

Cryptoassets and stablecoin consultation
Payments and Fintech
HM Treasury
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with a copy to: cryptoasset.consultation@hmtreasury.gov.uk

17 March 2021

Dear HM Treasury

UK regulatory approach to cryptoassets and stablecoins - Eden Block & RW Blears Joint Response (our “Response”)

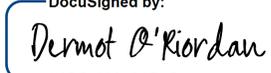
This is a response to your call for evidence as published in the January 2021 consultation paper of the same title as this letter (the “**Paper**”). We acknowledge your statement that the Paper marks the first stage in your consultative process with industry and stakeholders regarding the UK government’s forward-looking approach to regulating cryptoassets and the national crypto-economy.

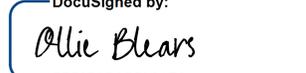
As an established European venture investor in the blockchain sector and as a specialist law firm with significant experience advising clients on operating in the UK’s alternative investments market, we represent two such stakeholder groups. We are delighted to be offered the opportunity to respond to the Paper’s questions and welcome the pragmatic and proportionate approach adopted by the Treasury.

We have sought to respond to as many questions as we felt warranted our combined feedback and recommendations. Notably, we have not focused our response too specifically on those proposals concerning the expansion of the existing regulatory perimeter to include activities in respect of stable tokens (although they are referenced elsewhere in this Response), as we are in broad agreement with what is proposed and are therefore supportive of the Treasury’s prioritisation of economic policy efforts.

We also acknowledge the statements made in the recent Kalifa Review of UK FinTech¹ concerning the UK regime for regulating cryptoassets and what follows espouses the same message of opportunity.

Yours faithfully

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Capitalised terms used but not defined have the meaning given to them in the glossary to the Paper.

Gradually, then suddenly

Unless you happen to be a Vanuatuan², the pace of technological change that has unfolded over the last eighteen months is self-evident. In no small part necessitated by the COVID-19 pandemic, the world has raced through a process of digital transformation to reach a state which was otherwise anticipated to take a further two years³. At some point since the beginning of last year, most of us have no doubt reflected that, had the pandemic struck just ten years earlier, we would have been plunged into a world of fragmented darkness and economically maimed far worse than even the current toll taken on the global economy.

In the UK, cash has all but disappeared from daily life. Scenes from not-so-old movies where the protagonists pull out wallets stuffed with banknotes suddenly look oddly archaic. As the Treasury rightly acknowledges in the Paper, the United Kingdom has been a world leader in financial technology and specifically the adoption of digital (often mobile) payment solutions. In 2019, our value of cashless transactions as a multiple of GDP was second only to China and far superior to other Western economies⁴.

Evolving rapidly alongside 'traditional' payment solutions has been the cryptoasset market, one of the major applications of blockchain technology in finance.

Judged in 2018 by the cross-authority Cryptoassets Taskforce as being at an "*immature stage of development [with] limited evidence...of...delivering benefits*"⁵, the Treasury now recognises in the Paper that the landscape is markedly different than it was in 2018. The Treasury correctly identifies stable tokens and their potential to lock, store and transfer value at low cost (including cross-border) and without the volatility that has become synonymous with popular exchange-traded tokens as a prospective game-changer for the way that public and private institutions and the general public view and interact with cryptoassets.

The digital information age has been with us for some time now. The advent of broadband internet and 4G mobile technologies has ushered in over the last decade a global communication hub accessible 24 hours a day, seven days a week for almost everyone living in an urban area. Fibre broadband and 5G is set to expand the connectivity even further and even faster. We can collectively wipe our brow as to just how well-timed this new technology is given the upending of traditional office environments in favour of a likely irreversible shift to remote-working for many and the increased demands on home connectivity.

The digital economic age is now in its ascendancy. Much-advanced technological solutions both on and off blockchain are creating a new web-based *value layer* to sit alongside, and as a complement to, the existing *information layer*. The crypto-economy, developing and iterating in plain view of market onlookers and regulators, is increasingly at the forefront of this

transformation. With the promise of stable tokens, the sandbox of smart contract creativity in Ethereum and DeFi protocols⁶, and the growing popularity of non-fungible tokens (“**NFTs**”) as digital collectables, we are beginning to witness bold new ways to transact, raise capital, invest and save ‘on-chain’. In the case of NFTs in particular, creators (musicians, artists etc) are also beginning to *earn* through the direct sale of digital representations of their assets, some of them significantly so⁷.

The approach set out in the Paper as to how the UK should harness this technology is impressive in its sensible rationale that applying too much regulation and in areas where there is little evidence (yet) of consumer and systemic risk would stymie continued innovation within our borders, and should be avoided if at all possible.

We note that this stance is in contrast to the European Union’s recent policy proposal in the form of the ‘Markets in Crypto-assets Regulation’ (“**MiCA**”)⁸, where the intention is to bring the use (and associated activities) of *all* cryptoassets within a widened regulatory perimeter. Instead, the Paper is highly commendable in proposing that we, the UK, focus on where risk is most acute and phase in our own legislative change. The first proposal being that stable tokens used as a means of payment are brought within the national regulatory perimeter.

Classification of cryptoassets and a defined nomenclature consistent with our neighbours (and globally if possible) is crucial for the technology to be more widely understood and not be prone to misinterpretation and/or ‘gamed’ for cross-border regulatory arbitrage.

