



# Tackling the risks in crypto: choosing among bans, containment and regulation

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Views expressed are those of the author and not necessarily those of the BIS.

# Motivation

- After several high-profile failures in 2022, **addressing the risks** from crypto markets has become a more pressing policy issue (priority area of India's G20 presidency)
- So far, the busts in crypto markets have not led to wider contagion nor threatened the stability of the traditional financial system or the real economy ...
- But, there is a heightened **urgency** to address risks before crypto markets become systemic

## This paper:

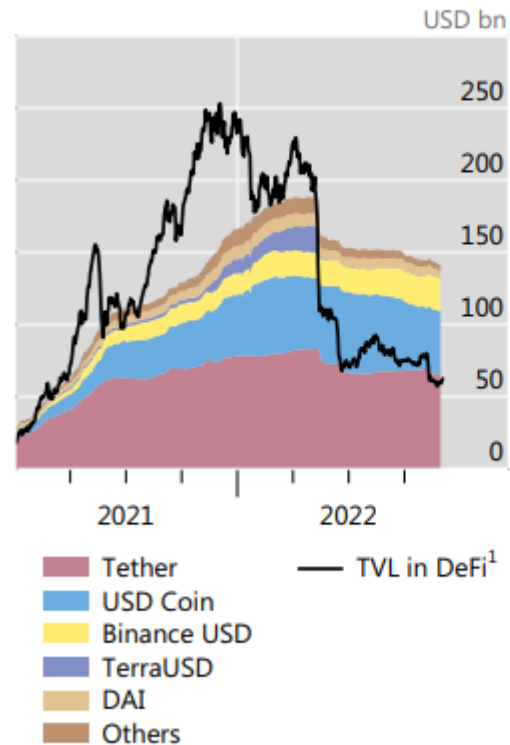
1. Provides **context** to current policy challenge
  - Draws lessons from collapses in 2022
  - Describes **market failures & vulnerabilities**
2. Lays out **three high levels of policy action**: ban, contain regulate
  - Describes rationale and gives pros and cons
3. Provides a **taxonomy** of how the three options could be combined

Crypto has gone through booms and busts in the past, and it is here to stay. But recent failures forcefully highlighted its vulnerabilities...

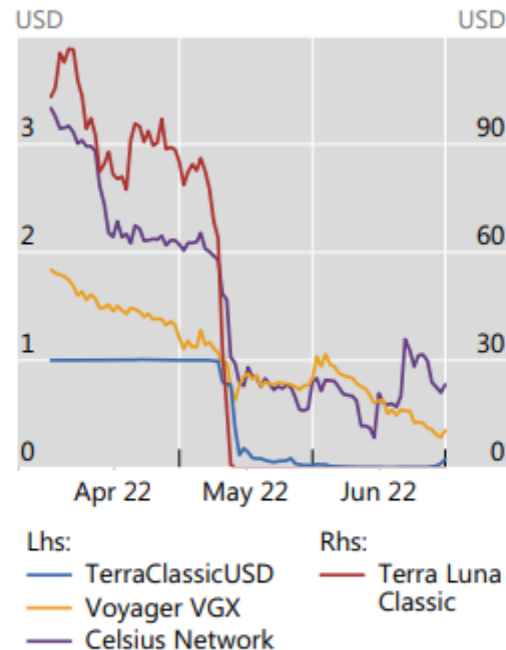
Prices and market capitalisation of crypto assets and the 2022 turmoil

Graph 1

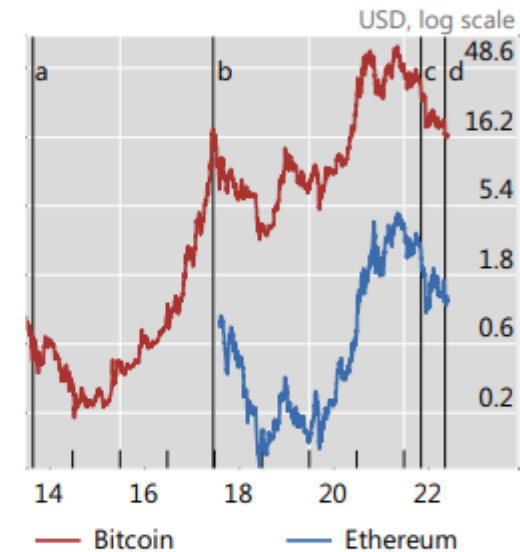
A. Stablecoin market capitalisation and DeFi activity peaked in May



B. The collapse of TerraUSD led to broader contagion and turmoil



C. Cryptoassets have gone through booms and busts before



<sup>a</sup> Bankruptcy of Mt Gox on 28 February 2014.

<sup>b</sup> Bursting of ICO bubble on 22 December 2017.

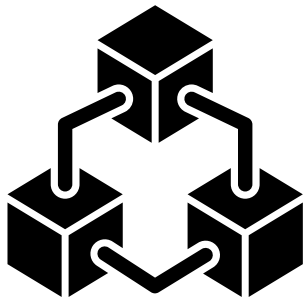
<sup>c</sup> TerraUSD implosion on 9 May 2022.

<sup>d</sup> Bankruptcy of FTX on 11 November 2022.

