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An Addendum to A Cashless Society- Benefits, Risks and Issues (2017)

**Digital-currency adoption by life and
pension industries?**

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Executive Summary

There are a limited number of insurers who allow payments to be made using digital currencies. This is unsurprising given the many risks which range from investment markets to pricing. Given the infancy of digital currency derivative markets and the low acceptance rates for digital currencies, it is difficult to envisage insurers or pension companies being willing to accept contributions in digital currencies.

Only if digital currencies become more widely used as a method of payment could the risks highlighted in this addendum dissipate to some extent. This may lead to there being a more stable exchange rate and so a digital currency credit market may develop.

The greater question is, if there is a demand from consumers for a world in which digital currencies are widely used, what would be an individual's motivation for this be? Is it that there would be no interference from governments but then who ensures the value of the currency and who determines interest rates in a high inflation or low growth economy? Is it that digital currencies are seen less as a currency and more as an asset upon which individuals can speculate or operate in the black market?

These very questions are what will ultimately determine the future progression of digital currencies but insurance companies and pension schemes with their prudent man principle for investing will always be slow adopters.

Introduction

As noted in the 'A Cashless Society Benefits, Risks and Issues (Interim Paper)' fewer people are using notes and coins to pay for goods and services. Alongside the increased use of credit and debit card payments, digital currencies are emerging as an alternative payment method. We will discuss in this addendum that some industries have opted to embrace this new payment method while others have been slower to allow their customers to use digital currencies to pay for goods and services.

The intention of this addendum is to understand the risks to life and pensions companies in accepting digital currencies as a payment method. It highlights how digital currencies have impacted the life and pensions industries to date and some of the risks that these two industries should look to manage when considering whether to accept this payment method. It does not consider the risks associated with these industries investing in digital currencies as assets.

This addendum does not consider the adoption or application of blockchain technology within the insurance and pensions industry. This is a development in technology and not a fundamental impact in payments and therefore does not fall under the remit of this Working Party.

What are digital currencies?

As defined in the 'A Cashless Society Benefits, Risks and Issues (Interim Paper)' a digital currency is a form of electronic money combined with new technology involving cryptography, peer-to-peer networking, databases and a system of consensus. The most prominent example of a digital currency is Bitcoin.

Bitcoin was the first established digital currency, launched in 2009, by an individual or group calling themselves Satoshi Nakamoto, the real identity remains a mystery to this day. Within two years, other digital currencies began to emerge as the idea of a decentralised and encrypted method of payment attracted interest. Bitcoin and other digital currencies are made available to the public through a process called mining, which is done using blockchain technology

The mining process requires vast amounts of computing power to record transactions and because all payments require miner approval there is a limit on the number of transactions that can be processed at any time. Once a transaction has been completed it is irreversible. Miners are critical to ensuring the validity of each transaction and are rewarded by receiving newly created digital currency units.

There is a significant market for digital currencies (\$135bn February 2019)¹ to be exchanged for fiat currencies; however, some of the exchanges have been vulnerable to hacking. The largest digital currency exchange hack in 2018 was the \$534m (£380m) 'Coincheck hack'. This was in Japan's largest digital currency exchange and the CEO, Koichiro Wada, later said in an interview that there were not a sufficient number of people working on internal checks, management and system risk.² The stolen Coincheck assets were stored in a "hot

¹ <https://coinmarketcap.com/>

² <https://www.reuters.com/article/us-crypto-currencies-japan-skills-shortage/japans-cryptocurrency-exchanges-face-shortage-of-engineers-idUSKCN1HD09M>

wallet", which is connected to the internet, rather than a 'cold wallet', which is offline and is more secure.

The volatility of digital currencies has drawn much interest over 2017 and 2018. In December 2017, Bitcoin reached a remarkable peak in value at nearly \$20,000 having started the New Year with a value shy of \$1,000. But by the end of January 2018, Bitcoin had plummeted in market value by more than \$44bn (£30.9bn), trading at under \$10,000. In early February, Bitcoin's value continued to fall on the back of the Indian government announcing that it would ban all digital currency trading and Facebook announcing a ban on digital currency adverts. The treatment of digital currencies varies by country. For example, China has banned digital currencies whereas Japan passed the Virtual Currency Act (Act) in March 2017 which made Bitcoin legal tender.