However a camel is a horse designed by committee and, now that we are free from the EU’s three-headed decision-maker (involving the Commission, the Parliament and the Council, and years of deliberations), the UK has a pivotal opportunity to capitalise on its newfound agility and to design a more thoughtful framework for supportive cryptoasset regulation, not behind closed doors and between technocrats, but through open cooperation between the Treasury, our two financial regulators and highly engaged market participants.

We note the similarity between the approach to the regulation of the national crypto-economy and that of the impending regulations being considered for ‘buy now, pay later’ payment services (“**BNPL**”) following the recent Woolyard Review⁹. Much like the BNPL market participants, we are aware that the majority of crypto-economy participants would welcome thoughtful regulation of the sector. Regulation confers credibility, and with credibility comes institutional interest; institutions bring with them the capital and the wherewithal to match the ambition of the early entrepreneurs and the technologists.

However, over-regulate, and we risk the analogous situation of the 12mph speed limit on motor cars imposed by the state of Connecticut in the United States in 1901¹⁰.

Through our combined experience, not just in the cryptoasset sector but in financial services more generally, we often find that it is rarely the use of the underlying asset or technology that requires regulation to combat risk, but instead the derivatives, the schemes and the promotions

which are manipulated by the familiar cast of nefarious actors in the wake of every technological breakthrough.

As we recommend in our specific responses to the Paper below, it is, therefore, this ‘second layer’ of activity where we think our national regulation should continue to focus. Through a well-designed framework, we should be able to provide the playbook for a generation of UK-located entrepreneurs to operate efficiently and at low cost, and at the same time provide the rulebook which helps quash the scammers, the schemers and the sharks.

By boxing cleverly, we should be able to honour the “same risk, same regulatory outcome” guiding principle and maintain a level playing field across the regulation of financial services, whether they be tokenised or not. Does a particular area of the cryptoasset market pose either no or minimal risk (e.g. if it is still ‘niche’ or immature)? If the answer is that it does not, then regulatory efforts should be redirected elsewhere.

We are blessed with the gold standard of law and regulation here in the UK and a cross-authority policy unit that took an interest in blockchain technology and its native cryptoassets at an early stage. Scientific progress has historically developed in increments rather than quantum leaps (artificial intelligence came into existence in 1956, for example¹¹), and should the Hemingway Law of Motion (“*gradually, then suddenly*”)¹² also apply to the crypto-economy as is looking incredibly likely, then we would surely cement our recognition as a world-leader in financial technology if we equip ourselves now with a framework fit for the future.

INVESTMENT AND WHOLESALE USES

Security Tokens

Are there any areas of existing regulation where clarification or amendments are needed to support the use of security tokens?

Useful feedback on this topic we think derives from an upfront assessment of the existing regulation in the UK concerning security tokens followed by an appraisal as to whether we can be doing more to support their use as a medium of capital raising alongside traditional equity and debt issuances.

When we talk about security tokens and specifically security token offerings (“**STOs**”), we have in mind primary market offers to the public of tokens which have been *intentionally* structured to confer the types of rights granted in conventional securities (e.g. the right to vote, the right to a dividend or coupon or a capital return etc.). Issuers behind properly structured STOs accept that they are proposing what is a regulated offering and thus subject to UK securities laws, in the same manner that the ‘initial coin offerings’ of 2017 often were intentionally structured by their founders to avoid such laws¹. Security tokens are thus regulated investments but in a purely digital format.

We are supportive of the Treasury and the FCA’s position taken to date and the response to previous market feedback (the “**2019 Guidance**”)². Substance over form is at the heart of the analysis conducted to date and in our experience the UK has consequently proved one of the more transparent jurisdictions internationally in which to review whether a particular token or token offering is analogous to a traditional security (or security offering) and so should be regulated.

It instinctively feels a little unsettling to not map out the eligibility criteria of what constitutes a security token in new legislation, and instead rely on a financial framework drafted before the advent of DLT. Terminology used in the Paper and the 2019 Guidance such as “*factors that are indicative of a security*” or “*akin to a specified investment*” demonstrates the difficulty in pinning down security tokens to one rigid definition which can sit shoulder-to-shoulder alongside definitions of other specified investments in FSMA and instead should remain to be “*determined on a case-by-case basis*”.

However, on balance we agree that the proper way to address the analysis of security tokens and STOs is indeed with technological neutrality. The breadth of form which a security token can adopt and thus resemble either an equity share, a debt instrument or a unit in a collective investment scheme is an obvious blocker to shoehorning such tokens into just one analogous sub-category of specified investment and similarly what point is there in legislative amendments where the outcome is duplicative of what already exists?

However, is now the time to move the consistent guidance from past consultation papers and policy statements into the FCA Handbook (and specifically PERG)? The 2019 Guidance notes that “[it] should act as a first step for market participants to understand whether authorisation is required and should be read in conjunction with PERG”. Such guidance will only become more dated if left in ageing papers and statements (even if the underlying analysis still holds) and a transfer of consolidated analysis across to PERG might go a small way to assisting firms and their advisers when they come to review their individual compliance with current authorisation requirements.

With the guidance enshrined in the FCA Handbook and the UK’s approach to security tokens widely understood, we would like to see the conversation then move on to how we as a marketplace could be doing more to support their active use in STOs.

Securities, whether tokenised or not, are the lifeblood for companies seeking to raise funds from the marketplace or incentivise their staff appropriately. The availability of capital to small and medium-sized companies in the UK has come a long way in recent years with the maturation of crowdfunding, peer-to-peer lending and access to public markets via SME growth exchanges such as AQSE. However, there are still deficiencies and anomalies in our rules which we now have the opportunity to change as an independent and sovereign policymaker.

