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Data, Statistics and Central Bank

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() Views should not be attributed to the ECB*

“You’re supposed to expand your mind to fit the art, you’re not supposed to chop the art down to fit your mind.”

Steven Soderbergh

- 1** **Digitailisation and central bank functions**
- 2** **Crypto-assets**
- 3** **Shadow Fintech**
- 4** **Productivity puzzle (I): Creating data**
- 5** **Productivity puzzle (II): The timing in the measurement of value added**

1. Digitalisation and central bank functions

Why should central banks care?

Changes in the price formation processes

impact on productivity/ equilibrium real rate of interest

Distortions to the transmission mechanism

New sources of liquidity and credit

Threats to financial stability

Innovations in payment systems

Effects on market infrastructure

1. Digitalisation and central bank functions

Why should central banks care?

Changes in the price formation processes

Do we rightly distinguish price from volume?

impact on productivity/ equilibrium real rate of interest

Do we measure output and factors correctly?

Distortions to the transmission mechanism

New sources of liquidity and credit

Threats to financial stability

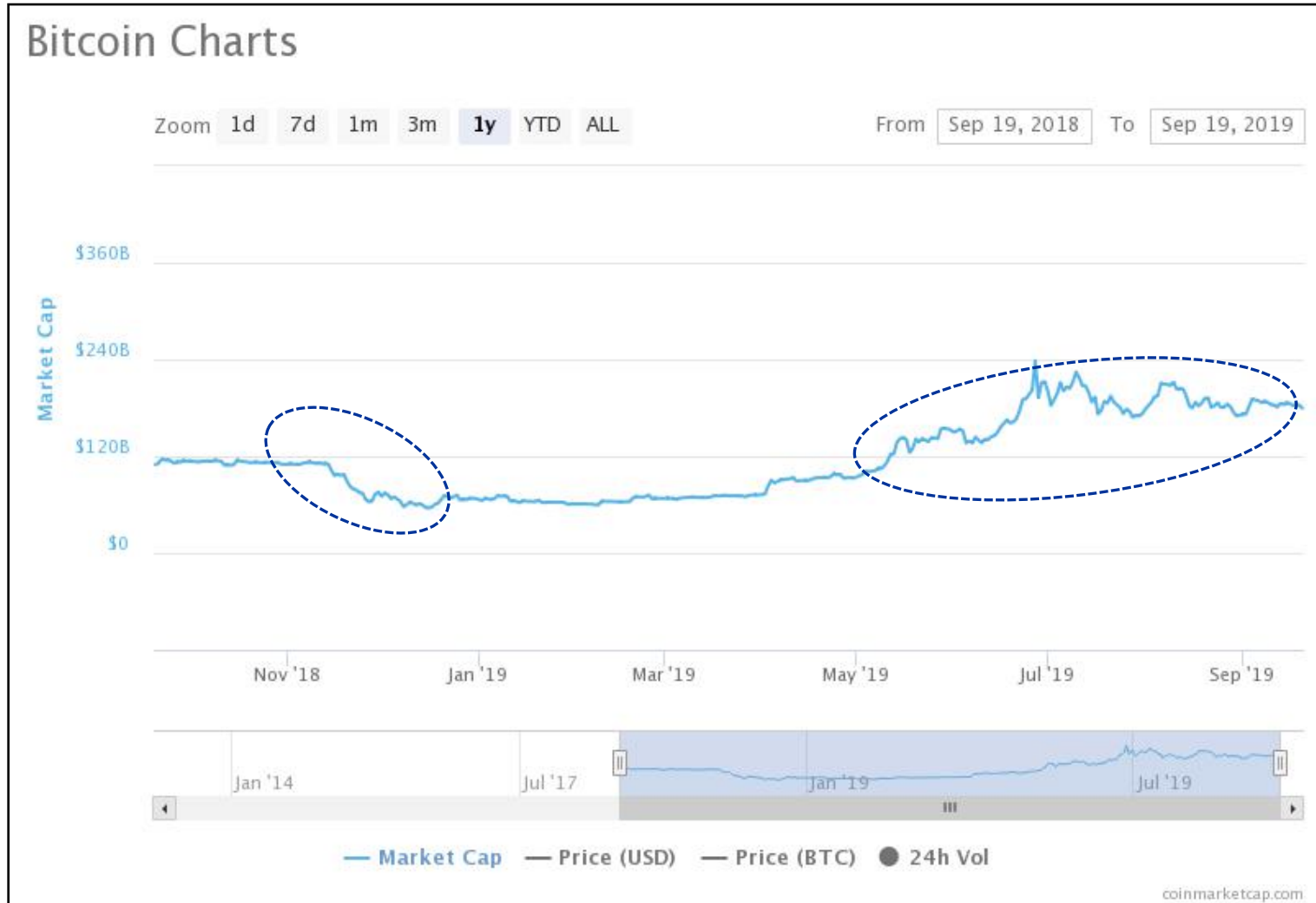
Innovations in payment systems

Effects on market infrastructure

Do we cover “alternative finance” and “Fintech” in an appropriate manner?

2. Crypto-assets

“Crypto winter” (seems) over ...



2. Crypto-assets

... but “crypto spring” seems complex ...

