



EUROPEAN CENTRAL BANK

EUROSYSTEM

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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

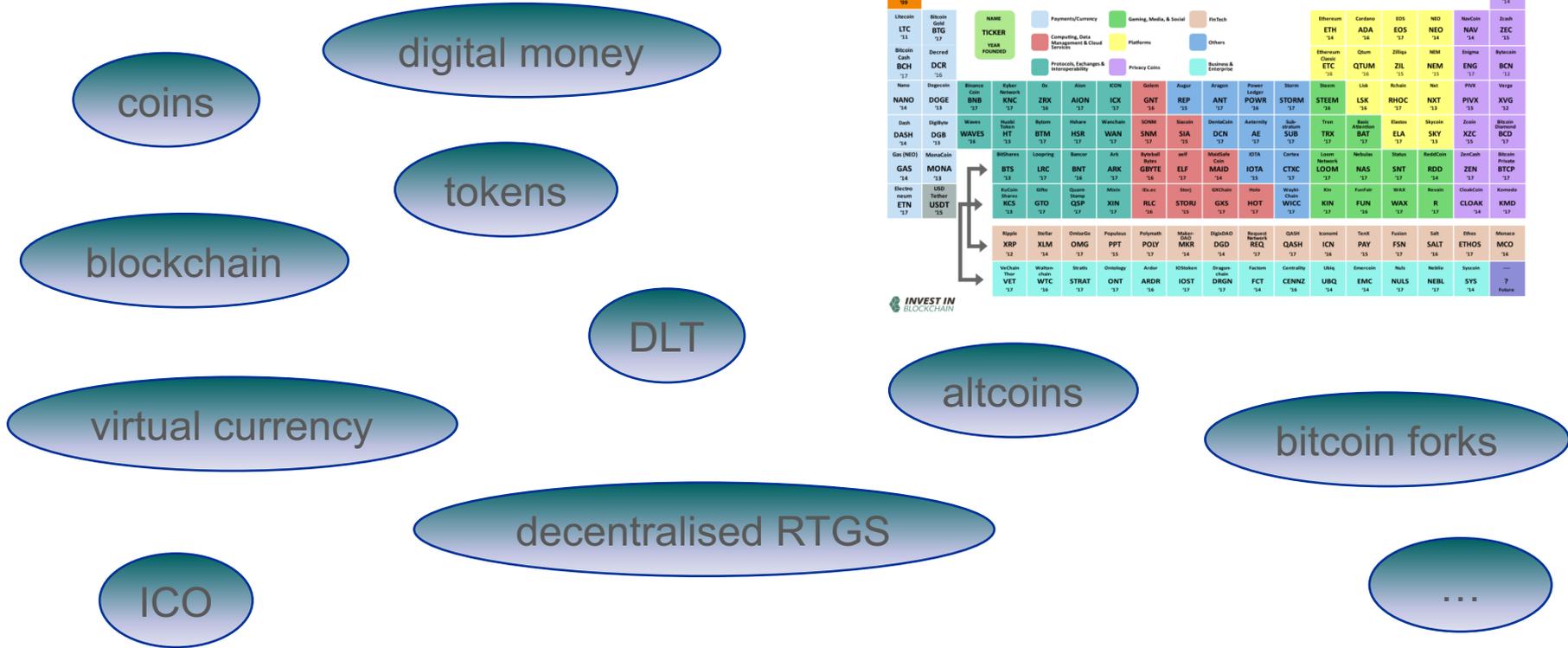
Bitcoin BTC '09		NAME TICKER YEAR FOUNDED										Ethereum ETH '14						Cardano ADA '16		EOS EOS '17		NEO NEO '14		NavCoin NAV '14		Zcash ZEC '15									
Litecoin LTC '11		Bitcoin Gold BTG '17		Payments/Currency		Gaming, Media, & Social		FinTech		Ethereum Classic ETC '16		Qtum QTUM '16		Zilliqa ZIL '15		NEM NEM '15		Enigma ENG '17		Bytecoin BCN '12															
Bitcoin Cash BCH '17		Decred DCR '16		Computing, Data Management & Cloud Services		Platforms		Others		Steem STEEM '16		Lisk LSK '16		Rchain RHOC '17		Nxt NXT '13		PIVX PIVX '15		Verge XVG '12															
Nano NANO '14		Dogecoin DOGE '13		Protocols, Exchanges & Interoperability		Privacy Coins		Business & Enterprise		Power Ledger POWR '16		Storm STORM '17		Tron TRX '17		Basic Attention BAT '17		Elastos ELA '17		Skycoin SKY '13		Zcoin XZC '15		Bitcoin Diamond BCD '17											
Dash DASH '14		DigiByte DGB '13		Waves WAVES '16		Huobi Token HT '13		Bytom BTM '17		Hshare HSR '17		Wanchain WAN '17		SONM SONM '17		Siacoin SIA '15		DentaCoin DCN '17		Aeternity AE '17		Substratum SUB '17		Loom Network LOOM '17		Nebulas NAS '17		Status SNT '17		ReddCoin RDD '14		ZenCash ZEN '17		Bitcoin Private BTCP '17	
Gas (NEO) GAS '14		MonaCoin MONA '13		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		Kin KIN '17		FunFair FUN '16		WAX WAX '17		Revain R '17		CloakCoin CLOAK '14		Komodo KMD '17			
Electroneum 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							
VeChain Thor VET '17		Walton-chain WTC '16		Stratis STRAT '17		Ontology ONT '17		Ardor ARDR '16		IOStoken IOST '17		Dragon-chain DRGN '17		Factom FCT '14		Centrality CENNZ '16		Ubiq UBQ '14		Emercoin EMC '14		Nuls NULS '17		Neblio NEBL '17		Syscoin SYS '14		---- ? Future							



