Using the BBQForExcel Program

The BBQ program finds turning points (peaks/ troughs) in a series y(t). Generally this is the log of some series such as GDP, industrial production, share price index etc. The original series will be designated as Y(t) and the log of it as y(t)=log(Y(t)). It does so by using a definition that a peak happens at time t if y(t-k),..,y(t-k+1) < y(t) > y(t+1),…,y(t+k) (and a trough involves y(t-k),..,y(t-k+1) > y(t) <y(t+1),…,y(t+k)). k needs to be set by the user e.g. k=2 for quarterly data, k=5 for monthly data and k=1 for yearly data. k is called the *SymmetricWindow* parameter.

Once the turning points are found the sample period can be partitioned into periods (phases) of expansions (between troughs and peaks) and contractions (between peaks and troughs). Some characteristics of these would be the durations, amplitudes and cumulative movements. If one wants the latter two to be measured as percentages then the data y(t) would generally need to be 100*log(Y(t)). An exception is when y(t) has been constructed by summing growth rates that are already expressed in percentage form. This can occur if one is simulating data from a model for growth rates where the mean and variance parameters imply that data is measured in percentages.

In BBQ output phases are summarized by the characteristics above and represented by a binary random variable S(t) (the states) taking the value 1 in expansions and zero in contractions.

Other restrictions are often imposed on the phases. Thus a 2 quarter minimum for expansions and contractions is often applied, in line with the rules used by NBER when dating these phases. This is the *MinimumPhase* parameter. A complete cycle length (contraction plus expansion duration) of five quarters is also common. This is the *MinimumCycle* parameter.

Finally, it may sometimes be desirable to overrule the minimum phase restriction. For example if the fall in a series is very large one might allow the contraction to be quite short. The parameter controlling this is *Threshold*. If this is given a value (say 25) then, when the fall in Y(t) is greater than 25% , any restriction on contraction length is lifted. This is useful when dating some stock return series. It should be noted that, **if one wishes to over-ride the minimum phase condition, one needs to have the data as y(t)=100*log(Y(t)).** Doing so means the amplitude of the contraction is measured in percentage terms, thereby allowing the chosen value of *Threshold* to be directly applied. If data is not measured as 100*log(Y(t)) then the contraction amplitudes will be small and less than the default of 25, so that the minimum phase restriction will not be over-ruled. Neither the log operation nor the conversion to percentages affects the location of turning points.

Versions of the original BBQ program in GAUSS and MATLAB written by James Engel are available from the NCER web page at http://www.ncer.edu.au/data/. Based on the GAUSS code Sam Ouliaris (souliaris@imf.org) of the IMF Institute has produced a version of BBQ that is a macro for Excel, and this is described in what follows.

The worksheet BBQForExcel.xlsm contains data on the log of US GDP in column C. To find the cycles in the US data proceed as follows.

1.   Open the spreadsheet and make sure macros are enabled. If not then you will see *security warning : macros are disabled*. If so then select *options* and then click on *enable this content*.

2.   Second, select an *EMPTY* area with *n rows and 7 columns* (n being the number of observations in the data) and, before you do anything else, press F2. You can select any 7 columns, but be sure they are empty so that you do not overwrite your own data.

3.   If you did it correctly, you should end up in the upper left hand corner of the area you selected. Suppose you selected columns D to J and rows starting at the first row. The upper left hand corner will then be D1.

4.   Paste *=XL.AdvancedBBQ(C2:C252,2,5,2,25)* into D1 . Note C2:C252 is where the log of US GDP is. This has to change if you put data in some other column and rows.

5.   Press *control, shift, enter* at the same time. The cycle information will then appear in the seven colums. The states are expansions (1) and contractions (0).

The command *=XL.AdvancedBBQ* has the inputs (Range of data, *MinimumPhase*, *MinimumCycle, SymmetricWindow* , *Threshold* , *CompleteCyclesOnly*).

Numerical parameter values used in the *=XL.AdvancedBBQ command* above are
MinimumPhase = 2
MinimumCycle = 5
SymmetricWindow =2
Threshold = 25%

There is a another parameter *CompleteCyclesOnly* which is mostly set to the default value. It indicates if one wants to use complete or incomplete cycles when computing the length of phases. It is either *True* or *False*. The default is *False* i.e. incomplete cycles are used (as in the example above)

If one doesn't wish to specify parameters one can use some alternative commands.

 *= XL.BBQ(**Range, "Q"**)*

Thus using *= XL.BBQ(C2:C252, "Q")* would be the same as *=XL.AdvancedBBQ(range, 2,5,2,10.4,False)* in the GDP example above (note the simpler command works with incomplete phases)

For monthly data

= XL.BBQ(Range, "M") would be equivalent to *=XL.AdvancedBBQ(range, 5,15,5,10.4,False)*

As well there is an annual data option

 = XL.BBQ(Range, "A") which would be equivalent to *=XL.AdvancedBBQ(range, 1,2,1,15,False*]

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