Financial big (micro) data and policy work

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Overview

1. Dual micro/macro dimension of financial statistics
2. Opportunities: what micro data can bring
3. Challenges
4. Central bank issues
5. Examples

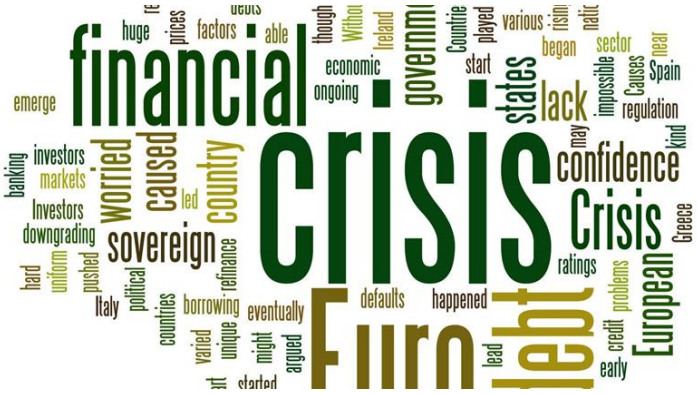
(1) Dual micro/macro dimension of financial statistics

- The **Great Financial Crisis of 2007-09**
  - Financial stability issues have micro & macro aspects
  - *"We need to see the forest as well as the trees within it"* (Borio, 2013)

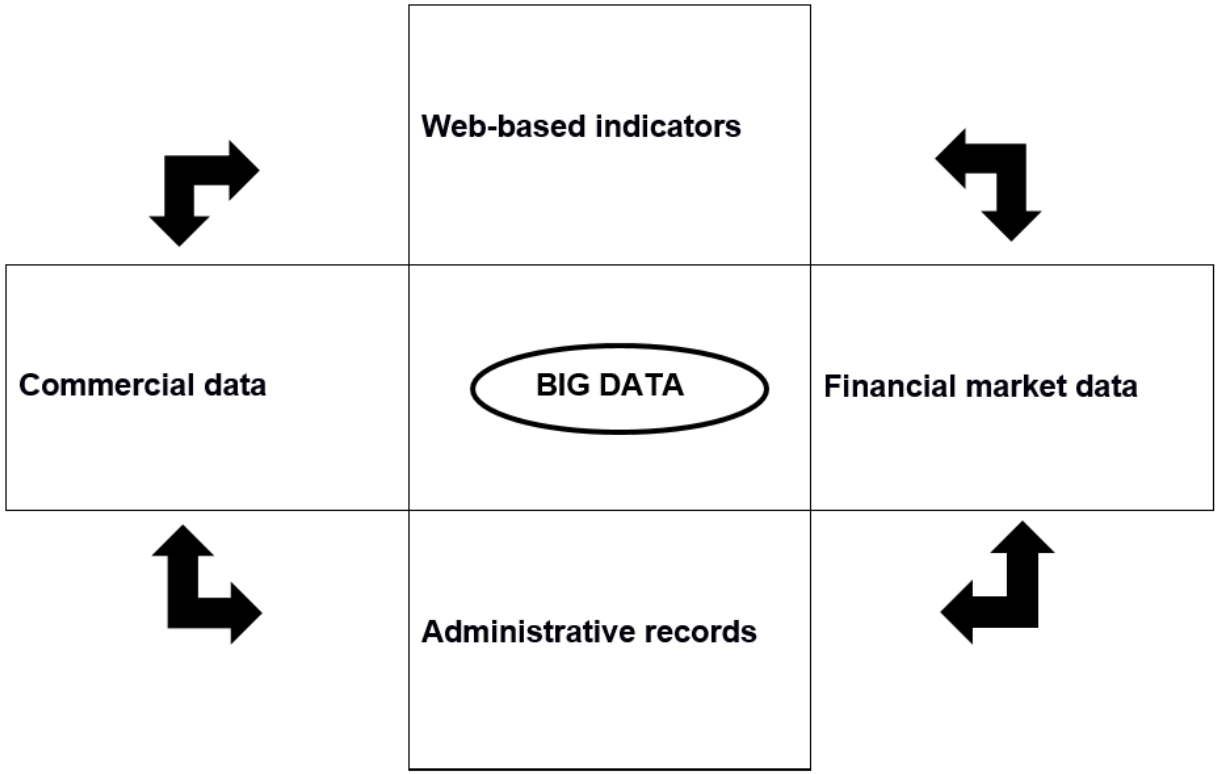
- **Data Gaps Initiative** (DGI): Phase I (2009) & II (2016)
  - New frameworks to combine micro- and macro-level data: *"help straddle the divide between micro and macro analysis"*