The Periodic Table of Cryptocurrencies

An overview of the cryptocurrency market

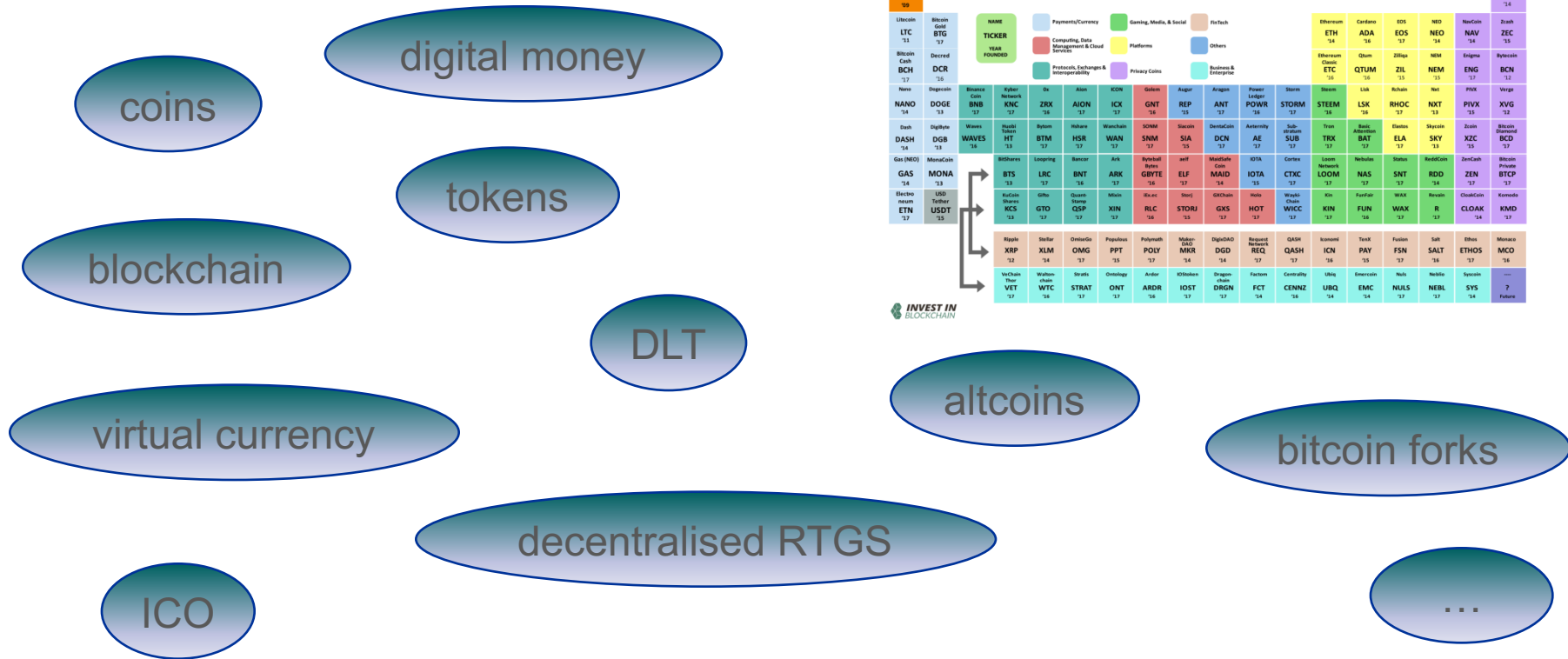
Created by Daniel Frumkin for
www.investinblockchain.com

An overview of the cryptocurrency market																	Created by Daniel Franklin for www.investinblockchain.com				Monero XMR '14
Bitcoin BTC '09																					
Litecoin LTC '11	Bitcoin Gold BTG '17	NAME TICKER YEAR FOUNDED	<div><div></div>Payments/Currency</div> <div><div></div>Computing, Data Management & Cloud Services</div> <div><div></div>Protocols, Exchanges & Interoperability</div>	<div><div></div>Gaming, Media, & Social</div> <div><div></div>Platforms</div> <div><div></div>Privacy Coins</div>	<div><div></div>FinTech</div> <div><div></div>Others</div> <div><div></div>Business & Enterprise</div>							Ethereum ETH '14	Cardano ADA '16	EOS EOS '17	NEO NEO '14	NavCoin NAV '14	Zcash ZEC '15				
Bitcoin Cash BCH '17	Decred DCR '16													Ethereum Classic ETC '16	Qtum QTUM '16	Zilliqa ZIL '15	NEM NEM '15	Enigma ENG '17	Bytecoin BCN '12		
Nano NANO '14	Dogecoin DOGE '13					Binance Coin BNB '17	Kyber Network KNC '17	0x ZRX '16	Aion AION '17	ICON ICX '17	Golem GNT '16	Augur REP '15	Aragon ANT '17	Power Ledger POWR '16	Storm STORM '17	Steem STEEM '16	Lisk LSK '16	Rchain RHOC '17	Nxt NXT '13	PIVX PIVX '15	Verge XVG '12
Dash DASH '14	DigiByte DGB '13	Waves WAVES '16	Huobi Token HT '13	Bytom BTM '17	Hshare HSR '17	Wanchain WAN '17	SONM SNM '17	Siacoin SIA '15	DentaCoin DCN '17	Aeternity AE '17	Sub-stratum SUB '17	Tron TRX '17	Basic Attention BAT '17	Elastos ELA '17	Skycoin SKY '13	Zcoin XZC '15	Bitcoin Diamond BCD '17				
Gas (NEO) GAS '14	MonaCoin MONA '13	<div><div></div></div> <div><div></div></div> <div><div></div></div>	BitShares BTS '13	Loopring LRC '17	Bancor BNT '16	Ark ARK '17	Byteball Bytes GBYTE '16	aelf ELF '17	MaidSafe Coin MAID '14	IOTA IOTA '15	Cortex CTXC '17	Loom Network LOOM '17	Nebulas NAS '17	Status SNT '17	ReddCoin RDD '14	ZenCash ZEN '17	Bitcoin Private BTCP '17				
Electro neum ETN '17	USD Tether USDT '15		KuCoin Shares KCS '13	Gifto GTO '17	Quant-Stamp QSP '17	Mixin XIN '17	iEx.ec RLC '16	Storj STORJ '15	GXChain GXS '17	Holo HOT '17	Wayki-Chain WICC '17	Kin KIN '17	FunFair FUN '16	WAX WAX '17	Revain R '17	CloakCoin CLOAK '14	Komodo KMD '17				
			Ripple XRP '12	Stellar XLM '14	OmiseGo OMG '17	Populous PPT '15	Polymath POLY '17	Maker-DAO MKR '14	DigixDAO DGD '14	Request Network REQ '17	QASH QASH '17	Iconomi ICN '16	TenX PAY '15	Fusion FSN '17	Salt SALT '16	Ethos ETHOS '17	Monaco MCO '16				
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By D Frumkin in <https://www.investinblockchain.com/periodic-table-cryptocurrencies/>

