QPM Model

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% ------------------------------------------------------------------------------ %
% ---------------------- Quarterly Projection Model (QPM) ----------------------- %
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% ------------------------------------------------------------------------------ %
!transition_variables
'Real GDP (100*log)'                                              L_GDP
'Trend in Real GDP (100*log)'                                     L_GDP_BAR
'Output Gap (in %)'                                               L_GDP_GAP
 'Quarterly Growth in Real GDP annualized (in % pa)'               DLA_GDP
 'Real GDP Growth YoY (in % pa)'                                   D4L_GDP
 'Real GDP Trend Growth QoQ annualized (in % pa)'                  DLA_GDP_BAR

 'Real Monetary Condition Index (in % pa)'                         MCI

 'CPI (level, 100*log)'                                            L_CPI
 'CPI Inflation QoQ annualized (in % pa)'                          DLA_CPI
 'Expected CPI Inflation QoQ annualized (in % pa)'                 E_DLA_CPI
 'CPI Inflation YoY (in % pa)'                                     D4L_CPI
 'Inflation Target (in % pa)'                                      D4L_CPI_TAR

 'Real Marginal Cost  (in %)'                                      RMC

 'Nominal Exchange Rate (LCY/FCY, 100*log)'                        L_S
 'Nominal Exch. Rate Depreciation QoQ annualized (in % pa)'        DLA_S
 'Nominal Exch. Rate Depreciation YoY (in % pa)'                   D4L_S
 'Country Risk Premium (in % pa)'                                  PREM

 'Nominal Policy Interest Rate (in % pa)'                          RS
 'Real Interest Rate (in % pa)'                                    RR
 'Trend Real Interest Rate (in % pa)'                              RR_BAR
 'Real Interest Rate Gap (in %)'                                   RR_GAP
 'Nominal Policy Neutral Interest Rate (in % pa)'                  RSNEUTRAL

 'Real Exchange Rate (level, 100*log)'                             L_Z
 'Trend Real Exchange Rate (level, 100*log)'                       L_Z_BAR
 'Real Exchange Rate Gap (in %)'                                   L_Z_GAP
 'Real Exchange Rate Depreciation QoQ annualized (in % pa)'        DLA_Z
 'Trend Real Exchange Rate Depreciation QoQ annualized(in % pa)'   DLA_Z_BAR

 'Foreign Output Gap (in %)'                                       L_GDP_RW_GAP
 'Foreign Nominal Interest Rate (in % pa)'                         RS_RW
 'Foreign Real Interest Rate (in % pa)'                            RR_RW
 'Foreign Real Interest Rate Trend (in % pa)'                      RR_RW_BAR
 'Foreign Real Interest Rate Gap (in %)'                           RR_RW_GAP
 'Foreign CPI (level, 100*log)'                                    L_CPI_RW
 'Foreign Inflation QoQ annualized (in % pa)'                      DLA_CPI_RW

% ------------------------------------------------------------------------------ %
!transition_shocks
 'Shock: Output gap (demand)'                                      SHK_L_GDP_GAP(σ=1)
 'Shock: CPI inflation (cost-push)'                                SHK_DLA_CPI(σ=0.75)
 'Shock: Exchange rate (UIP)'                                      SHK_L_S(σ=3)
 'Shock: Interest rate (monetary policy)'                          SHK_RS(σ=1)
 'Shock: Inflation target'                                         SHK_D4L_CPI_TAR(σ=2)