By D Frumkin in <https://www.investinblockchain.com/periodic-table-cryptocurrencies/>

2. Crypto-assets

... and confusing:



The Periodic Table of Cryptocurrencies

An overview of the cryptocurrency market

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NAME	Payments/Currency	Gaming, Media, & Social	FinTech
TICKER	Computing, Data Management & Cloud Services	Platforms	Others
YEAR FOUNDED	Protocols, Exchanges & Interoperability	Privacy Coins	Business & Enterprise
BTC	Bitcoin		
ETH	Ethereum		
ADA	Cardano		
EOS	EOS		
NEO	NEO		
NAV	NavCoin		
ZEC	Zcash		
ETC	Ethereum Classic		
QTM	Qtum		
ZIL	Zilliqa		
NEM	NEM		
ENG	Engage		
BCH	Bitcoin Cash		
XMR	Monero		
...

INVEST IN BLOCKCHAIN

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

The asset boundary

They are not “currency”

Is there a claim?

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

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?**

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

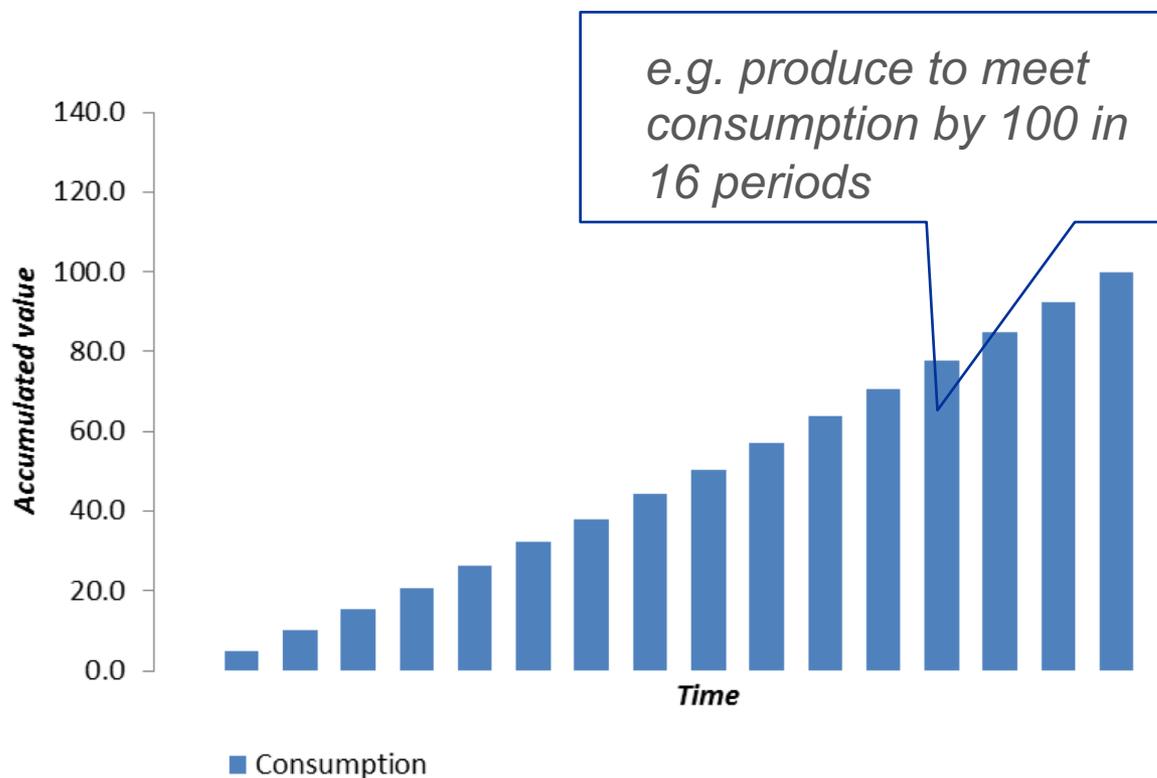
“The basic structure of the national income and product accounts features double-counting of investment. (...) This double-counting leads to over-statement of levels of aggregates such as GDP and national income;”