# Crypto's origin/ethos: decentralised, blockchain-based and reliant on private keys...

## "Pure" crypto

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## Bitcoin whitepaper (Nakamoto, 2008):

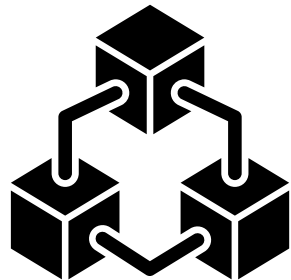
- Electronic payment system based on cryptographic proof can replace the trust that underpins transactions in TradFi
- Genesis block famously contains the embedded text "The Times 03/Jan/2009 Chancellor on brink of second bailout for banks"

-> Distrust of traditional finance an important impetus and underlying the original ethos of crypto proponents

But in reality: centralised intermediaries and “shadow crypto banks” channel funds into crypto, with stablecoins as the gateway ...

“Pure” crypto

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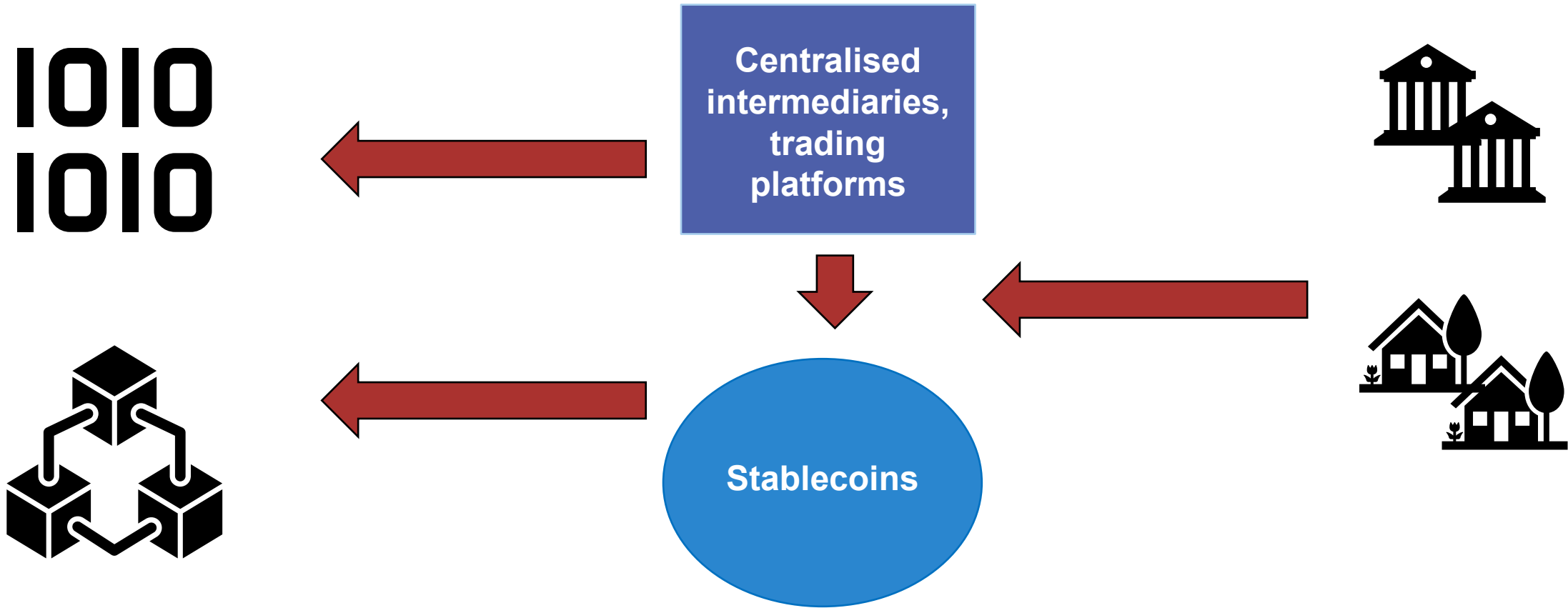
Centralised intermediaries,  
trading  
platforms



Stablecoins



“Pure crypto” grows (eg DeFi, new blockchains), sparking further inflows



# Crypto is as prone to common market failures as TradFi, and maybe even more so ...

- As underlined by the collapses in 2022, crypto markets are not immune to the vulnerabilities that have been known in traditional finance for a long time
- In fact, TradFi is regulated precisely because experience over centuries has shown that financial markets are subject to significant **market failures**

**Market failures** can be characterised into two broad sets:

## 1. Information problems

- Arise either when the available information is not adequate for market participants
- Or when one party to a transaction has access to a different set of information

## 2. Externalities

- Indirect costs or benefits that impact a party other than those involved in a transaction
- Can result in extremely severe outcomes where the process of intermediation grinds to a halt because the stability of the entire system is not guaranteed

But rather than market failures themselves, regulators tend to focus on their practical manifestations, which are often referred to as **vulnerabilities**...





While the vulnerabilities do not yet threaten financial stability, they could do so in the future as interlinkages with TradFi and the real economy grow ...