We ask that HMT reviews how it might seek to promote the use of security token offerings in the context of the wider calls for fundamental market reform as set out in Lord Hill’s recent UK Listings Review³. Specifically, in the context of the current prospectus regime where applied to private companies seeking to raise funds from the public by issuing ‘transferable securities’ (which would capture the great majority of STOs).

We share Lord Hill’s concerns that at present the Prospectus Rules have resulted in a cumbersome fundraising regime for SMEs. Unless companies looking to fundraise can avail themselves of an exemption to the requirement to publish an FCA-approved prospectus, then they can be put off the prospect altogether given the process and the time involved. Young companies understandably struggle with the lengthy checklist of requirements and so either turn to a sub-threshold fundraise and the help of an authorised firm to promote the raise without a prospectus or look to venture capital or debt investment. Not every company is a fit for traditional venture capital and many don’t want to or can’t seek additional leverage. The liquidity pool of direct investment from the general public is not being properly tapped right now.

An overhaul of the prospectus regime where changes made are supportive of direct fundraising by younger companies raising funds in the UK could confer indirect legitimacy to STOs. SMEs might see an FCA-approved STO as a credible fundraising option where they have their own reasons for not issuing either direct equity or raising additional debt. We would expect that in doing so the market would develop and iterate customary fundraising tools and platforms for STOs similar to how such tools and platforms have developed for traditional securities thanks to technological advancements. In doing so, each STO would share common ground with other

STOs that have gone before it and issuers will be encouraged in choosing to raise in the UK if they can see a well-trodden path ahead of them.

So our recommendation here is not to 'square the circle' with the technology and our existing primary legislation since the technology may well change and then change again. Instead, we ask that security tokens and STOs are kept in mind when addressing the proposed reforms more generally for our securities market - as we think they might yet have an important part to play.

Recommendations in brief:

- Maintain stance of technological neutrality where possible when assessing form and substance of cryptoassets
 - Consolidate guidance to date by way of an amendment to the FCA Handbook (PERG) so that the UK regulatory position regarding security tokens is better codified
 - Consider how STOs might be better supported and publicised as a genuine alternative capital raising medium for SMEs, particularly in light of the recent calls for reform by Lord Hill to the Prospectus Rules
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DLT-based financial market infrastructure

What, specifically, are the potential benefits of the adoption of DLT by FMIs? What could be the benefits for trading, clearing and settlement?

The most obvious benefits from the adoption of DLT by FMIs relate to; digitisation, automation and transparency.

See our response to the question entitled “*What are the risks and opportunities you see in relation to DeFi?*” below for a detailed assessment of the benefits of the adoption of DLT in finance.

What are the potential drawbacks of DLT for wholesale markets and FMIs?

See our response to the question entitled “*What are the risks and opportunities you see in relation to DeFi?*” below for a detailed assessment of the drawbacks of DLT for wholesale markets and FMIs, with a particular focus on the risks related to DeFi. This section covers more general concerns only.

One obvious drawback might be a loss of business for traditional financial intermediaries, such as clearing houses, as clearing and settlement processes are further commercialised for use on DLT.

Another is that businesses whose competitive market edge has been the ability to take advantage of information asymmetry will struggle when faced with the superior transparency that DLT-based financial systems like DeFi offer.

Any future mass adoption of DLT in financial services would likely leave FMIs with less control over their users’ assets and accounts, given that they will be permitted to transact with such assets only according to the system’s verifiable rules in question. Whilst of concern for those FMIs who are slow to change their business model, investors and savers should stand to benefit from greater control over their assets.

A final drawback worth mentioning derives from the principle of immutability in DLT systems. Immutability of transactions means that transactions are final once made, at least without obtaining consensus from a *significant* proportion of the community, which is likely to be unobtainable apart from in permissioned private blockchain systems. In traditional finance, familiar legal contracts between market participants govern the rules as to what happens where a transaction is disputed (a court claim, arbitration, amendment or severance) and whilst the parties may remain in dispute or the courts may find in favour incorrectly, at least backstops are available if the original transaction was not unanimously agreed on.

Would common standards, for example on interoperability, transparency/confidentiality, security or governance, help drive the uptake of DLT/new technology in financial markets? Where would common standards be most beneficial?

We think that the UK could become a leader for DLT by combining a pro-innovation legal and regulatory framework that works closely with private trade bodies to create best practice common standards around important issues such as transparency, governance, disclosure requirements, insider trading, and conflicts of interest. A worthy example of an existing trade association in the UK is the British Venture Capital Association which; regularly lobbies on behalf of its membership, promulgates common standards, events and seminars and maintains a membership of a wide variety of market participants - not just conferring credibility on those that have joined but also providing a deep directory of contacts for cross-marketing purposes. Might the DLT industry benefit from a similar representative trade association at this stage?

Regarding technical standards, like today's internet standards of TCP/IP, HTTP, SMTP, etc. - it is likely best to leave it to the market to decide. Government support could include best practice guidelines and support concerning technical audits of smart contracts so consumers can understand the benefits of interacting with an audited smart contract versus an unaudited smart contract. Additionally, supporting open source code in essential public infrastructure, particularly any leveraged by any government bodies, is one of the best ways security can be upheld and improved over time.

Public blockchain systems provide open API access to data by design. However, private permissioned systems are typically built using proprietary technology and have no incentive to enable third party access to the data on their platforms. We ask that the government consider introducing legislation that requires open API read/write access for all new financial systems, similar in principle to the Open Banking legislation. Data interoperability will support innovation and enable greater competition in the sector.