- **Financial Big Data** – not just the internet!
  - Designed versus organic data
  - By-products of financial, commercial & administrative activities
  - Large, granular, well-structured data-sets (eg registers)
  - Increased role of private commercial data providers

Dual micro/macro dimension: Crisis impact + Internet= …

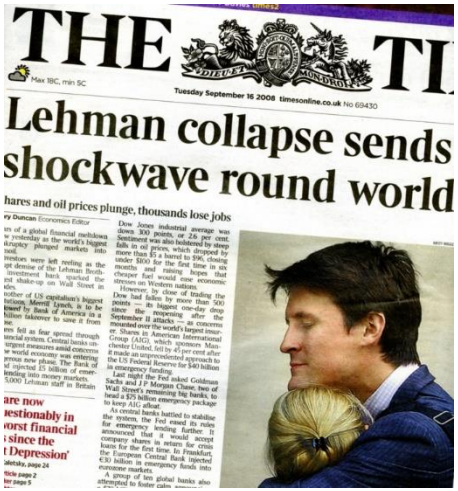


… = 4 main types of "Financial Big Datasets"



(2) Multiple opportunities: (i) Macro-relevant micro information

- Micro situation with **systemic importance**
  - Can be masked by "traditional" macro data
  - Need to understand what lies behind aggregates
  - Non-linearity: aggregates not the sum of individuals


THE TI

Tuesday September 16 2008 timesonline.co.uk No 69430

Lehman collapse sends shockwave round world

hares and oil prices plunge, thousands lose jobs

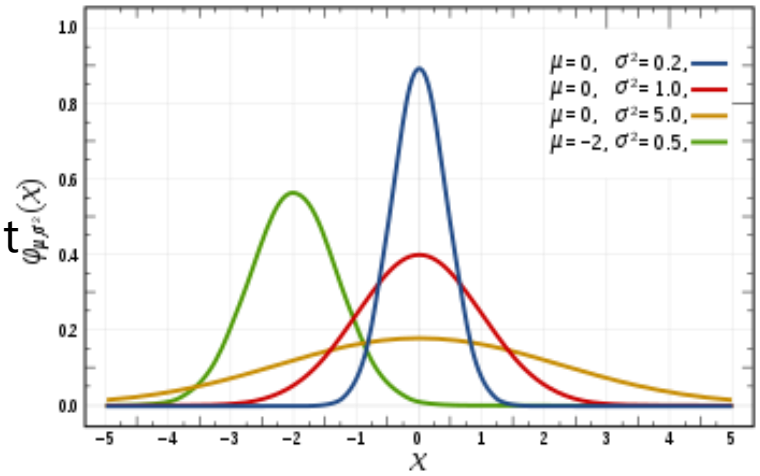
- **Monitoring of global institutions**
  - Focus is <u>not</u> the average situation of G-SIFIs together …
  - Extract micro information important for macro financial stability work
  - Similar approach for other market segments: repos, derivatives etc.

