



# Impacts of cryptocurrency on Financial Services value chains

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Patrick Bucquet, Partner US

Sebastien Meunier, Director US

Tanguy de Volder, Digital Asset Expert

Bernardo Manrique, Consultant US

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# Introduction

## **Cryptocurrency adoption is accelerating**

Cryptocurrencies are growing in popularity around the globe and are bringing a wave of innovation that has the potential to reshape the financial services industry for the years to come. Until recently, being involved in anything cryptocurrency related was perceived by the market as something at best risky, and often borderline illegal or unethical. Lately, a fundamental shift occurred in the way the financial services industry perceives cryptocurrency. It is now considered a "career risk" for any Financial Institution (FI) not to be involved in a way or another in cryptocurrency.

Cryptocurrencies are starting to be treated as an investible asset class. A bigger share of the VC capital is flowing into the sector. We are also seeing many top banks become active. According to blockdata.tech, more than half of the top 100 banks by assets under management have made investments in companies involved in this space.

## **A first country officially adopted Bitcoin**

El Salvador pushed the adoption story a step further by officially making Bitcoin legal tender in the country. President Bukele has managed to make El Salvador the first nation to adopt Bitcoin as legal tender, distribute \$30 worth of Bitcoin to all the country's citizens, install 200 Bitcoin ATMs within the country, purchase 700 Bitcoin for the national reserve, and begin to mine bitcoin on the side of a volcano, through geothermal power that is 100% renewable.

## **Bitcoin Future ETF**

On the US front, the SEC allowed bitcoin futures ETFs to begin trading on the 19<sup>th</sup> of October 2021. This is an important milestone as it makes access to bitcoin exposure much more convenient to many institutional investors that have until today remained on the sideline.

## **Objective of this paper**

As we are witnessing an acceleration in cryptocurrency adoption, it is crucial to understand how it will impact traditional FIs and their main businesses. In this study we compare some of the traditional value chains within Financial Institutions with cryptocurrency ones, analyzing their differences and similarities. We identify opportunities & threats that the new technology poses to traditional FIs; and propose strategies that they can put in place to take advantage of this technological revolution, gain relevance, and stay ahead of the competition.

*Note: In this paper, we use the terms "cryptocurrency" and "cryptoasset" interchangeably, as such products may exhibit features closer to the ones of a currency, of an investible asset, or even of a fixed income product depending on the use case. The examples and illustrations (actors, regulations, etc.) that we use are from the USA, but the analysis conducted is generic and applies across all jurisdictions.*

# Securities value chain

In the current financial system, centralized securities markets are comprised of several actors:

- Broker (Morgan Stanley, Charles Schwab, Robinhood, ...): party who arranges transactions between a buyer and a seller for a commission
- Market Maker or Dealer (Goldman Sachs, Morgan Stanley, ...): firm that buys and sells securities on a regular and continuous basis at a publicly quoted price, providing liquidity to the market
- Exchange (NYSE, LSE, ...): marketplace where buyers and sellers meet to execute transactions
- Clearing House (LCH.Clearnet, ...): entity centralizing and standardizing the steps leading up to the payment (i.e., settlement) of a transaction
- Central Counterparty Clearing (LCH.Clearnet): entity providing clearing services, and taking on the counterparty risk of the counterparties (member banks and broker-dealers)
- Custodian (State Street, Northern Trust, Citi, HSBC, ...): safekeeper of securities certificates, ensuring book-keeping, reporting and security
- Central Securities Depository (DTCC, EuroClear, ...): depository where the securities certificates are placed, so that two custodians don't have to move certificates between them, and can simply update entries in the CSD ledger

