reporting	24, 25
BITL	Displays a collection of Bloomberg-curated report templates for Microsoft Power BI	25
CORR	Build a correlation matrix	26, 27
GP	Use natural language to create charts	26, 27
CFND	Find and rank correlations to a selected asset such as Bitcoin	26, 27
BPS	Download a quant research white paper on news signals and medium-term returns	30
WSL	Allows you to download and save sample worksheets for key regions and themes	35
DS	Track trends in reference to key themes in earnings announcements	35, 36
NCAT	Extract tickers of companies mentioned in news stories related to a topic such as crypto	36
WATC	Create a custom template to analyze a list of stocks	37
NSUB	Subscribe to the <i>Bloomberg Crypto</i> newsletter	37
HF	Follow the performance of hedge fund strategies and styles	38
BQLX	Find tutorials on using BQL	38, 39

NEW ENHANCEMENTS TO TRY RIGHT NOW

- CRYP** The Cryptocurrency Monitor has been enhanced with a link that lets you find additional coins and pricing sources. Go to {CRYP <GO>}. Click on the blue More Coins and Sources | DAS <GO> link and you can use the Digital Asset Search function to drill down to the data you're looking for.
- RSAN** Russian Sanctions Dashboard lets you track market-moving data, research, and news related to Russia's invasion of Ukraine. Go to {RSAN <GO>}. The dashboard displays key macro indicators, the latest analysis from Bloomberg Intelligence and BloombergNEF, prices of affected commodities, and themes appearing in company documents and research. A live feed of breaking news is shown at the bottom of the screen.
- BTDY** Bloomberg Today is a new function that provides a curated roundup of news, opinion, podcasts, and other important content to help you stay on top of the day's events. Go to {BTDY <GO>} and click on a topic such as Need to Know or In Case You Missed It.
- DES** The Security Description function for equities has been enhanced with a new ESG tab. For example, run {NEM US <Equity> DES <GO>} and click on the ESG tab to display an overview of environmental, social, and governance data on Denver-based miner Newmont Corp.
- IB** Instant Bloomberg has been updated with autocomplete for emojis. To quickly add an emoji in a chat, simply type a colon—either at the beginning of a chat entry or after a space—and type one or more characters; an autocomplete menu will appear. For example, type “:sm” and click on the smiley match to add the emoji.

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What's Going On

By STACY-MARIE ISHMAEL

NSTM <GO>

MANAGING NEWS COVERAGE of a 24/7 asset class means that one of my very first thoughts every morning is, “Time to find out what happened to crypto while I was sleeping.” The answer is rarely straightforward.

There are a few different ways I can get up to speed, but my favorite function for a quick and immediate overview of the why behind any overnight price action is **{NSTM <GO>}**.

It’s no secret that one of the strengths of the terminal is its ability to swiftly surface relevant and timely news, research, and data from around the world. **{NSTM <GO>}** applies an additional level of structured insight to your preferred asset class, using machine learning to give an at-a-glance snapshot of the top five themes in a

given period, adjustable from the last hour to the previous three months. If you want to be more granular with the time frame, there’s a configurable option, too.

Unsurprisingly, my go-to search query is FRXDIGITAL, and I usually start with the filter that pulls in the top themes of the past eight hours—which, let’s be honest, is a couple of hours longer than I’ve been logged out of the terminal on most days.

This is a nonstop asset class and one for which “range-bound” can mean “up or down 4%” depending on the token in question. Because of its global nature, crypto can be affected by breaking news and major developments in finance, politics, or regulation in unexpected or unpredictable ways.

Having filters that are too specific,

or that are geographically bound, can mean you miss out on key events that are moving the market. Over the past 12 months, major crypto events included China cracking down (again), El Salvador making Bitcoin legal tender, several DeFi scandals, the rise and rise of nonfungible tokens, and the humanitarian and philanthropic response to Russia invading Ukraine.

When I look at **{NSTM <GO>}**, I expect to see headlines about Singapore’s latest regulatory proposals or about Bitcoin miners setting up shop in Texas—a breadth and range I find essential. And if what I want instead is a thoughtfully curated list of the biggest stories selected by my colleagues around the world, I head right over to the new **{TOP CRYPTO <GO>}**. ●

Ishmael is managing editor for crypto coverage at Bloomberg News in New York.

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