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

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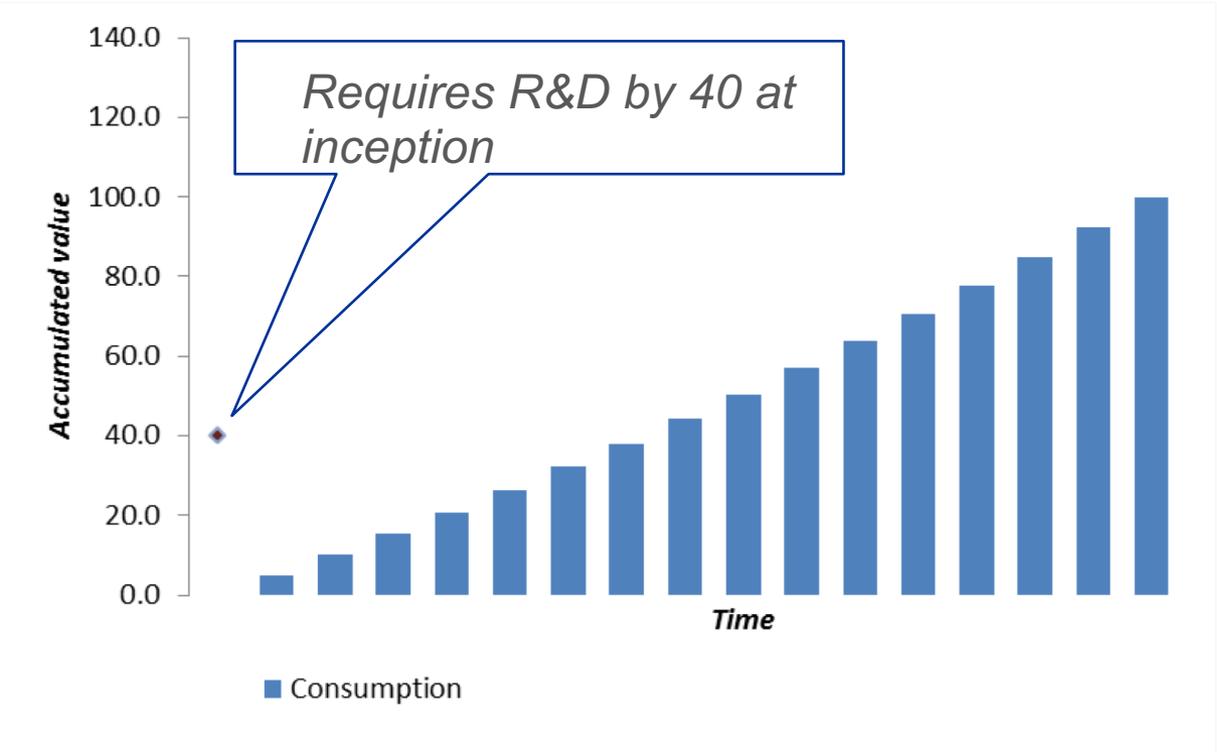
What does Barro mean?

