**Instructions for fitting two-stage feedback model using SAS**

This two-part model uses two SAS macros *%partitionedGMMPart1* and *%feedbackOut* that are included in the SAS code file provided in this repository. First run the *%partitionedGMMPart1* macro, which fits the first part of the model and checks and exports the valid moment conditions for the feedback model, stage 2 part of the model. Its syntax is like that of the *%PartitionedGMM* macro:

%***partitionedGMMPart1***(file= , timeVar= , outVar= , predVarTD= , distrPredVarTD= , idVar= , predVarTI= , alpha=**0.05**, distr= , mc=LWY);

Include the name of the dataset to be analyzed in the *file* argument. The name of the variable that contains the time points goes in the *timeVar* argument. Specify the outcome variable in the *outVar* argument. Declare the time-dependent variables in the model in the *predVarTD* argument. Specify the distribution types of the time-dependent covariates (*bin*=binary and *normal*=continuous) in the model using the distrPredVarTD argument, the order in this argument must be the same as the order in the *predVarTD* argument. Include the variable with the subjects’ ID in the *idVar* argument. Use the *predVarTI* argument to declare any time-independent covariates in the model. Leave the *alpha* and *MC* arguments as they are.

Once you have ran the %partitionedGMMPart1 macro and obtained the first part of the model, and have identified the time-dependent covariates for which feedback is of interest, take the next two steps to fit the feedback models.

1. Create a dataset in PROC IML and name it L. This dataset will that contain the positions of all the time-dependent covariates in the predVarTD argument for which feedback will be studied using code similar to the following in PROC IML:

**proc** **iml**;

L={**1** **3**};

varnames={'1' '3'};

print L;

CREATE L from L[c=varnames];

APPEND from L;

close L;

**quit**;

**run**;

Here, *L={1 3}* indicates that feedback will be studied for two time-dependent covariates, the time-dependent covariates in positions 1 and 3 in the *predVarTD* argument of the *%partitionedGMMPart1* SAS macro. You have to name the columns of the dataset L with the statement *Varnames={‘1’ ‘3’}*, with the names corresponding to the positions of the time-dependent covariates in the *predVarTD* and are the same as the values in the dataset L in the same order . If you were only investigating feedback for the time-dependent covariate in position 3 of the *predVarTD* argument, you L dataset would only have one variable and *L* would be *L={3}* with *Varnames={‘3’}*.

1. Run the *%feedbackOut* SAS macro with the following code:

**%macro** ***feedback***;

%***feedbackOut***(L=L, K=**2** , typemtxfut=typemtxfut , PredNamesTD=PredNamesTD, DistributionTD=DistributionTD,

mydatasorted=mydatasorted,

outVar= , idVar= , timeVar= , optim=NLPCG, ContUpdate=TRUE);

**%mend** feedback;

%***feedback***

Make the *L* argument equal to the dataset created in Step 1 that contains the positions of the time-dependent covariates for which feedback will be studied. In the argument *K* specify the number of time-dependent covariates that you want to investigate feedback for. This number has to be equal to the number of positions specified in dataset *L*. The *typemtxfut*, *PredNamesTD, DistributionTD* and *mydatasorted* arguments come from the *%partitionedGMMPart1* macro, these arguments are left as specified here, don’t do anything here. Specify the name of the outcome variable in the dataset in the *outVar* argument, this has to be the same as the *outVar* argument in the *%partitionedGMMPart1* macro. Identify the variable with subjects’ ID in the dataset in the *idVar* argument, the value in this argument must be the same as the *idVar* argument in the *%partitionedGMMPart1* macro. Declare the name of the variable with the time-points in the dataset in the *timeVar* argument which has to be the same as the *timeVar* in the *%partitionedGMMPart1* macro code. The only arguments that you have to change in the *%feedbackOut* macro statement above are *K, outVar, idVar*, and *timeVar*.