Short and sudden swings in Bitcoin's price are often attributed to trading "bots", which initiate trades and cause a domino effect on the price. One such example is the selloff in October 2018, when five percent was shaved off its price almost instantaneously. The price of digital currency can also be impacted by 'whales' (holders of huge amounts of digital currency), as they buy and sell amounts so vast they impact the whole market rate.

Most digital currencies have a source code which outlines the precise number of units that can and will ever exist and so there is a finite supply. Over time, it becomes more difficult for miners to produce digital currency units, until the upper limit is reached. Digital currencies finite supply makes them inherently deflationary, more akin to gold and other precious metals than fiat currencies. This too places a pressure on the price of digital currencies, unlike fiat currencies for which central banks can, in theory, produce an unlimited supply.

As digital currencies are characterised by their volatility, their use in long term contracts would appear to be unsuitable. Payments in a digital currency for a one year general insurance contract may in itself be a risky undertaking. Consider the purchase of car insurance in December 2017 when Bitcoin was at its peak valuation, if a claim was made in September 2018 the pay-out would be worth much less given the fall in the USD value of the digital currency (less than a third of the value had a claim been made in December 2017). This makes it crucial to ensure that life insurance companies who wish to accept digital currencies as a method of payment carry out a comprehensive risk assessment.

Digital currency users are attracted to the political independence associated with this payment method. They can be used to facilitate grey and black market transactions, so many countries view them with distrust or outright animosity. As of April 2018, State Bank of Pakistan has banned all virtual currencies/tokens/ coins. Similarly, the Central Bank of Nigeria passed a circular to inform all Nigerian banks that bank transactions in virtual currencies are banned.

Although digital currencies are anonymous, each transaction is recorded on a decentralised system. As evidenced by a recent study conducted by Qatar University and Qatar Computing Research Institute³, Bitcoin transactions can be traced to reveal the real identities of the individual making these transactions via linking transactions to IP addresses and social media posts. As every transaction is recorded on a public ledger this would make it possible to reconstruct every Bitcoin transaction carried out by the individual.

³ <https://arxiv.org/pdf/1801.07501.pdf>

Does anyone use digital currencies?

As Bitcoin faces a significant depreciation in value, several companies, including Dell, Paypal, Stripe and Expedia, have stopped accepting the currency as payment. Transactions for Bitcoin have plunged from its peak of over 400,000 per day in early January to 250,000 per day in November in line with a fall in the value of the digital currency⁴.

When the online game service Steam stopped accepting payments made with the Bitcoin in December 2017, it explained that this was due to "high fees and volatility". Steam started accepting payments in Bitcoins in April 2017. In a statement, development studio Valve, which runs Steam, said that the change in value was a problem because of the narrow window customers had to complete a purchase using Bitcoin. If a Bitcoin-based transaction was prolonged, the value of the coins being transferred could change "significantly", it said. In these cases, customers had to transfer more Bitcoin to make the payment, or get a refund. Either option would result in the customer paying more exchange fees.

Other companies such as Expedia silently stopped accepting Bitcoin in June 2018 without issuing a formal statement. The market consensus is that this was not done because of any regulatory demands but due to operational issues like delays, price volatility and high transaction fees.

In contrast Microsoft allows Bitcoin payments to purchase games, movies and apps in the Windows and Xbox stores. However, it is not possible to use Bitcoin to purchase items in the Microsoft online store and no refund can be made for any Bitcoin added to a member's wallet.

CheapAir allow customers to pay using digital currency. After choosing a flight customers' are given payment options, including Bitcoin. They can make both domestic and international flight arrangements with CheapAir. The travel company has been accepting Bitcoin payments since 2013 and is the only known company that will accept digital currency as payment for air travel. In mid-2018, following the loss of their third party payment processor Coinbase, the company has been trialing a new solution. ⁵ CheapAir have adopted a new open source Bitcoin payment processor, BTCPayServer, which enables CheapAir to circumvent BitPay's controversial BIP-70 wallet requirement, meaning there is no longer a dependence on a third party. This offers CheapAir much more control of the process enabling faster, more efficient order processing

There are small businesses worldwide that accept digital currency payments. In London there are 17 Bitcoin ATMs and a total of 63 retailers that accept Bitcoin.⁶ However, the total market for Bitcoin transactions is small relative to the global market of fiat transactions. Almost 32 million bitcoin wallets had been set up globally by December 2018 of which there are 7.1 million active bitcoin users.⁷