Is value added equal to consumption in the limit?



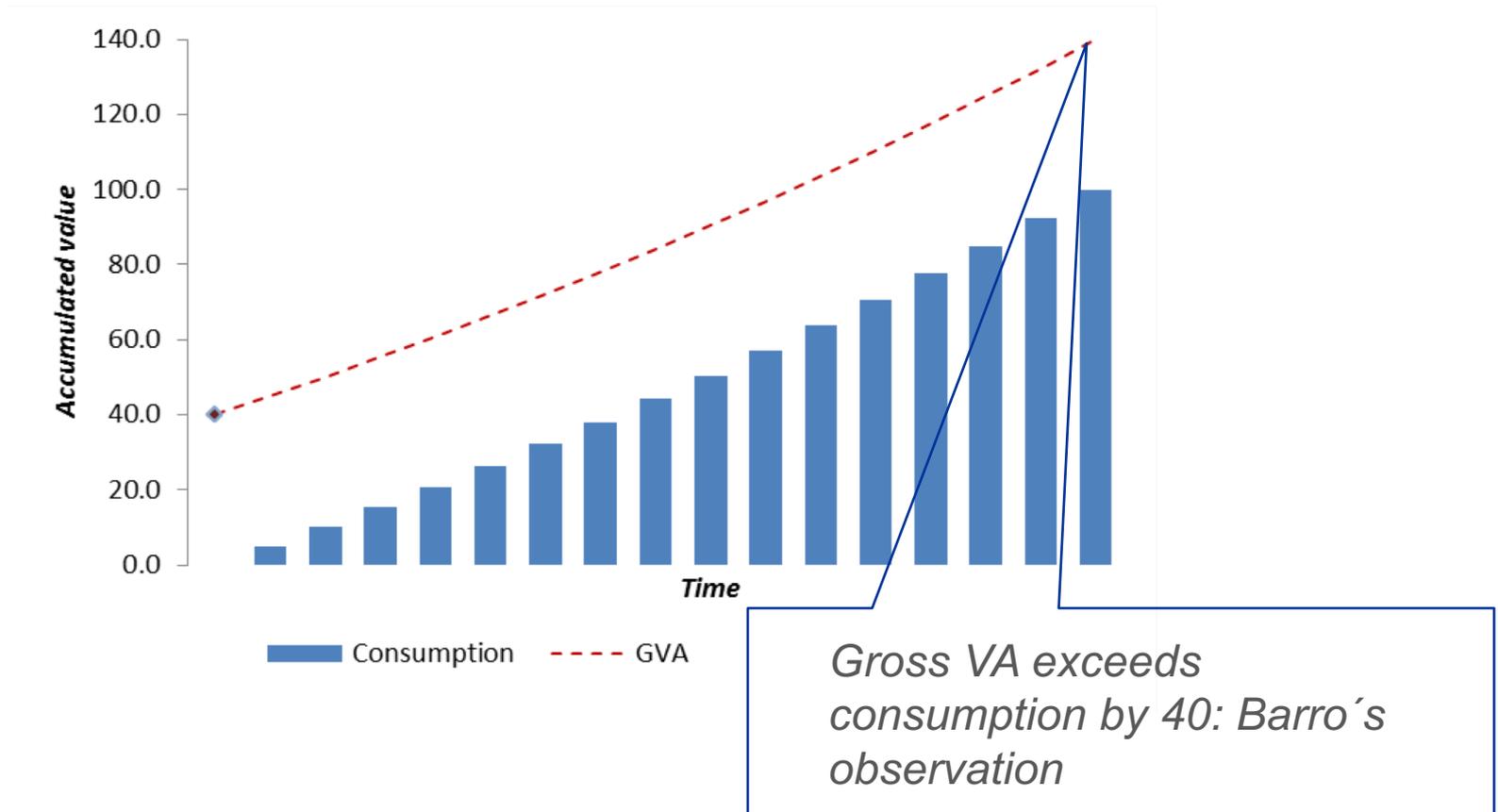