(2) Multiple opportunities: (ii) Distribution information

- Focus on the **distribution of indicators** in the population
  - Explore heterogeneity behind aggregates: tail analysis
  - Distribution key for policy actions

- **Increased importance** in the post crisis era

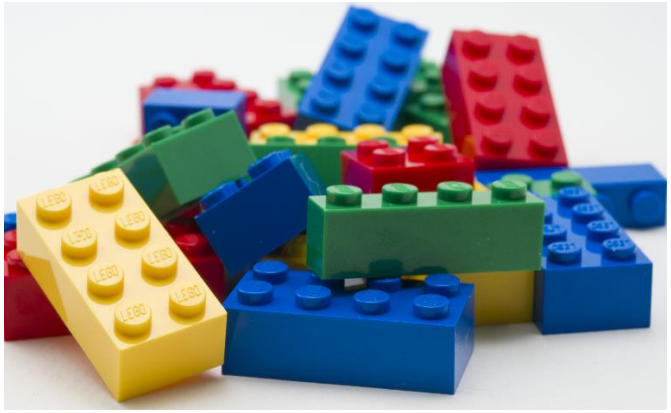
- **Example: macro prudential tools** targeted at
  - markets/sectors (eg property markets)
  - specific groups (eg first-home buyers)
  - instruments (eg mortgages)



(2) Multiple opportunities: (iii) Better aggregates with micro inputs

- Micro data to **support macro compilation**
  - Key role of granular, "administrative" datasets
  - Central banks' interest in loan-by-loan, security-by-security datasets

- Several **advantages**
  - Large size & coverage
  - Flexible & combination possibilities
  - Low collecting cost if by-product of an "administrative" operation



(2) Multiple opportunities: (iv) Policy design & assessment

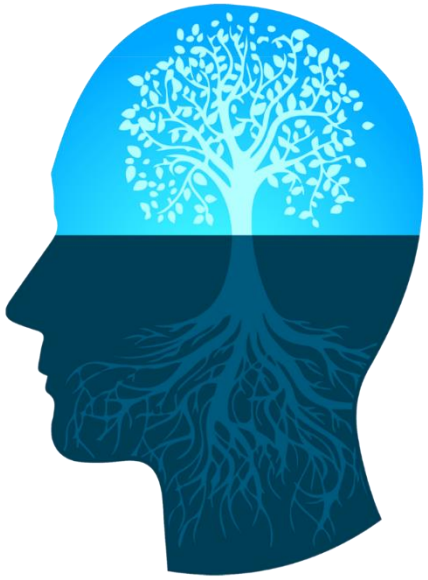
- Use of micro data **for evidence-based policy**
  - Micro-prudential authorities
  - Also macro policies: macro-prudential, fiscal, structural, monetary

- **Advantages** of micro data
  - Granularity: capturing multiple dimensions
  - Richness: multiple users
  - Flexibility: less ad hoc collections and reporting burden (?)
  - Understanding feedback effects, behavioural responses, unintended consequences, cross-impacts…

(2) Multiple opportunities: (v) New insights

- **Richer view** of the population of interest
  - Extensive data collected, over a long period of time
  - Information often available but not exploited (administrative data)
  - Private sector experience in dealing with large data-sets

- Granular information **offers new possibilities**
  - New types of (big) data
  - A trigger for re-thinking, new mind-set
  - Example: global financial system cannot be solely analysed through aggregated, country-based statistics

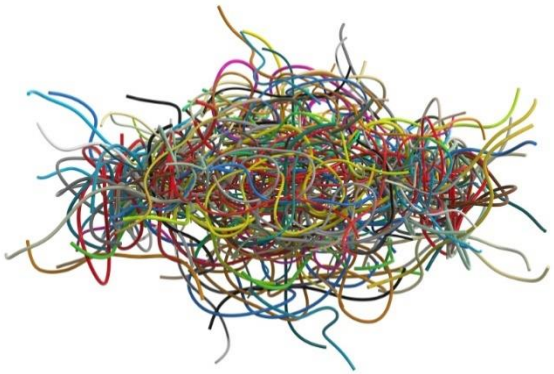


(3) Challenges: (i) Variety…

- In practice **various & heterogeneous "financial big data"**
  - Usually not designed for a direct statistical purpose
  - Indirectly, data exploited for addressing statistical needs

- Several **issues for statisticians**
  - Compilation (or acquisition) costs
  - Quality: attributes values / representativeness
  - Identifiers: connecting datasets / coverage of large entities

