IFC-Bank of Italy Workshop on "Data science in central banking: enhancing the access to and sharing of data"

17-19 October 2023

Future of time series: preliminary results from a BIS-IFC survey of central banks and statistical agencies[1]

Ryland Thomas,
Bank of England

[1] This contribution was prepared for the workshop. The views expressed are those of the authors and do not necessarily reflect the views of the Bank of Italy, the BIS, the IFC or the other central banks and institutions represented at the event.

Bank of England

Future of Time Series:
Preliminary Results from a BIS-IFC survey of Central Banks and Statistical Agencies

Ryland Thomas

Bank of England

Data Science in Central Banking: Enhancing the access to and sharing of data

17-19 October 2023, Rome, Italy

Survey questions

1. Are you able to share with us a broad overview or schematic of the end-to-end process for your time series products, from getting data 'in the building' to producing briefing/publications? Do you treat time series data as distinct from other forms of data (as we do at the BoE)?

2. What commercial and/or proprietary systems do you use to support this process? In particular, we would be very interested in your experience of using FAME which we use at the BoE.

3. What are the main strengths and shortcomings of your current approach? These can include issues such as timeliness, reliability, adaptability and ease of upgrading; or costs such as licencing, development and maintenance.

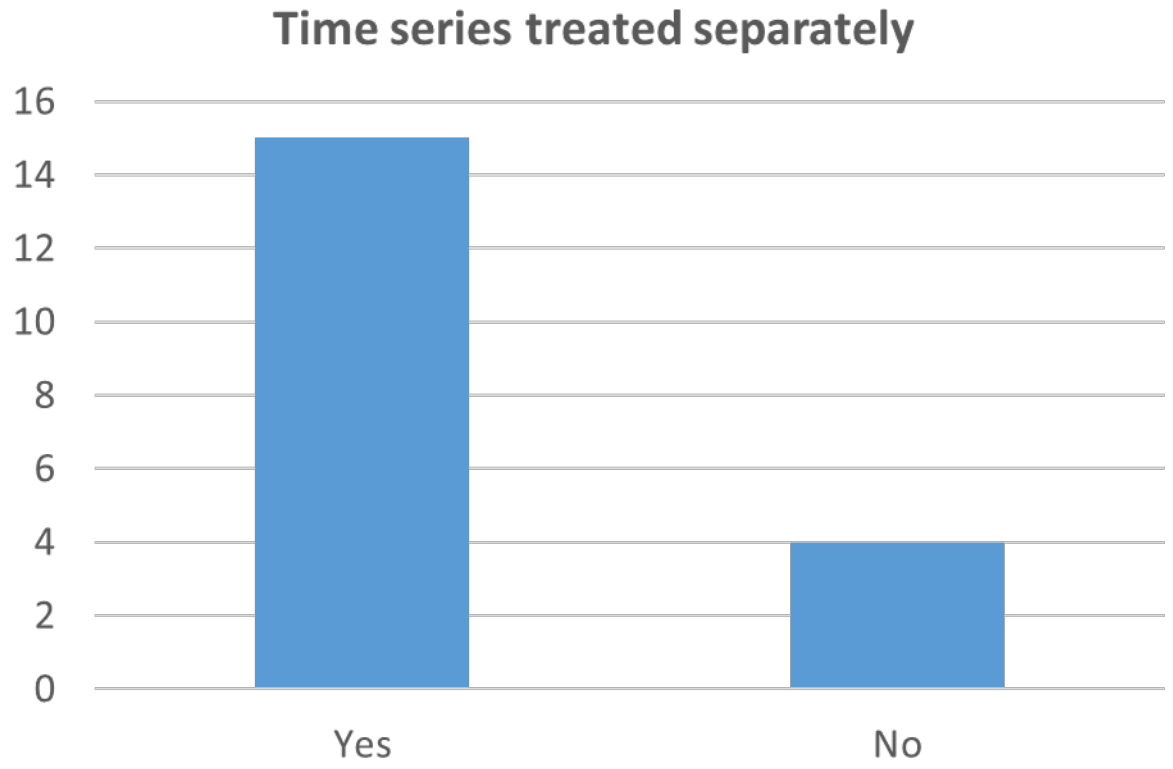
4. If you could develop your system over again, what would your ideal target state be, and how would it improve on your current set-up? Have you undertaken any market research to assess what is possible in this realm, and if so, what were the key findings?