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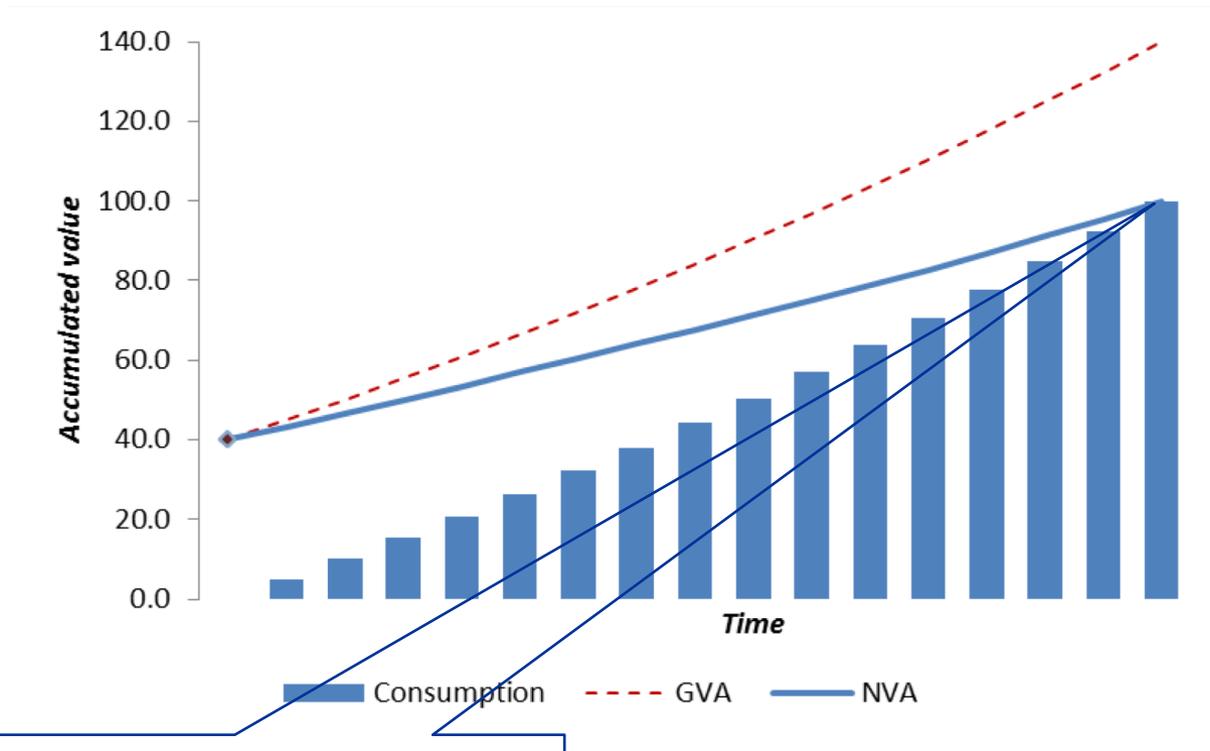
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