... and confusing:



What is what we need to measure!?

2. Crypto-assets

Four clarification points:

DLT, blockchain may support payment platforms for standard assets, fiat currencies .., or be of use for non-financial (even non-economic) activities

Technology does not matter

Digital “objects” that are “(...) store of value representing a benefit (...) accruing to the (...) owner (...). (...) a means of carrying value forward (...)” (SNA 3.30)

The asset boundary

They are not “currency”

Is there a claim?

Unless they represent claims on the central bank: SNA 11.52

Digital assets might follow the traditional asset-liability model (i.e. represent claims of economic agents on others), like most “tokens”, or still meet the definition of assets without representing a claim”, like “bitcoins” and other (wrongly called) “cryptocurrencies”

A simple taxonomy

Digital claims following an asset-liability model

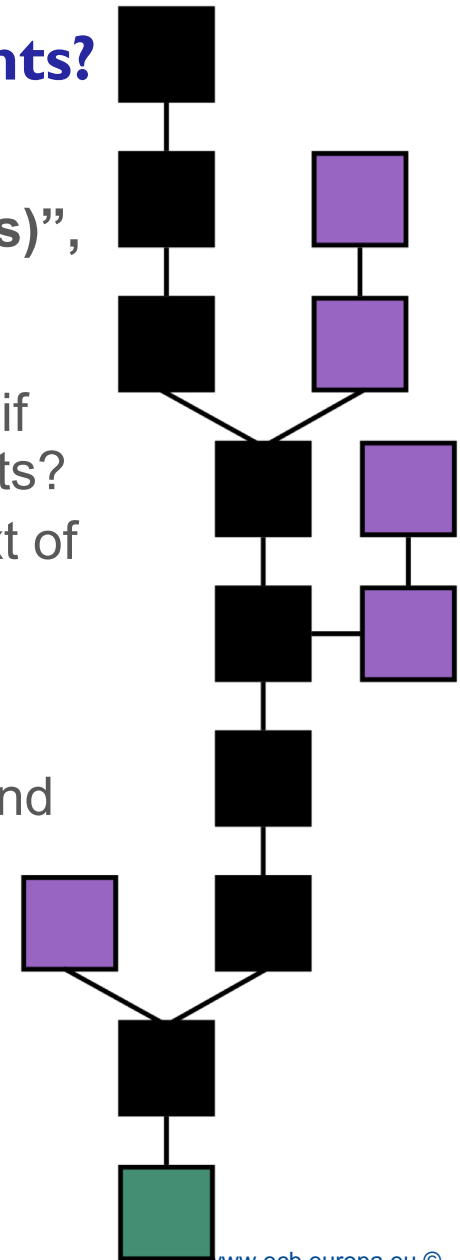
- Issuing unit (debtor) can be identified
- Can be supported by DLT and other decentralized technologies
- **To be treated as financial assets**

Crypto-assets

- No issuing unit exist ...
- *assets only evidenced and transferred by a decentralized chain of digital signatures ensured with cryptographic techniques*
- **How to treat them?**

How to treat crypto-assets in national accounts?