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57:     'Shock: Real interest rate'                                          SHK_RR_BAR(σ=0.5)
58:     'Shock: Real exchange rate depreciation'                             SHK_DLA_Z_BAR(σ=0.5)
59:     'Shock: Potential GDP growth'                                        SHK_DLA_GDP_BAR(σ=0.5)
60:
61:     'Shock: Foreign output gap'                                          SHK_L_GDP_RW_GAP(σ=1)
62:     'Shock: Foreign nominal interest rate'                               SHK_RS_RW(σ=1)
63:     'Shock: Foreign inflation'                                           SHK_DLA_CPI_RW(σ=2)
64:     'Shock: Foreign real interest rate'                                  SHK_RR_RW_BAR(σ=0.5)
65:
66:     % ------------------------------------------------------------------------------- %
67:     !parameters
68:     % --- Structural coefficients ---
69:     b1(0.8) b2(0.3) b3(0.5) b4(0.7)
70:     a1(0.7) a2(0.2) a3(0.7)
71:     e1(0.4)
72:     g1(0.7) g2(0.5) g3(0.5)
73:
74:     % --- AR Processes ---
75:     rho_D4L_CPI_TAR(0.5)
76:     rho_DLA_Z_BAR(0.8)
77:     rho_RR_BAR(0.8)
78:     rho_DLA_GDP_BAR(0.8)
79:
80:     rho_L_GDP_RW_GAP(0.8)
81:     rho_RS_RW(0.8)
82:     rho_DLA_CPI_RW(0.8)
83:     rho_RR_RW_BAR(0.8)
84:
85:     % --- Steady State Parameters ---
86:     ss_D4L_CPI_TAR(2)
87:     ss_DLA_Z_BAR(-1.5)
88:     ss_RR_BAR(0.5)
89:     ss_DLA_GDP_BAR(2.5)
90:     ss_DLA_CPI_RW(2)
91:     ss_RR_RW_BAR(0.75)
92:
93:     % ------------------------------------------------------------------------------- %
94:     !transition_equations
95:     %% === IS Curve ===
96:     L_GDP_GAP = b1(0.8)*L_GDP_GAP{-1} - b2(0.3)*MCI + b3(0.5)*L_GDP_RW_GAP + SHK_L_GDP_GAP(σ=1);
97:     MCI       = b4(0.7)*RR_GAP + (1-b4(0.7))*(- L_Z_GAP);
98:
99:     %% === Phillips Curve ===
100:     DLA_CPI   = a1(0.7)*DLA_CPI{-1} + (1-a1(0.7))*DLA_CPI{+1} + a2(0.2)*RMC + SHK_DLA_CPI(σ=0.75);
101:     RMC       = a3(0.7)*L_GDP_GAP + (1-a3(0.7))*L_Z_GAP;
102:     E_DLA_CPI = DLA_CPI{+1};
103:
104:     %% === Monetary Policy Reaction Function (a forward-looking Taylor-type Rule) ===
105:     RS        = g1(0.7)*RS{-1} + (1-g1(0.7))*(RSNEUTRAL + g2(0.5)*(D4L_CPI{+4} - D4L_CPI_TAR{+4}) + g3(0.5)*L_GDP_GAP) +
SHK_RS(σ=1);
106:     RSNEUTRAL = RR_BAR + D4L_CPI{+1};
107:
108:     %% === Modified UIP condition ===
109:     L_S = (1-e1(0.4))*L_S{+1} + e1(0.4)*(L_S{-1} + 2/4*(D4L_CPI_TAR - ss_DLA_CPI_RW(2) + DLA_Z_BAR)) + (- RS + RS_RW + PREM)/4 +
SHK_L_S(σ=3);
110:
111:     %% === Definitions ===
112:     % Fisher equation (RIR)
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113:     RR            = RS - D4L_CPI{+1};
114:     L_Z           = L_S + L_CPI_RW - L_CPI;
115:     % Long-term version of UIP (consistency of trends)
116:     DLA_Z_BAR{+1} = RR_BAR - RR_RW_BAR - PREM;
117:
118:     %% === Identities ===
119:     DLA_GDP_BAR = 4*(L_GDP_BAR - L_GDP_BAR{-1});
120:     DLA_Z_BAR   = 4*(L_Z_BAR - L_Z_BAR{-1});
121:     DLA_Z       = 4*(L_Z - L_Z{-1});
122:     DLA_GDP     = 4*(L_GDP - L_GDP{-1});
123:     DLA_CPI     = 4*(L_CPI - L_CPI{-1});
124:     DLA_S       = 4*(L_S - L_S{-1});
125:     D4L_GDP     = L_GDP - L_GDP{-4};
126:     D4L_CPI     = L_CPI - L_CPI{-4};
127:     D4L_S       = L_S - L_S{-4};
128:
129:     %% === Gaps ===
130:     RR_GAP    = RR - RR_BAR;
131:     L_Z_GAP   = L_Z - L_Z_BAR;
132:     L_GDP_GAP = L_GDP - L_GDP_BAR;
133:
134:     %% === Trends ===
135:     D4L_CPI_TAR = rho_D4L_CPI_TAR(0.5)*D4L_CPI_TAR{-1} + (1-rho_D4L_CPI_TAR(0.5))*ss_D4L_CPI_TAR(2) + SHK_D4L_CPI_TAR(σ=2);
136:     DLA_Z_BAR   = rho_DLA_Z_BAR(0.8)*DLA_Z_BAR{-1} + (1-rho_DLA_Z_BAR(0.8))*ss_DLA_Z_BAR(-1.5) + SHK_DLA_Z_BAR(σ=0.5);
137:     RR_BAR      = rho_RR_BAR(0.8)*RR_BAR{-1} + (1-rho_RR_BAR(0.8))*ss_RR_BAR(0.5) + SHK_RR_BAR(σ=0.5);
138:     DLA_GDP_BAR = rho_DLA_GDP_BAR(0.8)*DLA_GDP_BAR{-1} + (1-rho_DLA_GDP_BAR(0.8))*ss_DLA_GDP_BAR(2.5) + SHK_DLA_GDP_BAR(σ=0.5);
139:
140:     %% === Foreign Sector Equations ===
141:     L_GDP_RW_GAP = rho_L_GDP_RW_GAP(0.8)*L_GDP_RW_GAP{-1} + SHK_L_GDP_RW_GAP(σ=1);
142:     DLA_CPI_RW   = rho_DLA_CPI_RW(0.8)*DLA_CPI_RW{-1} + (1-rho_DLA_CPI_RW(0.8))*ss_DLA_CPI_RW(2) + SHK_DLA_CPI_RW(σ=2);
143:     RS_RW        = rho_RS_RW(0.8)*RS_RW{-1} + (1-rho_RS_RW(0.8))*(RR_RW_BAR + DLA_CPI_RW) + SHK_RS_RW(σ=1);
144:     RR_RW_BAR    = rho_RR_RW_BAR(0.8)*RR_RW_BAR{-1} + (1-rho_RR_RW_BAR(0.8))*ss_RR_RW_BAR(0.75) + SHK_RR_RW_BAR(σ=0.5);
145:     RR_RW        = RS_RW - DLA_CPI_RW;
146:     RR_RW_GAP    = RR_RW - RR_RW_BAR;
147:     DLA_CPI_RW   = 4*(L_CPI_RW - L_CPI_RW{-1});
148:
149:     %% ------------------------------------------------------------------------------ %
150:     !measurement_variables
151:     OBS_L_GDP
152:     OBS_L_CPI
153:     OBS_RS
154:     OBS_L_S
155:     OBS_D4L_CPI_TAR
156:
157:     OBS_L_GDP_RW_GAP
158:     OBS_DLA_CPI_RW
159:     OBS_RS_RW
160:
161:     %% ------------------------------------------------------------------------------ %
162:     !measurement_equations
163:     OBS_L_GDP = L_GDP;
164:     OBS_L_CPI = L_CPI;
165:     OBS_RS    = RS;
166:     OBS_L_S   = L_S;
167:     OBS_D4L_CPI_TAR = D4L_CPI_TAR;
168:
169:     OBS_L_GDP_RW_GAP = L_GDP_RW_GAP;
170:     OBS_DLA_CPI_RW   = DLA_CPI_RW;
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171:     OBS_RS_RW        = RS_RW;
172:
173:     %% ------------------------------------------------------------------------------- %
174:     Legend
175:     _GAP         cyclical deviation from a trend
176:     _BAR         trend (equilibrium)
177:     ss_          steady-state value
178:     DLA_         q-o-q change
179:     D4L_         y-o-y change
180:     _RW          foreign variable
181:     SHK_         equation residual
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Steady state