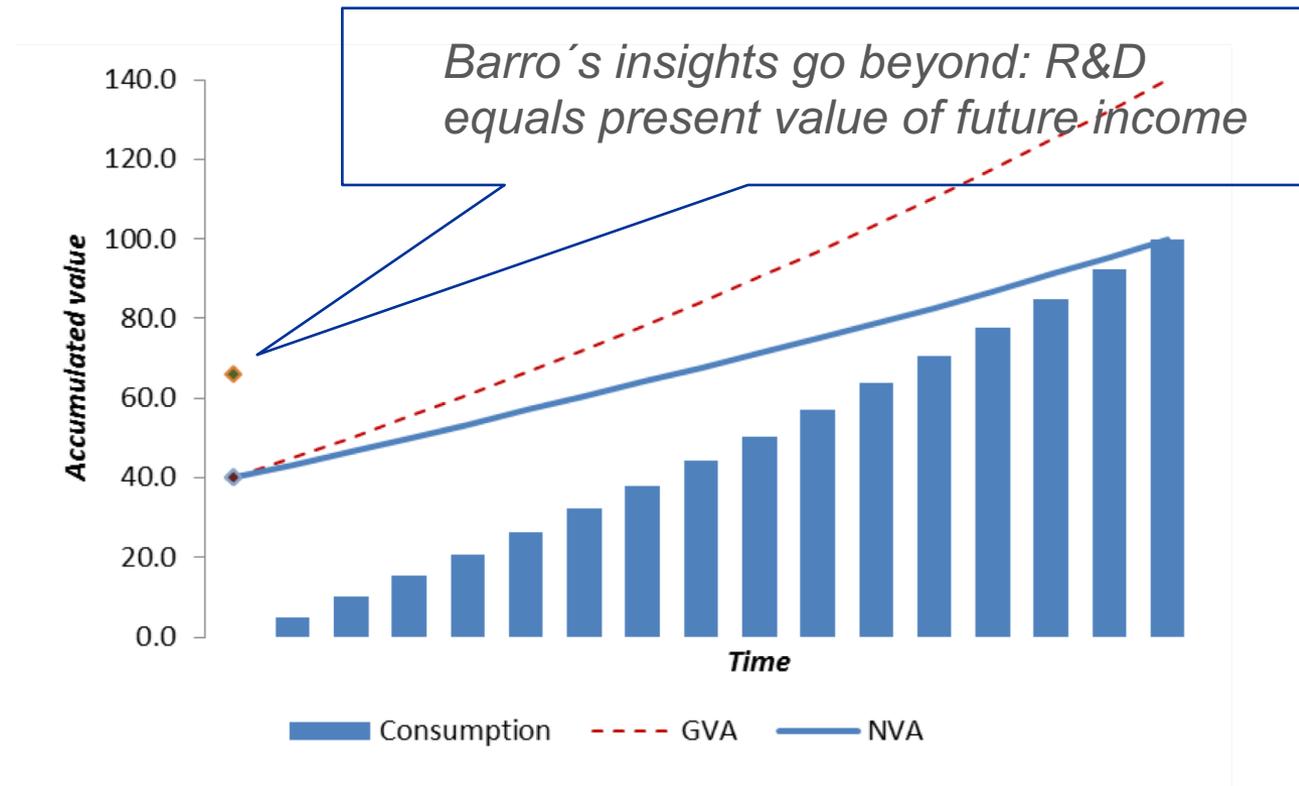
Is value added equal to consumption in the limit?