Lastly, the importance of positive (not scaremongering) public education regarding operational security in terms of private key management and understanding of potential risks is essential if members of the public are to avail themselves of the full benefits of DLT and specifically DeFi.

Recommendations in brief:

- Support the establishment and initial operation of a long-term focused private trade body association to represent the industry
- Allow market participants to lead on the adoption of technical standards
- Provide input on common standards developed by industry bodies and their members in respect of important topics such as transparency, governance and technical audits
- Require open API read/write access for all new financial systems

What should the UK government and regulators be doing to help facilitate the adoption of DLT/new technology across financial markets/FMIs?

One of the most common struggles for entrepreneurs operating in the UK's DLT ecosystem (whether or not their business relates directly to cryptoassets) is the artificially high barriers to entry imposed by commercial banking partners. Companies find it challenging to open UK bank accounts and banks find it easy to close them¹. Such business practice favours incumbents over new entrants and hinders the growth of the DLT ecosystem. The DLT ecosystem in the UK and abroad would warmly welcome better guidance and support for the sector from HM Treasury.

Government bodies should adopt DLT where possible in their own systems and act as leaders in their own right. The Central Bank Digital Currency (CBDC) initiatives currently being explored by the Bank of England is one such area through which the world can see the UK as at the forefront of this new movement.

We would also ask that a cross-industry group review the existing tax code to account for the unique characteristics of financial services enabled by DeFi. A purposive approach should be followed where possible.

Recommendations in brief:

- Provide the support necessary so that DLT entrepreneurs can open bank accounts more easily in the UK
- Establish a cross-industry group to review how the tax code can better support the objectives and growth of the DLT ecosystem in the UK

Other unregulated tokens and new developments in the market

Do you see value in the government capturing tokens typically used by retail consumers as a form of 'speculative investment' under the regulatory perimeter in the future?

"If you're seeing bitcoin on a bus, it's time to buy"

So goes the call to action splayed across the side of what feels like one out of every three London buses in circulation (for some months now). This heavily promoted campaign by a certain bitcoin exchange is grating in its brazenness of regulatory arbitrage. Falling neither within the scope of gambling advertising rules nor within FSMA's financial promotion regime, the static *"time to buy"* recommendation which is completely agnostic as to whether the price of bitcoin is either rising or falling at the time of viewing by an onlooker feels awfully dislocated from the 'level playing field' which we understand to be the government's priority when applying the principle of 'same risk, same regulatory outcome'.

Moreover, it is adverts like the one described above which perpetuate a negative news cycle and consequently often caustic opinion of the wider cryptoasset sector from large sections of the public who might otherwise be curious and engaged (beyond mere speculation).

It is our view therefore that there is little merit in seeking to capture bitcoin or other unregulated exchange-traded or utility tokens within the authorisation regulatory perimeter, but rather that their irresponsible promotion (by encouraging careless speculation) should be firmly held accountable by the in-scoping of such tokens to FSMA's financial promotion regime as 'controlled investments'.

Thankfully, it appears as if this will be an imminent outcome, as the results of last summer's consultation by the Treasury on cryptoasset promotions are due any day now¹. Our hope and expectation is that market feedback to the previous consultation corroborates our own views and the requisite changes to the financial promotion rules are made.

What might that achieve? In reality, it is arguable whether the effect of the advert above on a first-time interested onlooker would be watered down much by small print in the corner of the billboard noting *"#capitalatrisk"*. As the Paper notes, according to the FCA's latest consumer research '89% [of consumers] understood that they are not subject to regulatory protections'. If someone wants to buy bitcoin on the basis of such an advert then they will do so and it is not a proportionate use of our financial regulator's time to mollycoddle every individual investor's decision-making so that certain legitimate investments are either rendered uninvestable for the general public or the promotion of such investments drowns in disclaimers.

What should be effective however is that by in-scoping unregulated tokens into the financial promotions regime, those firms that are not themselves FCA-authorized will be required to seek the approval of their promotions by a third party who is FCA-authorized (which is how the current system operates).

Would any reputable authorised firm approve the above financial promotion? One that is quite clearly not ‘fair, clear and not misleading’ and emphasises only the benefits and not the risks? No, they would not. But a disreputable or careless authorised firm might do so and it is to this point that we refer to the parallel proposals by the Treasury to strengthen the FCA’s ability to ensure that the approval process of financial promotions by unauthorised firms operates effectively².

If only authorised firms who have first demonstrated to the FCA that they have the systems and the competence to approve financial promotions from cryptoasset firms are permitted to act in such a role, then we think we will see a much more orderly financial promotion regime entail, and a ‘level playing field’ in this regard.

Recommendations in brief:

- Policy priority should be a focus on ensuring that the financial promotion regime covers all cryptoassets to ensure a ‘level playing field’ in this regard
- Parallel proposals regarding the regulatory framework for approval of financial promotions to reach a sensible outcome as to which authorised firms are qualified to approve financial promotions on behalf of cryptoasset firms

Do you have any views on how the government should bring these tokens into the regulatory perimeter in the future?

As alluded to in the previous response, we do not consider the regulation of those tokens which are not already caught by our existing financial services regulation to either be a priority or a long-term goal of the UK government.

We have an opportunity following these most recent proposals and deliberations to distinguish ourselves from our neighbours and the proposals laid out in MiCA (to regulate all cryptoassets) and take a more thoughtful approach to legislative change.