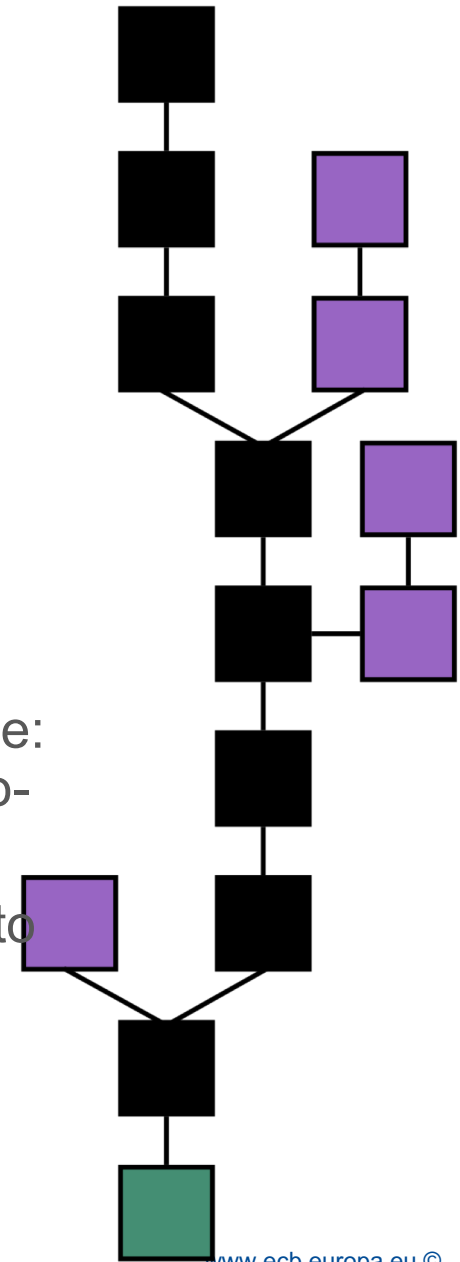
- Advisory Expert Group (AEG) recommends to treat them as “**produced non-financial assets (valuables)**”, but ...
- ... current expenditure paid with them would not be reflected as a decrease in net worth: do we want this if crypto-assets become generalized means of payments?
- AEG advise is preliminary, to be revised in the context of more encompassing methodological revisions. Some options:
 - Financial asset “without liabilities”, as gold
 - New category in between non-financial assets and financial assets... but...
 - .. apart from gold and crypto-assets what else would be in that new asset category?
 - ✓ *Non-produced non-financial assets?*
 - ✓ *Equity?*
 - ✓ ...



How to obtain information on crypto-assets? The ECB approach

- **Publicly available aggregated data** allows for constructing first set of indicators:
 - Data retrieval automatized via web API and big data technologies
 - Quality control measures in place
 - Indicators for price, volume, capitalization, “wallets”, ICOs,...
- **Data gaps** remain, to be addressed in a second phase: financial system exposure, retail payments with crypto-assets, use of crypto-asset DLT for settlement
- European System of Central Banks informal network to look into options to improve and enhance coverage

Global central bank initiatives would help!!



What is “Alternative Finance”?

- **Non-traditional financial intermediation**, fostered by new digital technologies: crypto-assets... but also peer-to-peer lending, crowdfunding, crowdsourcing, RBF ...
- **It is not Fintech:**
 - digital technologies might support traditional financial intermediation;
 - many fintech companies are actually non-financial corporations, or just financial auxiliaries, but not “intermediaries”
- **It is not shadow banking...**
 - Non- regulated banking intermediation might occur via not digitally - enhanced channels

... but some alternative finance models might put risks similar to those of “traditional” shadow banking (or present interlinkages with shadow banking)

An agenda for Alternative Finance

- **National accounts:**
 - Separate intermediation activities from ancillary Fintech activities
 - Most intermediation models would be covered by methodological provisions already existing? Do new models exist that require an innovative methodological answer?
- **Shadow banking/ financial stability:**
 - Put it in the radar of the monitoring initiatives: FSB (already in the 2017 Report) , ESRB, G-20 DGI;
- **Data?**
 - IFC Working Group on Fintech data:
 - Inventory of sources, needs, data gaps
 - Assessment of initiatives to close gaps
 - IFC report by January 2020 (Survey already conducted)

4. Productivity puzzle (I): Creating Data

Do we cover well the (growing) data-based business?

- Is data now in the system?
 - Databases are, but those are not “data”: *“observations that have been converted into a digital form that can be stored, transmitted or processed and from which knowledge can be drawn”* Statistics Canada (*)
 - Part of corporate “goodwill”, only showing up in corporate M&A
 - Implicitly included within the value of goods and services
- **Alternatives for recording data**
 - Produced by corporations
 - Current expenditure: does not increase GDP
 - Capital expenditure: does increase GDP
 - Provided by households (barter transaction)
 - Non-produced asset: increases GDP (exchanges against “free” services now measured)
 - Produced assets: increases GDP ... twice!!

