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Big data: A strategic asset for central banks policies
Disclaimer: The opinions expressed in this presentation are not necessarily those of the European Central Bank (ECB) or the European System of Central Banks (ESCB)
The 4 Vs are sourced from IBM: http://www.ibmbigdatahub.com/sites/default/files/infographic_file/4-Vs-of-big-data.jpg
Data never sleeps - “Everything flows" Heraklit

2017 This Is What Happens In An Internet Minute

Sources for digital exploration
• Accessing
• Structuring datasets
• Linking data sets
• Slice & dice across time and datasets
• Performing querying

Staying fit with Heraklit
Which preparations are needed today to have the capacity and functionality needed in 5 years time?
• From experimenting to central banking tool kits?
• Linking current and past data
• Querying variety of formats
• Technical independent

Data mania versus phobia – a paradigm of records

Digital transformation in finance and economics

E-trade
Settlement systems
Credit cards
Mobile transaction

E-commerce
Credit cards
Price scans

Lending & financing

Big data

- Fintech
- DLT

Data Scientist

- D-coins
- S-contracts

Data Analytics

Data lab

Systematic acquire, Process, summarize

Statistical algorithm and data explorations

Packaging data for Insights & business
Reflections for central banking policy purposes

- Near real-time, higher frequency snapshots
- New theories from combining different science fields
- Supplementary Insights
- Early warning indicators
- Detecting trends and turning points, better predictions
- Extract information on the impact of policy actions

Source: “Big data: The hunt for timely insights and decision certainty - Central banking reflections on the use of big data for policy purposes,” IFC working Paper No 14, 2016, Per Nymand-Andersen
Paradigm shift - Moving to micro level/granular data

Micro-level statistics
- Security-by-security statistics
- Holdings of individual securities
- Money market transactions (MMSR)
- Loans by loans register (Ana Credit)
- Register of Financial Institutions
- Individual bank supervisory data

Macro-level statistics
- Balance sheet statistics
- Monetary aggregates (M1 – M3)
- Securities issues
- Banks interest rates
- Government finance
- Euro area financial accounts

Statistics & Analytics
“Measure what is measurable, and make measurable what is not so.” Galileo Galilei
One misperception of big data is that we do not need to worry about sample bias and representativeness, as large volumes of information supersede standard sampling theory, since big data provide census-type information.

Digital recording of operations

Census of data?

Households
Corporates
Age, Gender, Income, Education
Tweeter population

21% of online adults use Twitter

Unit Measurement

Not people - but tweets (re-tweets)

Event driven

Volume changes may not refer to units (nor changes in demand)
Correlation is not (necessary) causation

No conclusion can be drawn simply on the basis of correlations between two variables. The similarity is a coincidence. We should say that there is no causation.

“The invalid assumption that correlation implies cause is probably among the two or three most serious and common errors of human reasoning”

Stephen Jay Gould, American evolutionary biologist and author, 1981
Irving Fisher Committee – Collaboration among central banks

**Skills, tools and insights**

- **Internet**
  - Search machines, Web-prices and properties, Tweets, internet media,

- **Financial Market**
  - Frequency trading, Prices, bid-offer spreads, Volumes and liquidity
  - Loans and Holdings Transactions

- **IFC Pilots**

- **Commercial**
  - Credit cards operations
  - Postal services

- **Administrative**
  - Fiscal, trade and corporate balance sheet data

**Discovery, collaboration and partnership**
Tre conclusioni - three take aways

1. There is a business case within economics and finance

2. Moving to micro level data does not challenge our statistics quality concepts

3. Call for collaboration, enhancing skills to create value
Thank you for your attention

Any questions?

Annex: ECB Paper Series as an outlet for big data research
ECB STATISTICS PAPER SERIES
Gaining insights - Growing understanding – Spreading knowledge

SNAPSHOT OF STATISTICS
SPS author Henri Maurer publishes
QUALITY ENHANCEMENTS IN GOVERNMENT FINANCE STATISTICS

"Mistrust against Government Finance Statistics in the Excessive Procedure Deficit was (unduly) exacerbated by the Greek bond crisis. It was a duty to analyse and communicate properly on the topic”

WHAT ABOUT YOU WRITING A PIECE FOR AN UPCOMING ISSUE?

WHERE TO FIND MORE INFORMATION?

The ECB Statistics Paper Series is a channel for statisticians, economists, researchers and other professionals to publish innovative work undertaken in the area of statistics and related methodologies of interest to central banks.

Check out the paper series on the ECB website: www.ecb.europa.eu
Or contact us: statisticspaperseries@ecb.europa.eu
An outlet for big data research:

- "Nowcasting GDP with electronic payments data" by Galbraith J & Tkacz G.
  - Electronic payment transactions can be used in nowcasting current gross domestic product growth
  - Finds that debit card transactions contribute most to forecast accuracy

- "Social media sentiment and consumer confidence" by Daas P & Puts M
  - Relationships between the changes in consumer confidence and Dutch public social media?
  - Could be used as an indicator for changes in consumer confidence and as an early indicator

- "Quantifying the effects of online bullishness on international financial markets" by Mao H & Counts S, Bollen J.
  - Develops a measure of investor sentiment based on Twitter and Google search queries
  - Twitter and Google bullishness are positively correlated to investor sentiment