Variable	Description	Value
L_GDP_GAP	Output Gap (in %)	0
DLA_GDP	Quarterly Growth in Real GDP annualized (in % pa)	2.5
D4L_GDP	Real GDP Growth YoY (in % pa)	2.5
DLA_GDP_BAR	Real GDP Trend Growth QoQ annualized (in % pa)	2.5
MCI	Real Monetary Condition Index (in % pa)	0
DLA_CPI	CPI Inflation QoQ annualized (in % pa)	2
E_DLA_CPI	Expected CPI Inflation QoQ annualized (in % pa)	2
D4L_CPI	CPI Inflation YoY (in % pa)	2
D4L_CPI_TAR	Inflation Target (in % pa)	2
RMC	Real Marginal Cost (in %)	0
DLA_S	Nominal Exch. Rate Depreciation QoQ annualized (in % pa)	-1.5
D4L_S	Nominal Exch. Rate Depreciation YoY (in % pa)	-1.5
PREM	Country Risk Premium (in % pa)	1.25
RS	Nominal Policy Interest Rate (in % pa)	2.5
RR	Real Interest Rate (in % pa)	0.5
RR_BAR	Trend Real Interest Rate (in % pa)	0.5
RR_GAP	Real Interest Rate Gap (in %)	0
RSNEUTRAL	Nominal Policy Neutral Interest Rate (in % pa)	2.5
L_Z_GAP	Real Exchange Rate Gap (in %)	0
DLA_Z	Real Exchange Rate Depreciation QoQ annualized (in % pa)	-1.5
DLA_Z_BAR	Trend Real Exchange Rate Depreciation QoQ annualized(in % pa)	-1.5
L_GDP_RW_GAP	Foreign Output Gap (in %)	0
RS_RW	Foreign Nominal Interest Rate (in % pa)	2.75
RR_RW	Foreign Real Interest Rate (in % pa)	0.75
RR_RW_BAR	Foreign Real Interest Rate Trend (in % pa)	0.75
RR_RW_GAP	Foreign Real Interest Rate Gap (in %)	0
DLA_CPI_RW	Foreign Inflation QoQ annualized (in % pa)	2