(*)<https://www150.statcan.gc.ca/n1/pub/13-605-x/2019001/article/00008-eng.htm>

5. Productivity puzzle (II): the timing in the measurement of value added

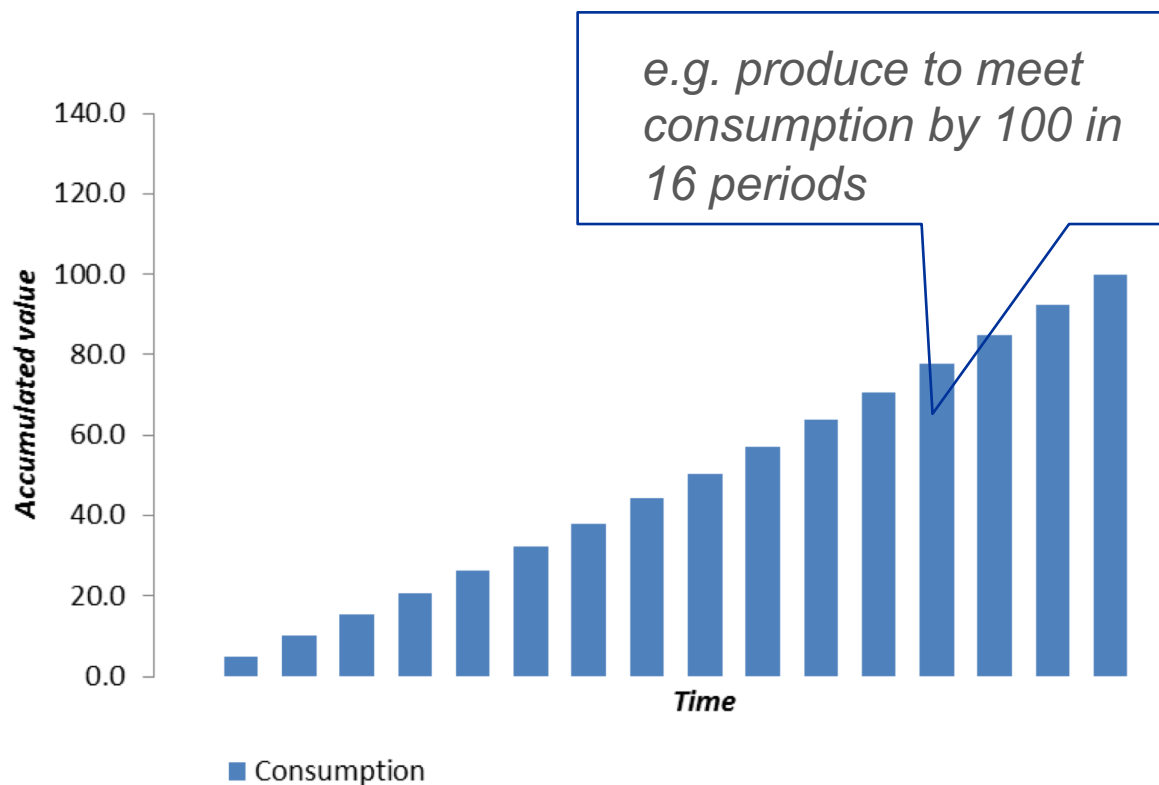
“The basic structure of the national income and product accounts features double-counting of investment. (...) This double-counting leads to over-statement of levels of aggregates such as GDP and national income;”

From “Double-counting of investment” (R J Barro, 2019)

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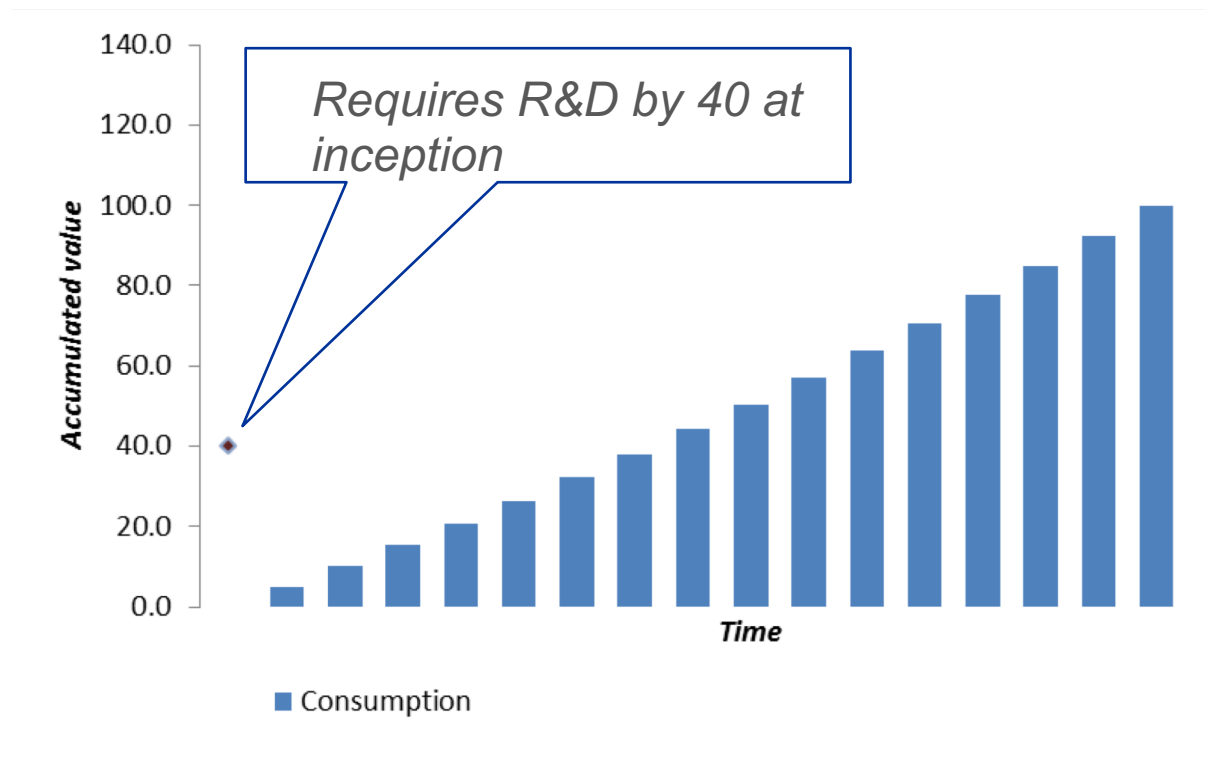
What does Barro mean?

Is value added equal to consumption in the limit?