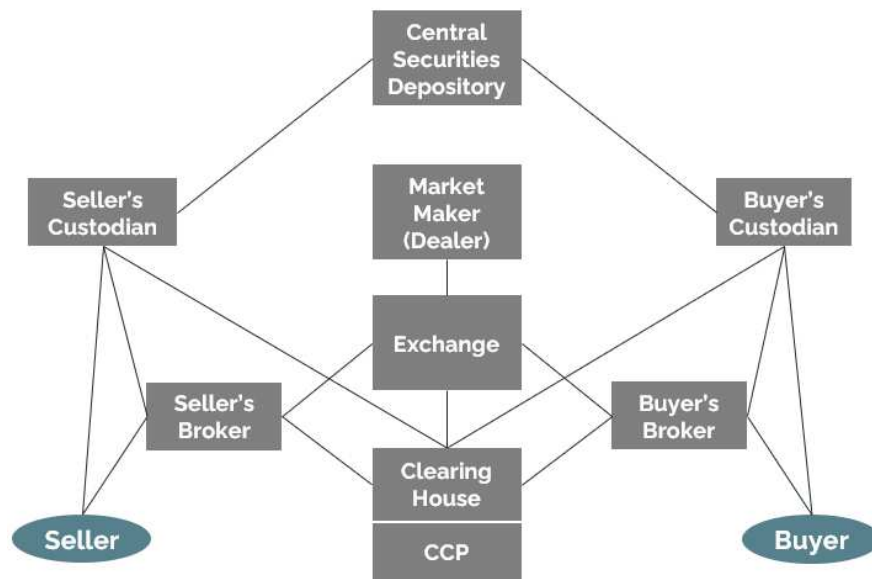


Figure 1: Securities market structure

Some large investment banks offer a wide range of the services mentioned above. If a seller and buyer happen to use the same bank, a transaction between them could almost be processed internally!

If we consider the cryptocurrency market, the functions described above still exist, except the two central counterparties. In the most decentralized case, sellers and buyers simply connect their own wallet to a decentralized exchange, while a pool alimented by users provides liquidity to the market:

Function	Role in the traditional securities market	Cryptocurrency world Most centralized case	Cryptocurrency world Most decentralized case
<b>Broker</b>	Party who arranges transactions between a buyer and a seller for a commission	Function still exists (ex: Gemini, Coinbase, ...)	Function doesn't exist
<b>Market Maker or Dealer</b>	Firm that buys and sells securities on a regular and continuous basis at a publicly quoted price, providing liquidity to the market	Function still exists (ex: Gemini, Coinbase, ...)	Liquidity Pool
<b>Exchange</b>	Marketplace where buyers and sellers meet to execute transactions	Function still exists (ex: Gemini, Coinbase, ...)	Decentralized exchange / protocol
<b>Clearing House</b>	Entity centralizing and standardizing the steps leading up to the payment (i.e., settlement) of a transaction	Function still exists to clear fiat to crypto and crypto to fiat transactions. For crypto-to-crypto transactions, settlement is almost instantaneous	Function doesn't exist (there is only crypto to crypto settlement, which are almost instantaneous)
<b>Central Counterparty Clearing</b>	Entity providing clearing services, and taking on the counterparty risk of the counterparties (member banks and broker-dealers)	Function doesn't exist	Function doesn't exist
<b>Custodian</b>	Safekeeper of securities certificates, ensuring book-keeping, reporting and security	Equivalent of a custodian is a wallet or custody solution provider, that safekeep users' private keys. Private keys are the crypto equivalent of "certificates" (allow access to the assets, and asset is lost if key is lost)	Function doesn't exist (users are their own custodians)
<b>Central Securities Depository</b>	Depository where the securities certificates are placed, so that two custodians don't have to move certificates between them, they can just update an entry in the CSD ledger	Function doesn't exist	Function doesn't exist

■ Similar function exists   
 ■ Function exists, in different form   
 ■ Function doesn't exist

Figure 21: Roles in the securities market

Large cryptocurrency actors happen to offer a full range of services like the large financial institutions we were alluding to previously:

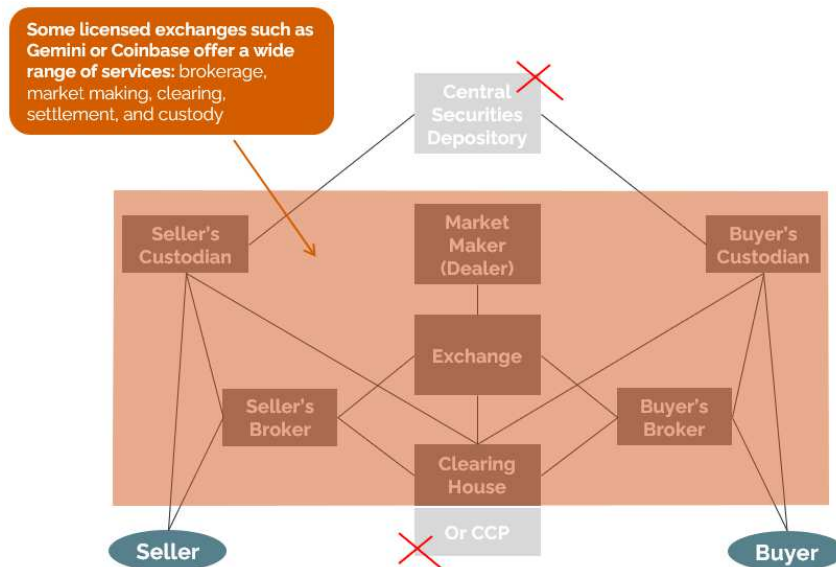


Figure 3: Coverage of a licensed cryptocurrency exchange such as Coinbase or Gemini

Indeed, companies such as Coinbase and Gemini on top of being cryptocurrency exchanges, offer all the typical functions of a broker-dealer such as sales & structuring for their institutional clients, onboarding/KYC, trading, AML/CFT, Cash management, Reporting, Clearing & Settlement, Custody, including transverse functions such as Compliance, Risk, HR, and IT. Such actors are incorporated companies, licensed to operate in countries around the world and at the state level in the USA. For instance, Coinbase has a Money Transmitter License and a Virtual Currency license in the state of New York. They must answer US federal regulators as well: in Sept. 2021 the SEC threatened to sue Coinbase over its cryptocurrency "Lend" product, that was subsequently abandoned. However, the decentralized exchanges are not incorporated and not licensed. They're maintained by groups of developers who may or may not be spread across jurisdictions:

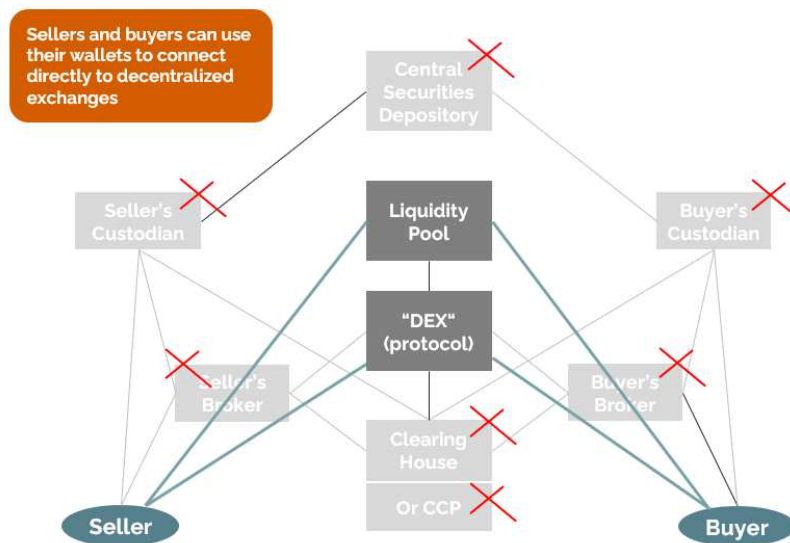


Figure 4: Market structure in the most decentralized case

### Focus on institutional-grade custody services

Traditional custodians offer two main services:

- safekeeping of securities, literally keeping the paper certificates in a safe
- servicing of the securities: income processing, corporate actions, intraday trade instruction and reporting, online proxy voting capabilities, class-action services, trust and fiduciary services, FX and more.