General insurers

It appears that a small number of General Insurers introduced Bitcoin as a payment method in 2013-2015 in anticipation that this may become a popular means of payment. One such company was "Cover you" which is a Netherlands based insurance provider that offers insurance cover for consumer, household, communication and photo electronics. They

⁴ <https://www.blockchain.com/charts/n-transactions?timespan=1year>

⁵ <https://www.cheapair.com/blog/update-on-our-search-for-a-new-bitcoin-payment-processor/>

⁶ <https://www.wheretospendBitcoins.co.uk/location/london>

⁷ <https://www.bitcoinmarketjournal.com/how-many-people-use-bitcoin/>

started accepting Bitcoin online for electronic device coverage in 2015⁸ but it no longer appears to be a payment option on their website. No statement appears to have been issued as to why this is no longer an available option.

Life insurers

A survey⁹ conducted by Medium, an online publishing company, found that approximately 12%¹⁰ of people would buy life insurance using digital currencies. However it is important to note that c. 60% of participants were individuals aged between 21 and 30. Respondents had a resounding opinion that the volatility of digital currencies would need to settle before this payment method becomes a viable option. In addition, only a small proportion of people would accept a pay-out in digital currency, if it was the same digital currency in which the premium was paid. A key reason for not receiving a pay-out in digital currency was the difficulty in converting to fiat (27%), along with concerns over the currency's volatility (37%) and that it is not yet widely accepted.

Our research has shown that very few life insurers accept digital currencies as a payment method. This is thought to be due to the long term nature of the contracts and as they are heavily regulated. Complexities such as having to hold assets which match their liabilities and the sustainability of digital currencies make offering digital currencies as a payment method difficult.

Examples of companies that accept digital currencies

- 1) INGUARD is an insurance and risk management firm, serving clients throughout the U.S. and abroad. They started accepting Bitcoin as a premium payment method in 2013¹¹. Inguard have partnered with Bitpay who carry out fraud checks and offer a guaranteed exchange rate.
- 2) In July 2017 Novis (a life and pensions insurance company which operates in the EU) partnered with Payment21 (a registered financial intermediary providing Anti Money Laundering (AML) compliant digital currency transactions) which has allowed Novis to accept digital currency in all of their markets. Payment21 aim to offer bank-grade compliance with AML/Know Your Customer regulations.

Impact on the Pensions industry

To date it would appear that there is a strong reluctance from the pensions industry to accept digital currencies as a contribution method. This is due to;

- there being a lack of regulation,
- the volatile exchange rate to a fiat currency,
- the risk of hacking,
- a lack of transparency and liquidity;
- And their sustainability is unclear.

From a tax perspective a number of countries, including the UK, have decided to treat digital currencies as an asset. In the UK, income from a pension is subject to income tax. If a digital currency were to be paid out it would be viewed as an asset and so would be subject to capital gains tax.

⁸ <http://www.coinfox.info/news/company/1878-dutch-insurance-company-starts-accepting-Bitcoin>

⁹ <https://medium.com/blocksure/cryptocurrency-and-insurance-our-survey-results-5ba33564f560>

¹⁰ 500 participants. 85% of who would buy travel or gadget insurance using digital currencies (425). 85% of these would buy other insurance with digital currencies (361). From the graph the proportion that would buy life insurance looks to be c.16% and therefore c12% of all participants in the survey would buy life insurance using digital currencies.

