Re item 2. Editor's report regarding of 2021-22[1]

(Note that ”Gekko version 2.4” generally means Gekko 2.5.2, whereas ”Gekko version 3.0” generally means Gekko 3.1.13.).

In general, there has been quite a bit of Gekcel (Gekko add-in for Excel) tuning, to make the system more robust and convenient.

The translator from Gekko 2.4 to 3.0 has been improved a lot. This new translator has subsequently been used to translate the ADAM data revision programs from 2.4 to 3.0, including syntactical verification. Implementation is still pending, though.

Some DOWNLOAD and px file improvements implemented.

Daily (!d) and weekly (!w) frequencies are implemented, including holiday calendar etc. Collapse etc. now works for frequencies A/Q/M/W/D.

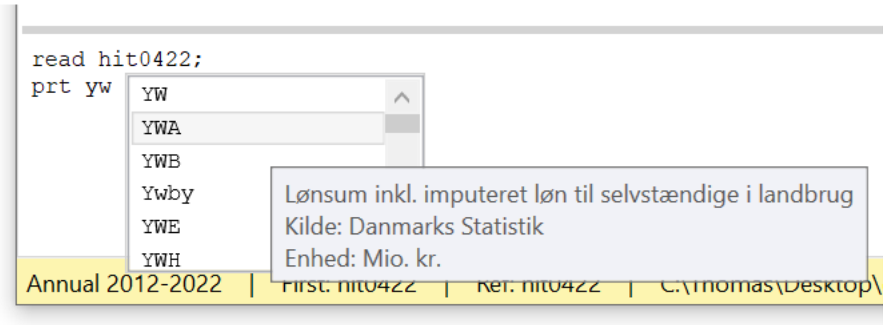
Library component has been augmented some more and finished. Libraries are practical for storing common code (or other file types like plot gpt schemas etc.) in library zip files, see the description here. This is similar to packages in for instance R or Python, but packages are much easier to create in Gekko (it is basically just zipping a number of files). Zip paths, passing through zip files, are also allowed now, for instance `read g:\common\data.zip\hit0422.gbk;`.

Error messages have been improved lately, particularly regarding typical errors in Gekko 3.0 where `{}`-curly braces are expected but not supplied. For instance statements like `%i = x + 1;` or `y = %i + 1;` where `%i` is a string (correct syntax is `{%i} = x + 1;` or `y = {%i} + 1;`). Similar errors of these kinds have been improved, too, for instance messages related to typical list errors. More work is still needed.

In general, the improved source code documentation and refactoring and commenting of source code has been a great help, and it is being kept up to date now!

[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.

Suggestions (Ctrl+Enter)



```
read hit0422;
prt yw
```

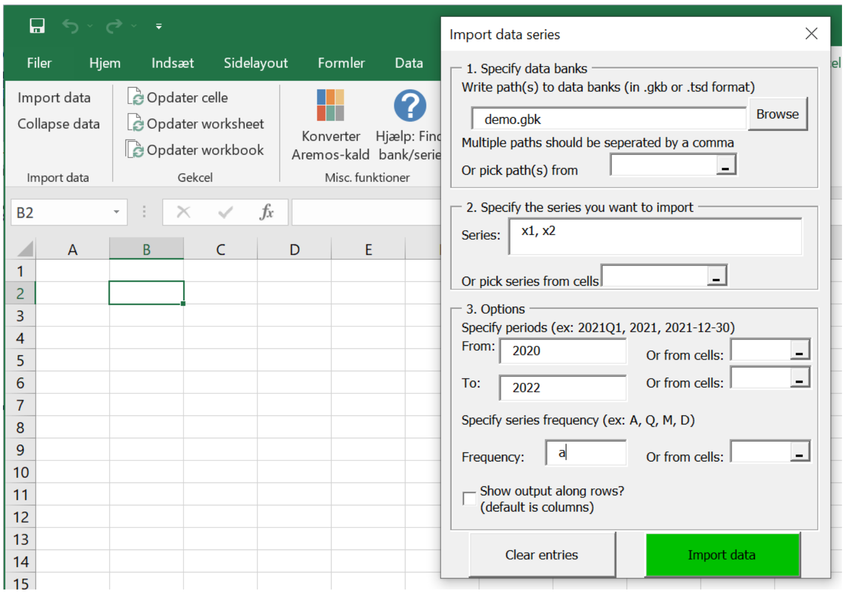
Lønsum inkl. imputeret løn til selvstændige i landbrug
Kilde: Danmarks Statistik
Enhed: Mio. kr.