But Net VA does equate total consumption

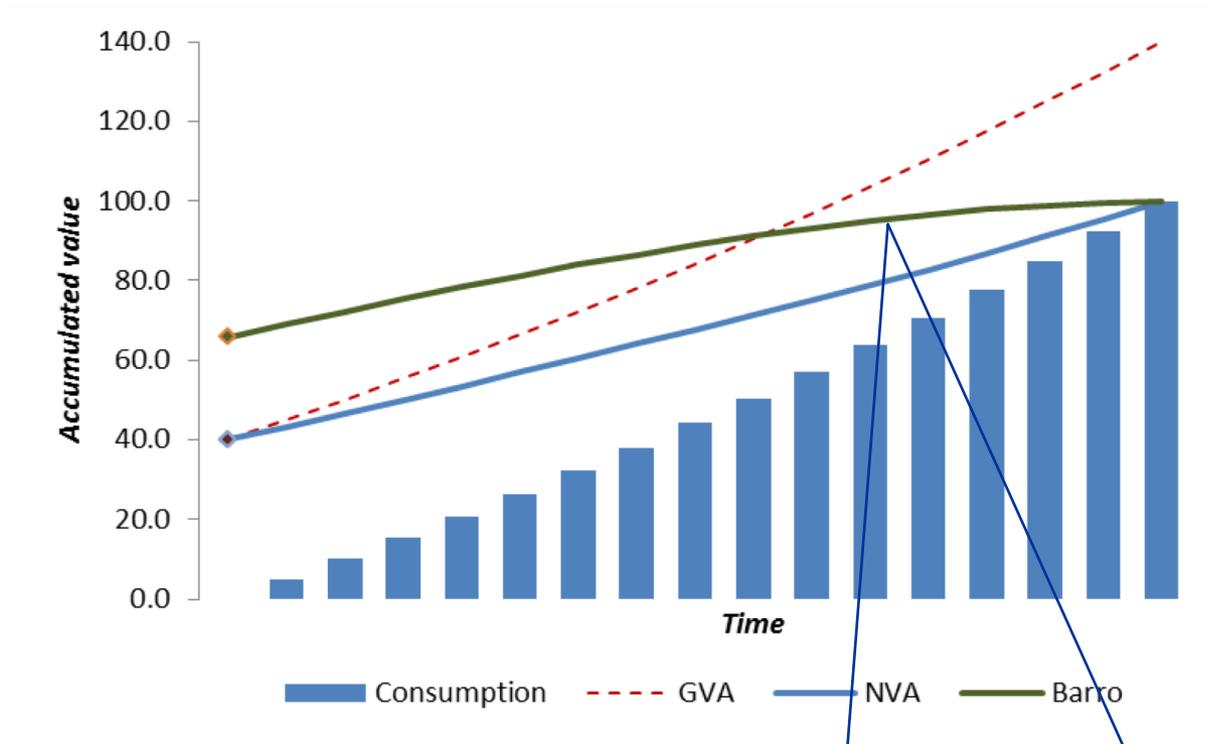
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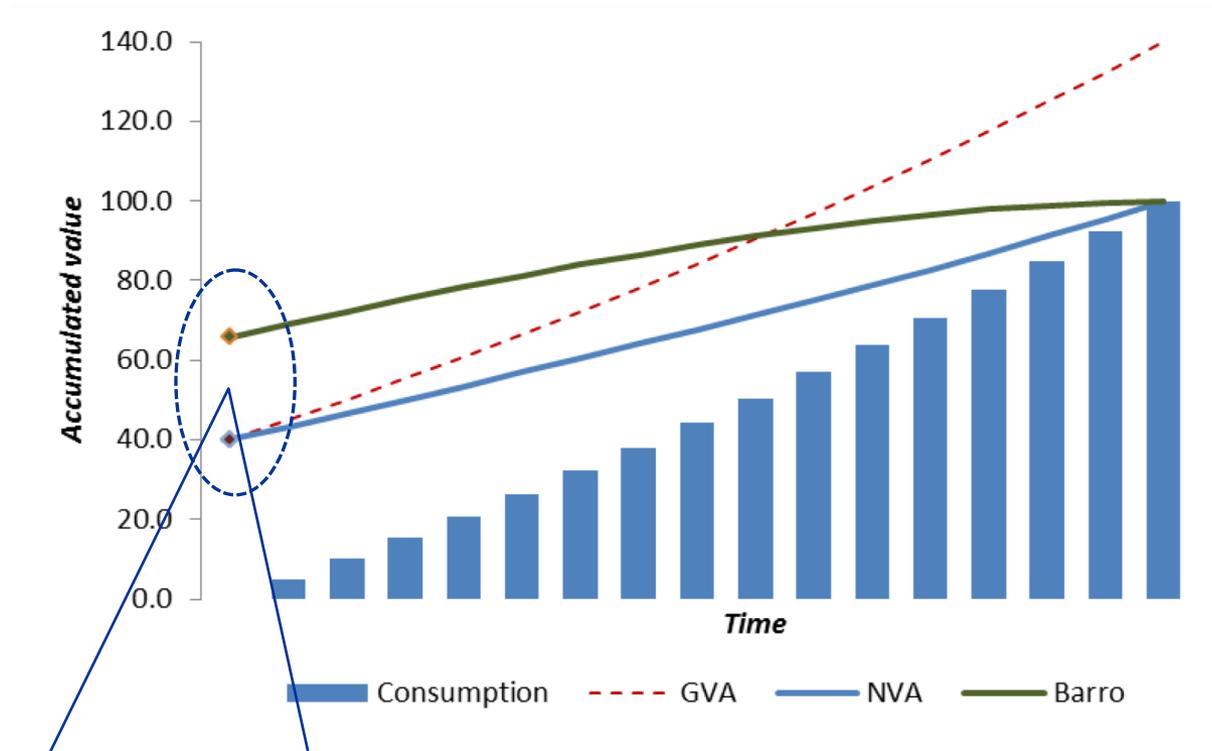
Is value added equal to consumption in the limit?



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 !