¹¹ <http://www.inguard.com/manage/make-a-payment>

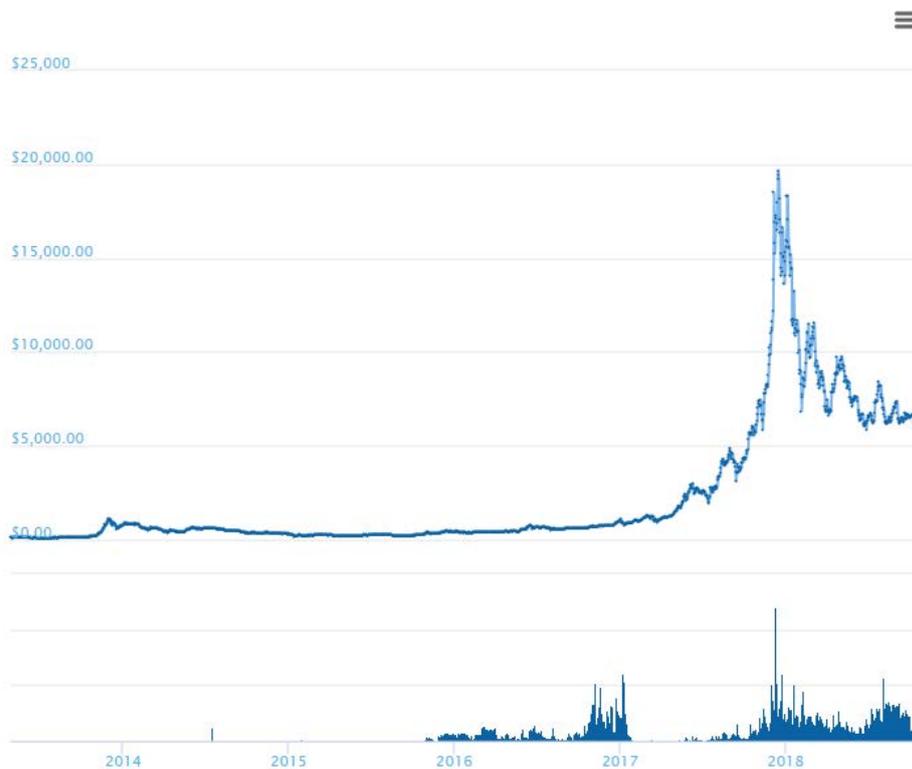
There are companies that allow customers to invest in digital currencies as part of their pension portfolio. For example, in the UK, Financial services company Hargreaves Lansdown has now made the XBT Ethereum ETN available through their service and this can be used by investors for their pension or as a general investment. Hargreaves Lansdown has warned that this is for sophisticated investors and should only form a small part of a diversified portfolio of assets.

Risks to the industry

As discussed above very few Life insurance companies and no Pensions companies have adopted digital currencies into their payment platforms. Consideration is given to some of the risks that are associated with digital currencies and possible developments which may make purchasing insurance using digital currencies a possibility.

Volatility of the currency

As mentioned above recently digital currencies have experienced significant volatility. The graph below demonstrates the volatility over the recent years.



Graph: Price of Bitcoin relative to USD

The volatile nature of digital currencies is the most cited issue in the aforementioned survey as to why policyholders are unwilling to make payments in digital currency. Furthermore, this is thought to be one of the key reasons why life and pensions companies have been unwilling to offer digital currencies as a payment option.

Life companies could use derivatives to manage the volatility. In December 2017 the Chicago Commodity Exchange launched Bitcoin futures contracts, providing a hedging and price-discovery venue that could help mitigate the notorious volatility of digital coin prices.

However, given that these are in their infancy there is neither a deep nor a liquid market in these contracts, which adds an additional risk to the insurer.

Additionally the requirements on companies to develop models to forecast future foreign exchange (FX) movements and what a FX stress might look like would be very difficult to calibrate given the very short history that these currencies have.

Anti-selection

When an individual is faced with a cost for a policy and has the option to pay using their fiat currency or Bitcoin they will make the payment based upon the value of a digital currency relative to their fiat currency. This enables anti-selection if the payment and payout are in different currencies as the choice in currency is an option against the insurer.

However if the payment and payout are both in digital currencies there is no risk of anti-selection as the policyholder would be accepting the exchange rate risk on the claims/income.

Guaranteed payments

If insurers are willing to accept the anti-selection risk of having payments and payouts in different currencies, they would need to manage the risk of an extreme appreciation of the digital currency. The company could hold additional reserves to protect customer payouts but would need to consider the opportunity costs of this option. In addition they would need to consider the impact on solvency requirements.

Alternatively, insurers could pass the risk entirely or partly onto their customers. If companies pass on all or a portion of the risk to their customers, insurers should ensure that customers are fully aware of the potential impact on their payout and/or premiums (for example the amount of cover when converted into fiat currencies upon claim may be significantly less than when the contract was taken out). Some regulators may feel that disclosures of this nature are insufficient and hence may require companies to make a good faith payout in a fiat currency should a fiat currency dramatically depreciate.

