Minutes of the Gekko steering committee meeting, June 10, 2022 at Statistics Denmark[1]

Participants:

- Asger Olsen (Statistics Denmark/ADAM)
- Michael Osterwald-Lenum (Statistics Denmark/ADAM)
- Christian Retoft (Statistics Denmark/ADAM)
- Søren Gjedsted (Statistics Denmark /Quarterly National Accounts, QNA)
- Dorte Grinderslev (Danish Economic Councils, DØRS)
- Rasmus Bisgaard (Central Bank of Denmark)
- Philip Groes (Ministry of Finance)
- Mads Harslund (Ministry of Finance)
- Nikolaj Tranholm-Mikkelsen (Ministry of Finance)
- Sofie Holme Andersen (The Economic Council of the Labour Movement, ECLM)
- Thomas Thomsen (Gekko editor)

Note: In the following, version "2.4" covers Gekko versions 2.2, 2.4, and 2.5.x, whereas version "3.0" covers Gekko versions 3.0 and 3.1.x. Most current development is on 3.1.x.

Item 1. Welcome + choice of minute taker + approval of last year's minutes

Thomas was chosen as minutes taker, and Michael as moderator. There were no comments regarding last year's minutes.

Dorte said that it would be helpful for them if the ADAM group migrated to Gekko 3.0, too, because it would enlarge the pool of people to talk to regarding this version. Migrating programs from one software product/version to another is often postponed because other issues are more pressing.

Sofie mentioned a Gekko 2.4 version for ADAM that contained a Gekko 3.0 help file. That did not reduce the confusion!

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[1] Links: Gekko main webpage: www.t-t.dk/gekko, organization: www.t-t.dk/gekko/organization. Gekko on GitHub: https://github.com/thomsen67/GekkoTimeseries.

Item 2. Editor's report regarding 2020-21.

Thomas provided an overview.

Item 3. Status regarding Gekko 2.4 and 3.0

Thomas said that for all practical purposes he had not developed anything in Gekko 2.4 in the current period, among other things because such work would end up being "sunk" in the long run. Thomas would fix severe bugs in 2.4 if discovered, but otherwise development is in the 3.0 line. Thomas had written a blueprint regarding enhanced modelling facilities, and in *principle* these facilities could be implemented in both 2.4 and 3.0, but it would imply a lot of double work, and one of the roles of the Gekko editor is to make sure that the project progresses in one direction. (Asger noted that these statements were also made last year).

Asger said that work was ongoing regarding migration of the ADAM databank systems, whereas the modelling systems would probably migrate subsequently

Item 4. Feedback regarding Gekko 2.4 and 3.0

Grane (MAKRO) uses Gekko a lot, and misses being able to use DECOMP for array-series and GAMS models. Grane thinks it is a lot better to use Gekko than GAMS for working with MAKRO, and he looks forward to not having to decompose by hand.

Sofie said that ECLM primarily uses Gekko to run ADAM, and they therefore use Gekko 2.4. It is their intention to try out MAKRO, too, in GAMS and perhaps Gekko. Sofie proposed that a Gekko version could perhaps warn if syntax is written for the wrong version, particularly trying to input 2.4 syntax for version 3.0. Thomas said that it is planned to do this, and also (in the error message) show a machine-translated version of the "wrong" code.

Dorte (DØRS) normally only uses Gekko 3.0, but has recently used Gekko 2.4 for some ADAM-related work, which felt like a mental load. Thomas said that simulating ADAM ought to work out of the box in Gekko 3.0, since Gekko 3.0 reads Gekko 2.4 databanks, and since the model .frm files and simulation engine is basically identical between 2.4 and 3.0 (any commands and command files must use 3.0 syntax, though).

For Dorte/DØRS, much of the focus had been on using Gekko libraries for common files like functions/procedures, gcm files, even plot schemas (.gpt) and .xlsx files. It is convenient to be able to assemble all these files in one central place (one library zip file).

Dorte misses more functionality regarding INTERPOLATE (from lower to higher frequencies).

She also asked if the html equation browser system that is being used for SMEC and MONA could perhaps also be implemented for MAKRO, so that users could investigate MAKRO using a standard web browser. Thomas said that this is planned, but awaits finishing the DECOMP module for GAMS models (from which the html browser will extracts it information).

The Ministry of Finance still use Gekko 2.2. They are going to use Gekko 3.0 for MAKRO, and are looking forward to be able to use DECOMP for GAMS models, too. They use Python when they have to load more than three MAKRO databanks at the same time, because Gekko stumbles on that task (probably due to RAM constraints). Thomas would look into that issue, because for instance banks of size around 100 MB ought not to really challenge a Gekko 64-bit system with for instance 8 GB. Regarding read time, using .gbk files instead of .gdx files should reduce reading times significantly. Michael said that having Gekko do this conversion automatically via a cache would be convenient.