- Taken together, the deficiencies in crypto markets strongly undermine investor protection and market integrity
- 2022 turmoil has shown that the sector has not grown large enough or sufficiently interconnected with TradFi to threaten financial stability but, this could change if
  1. Retail or institutional investor interest does not abate.
  2. Interconnections with the real economy and TradFi increase should crypto become less self-referential, in particular if asset tokenisation makes inroads

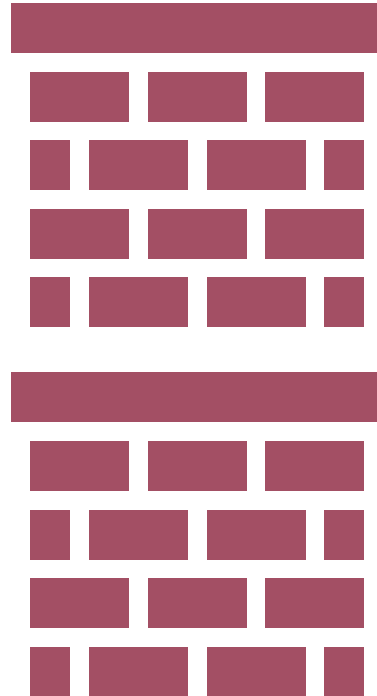
-> All this means that proactively tackling the risks in crypto through an effective policy mix is important at the current juncture

There are three high-level approaches available to authorities ...

## “Ban”



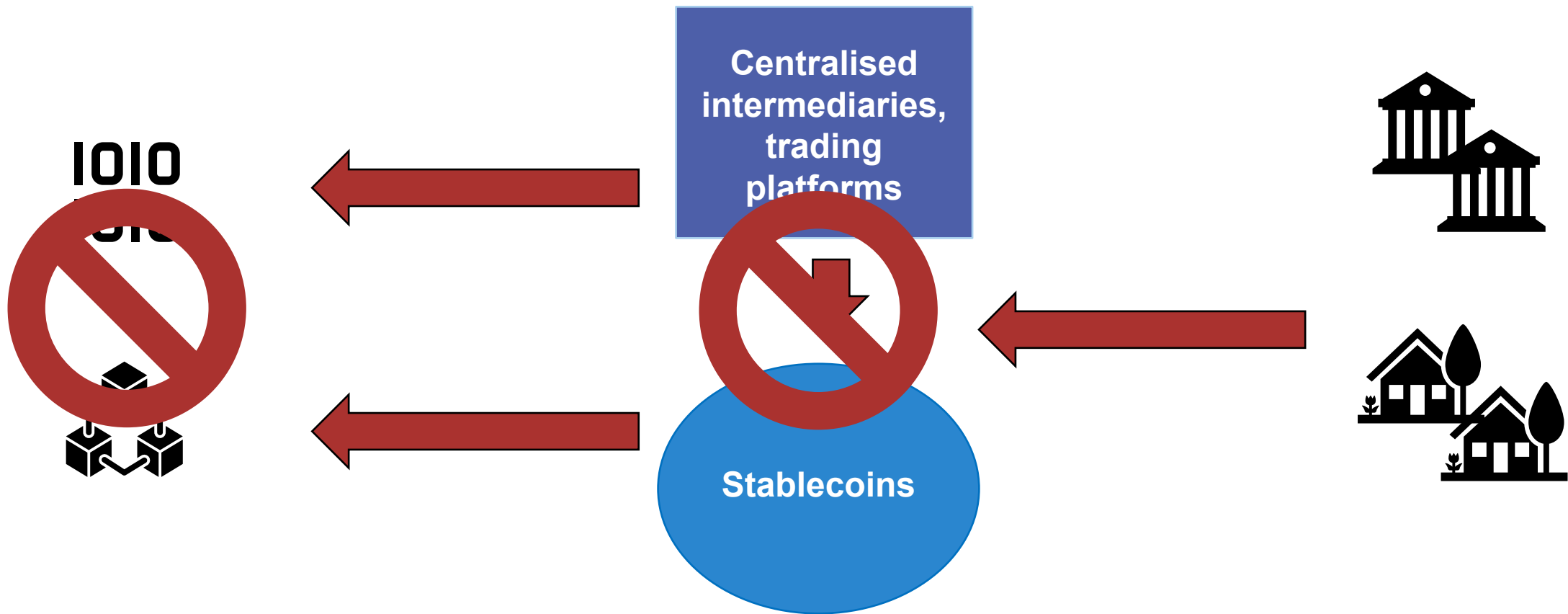
## “Contain”