Pricing

As mentioned above if insurers allowed customers to pay for a contract in a digital currency and paid out the benefit in a different currency they would open themselves up to the risk of anti-selection. Therefore, if it is assumed that;

- the contracts offered by insurers are where the payments and payouts are both in digital currencies
- the digital currencies are not backed by the central bank; as if they were the risks would be similar to policies issued in fiat currencies
- the digital currencies are stable and hence the volatility issues mentioned above do not apply

Insurers would need to understand if policies written in digital currencies appealed to a particular market and hence have different experience assumptions. For example, policies paid for in digital currency may generally appeal to people of younger age and therefore may have a lower mortality rate.

To price an insurance contract, insurers require experience rates and an understanding of the cost of holding that contract. Insurance liabilities are generally backed with assets that

match the cashflow profile of the liability. For example Sterling insurance policies are often backed with Gilts. As there is no equivalent digital currency asset insurers would need to consider what to back these policies with and understand the capital impact of their decision.

This means that insurers require exchange rate, credit curve, interest rates and inflation rates information. Each one of these are discussed below.

Interest rates

Regulators require insurers to use risk free interest rates to calculate capital requirements. However, there is currently no risk free interest rate for digital currencies as they are not an interest bearing currency rather they have a cost of carry. Therefore there is no interest rate parity with Sterling. To determine a risk free rate it would be possible to extrapolate a rate if the currency was pegged with a traditional fiat currency but this is not the case. Therefore the rules for determining the RFR if it is not a liquid market is this:

In case of lack of reliable financial market data to apply the methodology, it is expected that insurance and reinsurance undertakings, the relevant EEA supervisor and the supervisor of the corresponding country will have a dialogue in order to derive appropriate technical information.

For that purpose the use of the basic risk-free interest rate term structures of economies sufficiently similar or inter-linked, may be an option, provided that any adjustment to the term structure used as reference is made under a prudent and objective process, and it is compatible with the methodology described in this document.

This is according to the Technical documentation of the methodology to derive EIOPA's risk-free interest rate term structures.¹²

Inflation Rates

A person living in the UK may have an insurance contract that is inflation linked in which case it is likely to be linked to RPI inflation. RPI inflation is calculated and is a measure of inflation published monthly by the Office for National Statistics. It measures the change in the cost of a representative sample of retail goods and services. However for a digital currency it is not possible to price a basket of goods to determine the index level on a month by month basis. The use of digital currencies is limited and so widespread acceptance of a digital currency is needed before inflation can be determined.

Inflation means there is a general increase in the price level. The main causes of inflation are either excess aggregate demand (economic growth too fast) or cost push factors (supply-side factors). However for a digital currency when there is a greater demand, the price of the currency changes by the very nature of the exchange rates relative to a fiat currency. As such a digital currency is more like an asset with a finite supply and price determined by demand than a currency. It is therefore unlikely that insurers would be able to offer inflation linked products.

¹²<https://eiopa.europa.eu/Publications/Standards/Technical%20documentation%20of%20the%20methodology%20to%20derive%20EIOPA%E2%80%99s%20risk-free%20interest%20rate%20term%20structures.pdf>

Credit Curve

Currently there is no liquid market for digital currency assets. Insurance companies could invest in the usual government bonds to back the liabilities and then use a cross currency swap to negate the associated exchange rate risk. However there is currently no developed market for digital currency derivatives however there have been some progress. Morgan Stanley is reportedly preparing to offer Bitcoin swap trading for clients and similarly Goldman Sachs confirmed that they are working on a type of derivative for Bitcoin called non-deliverable forwards due to client demand.¹³

However this is a new market which introduces unknown risk for both investors and for the banks writing these contracts. The additional cost of the FX derivatives would also need to be embedded into the cost of the policy.

FX rate

There is no stable exchange rate at present with a fiat currency. The assumption of this section is that an insurance contract would only become feasible if the exchange rates were stable. However for that to be the case people would need to be paid in digital currencies and these currencies would need to be widely accepted across many industries. That very assumption requires the two currencies to live side by side in an economy with companies willing to accept payment in both.

Risk of fraud to the company

For an insurer to enable premium payments in digital currencies they need to partner with a digital currency exchange or carry out their own compliance checks. As mentioned above both INGUARD and Novis partnered with a currency exchange and only made payments available through one digital currency, Bitcoin. As mentioned in the opening remarks, there is a significant risk of fraud as many of the world's largest digital currency exchanges have been targeted by hackers.