Respondents

- Feedback from 18 central banks/statistical agency via BIS Irving Fisher Committee network, 19 including the Bank of England
- Detailed responses available in spreadsheet on eBIS

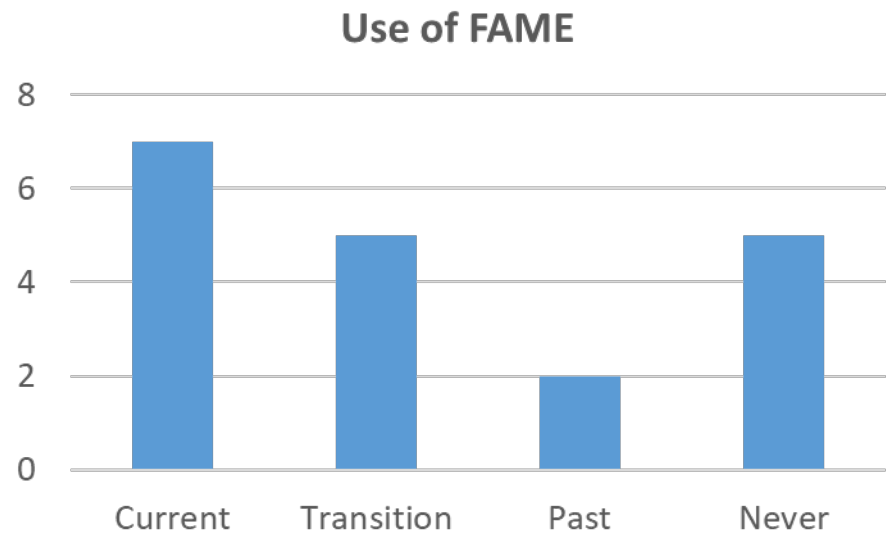
EUROPEAN CENTRAL BANK

Time series treatment (incl. BoE)



- Most respondents treat time series as distinct from other types of data in at least some key aspects of data management and access

FAME Usage across sample (incl. BoE)



- Many of the respondents still using FAME though some clearly in transition away
- No one using something else was looking to move to FAME
- Of 19 institutions surveyed, 12 currently use FAME of which 5 are in the process of transitioning away
- 2 central banks previously used FAME but have transitioned fully away
- The 5 that have never used FAME use bespoke systems: there is no single, commonly used alternative for time series data

Reasons given to stick with FAME

- It has excellent functionality for time series data
- No other proprietary database handles traditional macroeconomic time series as effectively – e.g. Fame dynamic formulae which can be stored in the same database
- With proper support it is stable and efficient
- It is deeply embedded in analytical systems and moving away would be very costly
- It works well with Excel, through the FAME populator add-in

Reasons given to move away from FAME

- Although some users are expert in FAME, their number is dwindling, and many users do not use FAME directly but through other interfaces
- Excel use is falling, with analysts increasingly using open source analytical tools such as R and Python, and specialist data visualisation tools such as Tableau
  - FAME does not integrate as well with these packages
- It is increasingly difficult to find technology people who are able to support FAME
- FAME licence is expensive (but perhaps not compared to some proprietary databases or costs of developing and maintaining a complex data architecture)
- FAME is not designed to handle large/unstructured data sets, which are increasingly available
- Searchability/metadata are better handled outside of FAME

What systems are replacing FAME?

- No single solution has yet emerged
- Some have moved to SQL data warehouses, one to a NoSQL database, one to HBASE, one is developing a data lakehouse
- Although these solutions are better for handling larger and irregular data sets, a major challenge is to replicate the convenience, speed and efficiency of FAME for traditional time series data
- Those systems also still require work to integrate with R and Python
- Some seeking to de-couple FAME (eg 4GL language) and play to its strengths as a time series database - other tools can now do analysis and visualisation better
- FAME database coupled with open source tools seen by some as efficient low cost solution
  - Large costs and risk in starting from scratch

Other issues

- Aim if possible for “single source of truth”
  - Data is collected once and used multiple times
  - Data is stored in one system
  - “It is better to produce micro-level data and then aggregate at one central institution”
- Use of Cloud Services
- Now have a broader spectrum of end users: conjunctural analyst, forecaster, researcher, data scientist all with different requirements. These “use cases” need to be identified and mapped out.
- Key challenges seem to be:
  - How best to scale up and integrate new elements into a system especially starting from a complex position ?
  - For current users what role does FAME play in that? Is it a help or barrier to fundamental change?
  - How to manage the demands of end users with increasingly different and complex requirements ? How to manage transition of existing users to new state.

Lessons so far

- **FAME isn't the issue *per se***
  - Still performs well as a fast, efficient time series database and some are sticking with it for the time being
  - There is nothing out there that does all the things that FAME currently does well
- It is other elements that cause trade-offs for CBs and SAs
  - **Acquisition/data input** is getting more complex with different types of data
  - **Searchability/metadata** is better served outside FAME
  - **Analytical time series functions and econometrics** better in open source tools than FAME 4GL
  - A range of **visualisation** tools are now available eg Tableau
- **Key challenges seem to be:**
  - How best to plug in and fit different elements together especially starting from a complex position ?
  - How to manage transition of users familiar with old systems to new ways of working
  - How to manage scalable solutions to meet demands of end users with increasingly different needs?
- **Sharing knowledge and collaboration going forward**
  - Sessions at future IFC conferences or bespoke co-development workshops, BIS innovation hub can help

FoTS - Feedback from other Central Banks