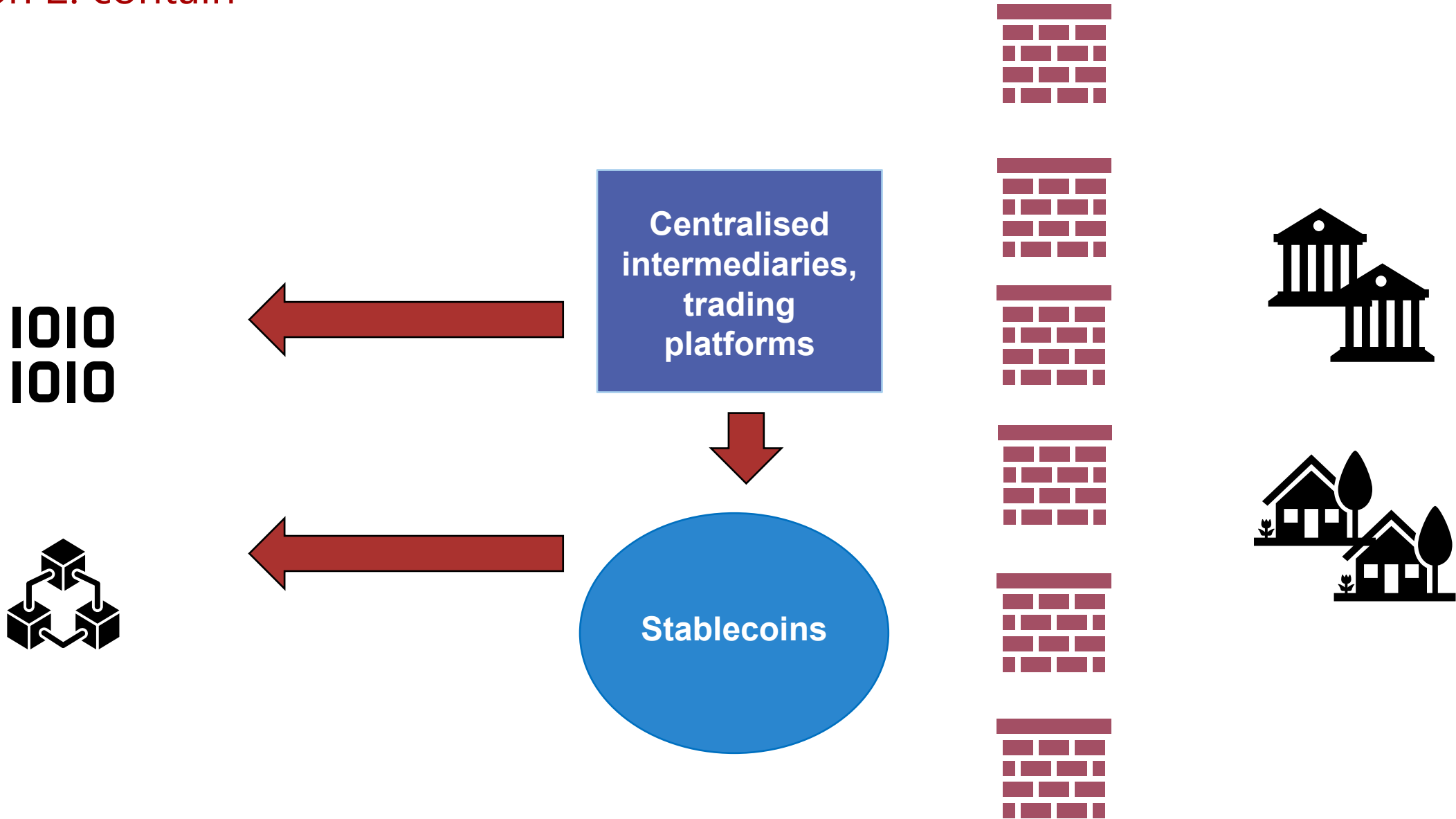
## “Regulate”



# Option 1: ban

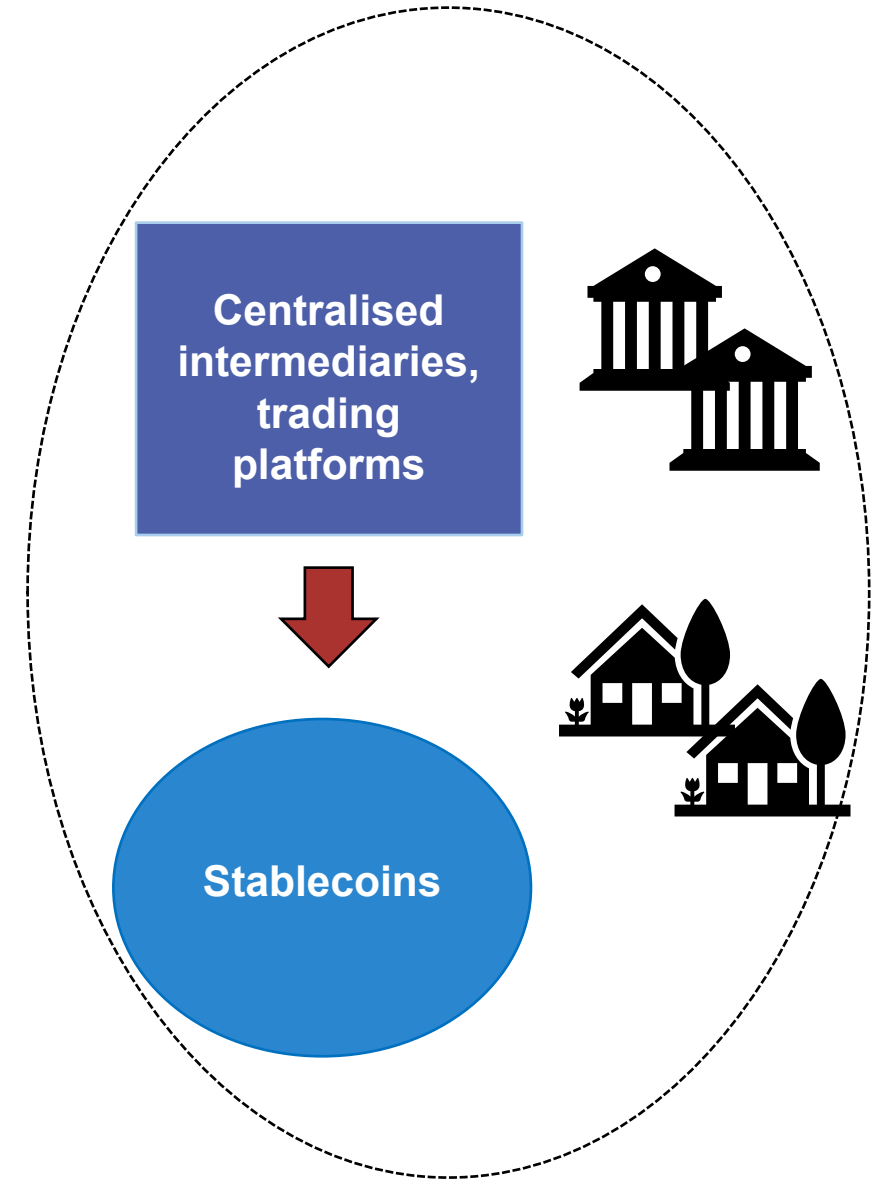
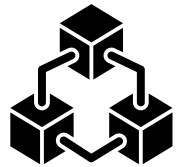