However there is an emergence of digital currency insurance options which offer protection against the risk of hacking. The digital currency exchanges have put in place this insurance and it may be possible for insurers to also utilise this form of insurance. The concept of digital currency insurance is in itself very interesting. For example, following a hack event the value of the digital currency would have likely suffered a significant devaluation so would the insurance policy pay out the fiat equivalent value of the losses or the amount of digital currency that had been lost despite the significant reduction in value.

In practice, the cost of a digital currency insurance contract can be very high, with premiums reported to be as high as 5 percent of the exchange's coverage limits each year. Companies looking for high levels of coverage often require multiple insurers which limit the loss ratio for any single insurer should fraud be committed.¹⁴

Exposure to digital currencies

In June 2018, a deputy governor of the Bank of England, Sam Woods, wrote to banks and insurance companies warning them against increasing their exposure to digital currencies.

¹³ <https://www.cnn.com/2018/09/13/morgan-stanley-gearing-up-for-Bitcoin-derivative-trading.html>

¹⁴ <https://www.bloomberg.com/news/articles/2018-07-19/crypto-heist-insurance-fat-premiums-lots-of-underwriting-risk>

Mr. Woods wrote: "We acknowledge that firms may have taken limited exposure to crypto-assets to date, and hope this letter is helpful to firms in considering any existing exposures and/or plans for the future.

"The range of products and market participants related to crypto-assets has grown quickly. In their short history, crypto-assets have exhibited high price volatility and relative illiquidity.

"Crypto-assets also raise concerns related to misconduct and market integrity – many appear vulnerable to fraud and manipulation, as well as money-laundering and terrorist financing risks. He added entering into activity related to crypto-assets may give also rise to "reputational risks".¹⁵

Barriers to entry

There are limited barriers to entry for a new digital currency. Hence there is a risk that currencies could be wiped out or overridden during the term of a contract. Offering multiple digital currencies on an insurer's payment platform could increase the complexity of the contracts. So should insurers only allow one digital currency? If so which one? Consideration also needs to be given to any limitations with the currency. For example, if Bitcoin is widely used there may be issues due to its limited ultimate supply.

Many central banks have placed a complete ban on the use of digital currencies. Other countries have issued restrictions on its use. Alternatively, a central bank may wish to introduce their own Central Bank Digital Currency (CBDC). A CBDC is defined by the BoE as an electronic central bank money that:

- i. can be accessed more broadly than reserves,
- ii. potentially has much greater functionality for retail transactions than cash,
- iii. has a separate operational structure to other forms of central bank money, allowing it to potentially serve a different core purpose, and;
- iv. can be interest bearing, under realistic assumptions paying a rate that would be different to the rate on reserves.

The introduction of a CBDC would likely make other digital currencies redundant.

In contrast, when considering barriers to entry for policyholders it is likely that only those that are more tech savvy are likely to participate in digital currency policies. It is anticipated companies would continue to allow customers to pay for their policies in fiat currencies and therefore would expect insurers to have segregated books of business and have to manage the risks associated with this. For example, there may be separate pricing and valuation methods and assumptions for digital currencies. In addition if some companies are slow in adapting and allowing customers to pay in digital currency they risk losing their market share.

Liquidity

Digital currencies by their very existence on a Distribution Ledger Technology (DLT) are less liquid compared to fiat currencies. As the number of customers on a DLT increases the processing of payments is invariably delayed given the greater volume. Unlike credit/ debit

¹⁵ <https://www.ftadviser.com/investments/2018/06/29/bank-of-england-warns-finance-firms-on-Bitcoin-exposure/>

card payments digital currencies can take time to clear (for example Bitcoin payments can take c. 15 minutes to clear). However, given the long term nature of life and pensions contracts, this would not be a material risk for these companies.

Additionally if there is a selloff in the market, given the lack of liquidity, the price tends to be affected negatively. If insurers were to hold considerable levels of digital currencies it may increase their liquidity requirements. However, companies could use derivatives to manage this risk.

The anonymous nature of the transactions

As numerous identity checks are carried out as part of the application process, this risk is likely to be immaterial for these particular industries. However compliance checks would need to be carried out on the source of the funds but this could be done either through partnering with a company like Payment21 or Bitpay or setting up an internal compliance function.



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