Short description of Macroeconomic Model Data Base accommodating models with adaptive learning (AL)

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This version of the Macroeconomic Model Data Base (MMB) is kept as close as possible to the standard, rational expectations (RE) version of the MMB 1.2. Current version works under DYNARE 4 (tested under DYNARE 4.2.5).

This version contains 11 models that are operative under adaptive learning (AL) in expectations formation and comparable with their respective RE counterparts. The software orders the models into logical groups, as given in the header of MMB_AL.m file, and adds 6th model group for models with AL. As a result, adding the model to the database is slightly different – one needs to add the model identifier to a vector modelbase.names_full, namely, into the proper group. Except for that, the functionality of the database remains exactly the same as in the MMB 1.2 version.

If a model under AL is selected, when this model is being computed, the user is presented with two additional menus. The first menu allows the user to select the value of constant *gain*, a number between 0.0 and 0.05. Gain measures how fast agents' beliefs change in response to forecasting errors, with *gain*=0 meaning the beliefs stay fixed. In the second menu, the user has a choice of selecting an arbitrary subset of right-hand side variables which the agents populating the model would use for forecasting forward-looking variables. Selecting a subset which is strictly smaller than *MSV set* leads to the different transmission mechanism from the one under RE.

The presence of these two menus allows the user to get an idea regarding relative importance of information set used for forecasting the forward-looking variables *versus* the speed of belief adjustment. Selecting the set that differs significantly from the MSV set would result in quite different IRFs.
In addition, choosing *gain*=0 and the *MSV* set provides the most straightforward check of correctness of AL model. With these choices, the model under RE and AL should simulate exactly the same IRFs, as long as the parameters have identical values in the both models. Any user who is willing to add an AL model to the database is strongly advised to make sure that the corresponding RE counterpart is also present with the same parameter values and the both model deliver the identical IRFs.

The user can compute ACFs and unconditional variances of the variables with models under AL. It is noteworthy that under AL these derivations are, in general, impossible to perform analytically. Therefore, the data is generated using simulations (10 set of length 500) and then is used for producing the second moment statistics. The comparison of US_SW07 (Smets and Wouters 07) *vs.* US_SW12 (Slobodyan and Wouters 2012) models have shown that theoretical second moments can differ from the simulated ones even with *gain*=0 and *MSV set*: typically, under RE unconditional variances and ACFs tend to be higher. However, it is possible to achieve near equality, especially for ACFs, if one uses very long simulation (10,000-50,000). It is worth noting that selecting this value would require a long computing time.

The list of models under AL:

1. US_MI07AL: Milani (2007) under Adaptive Learning
2. US_SW07AL: Slobodyan and Wouters (2012), Adaptive Learning version of US_SW07
3. US_YR13AL: Rychalovska (2013) under Adaptive Learning
4. NK_RW97AL: Rotemberg, Woodford (1997) under Adaptive Learning
5. NK_RW06AL: Ravenna and Walsh (2006) under Adaptive Learning
6. NK_IR04AL: Ireland (2004) under Adaptive Learning
7. NK_LWW03AL: Levin, Wieland, Williams (2003) under Adaptive Learning
8. US_FM95AL: Fuhrer, Moore (1995) under Adaptive Learning
9. NK_BGG99AL: Bernanke, Gertler, Gilchrist (1999) under Adaptive Learning
10. NK_CGG02AL: Clarida, Gali, Gertler (2002) 2-Country under Adaptive Learning
11. NK_CGG99AL: Clarida, Gali, Gertler (1999) Hybrid under Adaptive Learning