# Option 2: contain

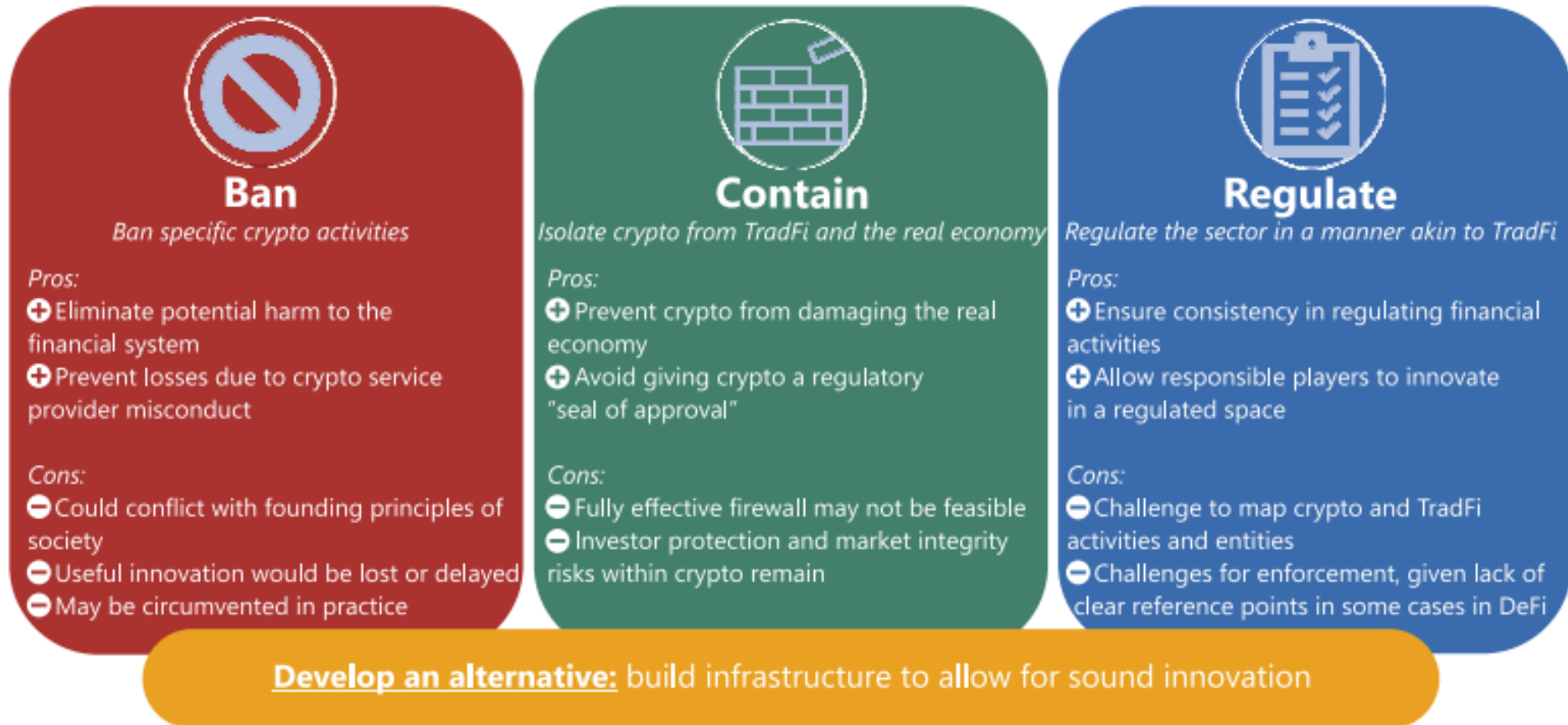


# Option 3: regulate

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## Options for addressing the risks in crypto and their pros and cons



To pursue the regulation approach, authorities could start from a “functional” approach à la Merton (1995) ...