(3) Challenges: … (ii) Complexity…



- Micro-level data universe is **complex and evolving**
  - Use of specific sources depends on policy questions
  - Example of payment systems :

  of interest for supervision / tourism analysis
  - Interaction between data available, specific policy needs and actions (feedback loop)

- **Transforming data into relevant information** for policy
  - Public authorities at the beginning of making sense of these data:

  connecting the dots, not just collecting them (Caruana, 2017)
  - "Smart data": treatment of the raw, "organic" data is key

(3) Challenges: … (iii) time dependency…

- **Information needs evolve over times:**
  - The financial system changes… not least due to policy actions
  - Assessment of how **fragilities are building up** typically rely on aggregated statistics to spot "abnormal patterns"
  - In contrast, **resolution work** in the aftermath of a financial crisis will request much more timely and granular information

→ *rough aggregates often OK to indicate rising imbalances*

→ *more granular data needed after a crisis* (Carstens, 2018)

(4) Central banks' issues when (i) handling financial big data…

- **Resources**
  - IT, staff, security
  - Proper arrangements for managing data
- New statistical **production chain**
  - Comprehensive information management process
  - Governance
- **Reputation risk** when handling the data
  - Confidentiality and trust
  - Ethical issues

(4) Central banks' issues when (ii) using financial big data

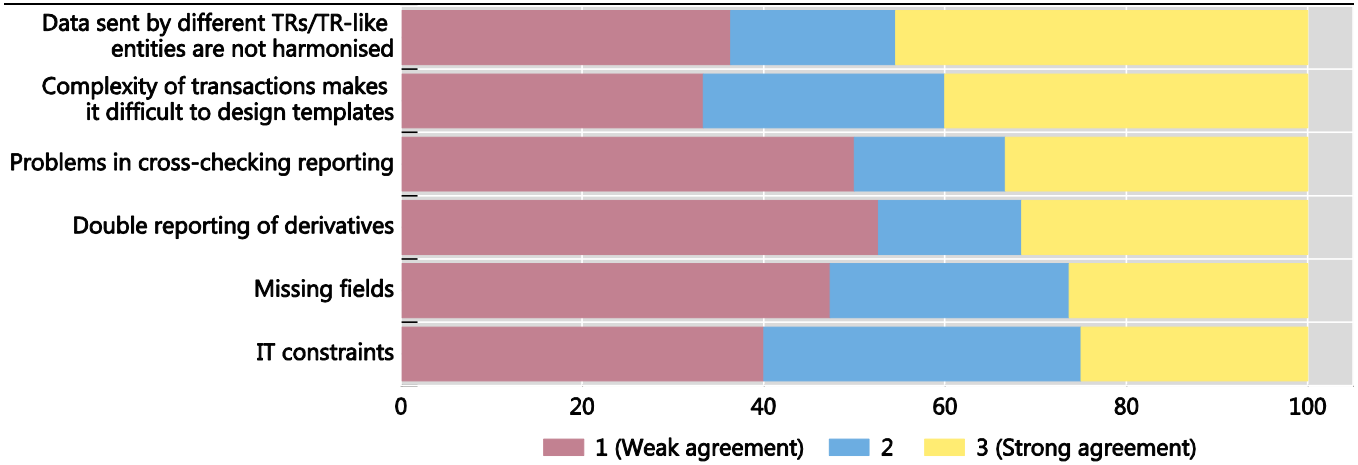
- **Accuracy?**
  - Unknown coverage bias (eg social medias, commercial activities)
  - Large samples less accurate than (small) traditional probabilistic samples?

- **Reputation risk?**
  - Lack of transparency, poor quality of sources
  - Social costs of misguided policy decisions

- **Altering decision-making?**
  - Bias towards responding to news, encouraging shorter horizons?
  - Risk of fine-tuning policy communication?
  - How to communicate "black box" calculations?

(5) Examples: (i) Derivatives reported to Trade Repositories

Does your central bank face problems in the aggregation process of data collected by TRs/TR-like entities?