Seeking to regulate the underlying technology, particularly when one of its core attributes is decentralisation, risks muddying the regulatory waters for firms and entrepreneurs operating (or wishing to operate in) the UK and may favour incumbent financial institutions, thereby harming healthy competition. As the FCA itself notes, “*markets [should be] open to entry and innovation, and successful, innovative firms thrive, while unsuccessful firms change or exit*”³.

Rather, we recommend that we largely rely on the existing regulatory perimeter in relation to security tokens and e-money tokens, save for the changes to be made to include fiat-backed and commodity-backed stable tokens so that they are ‘in-scope’. Otherwise, UK regulatory

efforts should focus on the ‘second layer’ of activities concerning unregulated tokens; promotion, derivatives and schemes.

The sale, marketing and distribution of crypto-derivatives to retail consumers is currently banned⁴, the promotion of unregulated tokens also looks set to become regulated. Since a security token with characteristics similar to a unit in a collective investment scheme would already be caught by the rules on collective investment schemes, we feel there is proportionate regulatory coverage already in relation to schemes.

That being the case, we should take pause once the changes-to-come are implemented. We have a generational opportunity to provide a regulatory tailwind for great leaps to be taken in the domestic financial technology sector, let us not legislate for the sake of legislation.

Recommendations in brief:

- Focus should be on the ‘second layer’ of activity regarding cryptoassets, and not on regulating the underlying technology (where not already caught by existing rules)

Do you have any views on continuing to use a classification that is broadly consistent with existing guidance issued by UK authorities supplemented with new categories where needed?

Simply that where we might seek to position ourselves as the flagbearer for responsible innovation through thoughtful regulation, we might also seek to ensure harmonisation with all jurisdictions with regard to the taxonomy of cryptoassets.

Each regulatory jurisdiction has its own policymakers, priorities and processes and so it is naive to think that we will achieve global regulatory harmony in respect of the crypto-economy any more so than we are already unable to do so with existing securities regulation (for example).

What is imperative for this technology to mature and gain widespread understanding however is consistently applied nomenclature. Our classification of token categories thankfully looks aligned to that of the EU (in MiCA) and terms like ‘cryptoassets’, ‘crypto-economy’ and ‘tokens’ dovetail well with each other in their flexibility for naming such a broad set of subject matters. In an effort to continue to do away with a lot of the negative connotations attaching themselves to the technology we would be in favour of the regulator and market participants eschewing the use of terms like ‘virtual’ or ‘coin’, save for perhaps one notable cryptoasset(!). Such harmonisation can only be helpful not just for the general public but also for those firms and founders who operate cross-border.

Recommendations in brief:

- UK to take a lead on global efforts to harmonise classification of cryptoassets

What are the risks and opportunities you see in relation to DeFi?

Note, this response is less focused on recommendations and is instead more assessment-based

Much like the Federal Reserve Bank of St Louis (and Fabian Schar's superb paper published earlier this year⁵) we believe that DeFi can increase today's financial infrastructure's efficiency through digitisation and automation and provide additional benefits through the technology's inherent transparency, accessibility, and composability.

Furthermore, we believe that DeFi provides an opportunity for the UK to leverage its existing resources and competitive advantages to remain one of the global financial technology leaders for the long-term.

We discuss the specific opportunities and risks relating to DeFi in the sections below.

Opportunities related to DeFi

Automation

An important starting point when considering the benefits of DeFi is to understand that all trades are free from counterparty risk. The ability for immediate 24/7 settlement of trades on a distributed ledger can make financial market infrastructure more resilient by removing the need for often systemically risky clearing houses.

An example of an automated DeFi trading system's efficiency is shown by the example of Uniswap, a smart contract-based protocol for automated value exchange on Ethereum. Coinbase, the leading US-based cryptocurrency exchange, employs over 1,000 employees around the world. Yet, Uniswap with less than 20 full-time employees, has approximately one-third of Coinbase's daily trading volume and processed more trades than Coinbase for the month of September in 2020⁶⁷.

The reconciliation of asset transfers is a painful process which can too often be subject to frequent error and legal uncertainty. DLT enables automatic reconciliation, meaning that the underlying registry for a particular asset is always up-to-date. It is a single and verifiable source that market participants can audit themselves in real-time without relying on financial intermediaries to report accurately (and regularly).

One major innovation in DeFi versus bilateral P2P or order-book based exchanges is the development of new "single-player" models that use smart contracts as counterparties, meaning that users can trade 24/7 with a smart contract asset pool. Global prices for such trades are set algorithmically via a constant product rule in Uniswap and an interest rate model based on asset utilisation in Compound, the automated lending protocol. Such innovations help price discovery for longer-tail assets and overall efficiency as it is not necessary to match each trade.

It is becoming increasingly evident that DLTs excel at managing ownership rights of property and enforcing rules on how transacting parties interact. DeFi-based systems go a step further and can enhance loans (or shares, or any other cryptoasset) with legal and economic logic. In the future, lawyers able to write smart contracts could program a loan similar to the Citibank debacle⁸. A smart contract loan could be verified and trusted to guarantee that the underlying rights and obligations (as spelt out in any term loan, intercreditor agreement, articles of association of the company etc.) are always met.