The Ministry of Finance said that it was a bit "funny" to have to use Gekko 2.4 (actually 2.2) and 3.0 interchangeably, but migrating their own systems from 2.2/2.4 also costs some resources, and a decision needs to be made.

Rasmus Bisgaard (Central Bank of Denmark) said that the MONA model runs in Gekko 3.0, whereas some data handling modules still run in Gekko 2.4. Quite a lot of modules have migrated from AREMOS to Gekko 3.0. They have wrestled a bit with Gekcel (Gekko add-in for Excel), and have "invented" a VBA system around Gekcel that makes it easier to store and reuse "queries" stored inside an Excel spreadsheet. Inside the Central Bank, people are really happy to be able to use Excel, since there are few Gekko power users.

They could also use better INTERPOLATE facilities (at the moment they run interpolate through R); an in-built facility would be convenient.

Error messages could need improvement, especially for non-super users.

Asger (ADAM) said that they had a mountain of Gekko 2.4 files to translate for 3.0 (not least their databank system). He said that the so-called UADAM system (population and labour market, age distributed) runs slowly in Gekko 2.4, which ought to be investigated (Thomas mentioned that the Gekko 3.0 array-series components are like tailor-made for the data generation parts of UADAM).

Michael said that using Gekko 3.0 instead of 2.4 requires some mental effort. He was looking forward to – eventually – having only to deal with one syntax. Dorte said that the standard machine translator handles a lot of the translation, but it paid off to also clean up the programs a bit after translation.

The Gekko 3.0 documentation has become rather voluminous, making it harder to find answers to "simple questions". Thomas suggested a "cheat sheet" for the migrating 2.4 to 3.0 users, highlighting the most important and commonly used syntax differences.

Søren (QNA) mentioned some problems with getting Gekcel up and running. They are live-testing at the moment, and their system will soon migrate from AREMOS to Gekko 3.0. Data differences between the AREMOS and Gekko systems have been identified, and are explainable in general.

Item 5. Prioritization of main lines regarding 2022-23

It was decided that (prioritized are with '**+**'):

- **+** Regarding 1: error messages – Thomas would give this a try, by rewiring the internal parser, and also provide basic checks for stuff like non-balancing parentheses etc. Goal is to avoid pages of incomprehensible error message gibberish for simple syntax errors.
- **+** Regarding 2+3: decomposition – DECOMP for GAMS models was deemed important. Also providing this module for ADAM/SMEC/MONA kinds of models.
- Regarding 4: modelling developments – this is postponed at the moment. May resurrect when ADAM runs under Gekko 3.0.
- **+** Regarding 5: data tracing – data tracing was deemed important.
- Regarding 6+7: interpolate and seasonal adjustments – this is not super prioritized for ADAM or MAKRO, but may be funded by other users. Ought to be implemented sooner or later, though.
- Regarding 8: the plot window – this can wait right now, but for instance supporting the age dimension on the x-axis would be interesting sooner or later.
- Regarding 9: daily and weekly frequencies – this works ok as it is right now.
- **+** Regarding 10: Gekcel developments – this would be helpful for many users.
- Regarding 11: help systems – this is not the most pressing right now. Dorte would try out the user guide on new DØRS employees.

In addition to the above:

- An important item not on the above list is that Thomas will look into speeding up gdx reading in Gekko 3.0, perhaps by using an internal cache. This ought to improve matters regarding speed and RAM use for gdx files.
- Html equation browser for MAKRO would be nice to have, but awaits the DECOMP module.
- Thomas would produce a "cheat sheet" for users migrating from Gekko 2.4 to 3.0.

Item 6. Organization and choice of editor for the next period

Thomas was elected as editor for the next period.

Item 7. Date of the next meeting + any other business

Next meeting is planned for medio June 2023.

Item 8. Commentaries regarding detailed checklist + prioritization of this

Michael asked if it would be wise to migrate the Gekko source code to .NET Core? Thomas said that yes: sooner or later this ought to be done, at least before the current .NET Framework begins to be phased out. (Here, Thomas will taste his own medicine, because migration can be a pain!).

Item 9. Other potential users

There were some requests from potential users from US/Hawaii, but apart from that, Tina Hvolbøl (Central Bank) uses Gekko for some financial stability modules. There may be other unknown users worldwide.

There was a question about DI (Confederation of Danish Industry) who apparently has a large AREMOS system.

Item 10. Status regarding documentation, help systems, etc.

The help system etc. is reasonable at the moment, and there is a new "guide" part of the documentation. The help system is generally kept up to date, but it is becoming voluminous, though, and one day Thomas ought to read through it all and tidy it up.