Cryptocurrency actors offer similar institutional grade custody services:

- safekeeping of the cryptographic keys – the equivalent of digital certificates – in a cold storage (in practice it takes the form of a hard disk in a safe)
- servicing of the cryptoassets, which is simpler than for traditional securities: transfer between hot, warm, and cold storages, reporting and staking (for PoS cryptocurrencies)

In the US, cryptocurrency custodians are licensed and regulated by the same regulators as for traditional custodians.

As for Over The Counter (OTC) markets, in the US there are both similarities and differences between the two worlds. The main similarities are the following:

- Large broker-dealers have OTC desks (including Coinbase, Kraken, Binance, etc.). There are also specialized OTC players;
- Market participants need to be registered with FINRA.

The main differences are the following:

- There aren't specific alternative trading systems (ATS) to support OTC crypto transactions (knowing that ~30% of off-exchange securities trades in \$ volume happen on 32 registered ATS in the US, according to FINRA).
- Block trades (i.e., very large transactions) represent a significant portion of the OTC crypto trades, whereas it's a small portion of off-exchange transactions in the US equities market (block trades are defined as 10,000+ shares; the average off-exchange trade represents ~200 shares according to FINRA).

The analysis developed in this section shows the following opportunities and threats in the securities market for traditional financial institutions:

Opportunities for Financial Institutions	Threats for Financial Institutions
<ul style="list-style-type: none"> <li>• Banks could offer cryptocurrency brokerage, market making, clearing and/or custody services to their clients (some, such as Fidelity Investment, already do)</li> <li>• Exchanges could launch cryptocurrency exchange and clearing services</li> <li>• Asset managers could offer cryptocurrency custody services to their clients</li> </ul>	<ul style="list-style-type: none"> <li>• New entrants such as Coinbase or Gemini may capture a large share of the market if such cryptocurrency markets become regulated and grow; and if existing investment products such as equities &amp; credit derivatives are ever migrated and traded in similar ways in the future</li> </ul>

# Payment value chain

The traditional digital payment value chain primarily involves debit and credit cards, whether in a brick-and-mortar shop or online, and involves several actors:

- A digital wallet may store the encrypted card data, allowing to pay without the card
- The payment gateway transfers the card information to the payment processor
- The payment processor processes the card transaction and contacts the card network
- The card network connects the issuing and acquiring banks enabling authorization
- The issuing bank authorizes the transaction & transfers the funds to the acquiring bank
- The acquiring bank fronts the money to the payee, until funds are transferred from the issuing bank



Figure 5: traditional digital payment value chain

Cryptocurrency P2P payments are more straightforward. They happen in two main steps:

- The payment is initiated through a cryptocurrency wallet, who also acts as a gateway to a cryptocurrency network (Metamask, Exodus, Electrum, Trezor, ...)
- A cryptocurrency system offers all the other functions of the value chain: authorization, processing, and update of the ledger (Bitcoin, Ethereum, ...)

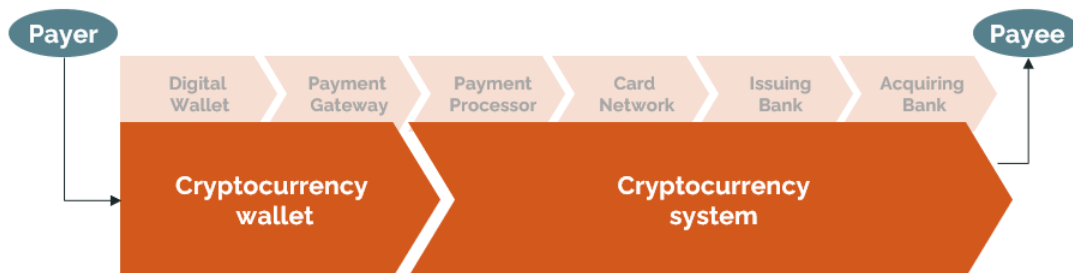


Figure 6: cryptocurrency P2P payment



In fact, this is the same for any closed-loop payment. In the case of a Venmo payment for instance, if both the payee and payer have Venmo balances and the payer has sufficient balance, the transaction stays within Venmo:

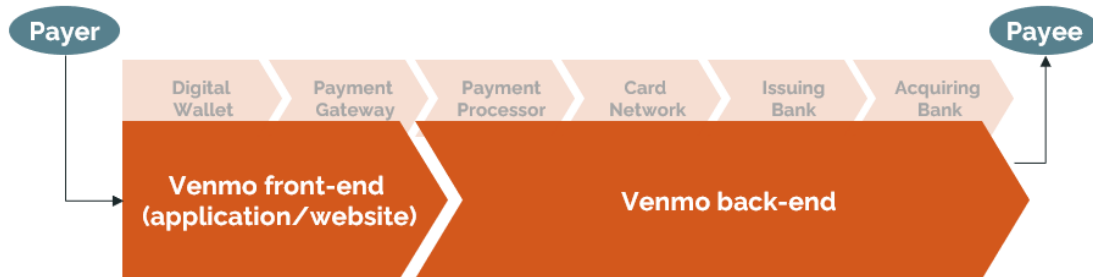


Figure 7: Venmo P2P payment

As for cross border payments, the most common way (by \$ volume) to transfer funds is to use a network of correspondent banks and Swift as the messaging system between them:

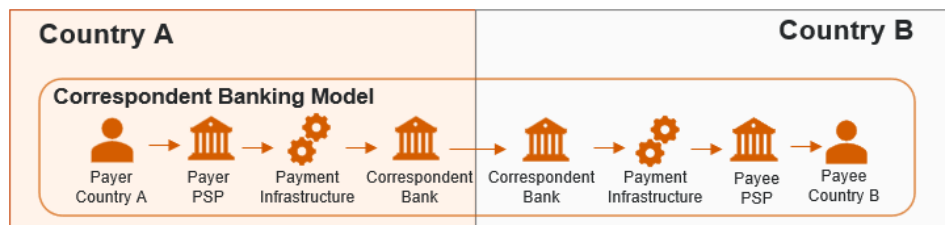


Figure 8: Correspondent banking payment flow (BIS, Feb 2018)

There are also dedicated solutions relying on closed loop systems such as WorldRemit or Wise:

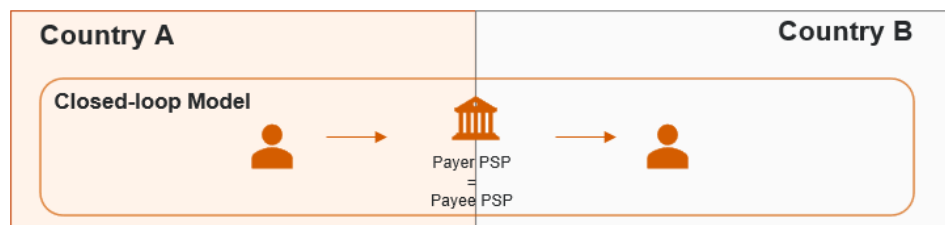


Figure 9: Closed loop payment flow (BIS, Feb 2018)

If both countries have faster payment systems, the transactions can be settled in seconds with Wise. This represents 26% of transactions according to Wise 2020 annual report.

The cryptocurrency case is conceptually like the closed loop payments one, except that the cryptocurrency network is the system used to exchange value:

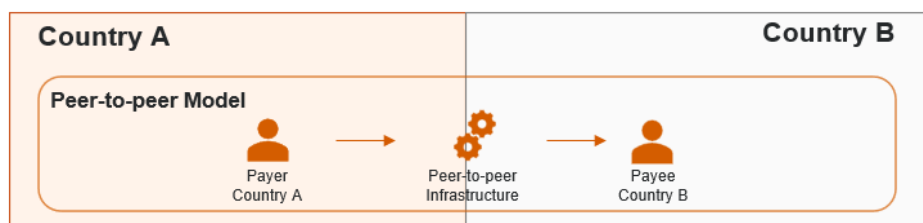


Figure 10: P2P payment flow (BIS, Feb 2018)