Function	TradFi example	DeFi example
Clearing and settling payments to facilitate trade		
Pooling of funds to undertake large-scale enterprises		
Transfer economic resources though time and space		
Manage uncertainty and control risk		
Provide price information to coordinate decentralised decision making		
Deal with incentive problems		

## The functions (à la Merton, 1995) that DeFi attempts to fulfil are similar to those in TradFi...

Function	TradFi example	DeFi example
Clearing and settling payments to facilitate trade	Payment systems, deposit accounts, e-money, cards, central counterparties	Bitcoin network, other blockchains (eg Ethereum, Solana), stablecoins, automated market making (AMM)
Pooling of funds to undertake large-scale enterprises	Stocks, bonds, mutual funds, exchange-traded funds (ETFs)	Asset management DApps, DeFi tokens, governance tokens
Transfer economic resources though time and space	Loans, mortgages, pension funds, mutual funds, etc	Lending DApps, flash loans, asset management DApps, smart contracts
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Provide price information to coordinate decentralised decision making	Exchanges, trading activities, derivatives	DEXs (and CEXs), AMM, trading activities, crypto derivatives
Deal with incentive problems	Risk management, repeated interactions with the same known counterparties	Smart contracts, overcollateralisation



## Determining entry points of regulation can be a challenge in DeFi ...

- In CeFi entry points for regulation can be more easily determined
  - For instance, HMT (2023) suggests that issuers of stable-coins or other cryptoassets whether they are based in the UK or sell to UK customers are subject to UK rules
- In some cases, (decentralised protocols, DAOs) the entry point for regulation (firms or individuals) could be less clear-cut
- But useful starting point could be the entities and persons that exert de-facto control of a DeFi protocol or Dapp

## Developing guiding principles when deciding how to proceed with respect to the introduction of bans, appropriate containment measures, or regulation

- Ban/Contain/Regulate: choosing among options should not be seen as black and white
- To be effective, it is sensible to combine policy options in an effective mix

The **main thrust** of our suggestions can be summarised as follows:

1. **Bans** should be used **sparingly**

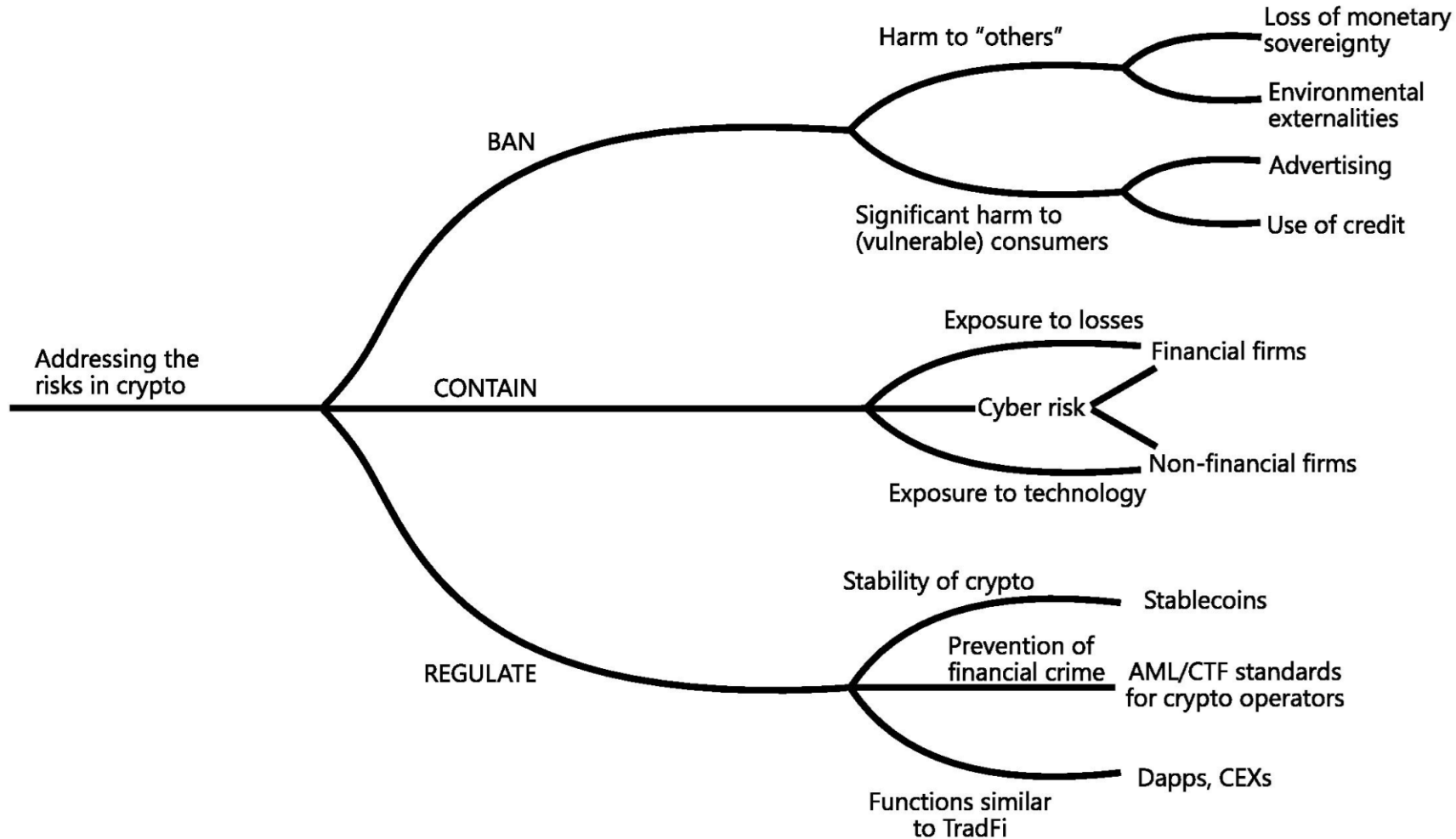
- Only when harms are reflected on agents that do not participate in crypto activities
- Or when they are deemed to be of extremely high magnitude to create societal damage