Digitisation

All tokenised assets (shares, loans, money, commodities, cryptoassets, NFTs, etc.) on a distributed ledger system are natively digital in the sense that they can be programmed with artificial intelligence through the latest updates in software development. For example, all cryptoassets on Ethereum 'speak the same language', and so there is a fluid exchange between every asset-type. In the current financial system, each asset class has its own exchanges, custodians and related intermediaries, all of which add their own margins and delays into the process of transferring assets. For the typical retail consumer, transferring equities from one custodian to another can take days or even weeks, whereas using DeFi on Ethereum, a transfer would typically settle in less than ten minutes.

Transparency

All of DeFi's financial services are built on shared data layers provided by public blockchains, placing each user in control of their data and assets. Therefore, competing service providers showcase the same complete user data, leading to significant usability and convenience gains for the consumer⁹. The analogue in the existing financial system would be if Barclays and Lloyds both gave their users access to the same underlying assets and the ability to manage them, even though operating different interfaces. Users having end-to-end control of their assets limits platforms' ability to create user lock-in as *true* competition really is just one click away. More open markets for financial services will incentivise FMIs to compete to provide the best UX to their customers *and* the best financial services.

Open access to on-chain market data will level the playing field for all investors, notwithstanding their access to the corridors of power or the capital on their balance sheet. Additionally, in times of market volatility and uncertainty, the single shared source of truth offered by the distributed ledger within a DLT system like DeFi should provide regulators, and market participants with better data for real-time analysis of market conditions so more informed decisions can be made quicker.

An overlooked benefit of DeFi is that almost all of the widely adopted protocols are built using open source software (OSS). Using OSS improves the likelihood that major bugs will be spotted due to the greater number of parties with sufficient skin-in-the-game to audit and maintain the code. As they say, "given enough eyeballs, all bugs are shallow"¹⁰. The open-source ethos of

DeFi works to its security advantage over the long-run. While hacks are all too common for now, it is a good thing that these vulnerabilities are exploited, patched, and learned-from at this nascent stage of development. The most successful DeFi primitives will continue to get more robust through 24/7 battle testing until they are more secure than any incumbent financial software. At that point, they will be ready to be integrated into other financial applications using the power of composability. This benefit is described in more detail in its own section below.

Accessibility

The openness and accessibility of DeFi are two of its key ingredients. It is a system that, in general, has rules that are transparent and visible to everyone. DeFi platforms are said to be “credibly neutral”¹¹ as it is possible to prove mathematically that no one entity or special class is granted preferential rights over any other. This provides benefits in terms of trust and confidence in essential financial infrastructure.

Composability

DeFi’s many innovations are enabled through DeFi’s native composability, whereby smart contracts for different financial applications can plug into each other like Lego pieces¹². Each DeFi Lego block can be integrated into any other protocol or service, copied (forked), or remixed to create something entirely new. Composability is so powerful because it allows developers to do more with less.¹³

A product called “Vaults” from the Yearn Finance protocol illustrates DeFi’s composability [FN FN]. Vaults offer users the choice of different open source “strategies” that manage user capital to earn a yield on their assets, but in a self-custodial manner using smart contracts. For example, the aLink Vault first takes users’ LINK (the protocol token behind Chainlink, the decentralised Oracle network) to use as collateral on Aave, a smart contract-based lending protocol. The users’ LINK collateral is used to take out a loan of a stable token, such as USDC, to provide liquidity on decentralised exchanges (DEXs) with high stable token trading volume such as Curve to earn yield on such capital from trading fees and additional liquidity provision rewards that the DEX in question may incentivise. Users benefit from Vaults by sharing the transaction costs of interacting with the Ethereum blockchain (paid in the form of “gas”) and not developing their own custom code otherwise required to automate the various steps managed by each Vault when interacting with each underlying DeFi protocol.

“The next big thing will start out looking like a toy”¹⁴

When examining DeFi, it is crucial not to judge purely on the merits of today, but on its overall direction and rate of change. The accelerating exponential growth¹⁵ arising from the network effects provided via DeFi’s composability makes it all too easy for doubters to fail to anticipate just how rapidly blockchain technology and the DeFi ecosystem itself will improve in the coming years.

Build Back Better

Similar to how Open Banking regulations helped the UK become the Fintech capital of the world, DeFi provides the UK with the opportunity to leverage London's financial ecosystem of financiers, insurers and lawyers, along with English law to become the home of the next wave of global fintech unicorns. A vibrant ecosystem for DeFi in the UK should equip local leaders to compete for capital and users on a global stage as DeFi's inherent programmability and interoperability enable assets to flow more freely across borders.

This is a global battle for talent and capital, and the rewards will accrue to those who combine the right mix of entrepreneurial support and legal and regulatory foresight. Examples of early leaders include the organic rise of the "Australian DeFi" ecosystem and the pioneering legislative approach led by Wyoming to accommodate blockchain banks¹⁶ and the primary means of governing DeFi protocols, decentralised autonomous organisations (DAOs)¹⁷.

Not only is DeFi good for UK business and its global brand as a centre of financial innovation, it is also good policy. Open Banking has created many new exciting Fintech banks and digital wallets, but it hasn't improved the underlying infrastructure upon which financial assets are manufactured and distributed. DeFi has the potential to improve the back-end of finance, not just the front-end.

Risks relating to DeFi

While DeFi has great potential, there are certain risks involved. Namely, new compliance considerations, smart contract execution risk, operational security risks, external dependencies, and the underlying technology's scalability. Such risks are well documented elsewhere, for example, in the paper as mentioned earlier from the Federal Reserve of St Louis.