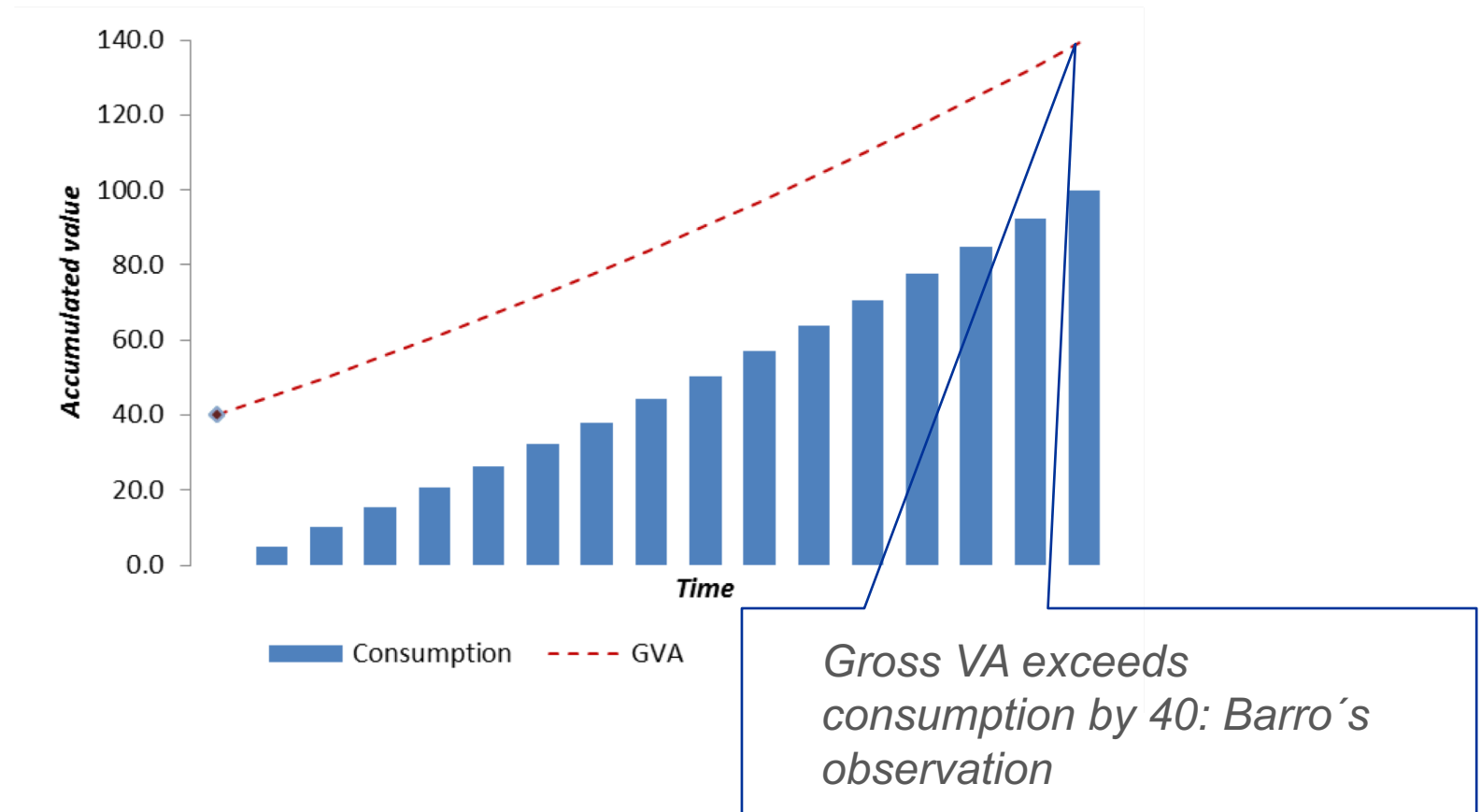
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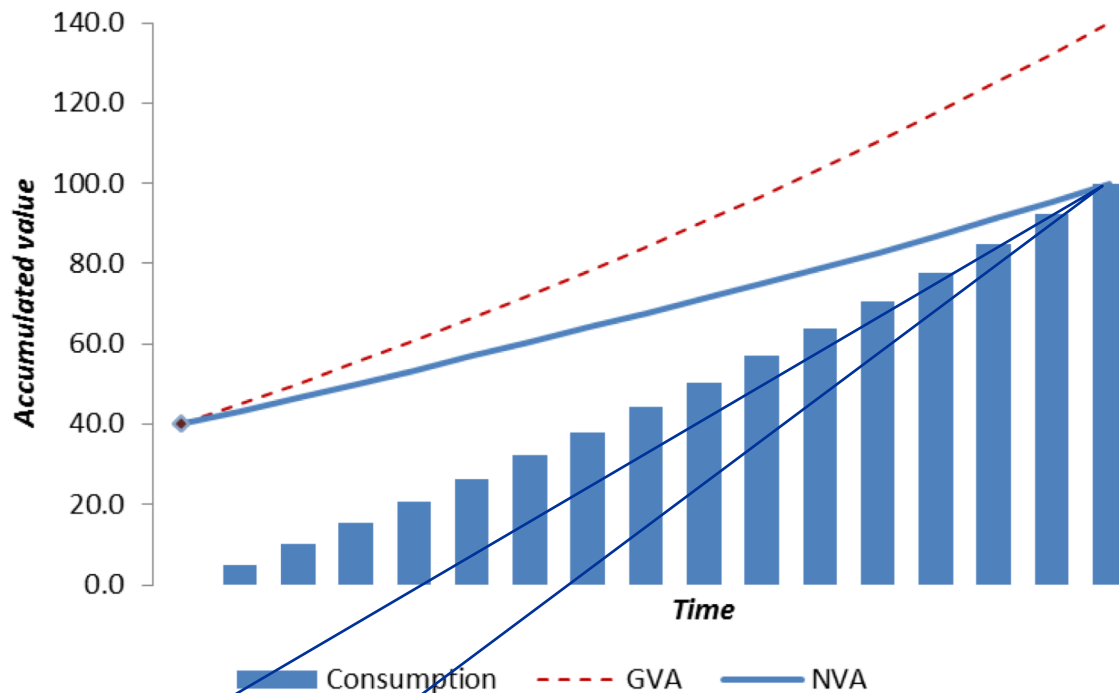