As for merchants “accepting” cryptocurrencies as payment, they actually get paid in fiat money. They use a third-party service provider to convert the cryptocurrency into the local currency, received through an ACH wire two days after the transaction:

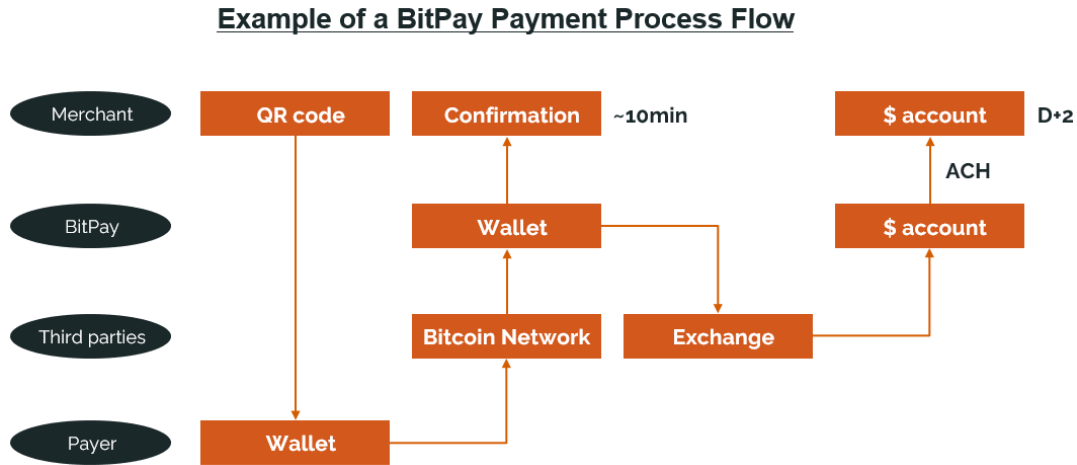


Figure 11: BitPay payment process flow

The analysis developed in this section shows the following opportunities and threats in the payment market for traditional financial institutions:

Opportunities for Financial Institutions	Threats for Financial Institutions
<ul style="list-style-type: none"> <li>• The same way US banks have successfully launched Zelle in response to Paypal’s Venmo and Square’s CashApp, they could offer a cryptocurrency wallet to their retail customers. That would happen for sure if the FED was to launch a CBDC or endorse a USD stablecoin.</li> <li>• Banks could also offer a cryptocurrency payment service to merchants</li> <li>• Banks, payment processors or card network companies could become the operators of a CBDC network</li> </ul>	<ul style="list-style-type: none"> <li>• Payment processors and card networks are at risk of being disintermediated, if a truly public cryptocurrency network was ever to be launched or endorsed by authorities (unlikely)</li> <li>• Digital wallets may lose market share to new entrants if cryptocurrency payments ever become mainstream. Hence why Paypal &amp; Square were quick to offer cryptocurrency buy/sell services!</li> </ul>

# Lending / Financing value chain

The traditional lending value chain include the following steps:

- Capital sourcing
- Loan origination (qualification of the loan request)
- Underwriting (credit risk assessment)
- Servicing (payment processing, accounting flows)
- Collection (litigation and recovery)
- Securitization (pooling of loans into an asset sold to investors)

Some financial institutions cover the full chain, while others focus on a specific step of the chain:

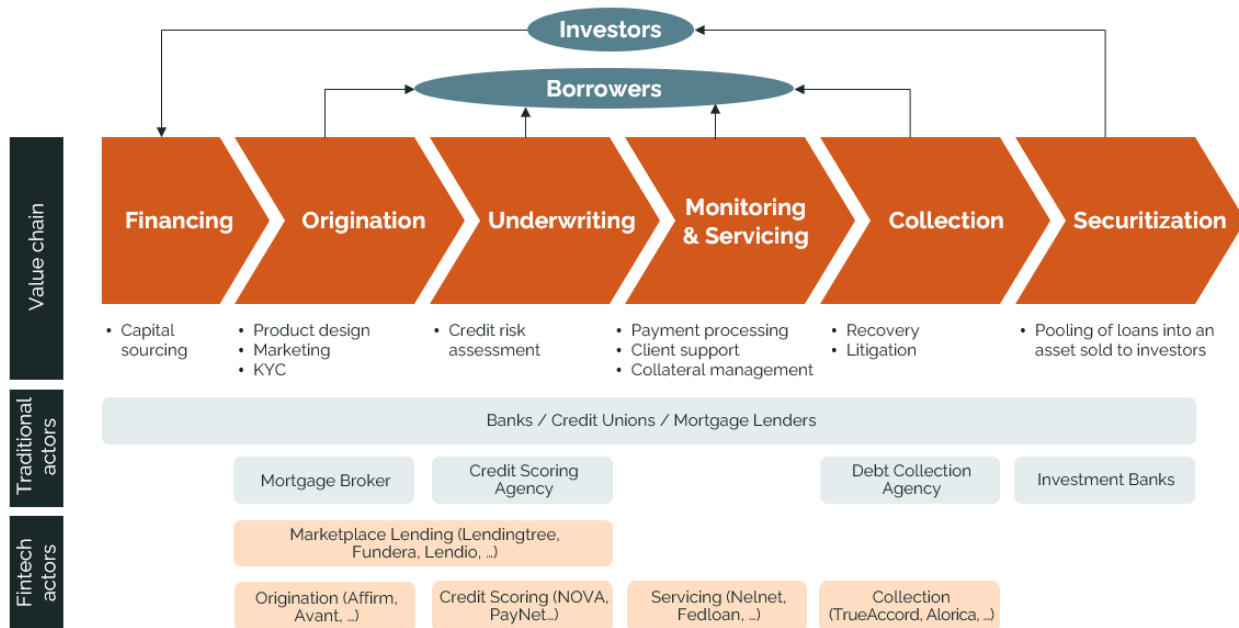


Figure 12: Lending value chain

As of today, there are two main lending products in the cryptocurrency world:

1. Borrow cash with overcollateralized cryptocurrency (BlockFi, Unchained Capital, Celsius Network, Nexo...)
2. Borrow stablecoins with overcollateralized cryptocurrency (Aave, Maker, Compound...)

It is also possible to borrow a non-stable cryptocurrency with an overcollateralized cryptocurrency, but rather than a lending product, this is an investing strategy which is very similar to currency carry trading.

The case 1 is like traditional retail loans except that retail loans aren't always collateralized. The case 2 is like a margin loan, when brokerage firms lend money against the value of a portfolio:

Traditional Product	Purpose	Secured by collateral	Equivalent in the Crypto world
Mortgages	To buy real estate	Yes	<ul style="list-style-type: none"> <li>Borrow cash with <b>overcollateralized</b> cryptocurrency (BlockFi, Unchained Capital, Celsius Network, Nexo)</li> </ul>
Personal Loans	To consolidate debt, pay off credit cards, or finance large purchases	Usually not, but it may be	
Students Loans	To pay for education	No	
Auto Loans	To buy cars	Usually yes, but it may not be	
Small Business Loans	To cover gaps in short term financing, to pay for daily expenses and to purchase property (commercial real estate loan, line of credit, Merchant Cash Advance, Invoice Factoring, ...)	In most cases yes	x
Margin Loan	To invest in additional securities or to meet short-term lending needs not related to investing	Yes (brokerage firms can lend money against the value of a portfolio)	<ul style="list-style-type: none"> <li>Borrow stablecoin with <b>overcollateralized</b> cryptocurrency (Aave, Maker, Compound...)</li> </ul>

