Re item 2. Editor's report regarding of 2018-19[1]

First, some history. Gekko 2.0 was released in March 2016, and the first steps regarding 3.0 started in the summer 2017. The reason for developing 3.0 so soon after 2.0 was that a number of inconsistencies in the syntax of Gekko 2.0 had appeared, and that the databanks would anyway be augmented with a number of new variable types (including array series). In addition, because of functions, procedures, etc., the original way of dealing with time series expressions had to be refined, too. Together, these changes were so fundamental that it would be most rational to rewrite large parts of Gekko, including syntax and the parser. The core of the 3.0 version was developed in fall 2017 and spring 2018, and Gekko 3.0 was released as a beta version November 2018. The official Gekko 3.0 was released in April 2019. Overall, 2018-19 was characterized by getting 3.0 completed, stabilized and documented. However, various components were also incorporated into Gekko 2.4, in those places deemed important to the useres.

One can ask oneself if it had instead been wiser to implement the mentioned 3.0 components in Gekko 2.0 instead? However, the editor is certain that the source code in that case would have descended into an intransparent mess, and the syntax would have suffered from sustained ambiguities and inconsistencies.

All in all, the editor is quite content with Gekko 3.0. The syntax has been a question of balancing consistency on the one hand, and avoiding too many quotes, parentheses, etc. while typing on the other hand. Whether the right balance has been achieved, and if the syntax is clearer, must be up to the users to decide upon. There are undoubtably things in 3.0 that the users will wonder about at first, and it is one of the main points of the stabilization of 3.0 to offer better error messages to the users, when something is written wrongly. However, everything is not about syntax in 3.0, a lot of functionality has been added, too.

Users of 3.0 are at the moment MAKRO (DREAM), DØRS, The Central Bank, and the Quarterly National Accounts (Statistics Denmark). Finance Denmark have been performing some reporting in 3.0, while the Danish Trade Union Confederation (FH) are probably still using Gekko 2.4. The Ministry of Finance are still using 2.2, while ADAM is soon transitioning to 2.4. The migration of ADAM to Gekko 3.0 has longer prospects: their systems are quite large and hence the porting is heavier.

The editor has helped DØRS and the Central Bank quite a lot regarding 3.0, and some of that feedback has manifested as adjustments to 3.0. A lager project in the period has been the translation of parts of the Quarterly National Accounts system from AREMOS to Gekko 3.0. This translation is a quite rigorous check of timeseries, databanks, frequencies, etc. The editor tasted his own medicine, and further adjustments to 3.0 were made.

Regarding the MAKRO/DREAM project, a lot of work was done regarding array-series, and making these run in Gekko in a way compatible with GAMS. There are quite a few questions

[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.

regarding the interface between GAMS and a timeseries-oriented software system like Gekko (for instance missing values versus zeroes, etc.). There is a large project ongoing regarding DECOMP, making decomposition suited for GAMS-like models. This entails models where the dependent variable is not necessarily on the left-hand side in equation, and perhaps cannot even be seen in the equation (if it is an equilibrium condition). The improved DECOMP will also support array-series and recursive decomposition (substituting equations into other equations) etc. Custom aggregations and the PLOT window, etc. will also be looked at.

As mentioned above, Gekko 2.4 was improved with some components that were designed to ease the use for DØRS and other users. Later on, 2.4 was augmented so that it could read 3.0 databanks, more precisely series and array-series from these, which will facilitate step-wise porting of systems from 2.4 to 3.0. Apart from that, only minor adaptations and bugfixes have been made in 2.4, but it is the intention to try to implement some model and solver improvements with version 2.4, before it is shipped with the next ADAM version. (Since the source code regarding the solver of Gekko has not changed much between 2.4 and 3.0, such improvements can be easily ported to 3.0, too).

The editor and several users believe that what is needed now is a “reform pause”, with a longer stable period, where existing command files are not made obsolete, and where the users are not held back regarding systems/procedures/function because they are waiting for a certain future Gekko version. A stable period would also make it easier and more feasible to write documentation and example manuals, without the risk of being out of date too soon. Finally, a reform pause would also facilitate source code documentation and API for Gekko 3.0.

This should not be understood as the development of 3.0 being put on the back burner, while only polishing. For example, the solver in 3.0 needs a service check, and interfaces to GAMS, R, Python etc. should be further improved, so that Gekko is perceived as an open software system. A future project is also daily observations, funded by DØRS.

During the period, a number of blog posts have been published on the Gekko homepage, among other things detailing different choices in relation to the evolution of Gekko 3.0. If these posts are combined with what is written on syntax, data structures etc. in the Gekko user manual (the first to main sections of the user manua), one can obtain a pretty good idea of the choices that were made, including reasons and different trade-offs.

In the up-coming period, there is a need to address the different kinds of documentation, among other things introductory guides, example manuals, etc., but also what should be done regarding user forum, source code documentation, Gekko API, etc. Many of these things have awaited a stable Gekko version to relate to.

Regarding courses, an ADAM course has been held in October 2018. The next planned course is September 10 and 11, 2019. The university course Economic Prognoses in Practice is running in the fall of 2019 (University of Copenhagen).