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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**

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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

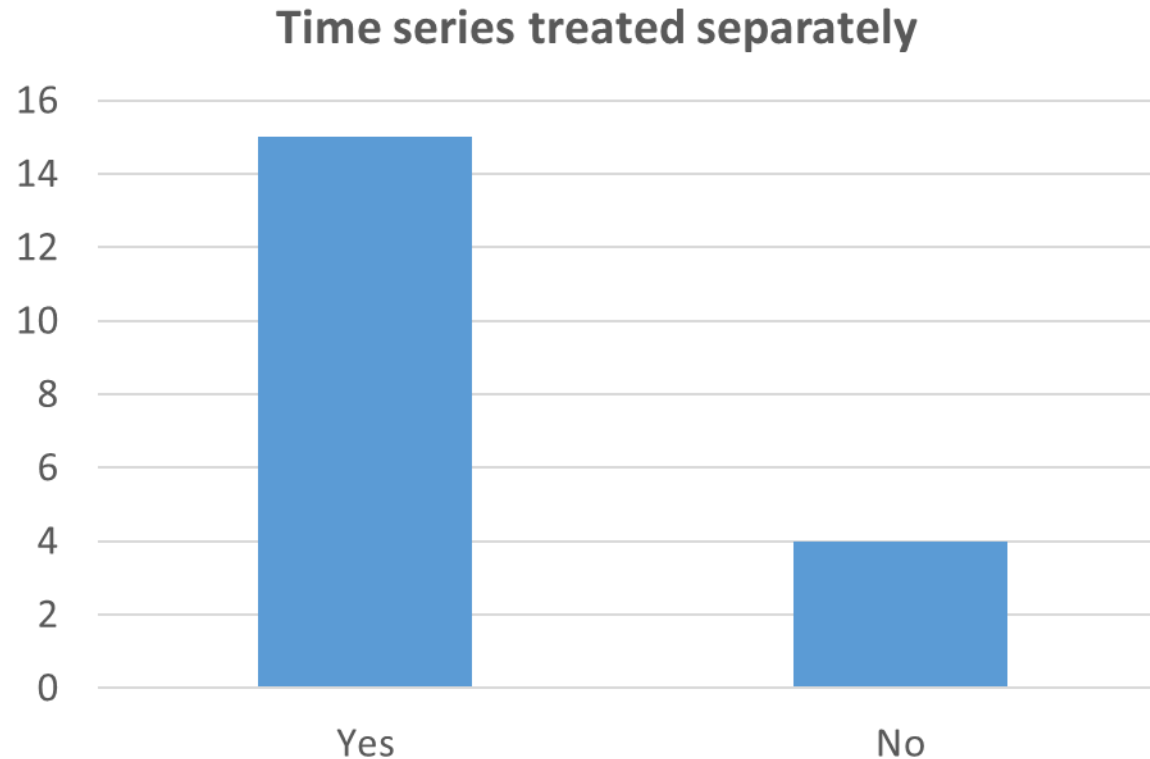
- Feedback from 18 central banks/statistical agency via BIS Irving Fisher Committee network, 19 including the Bank of England
- Detailed responses available in spreadsheet on eBIS



EUROPEAN CENTRAL BANK

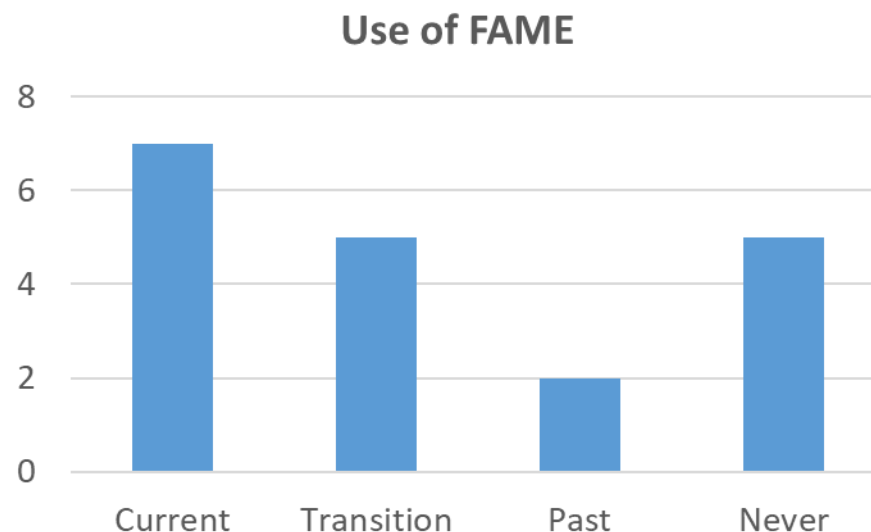


Time series treatment (incl. BoE)



- 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