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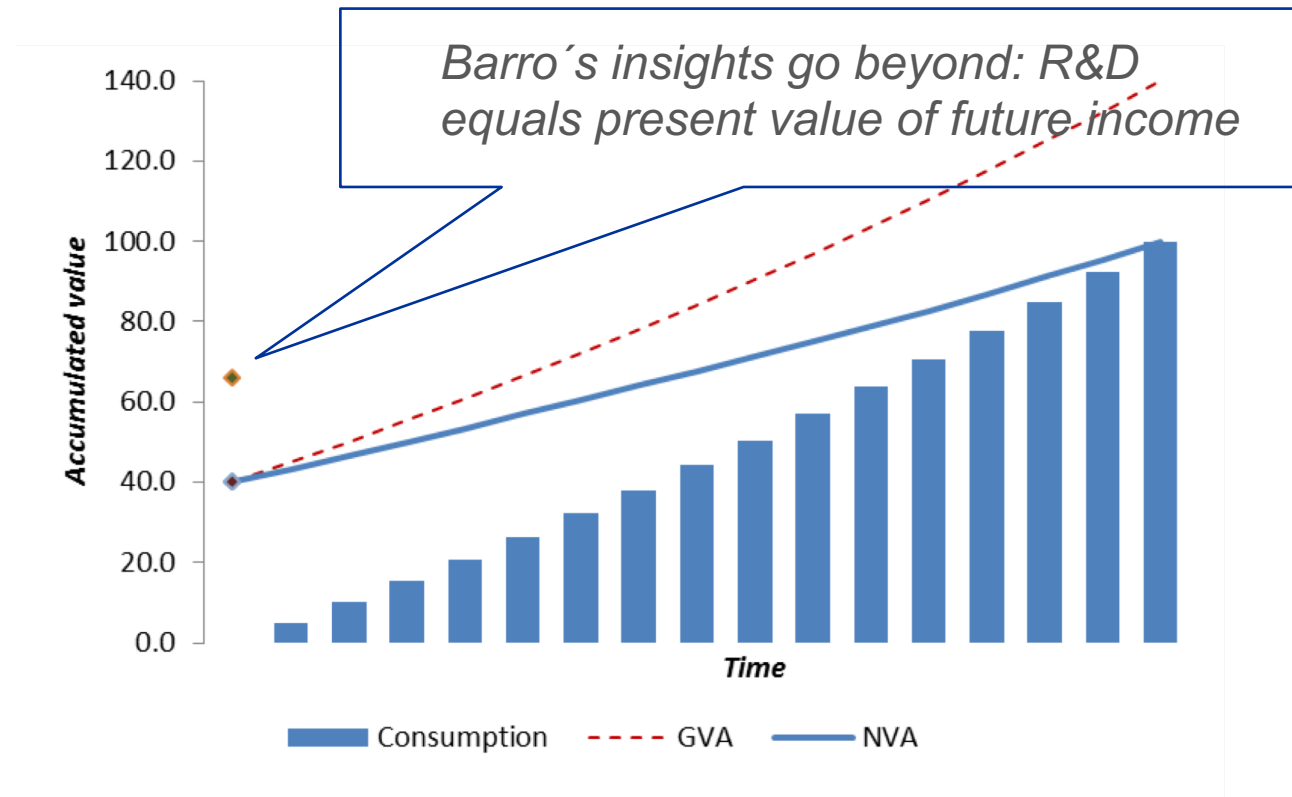
Is value added equal to consumption in the limit?