Source: IFC Survey on Trade Repositories, 2018

→ ***Importance of quality issues and need for harmonised identifiers***

(5) Examples: (ii) BIS International Debt Securities (IDS)

- BIS **"own" security-by-security dataset** (from commercial sources)
  - International market: where non-residents issue
  - For each security, issuer residence compared to 3 locations: registration domain/ listing place /governing law
- **Security classified as "international"** if 1 characteristic differs
  - Half of the cases: 3 characteristics provide same information
  - One third: at least one characteristic differs
  - Significant part is inconclusive
- **Quality issues**
  - Across sources / over time

(5) Examples: (ii) BIS IDS: insights from security-by-security data

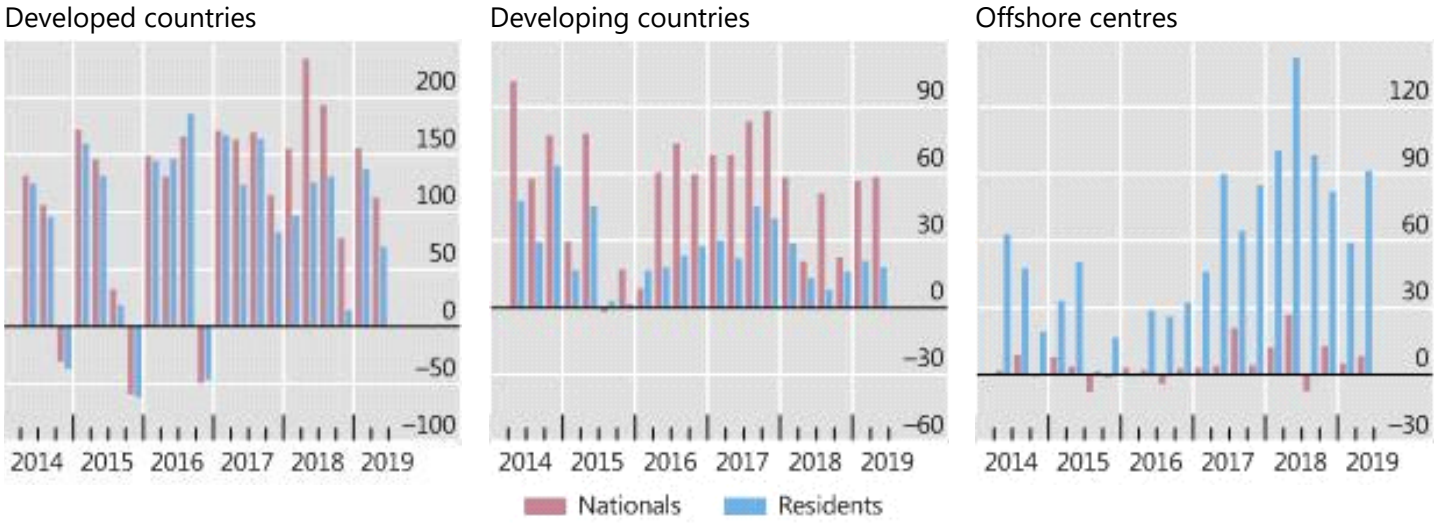
- Multiple **indicators**
  - Gross/net issues, repayments, amounts
- Multiple **breakdowns**
  - Instrument, currency, maturity bands, interest rate, rating, guarantees
- Very flexible, allows to address various **policy questions**
  - Issuance both by **residence and nationality** (defined as the residency of the controlling parent)
  - Nationality-based consolidated data to understand who takes underlying decisions

(5) Examples: (ii) BIS IDS: Who is issuing for whom?

→ Large debt issuance activity in offshore centres by foreign affiliates

International debt securities issued by financial and non-financial corporations[1]

Net issuance by region, in billions of US dollars[2]



Further information is available at www.bis.org/statistics/secstats.htm.

[1] Excluding general government. [2] For a list of countries in each region, see Table C1 (http://stats.bis.org/statx/srs/table/c1).

Sources: Dealogic; Euroclear; Refinitiv; Xtrakter Ltd; BIS debt securities statistics.

Thank you!!

Questions?

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BIS Statistics:

Debt securities: **www.bis.org/statistics/secstats.htm?m=6%7C33%7C615**

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