2. **Containment** should be part of interventions that focus on entities exposed to crypto risks (even if crypto is not their core business activity)

- Goal is to ensure that these entities can withstand any losses caused by spillovers or outages taking place in the crypto ecosystem
- Ensure continued functioning of core parts of the financial system

3. **Regulation** for those areas that **mimic economic functions that are currently regulated**

# Combining policy options – a taxonomy



# Conclusions

- Crypto markets have experienced booms & busts, resulting in large losses for investors
- While these failures have so far not spilled over to TradFi or the real economy, there is no assurance that they will not do so in the future
  - DeFi and TradFi become more intertwined, especially if tokenisation gains traction
- Authorities can consider three main policy approaches to rein in the risks: contain/ ban/regulate
  - At the same time, they can engage in work raising the attractiveness of TradFi
- It seems sensible to use a combination of bans, containment and regulation to harness the innovative aspects of crypto markets, while at the same time ensuring that the risks they pose, are appropriately mitigated

## References

- Aquilina, M, J Frost and A Schrimpf (2023a), “Tackling the risks in crypto: choosing among banks, containment and regulation”, mimeo
- Aquilina, M, J Frost and A Schrimpf (2023a), “[Addressing the risks in crypto: laying out the options](#)”, BIS Bulletin no 66, 12 January
- Aquilina, M, J Frost and A Schrimpf (2023b), “[Decentralised finance \(DeFi\): a functional approach](#)”, CEPR Discussion Paper 17810, 16 January
- Buldyrev, S, R Parshani, G Paul, H Stanley and S Havlin (2010), “[Catastrophic cascade of failures in interdependent networks](#)”, Nature, no 464, pp 1025–8.
- Merton, R (1995), “[A Functional Perspective of Financial Intermediation](#)”, Financial Management, Summer.

- Annex -

## Options are not mutually exclusive, and some areas of crypto (eg DeFi) are likely to need regulation...

- Evolution of financial markets from 'human-based' to 'computer based' is not new (ATMs in the '60s, HFTs in the '00, smartphones in the '10s...)
  - DeFi can be interpreted as the continuation of the trend
- Crypto proponents disagree: DeFi is a 'game changer':
  - "Ethereum is a technology for building apps and organizations, holding assets, transacting and communicating without being controlled by a central authority"
  - [...]
  - "Transactions directly connect sender and recipient without having to deal with any central authority. Nobody else will have access to your funds and nobody can tell you what services you can use" (emphasis in the original).

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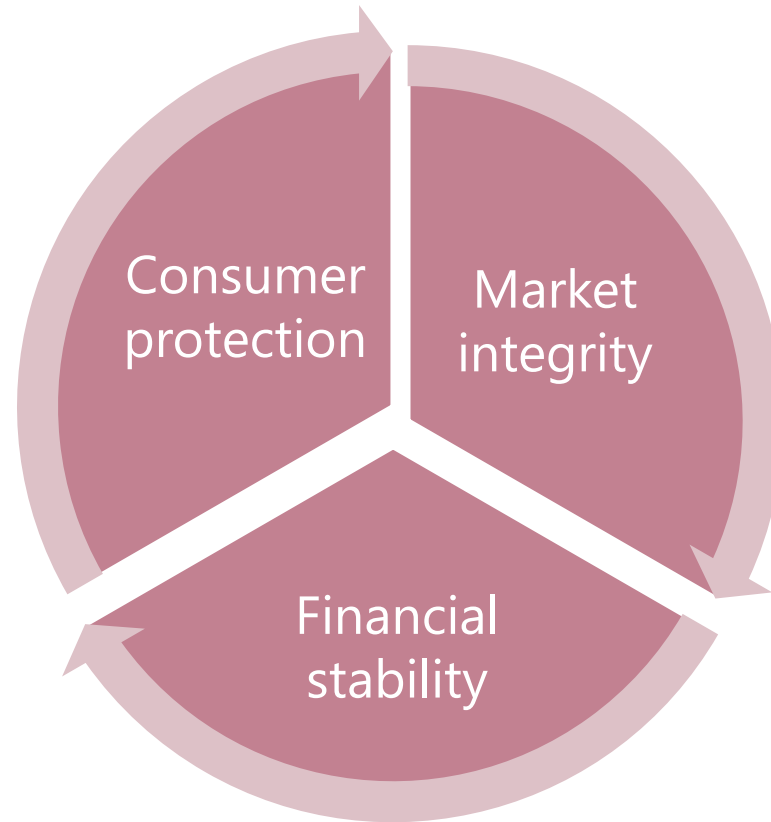
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



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Addressing the risks in crypto should adhere to the three high level objectives that have underpinned the approach to TradFi for decades...



As in TradFi, it will require the regulation of **entities** (even if 'decentralised') and **activities**. Enforcement is a crucial issue and will need to be tackled in DeFi.

...and we have known for decades that financial markets in the absence of regulation lead to suboptimal outcomes...

- In the presence of **market failures, regulation** can lead to better outcomes for society
- There are **two main sets of market failures**:
  - **Externalities** 
  - **Information problems** 
- On top of market failures there are two additional rationales for regulation that apply to DeFi (and indeed TradFi)
  - Economies of scale in monitoring 
  - Consumer demand for regulation 



# Information problems in DeFi...

- Inadequate information eg:
  - Lack of information on identity and skills of developers of Dapps
  - Difficulties understanding how a smart contract will behave in future states of the world
  - Difficulties assessing how Dapps will work if external data change
- Information asymmetries eg:
  - What effort is the team of developers going to exert once they funded their Dapp?
  - Which among competing DApps is the higher quality one?
  - Can I trust the information disclosed by the teams of developers?

