

The above input stream corresponds to two expansions, the first lasting 17 periods after censoring, and the second 4 periods after censoring. Censoring corresponds to the minimum phase duration, if the minimum is larger than unity. For example, let M represent the minimum phase. Then delete $M-1$ zeros from each string of expansions. So, if $M=3$ and the observed duration of the expansion is $Y=15$, then the expansion is represented by 13 zeros followed by exactly one "1". For details, see Ohn, Taylor and Pagan: *Econometrics Journal* (2004), volume 7, pp. 528-549.

The number of phases must be entered in SB.do. On line 29, specify

```
gen phase = N
```

where N is the number of expansions in the data set. In our example file, $N=10$. This change is critical for the proper execution of SBBOOT.do.

To run the procedure: Both SBIN and SB are embedded in SBBOOT.do. As a result, once the correct input file path is written into SBIN and the number of phases specified in SB, all that is required to run the bootstrap routine in Stata are the following two commands:

- do SBBOOT.do
- SBBOOT

The program is finished when you see the phrase "SBBOOT has completed the simulation". The simulation is set for $B=10,000$ replications. However, this can also be modified by changing the simulate command in SBBOOT.do. On line 36, specify

```
simulate ... reps(B)
```

where B is the number of bootstrap replications.

Data output: Key information will print on-screen upon completion of the bootstrap. This includes the empirical t-ratio from SBIN.do, the bootstrapped critical value for the said t-ratio, critical values for a 95% confidence interval, the number of valid and invalid replications and finally, the finite-sample p-value. The sign of the empirical t-ratio indicates either positive or negative duration, and this is also indicated in the computer output.

Comments: SBIN.do can be run separately from SBOOT.do to obtain the empirical t-ratio. However, it is recommended that bootstrapped p-values be employed; see Ohn, Taylor and Pagan (2004). Second, as a technical matter, SB.do is set for a maximum of 1000 observations per replication. This value could be exceeded on any given bootstrap replication if the termination probably (under the null geometric distribution) is small and the number of phases (N) is large. If the number of valid replications is less than B (as reported by SBBOOT.do), then specify on line 27 of SB.do:

```
set obs O, such that  $O > 1000$ .
```