*But **Net** VA does equate total consumption*

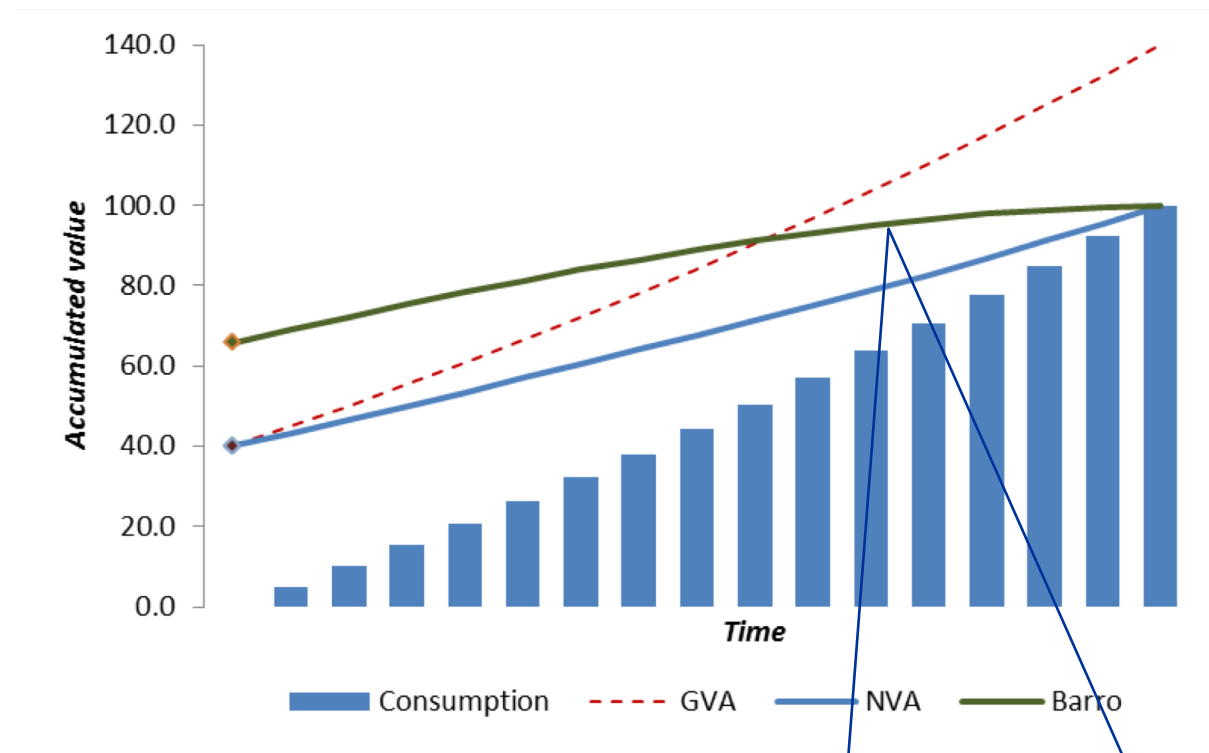
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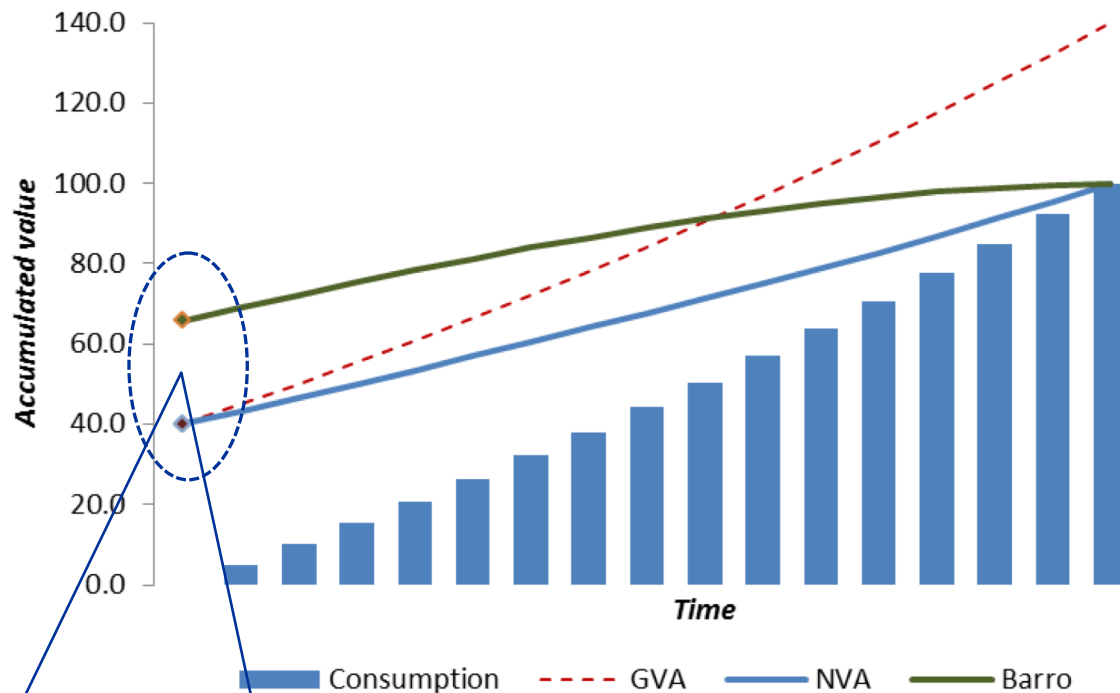
Is value added equal to consumption in the limit?



Temporal profile different from NVA, but still value added is equal to consumption

5. Productivity puzzle (II): the timing in the measurement of value added

Is the “gap “ increasing as the digital economy grows in importance?



Standard national accounts do not measure this “gap”

A few summary messages

- Understanding digital developments is (will become) key for central bank activities: monetary policy, financial stability, economic and financial analysis
- Crypto-assets and other alternative finance might pose severe financial stability problems and affect the monetary policy transmission mechanism: developing sound statistical treatments and data sources should be high in the agenda of central banks
- Under-measurement of data-based business might be one of the factors behind the observed decline in productivity. However, the new accounting treatments should not artificially boost the measurement of GDP.
- (satellite accounts) changes in the national accounts framework to further integrate inter-temporal budget constraints might provide a useful, complementary view of value generation

Thank you for your attention !