Annual 2012-2022 | First: hit0422 | Ref: hit0422 | C:\Thomas\Desktop\

As a new feature, when Ctrl+Enter is typed, Gekko looks for variable names (possibly using a databank indication), and shows the results in a listbox to choose from (in the above example, Gekko looks for matches to `yw*`, when Ctrl+Enter is pressed). Wildcards ‘`*`’ and ‘`?`’ and ranges ‘`..`’ can be explicitly used too, and Ctrl+Enter returns the same results as the INDEX command, just in a graphical listbox. Suggestions work everywhere in the Gekko input window, so the functionality can also be used while typing expressions etc. Suggestions also work for array series indexes, so that you can for instance type “`vHh[`” followed by Ctrl+Enter, and it will show you the possible elements for the first dimension of the array-series `vHh`. If present, labels are shown as tooltips for each listbox element, as shown above (ADAM example).

Gekcel queries

The users at the Central Bank of Denmark have developed a VBA module that interacts with the Gekko Gekcel add-in and exposes a special ribbon for importing and collapsing data (or cells can be refreshed).



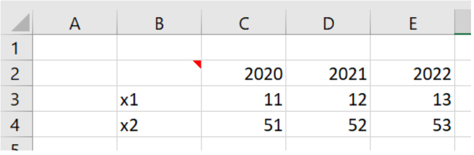
Import data series

1. Specify data banks
Write path(s) to data banks (in .gkb or .tsd format)
demo.gbk
Browse
Multiple paths should be seperated by a comma
Or pick path(s) from

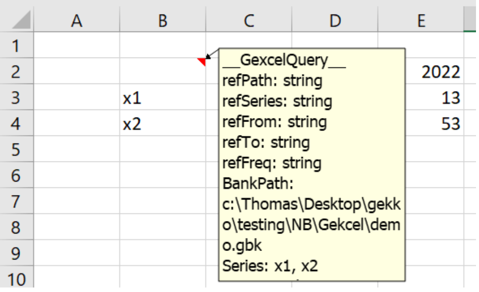
2. Specify the series you want to import
Series: x1, x2
Or pick series from cells

3. Options
Specify periods (ex: 2021Q1, 2021, 2021-12-30)
From: 2020 Or from cells:
To: 2022 Or from cells:
Specify series frequency (ex: A, Q, M, D)
Frequency: a Or from cells:
□ Show output along rows?
(default is columns)

Clear entries
Import data



	A	B	C	D	E
1					
2			2020	2021	2022
3		x1	11	12	13
4		x2	51	52	53



	A	B	C	D	E
1					
2					2022
3		x1			13
4		x2			53
5					
6					
7					
8					
9					
10					

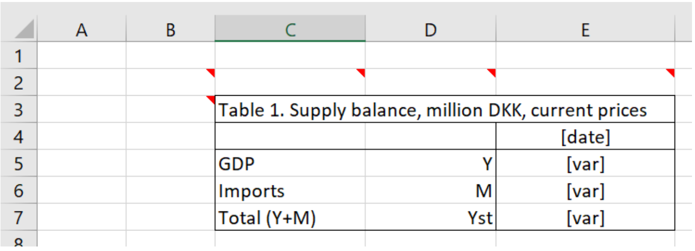
__GexcelQuery__
refPath: string
refSeries: string
refFrom: string
refTo: string
refFreq: string
BankPath:
c:\Thomas\Desktop\gekko\testing\NB\Gekcel\demo.gbk
Series: x1, x2

When clicking for instance “Import data” in the ribbon, the above dialog box is shown, and data can be imported (or imported+collapsed) from an external databank (for instance in .gbk format). In the top-left cell of the data area, a comment containing the “query” is inserted (red triangle). This comment stores the relevant meta-information of the query, so if the user later on selects the B2 cell and clicks “Import data”, the dialog box fields will be pre-filled.