Figure 13: Comparison of lending products

Lending in the cryptocurrency world is a very specific business in the sense that default isn't really a risk. Collateral management becomes key though, as the collateral value can be very volatile. Hence why loans are often overcollateralized, usually at 150%. The value for lenders doesn't come from managing credit risks but from a pure supply/demand mechanism with almost zero overhead (maximum automation, no/limited KYC, etc.). The value chain steps are basically the same as the traditional ones, with the following differences:



Figure 14: Cryptocurrency lending value chain

The analysis developed in this section shows the following opportunities and threats in the lending market for traditional financial institutions:

Opportunities for Financial Institutions	Threats for Financial Institutions
<ul style="list-style-type: none"> <li>Banks could offer cryptocurrency lending products to their clients, starting with cash against overcollateralized cryptocurrency (Silvergate Bank already does that!), adding more complex products in a second step</li> </ul>	<ul style="list-style-type: none"> <li>New entrants such as BlockFI or Nexo may capture a large share of the market if such lending markets become regulated and grow, and if existing credit products and their derivatives are ever managed in similar ways in the future</li> </ul>

### Earning Passive Income with Cryptocurrency

#### *Where do the high yields come from?*

Cryptocurrency holders can earn passive income by:

1. Keeping them in **savings accounts**. In this case, lenders receive high yields simply because borrowers are willing to pay even higher yields. Those borrowers are traders and investment funds who earn profit using the borrowed cryptocurrency in interest rate arbitrage, short-selling, and other trading strategies.
2. **Staking the tokens**, meaning locking the tokens from a proof-of-stake (PoS) system in a target wallet for a specified time, in exchange for rewards. Staked coins essentially function as collateral against bad behavior.
3. **Providing liquidity** to decentralized exchanges' pools (UniSwap, SushiSwap, PancakeSwap, etc.), receiving a share of the fees paid by users to process transactions on the platform in exchange. It's essentially a market-making fee. The fees received are high in the case of an active market with few liquidity providers, low in the case of a small market with many liquidity providers.

#### *What are the risks?*

With high rewards generally come high risks:

- The deposited cryptocurrency could decrease in value, as cryptocurrency markets remain highly volatile
- When lending cryptocurrency, users lose control over it. It could be stolen in a scam or hack. As of the time of writing, 63 hacks of DeFi platforms have occurred with lost funds amounting to a total of approximately \$1.2 billion according to the website Cryptosec.info. Conditions for withdrawals can also be very strict
- In the saving account case, counterparty risks are high, as borrowers may not be able to pay back their high APY loans

## Conclusion

Our analysis shows that the cryptocurrency value chains, especially the institutional-grade versions of those, are not so different from the traditional ones. Large exchanges such as Coinbase or Gemini offer the services of a typical broker-dealer, cryptocurrency P2P payments are like closed loop payments, and cryptocurrency lending products functions similarly as traditional collateralized lending products.

If the cryptocurrency markets keep growing, the risks for financial institutions are disintermediation and irrelevancy due to the rise of large new players. Regulation, though, remain a key factor that will shape the future of the cryptocurrency industry. One can argue that cryptocurrency markets, especially the most decentralized versions of those markets ("DeFi"), may be more efficient with less intermediaries and less data reconciliation of all sorts, *precisely* because they're not burdened by the layers of controls and reporting that regulation require. As seen in the US, when regulations are imposed (KYC, AML, Capital & Liquidity requirements, etc.), cryptocurrency markets tend to recreate large, centralized intermediaries. Thus, it will be interesting to observe how "DeFi" evolves as the regulatory pressure increase.

Financial Institutions are experts in risk management and regulatory compliance. It's a competitive advantage that they should leverage to position themselves in the cryptocurrency market and stay ahead of the competition. Some actors such as Fidelity have already launched some of the services presented in this paper. The most advanced projects such as Singapore Ubin or Hong-Kong mBridge enable the tokenization of different types of assets for a better synchronization of financial flows (payment - trade - capital markets). As stated earlier, it can now be considered a risk for any Financial Institution to not be involved in cryptocurrency in one way or another.

### Who is CH&Co.?

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