## DeFi proponents would argue that there is full transparency. But...

- ...availability of information does not mean it can be understood and used by all
- Consumers may not be able to understand...
  - We can all read a medicine book...
  - ...but we should not base the treatment of our illnesses on our own understanding!
- Consumers are subject to behavioural biases
- Information may only be revealed a long time after purchase

# Externalities in DeFi

- Cascades of defaults (recall the Terra/Luna and FTX episodes)
- Instability of stablecoins
- DeFi loans are overcollateralized and collateral spirals could ensue
- Anonymity reduces reputational risk and induces risk-taking
  - Fosters Ponzi schemes and rug pulls
- Composability of DeFi gives rise to layers of interdependent networks that are known to be unstable (Buldyrev et al, 2010)

# Functions and objectives of regulation...

Function	Consumer protection	Market integrity	Financial stability
Clearing and settling payments to facilitate trade			
Pooling of funds to undertake large-scale enterprises			
Transfer economic resources through time and space			
Manage uncertainty and control risk			
Provide price information to coordinate decentralised decision making			
Deal with incentive problems			

# Functions and objectives of regulation...

Function	Consumer protection	Market integrity	Financial stability
Clearing and settling payments to facilitate trade	Minimum standards (eg. constraints on which firms can provide the service).		
Pooling of funds to undertake large-scale enterprises	Minimum standards (eg. appropriateness tests); Disclosure requirements (eg. on investment strategy); Reliance on intermediaries and/or advisers		
Transfer economic resources though time and space	Minimum standards (eg. appropriateness tests); Disclosure requirements (eg. on sensitivity of loans to interest rate changes); Reliance on intermediaries and/or advisers.		
Manage uncertainty and control risk	Minimum standards (eg. minimum insurance coverage); Disclosure requirements (eg. on claims ratios); Reliance on intermediaries and/or advisers.		
Provide price information to coordinate decentralised decision making	Minimum standards (eg. listing rules); Disclosure requirements (eg. prospectuses).		
Deal with incentive problems	Disclosure requirements (eg. on inducements); Reliance on intermediaries and/or advisers.		

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Pooling of funds to undertake large-scale enterprises	Minimum standards (eg. appropriateness tests); Disclosure requirements (eg. on investment strategy); Reliance on intermediaries and/or advisers	Conduct of business rules (eg. limits on self-trading); Disclosure requirements (eg. if directors transact).	
Transfer economic resources though time and space	Minimum standards (eg. appropriateness tests); Disclosure requirements (eg. on sensitivity of loans to interest rate changes); Reliance on intermediaries and/or advisers.		
Manage uncertainty and control risk	Minimum standards (eg. minimum insurance coverage); Disclosure requirements (eg. on claims ratios); Reliance on intermediaries and/or advisers.	Conduct of business rules (eg. constraints on orders that can be sent to exchanges);	
Provide price information to coordinate decentralised decision making	Minimum standards (eg. listing rules); Disclosure requirements (eg. prospectuses).	Conduct of business rules (eg. constraints on orders that can be sent to exchanges); Minimum standards (eg. listing rules).	
Deal with incentive problems	Disclosure requirements (eg. on inducements); Reliance on intermediaries and/or advisers.	Minimum standards (eg. minimum qualifications for market participants); Conduct of business rules.	

# Functions and objectives of regulation...

Function	Consumer protection	Market integrity	Financial stability
Clearing and settling payments to facilitate trade	Minimum standards (eg. constraints on which firms can provide the service).		Prudential requirements (micro and macro); Margin requirements; Deposit insurance.
Pooling of funds to undertake large-scale enterprises	Minimum standards (eg. appropriateness tests); Disclosure requirements (eg. on investment strategy); Reliance on intermediaries and/or advisers	Conduct of business rules (eg. limits on self-trading); Disclosure requirements (eg. if directors transact).	Risk management requirements (eg. constraints on asset quality, liquidity management tools).
Transfer economic resources though time and space	Minimum standards (eg. appropriateness tests); Disclosure requirements (eg. on sensitivity of loans to interest rate changes); Reliance on intermediaries and/or advisers.		Prudential requirements for lenders (micro and macro); Risk management requirements (eg. collateralisation).
Manage uncertainty and control risk	Minimum standards (eg. minimum insurance coverage); Disclosure requirements (eg. on claims ratios); Reliance on intermediaries and/or advisers.	Conduct of business rules (eg. constraints on orders that can be sent to exchanges);	Prudential requirements (micro and macro); Risk management requirements (eg. constraints on asset quality).
Provide price information to coordinate decentralised decision making	Minimum standards (eg. listing rules); Disclosure requirements (eg. prospectuses).	Conduct of business rules (eg. constraints on orders that can be sent to exchanges); Minimum standards (eg. listing rules).	Prudential and risk management requirements for exchanges. Margin requirements.
Deal with incentive problems	Disclosure requirements (eg. on inducements); Reliance on intermediaries and/or advisers.	Minimum standards (eg. minimum qualifications for market participants); Conduct of business rules.	Margin requirements; Collateralisation.

# Two pillars for the regulation of DeFi