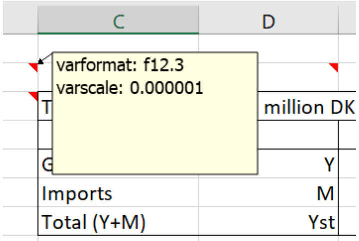
There are at least two nice things about this approach. Firstly, storing the meta-information regarding the “query” as a commentary makes it easy to spot the parts of a spreadsheet that stem from Gekko queries. Secondly, the query is able to paste a collection of cells with an arbitrary number of rows and columns. This is a circumvention of what is normally allowed in Excel versions lower than 365, where a function call cannot normally “spill” into adjacent cells (this restriction is the reason why the official Gekcel version uses array formulas and Ctrl-Shift-Enter for similar queries). The above module is much more convenient and easier to use than the existing array formula approach, so it is the intention to clean up the module a bit and then implement it as a part of the official Gekko/Gekcel distribution.

Xslx files as table templates

Currently, Gekko tables (TABLE command) are defined via xml file templates (.gtb files) containing information regarding the design of and the data of each table. The xml format is not very human friendly, and therefore there is a project of using Excel files instead for Gekko table templates. This is an ongoing project, but the idea is to use an Excel spreadsheet template like the following:



	A	B	C	D	E
1					
2					
3			Table 1. Supply balance, million DKK, current prices		
4					[date]
5			GDP	Y	[var]
6			Imports	M	[var]
7			Total (Y+M)	Yst	[var]



varformat: f12.3
varscale: 0.000001

	C	D
	T	million DK
	G	Y
	Imports	M
	Total (Y+M)	Yst

The above template contains the same information as a .gtb xml template, just much easier to visualize. In the same spirit as the Gekcel query module mentioned above, meta-information would be stored in commentaries. For instance, the commentary of cell B2 stores information that applies to the whole table. The commentary of cell B3 stores information that applices to the first row of the table, etc. Borders can be designed/drawn directly in Excel, and the special codes `[date]` and `[var]` are used to indicate expanding columns (just like in the .gtb xml templates). The Excel component that Gekko already uses for import/export of xlsx data files can easily read such xlsx schemas and find their borders etc., and hence such files could be used directly as Gekko table templates, too. Using xlsx files as table templates would not require the user to have Excel installed on their system, because the Excel component that Gekko uses is not dependent upon this. The xlsx file templates are not complicated and could therefore also be edited by OpenOffice/LibreOffice/Google Sheets etc. if the user does not have an Excel installation. Gekko 3.0 would be able to tranform .xlsx templates into corresponding .gtb templates for Gekko 2.4 if need be.

Gekko table schemas output text or html files. If needed, xlsx files could easily be outputted, too.

JDemetra+

JDemetra+ is officially recommended for seasonal adjustment for members of the European Statistical System (ESS) and for the European System of Central Banks. Statistics Denmark uses JDemetra+ for seasonal adjustments, and in general it would be practical to offer users of Gekko easy access to JDemetra+. JDemetra+ presupposes Java (not to be confused with JavaScript) in order to run, which should be downloaded and installed separately (about 76 MB), and JDemetra+ could be bundled with Gekko (which would augment the size of Gekko with about 25 MB). Java has gotten a bad reputation due to security issues regarding Java browser applets, but these are not used anymore, and in fact Java is a completely stable and reliable system that serves as a backbone language for an enourmous number of web servers and Android mobile phones.

Statistics Denmark does not use the graphical interface of JDemetra+ directly, but instead a so-called ”cruncher” (a console tool). Gekko is able to call this cruncher directly, and the plan is to provide an easy interface to JDemetra+, among other things offering seasonal correction with the same settings as Statistics Denmark uses.

The big question is whether the separate Java download and installation would be a roadblock for the general use of JDemetra+ from inside Gekko? If so, a web server could perhaps be set up, offering to do the seasonal adjustment and using csv files as interface. It seems that JDemetra+ can also do temporal disaggregation (Gekko INTERPOLATE command).

New decomp

See separate paper on this (Decomp.pdf)

Data tracing

See separate paper on this (Trace.pdf)