One oft-quoted risk is that relating to AML and KYC considerations. While such concerns are not to be overlooked, despite the exponential growth in compliance costs for the financial industry¹⁸, of the estimated \$2 trillion that is laundered globally through the traditional financial system, only 1-3% of these funds are identified and possibly stopped¹⁹. Consequently, it would be a mistake to hinder the growth of DeFi solely on the basis that DeFi does not fit neatly within the parameters of the current AML and KYC regime. Rather, DeFi should be seen as an opportunity to rethink the current approach. In terms of perspective, when looking directly at the data, cryptocurrency-related crime is falling, it remains a small part of the overall crypto economy, and it is comparatively smaller than the amount of illicit funds involved in traditional finance²⁰. DeFi, itself, is not the problem.

Another risk that is worth considering relates to the question of what happens when DeFi scales and breaks into the mainstream. While it should make the financial system more efficient, transparent and resilient, it is also likely to drastically reduce the efficacy of national regulations and create various systemic risk factors. Understanding and addressing these risks will require cross-border multi-stakeholder collaboration and this is why we suggest that the UK has such a

unique opportunity with DeFi to become a global leader in a rapidly growing new area of importance. Related efforts to establish self-regulatory organisations and support common standards in areas such as transparency and governance are to be welcomed.

Lastly, we can compare the current stage of DeFi to the dial-up internet phase of the internet before transitioning to broadband. Consequently, expensive transaction costs and scaling issues are not unsurprising; they usually are with new technology prior to mass adoption. Few remember that the first mobile phone cost \$4000²¹.

It doesn't take much to suppose the risks relating to DeFi can be solved. In that case, DeFi may lead to a paradigm shift in the financial sector synergistic with the stated objectives of HM Treasury in protecting financial stability and market integrity, delivering robust consumer protections, and promoting competition, innovation and supporting UK competitiveness.

References

Gradually, then Suddenly

1. 'The Kalifa Review of UK FinTech', an independent report on the UK FinTech sector by Ron Kalifa OBE, 26 February 2021 (<https://www.gov.uk/government/publications/the-kalifa-review-of-uk-fintech>)
2. 'Ten countries kept out of Covid. But did they win?', Owen Amos writing for BBC News, 24 August 2020 (<https://www.bbc.co.uk/news/world-asia-53831063>)
3. '2 years of digital transformation in 2 months', Jared Spataro, Corporate Vice President of Microsoft 365 (<https://www.microsoft.com/en-us/microsoft-365/blog/2020/04/30/2-years-digital-transformation-2-months/>)
4. 'Virtual control: the agenda behind China's new digital currency', James Kynge and Sun Yu writing for the Financial Times, 17 February 2021 (<https://www.ft.com/content/7511809e-827e-4526-81ad-ae83f405f623>)
5. 'Cryptoassets Taskforce: final report', HM Treasury, 30 July 2018 (<https://www.gov.uk/government/publications/cryptoassets-taskforce>)
6. 'Decentralised Finance: On Blockchain- and Smart Contract-Based Financial Markets', Fabian Schar writing on behalf of the Federal Reserve Bank of St. Louis, 5 February 2021 (<https://bit.ly/3rDRfgy>)
7. 'Beeple collage smashes digital art record with \$69.3m sale', Sara Germano writing for the Financial Times, 11 March 2021 (<https://www.ft.com/content/2f28eac6-547a-43f2-b7d3-593da9f46a3d>)
8. 'Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937, European Commission, 24 September 2020 (<https://bit.ly/3kSFOiF>)
9. "Buy now, pay later - regulate how?", Diego Zuluaga, 8 February 2021 (<https://fingleton.com/news/buy-now-pay-later-regulate-how/>)
10. 'May 21, 1901: Connecticut Sets First Speed Limit at 12mph', Randy Alfred writing for WIRED, 21 May, 2008 (<https://www.wired.com/2008/05/dayintech-0521/>)

11. 'What is Artificial Intelligence (AI)?', IBM Cloud Education, 3 June 2020 (<https://www.ibm.com/cloud/learn/what-is-artificial-intelligence>)
12. 'The Hemingway Law of Motion: Gradually, then Suddenly', Timothy Taylor writing in his blog the 'Conversable Economist', 17 January 2015 (<https://conversableeconomist.blogspot.com/2015/01/the-hemingway-law-of-motion-gradually.html>)

Security tokens and other unregulated tokens in the market

1. 'Rise of the ICO: Attempting to Harness Blockchain's Wildchild', Ollie Blears writing for International Banker, 26 February 2018 (<https://internationalbanker.com/brokerage/rise-ico-attempting-harness-blockchains-wildchild/>)
2. 'Guidance on Cryptoassets - Feedback and Final Guidance to CP 19/3', FCA Policy Statement PS19/22, July 2019 (<https://www.fca.org.uk/publication/policy/ps19-22.pdf>)
3. 'UK Listings Review', a policy paper chaired by Lord Jonathan Hill, 3 March 2021 (<https://www.gov.uk/government/publications/uk-listings-review>)

DLT-based financial market infrastructure

1. 'Coinbase Resumes U.K. Fast Payments After Breaking With Barclays', Bloomberg News, 3 October 2019 (<https://www.bloomberg.com/news/articles/2019-10-03/coinbase-resumes-u-k-fast-payments-after-breaking-with-barclays>)

Other unregulated tokens and new developments in the market

1. 'Cryptoasset promotions: consultation', HM Treasury, 20 July 2020 (<https://www.gov.uk/government/consultations/cryptoasset-promotions>)
2. 'Regulatory framework for approval of financial promotions', HM Treasury, 20 July 2020 (<https://www.gov.uk/government/consultations/regulatory-framework-for-approval-of-financial-promotions>)
3. 'Promoting Competition', Financial Conduct Authority, 22 March 2016 (<https://www.fca.org.uk/about/promoting-competition>)
4. 'FCA bans the sale of crypto-derivatives to retail consumers', Financial Conduct Authority, 6 October 2020 (<https://www.fca.org.uk/news/press-releases/fca-bans-sale-crypto-derivatives-retail-consumers>)

5. 'Decentralised Finance: On Blockchain- and Smart Contract-Based Financial Markets', Fabian Schar writing on behalf of the Federal Reserve Bank of St. Louis, 5 February 2021 (<https://bit.ly/3rDRfgy>)
6. 'Uniswap: Community', a dashboard curated by Matteo Leibowitz showing live and historical data about Uniswap using Ethereum data analytics provider, Dune Analytics (<https://duneanalytics.com/MatteoLeibowitz/uniswap-community>)
7. 'Uniswap's monthly trade volume exceeded Coinbase's in September' The Block, 4 October 2020 (<https://www.theblockcrypto.com/linked/79775/uniswap-coinbase-monthly-volume-september>)
8. 'Citi Can't Have Its \$900 Million Back', Matt Levine writing in Bloomberg blog 'Money Stuff', 17 February 2021 (<https://www.bloomberg.com/news/newsletters/2021-02-17/money-stuff-citi-can-t-have-its-900-million-back>)
9. 'A Superior Financial System', Chris Burniske writing for the Placeholder VC blog, 15 June 2020 (<https://www.placeholder.vc/blog/2020/6/13/a-superior-financial-system>)
10. 'Linus' Law', Wikipedia entry last updated on 23 February 2021, (https://en.wikipedia.org/wiki/Linus%27s_law)
11. 'Credible Neutrality As A Guiding Principle', Vitalik Buterin writing for the 'Nakamoto' blog, 3 January 2020 (<https://nakamoto.com/credible-neutrality/>)
12. 'A beginner's guide to DeFi', Linda J. Xie writing for the 'Nakamoto' blog, 3 January 2020 (<https://nakamoto.com/beginners-guide-to-defi/>)
13. '4 Eras of Blockchain Computing: Degrees of Composability', Jesse Walden writing for the Andreessen Horowitz blog, 16 December 2018 (<https://a16z.com/2018/12/16/4-eras-of-blockchain-computing-degrees-of-composability>)
14. 'The next big thing will start out looking like a toy', Chris Dixon writing for his personal blog 'cdixon', 3 January 2010 (<https://cdixon.org/2010/01/03/the-next-big-thing-will-start-out-looking-like-a-toy>)
15. 'DeFi Pulse', live and historical data analytics of DeFi protocols, (<https://defipulse.com/>)
16. 'Digital Asset Exchange Kraken Gets Bank Charter in Wyoming', JD Alois writing for Crowdfund Insider, 16 September 2020

<https://www.crowdfundinsider.com/2020/09/166873-digital-asset-exchange-kraken-gets-bank-charter-in-wyoming/>)

17. 'Wyoming Bill to Recognize DAOs as Companies Approved by Senate Committee', Jamie Crawley writing for Coindesk, 10 March 2021
(<https://www.coindesk.com/wyoming-bill-recognize-daos-senate>)
18. 'Rise of the No Men: The past decade has brought a compliance boom in banking' The Economist, 4 May 2019
(<https://www.economist.com/finance-and-economics/2019/05/02/the-past-decade-has-brought-a-compliance-boom-in-banking>)
19. 'The Currency Cold War—Cash and Cryptography, Hash Rates and Hegemony', a book by David Birch, May 2020
20. '2021 Crypto Crime Report', ChainAnalysis, 16 February 2021
(<https://go.chainalysis.com/rs/503-FAP-074/images/Chainalysis-Crypto-Crime-2021.pdf>)
21. 'The First Cellphone Went on Sale 30 Years Ago for \$4,000', Stewart Wolpin writing for Mashable, 13 March 2014
(<https://mashable.com/2014/03/13/first-cellphone-on-sale/?europe=true>)

Non-specific references (but valuable to this Response)

1. 'Hyper Real; an overview of global blockchain industry trends', Keith Bear and Michel Ruachs, January 2021 (<https://bit.ly/3vmYqw6>)
2. 'Complete guide to Stablecoins in 2020', Yogesh Rawal, 17 July 2020
(<https://medium.com/akeo-tech/complete-guide-to-stablecoins-in-2020-1f37b7e11d9d>)
3. 'UniSwap', Hayden Adams, 2018 (<https://hackmd.io/@HaydenAdams/HJ9jLsfTz>)
4. 'Formal specification of Constant Product ($x \times y = k$) Market Maker Model and Implementation', Yi Zhang, Xiaohong Chen, and Daejen Park, 24 October 2018
(<https://github.com/runtimeverification/verified-smart-contracts/blob/uniswap/uniswap/x-y-k.pdf>)
5. 'Introduction to Yearn', Andre Cronje, 2020 (<https://docs.yearn.finance>)
6. 'Compound: The Money Market Protocol', Robert Leshner and Geoffrey Hayes, June 2018 (<https://compound.finance/documents/Compound.Whitepaper.v04.pdf>)
7. 'Systemic Risk Mitigation In DeFi', Mario Laul writing for the Placeholder VC blog, 11 March 2021 (<https://www.placeholder.vc/blog/2021/3/10/systemic-risk-mitigation-in-defi>)