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// Model code for W. Roeger and L. Vogel: Horizontal Transfers and
Consumption Smoothing in a Monetary Union, 10.1515/jbnst-2017-0107,
Jahrbuecher für Nationaloekonomie und Statistik
// To be run with DYNARE for MATLAB
// In the following EA and R stand for the two regions of a monetary
union, the monetary union is a closed economy
// Parameter and variable names may differ from notation in the paper
// Robustness checks 1-3 in the paper amount to variations in parameter
values; check 4 changes the matrix of shocks (cross-country correlation);
check 5 replaces the budget closure via tl by a closure rule on tvat or
tax (requiring modification of the closure rule and an appropriate
redeclaration of the tax rates concerned as endogenous versus exogenous
variables)
// Some of the output (definitions) has not been used in the paper


// DECLARATION OF ENDOGENOUS VARIABLES (explanation at bottom of file)

var ea_u_rpremk r_u_rpremk ea_u_rpreme ea_u_im r_u_im ea_surplus
r_surplus ea_uempl r_uempl ea_tl r_tl euro_inom ea_tax r_tax ea_ben ea_br
ea_bwr ea_bwry ea_by ea_c ea_cay ea_clc ea_cnlc ea_dbr ea_dbwr ea_dc
ea_dcnlc ea_dex ea_dexl ea_dexr ea_dexucap ea_dgs ea_di ea_digs ea_dim
ea_dinfc ea_dinfx ea_dinfy ea_dinom ea_dk ea_dkg ea_dl ea_dlamlc
ea_dlamnlc ea_dltfp ea_dnomint ea_doil ea_dpim ea_dpx ea_dq ea_dr
ea_drealint ea_dtl ea_dv ea_dwinf ea_dwr ea_dy ea_eta ea_ex ea_EX_l
ea_EX_r ea_EX_ucap ea_f ea_g ea_gby ea_gs ea_i ea_ig ea_igs ea_im ea_imr
ea_infc ea_inflation ea_infx ea_infy ea_inom ea_k ea_kg ea_l ea_lamlc
ea_lamnlc ea_lc ea_lclc ea_lcnlc ea_ll ea_ltfp ea_ly ea_m ea_nomint ea_o
ea_oil ea_pc ea_pcy ea_pim ea_po ea_poil ea_px ea_q ea_r ea_realint
ea_rer ea_tby ea_tfp ea_tot ea_toty ea_tr ea_trfor ea_trfory ea_trlc
ea_try ea_ucap ea_ucnlc ea_utilclc ea_utilcnlc ea_utill ea_v ea_vl
ea_welflc ea_welfnlc ea_welftot ea_winf ea_wr ea_wrinf ea_y ea_ygap
euro_EX_r EURO_INFC euro_ygap r_ben r_br r_bwr r_bwry r_by r_c r_cay
r_clc r_cnlc r_dbr r_dbwr r_dc r_dcnlc r_dex r_dexl r_dexr r_dexucap
r_dgs r_di r_digs r_dim r_dinfc r_dinfx r_dinfy r_dinom r_dk r_dkg r_dl
r_dlamlc r_dlamnlc r_dltfp r_dnomint r_doil r_dpim r_dpx r_dq r_dr
r_drealint r_dtl r_dv r_dwinf r_dwr r_dy r_eta r_ex r_EX_l r_EX_r
r_EX_ucap r_exoil r_f r_g r_gby r_gs r_i r_ig r_igs r_im r_imea r_infc
r_inflation r_infx r_infy r_inom r_k r_kg r_l r_lamlc r_lamnlc r_lc
r_lclc r_lcnlc r_ll r_ltfp r_ly r_m r_nomint r_o r_oil r_pc r_pcy r_pim
r_po r_poil r_px r_q r_r r_realint r_rer r_tby r_tfp r_tot r_toty r_tr
r_trfor r_trfory r_trlc r_try r_ucap r_cnlc r_utilclc r_utilcnlc r_utill
r_v r_vl r_welflc r_welfnlc r_welftot r_winf r_wr r_wrinf r_y r_ygap
all_welf r_tby2 ea_cay2 r_cay2 trfor_ib r_u_rpreme ea_gc ea_gy r_gc r_gy
ea_cay_net_tr r_cay_net_tr ea_gnp ea_gnptr ea_ggnp ea_ggnptr ea_gfi
ea_gtr ea_gcred ea_rcpi ea_gcrednom ea_gcnom ea_eps_slc r_eps_slc ea_tb
ea_cnom ea_invnom ea_gnom ea_ignom ea_gnlc r_gnlc ea_y_pc ea_tb_pc ea_gcg
ea_gcredg ea_uemplp r_uemplp ea_gdemc ea_gdemcg ea_glincg ea_gcnlc
ea_gclc r_gcnlc r_gclc ea_gcredcnlc ea_gcredclc ea_uclc r_uclc gapcnlc
gapclc gapc gapgs gaptfp ea_gapgc ea_gapguc ea_lwr;

// DECLARATION OF EXOGENOUS VARIABLES

varexo ea_eps_rpreme ea_bfund r_bfund ea_taxshare r_taxshare ea_a ea_btar
ea_bwyt ea_eps_ben ea_eps_clc ea_eps_cnlc ea_eps_eta ea_eps_etax ea_eps_g
ea_eps_gs ea_eps_i ea_eps_ig ea_eps_igs ea_eps_im ea_eps_l ea_eps_ltfp
ea_eps_m ea_eps_rpremb ea_eps_rpremk ea_eps_tl ea_eps_tr ea_eps_trlc
ea_eps_ucap ea_eps_v ea_eps_w ea_EX_ben ea_EX_by ea_EX_gby ea_EX_gs
ea_EX_igs ea_EX_inf ea_EX_ltfp ea_EX_tl ea_EX_trlc ea_EX_tvat ea_fcl
ea_fcy ea_ilag ea_libdum ea_npart ea_rpremb ea_rpremk ea_size ea_ssc
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```
ea_taxdum ea_tc ea_tinf ea_trshare ea_tryshare ea_tvat ea_ty ea_upi
euro_EX_inf euro_size null r_a r_btar r_e r_eps_ben r_eps_clc r_eps_cnlc
r_eps_eta r_eps_etax r_eps_g r_eps_gs r_eps_i r_eps_ig r_eps_igs r_eps_im
r_eps_l r_eps_ltfp r_eps_m r_eps_poil r_eps_rpremb r_eps_rpremk r_eps_tl
r_eps_tr r_eps_trlc r_eps_ucap r_eps_v r_eps_w r_EX_ben r_EX_by r_EX_gby
r_EX_gs r_EX_igs r_EX_inf r_EX_ltfp r_EX_tl r_EX_trlc r_EX_tvat r_fcl
r_fcy r_ilag r_npart r_rpremb r_rpremk r_size r_ssc r_taxdum r_tc r_tinf
r_trshare r_tryshare r_tvat r_ty r_upi w_coreinf w_gpop w_gtfp
r_eps_rpreme;

// DECLARATION OF PARAMETER VALUES

parameters rhoslc gamslc rho_rprem rho_im dyn ea_a1 ea_a2 ea_alpha
ea_alphag ea_benex ea_benpc ea_benrr ea_bentl ea_bentvat ea_delta
ea_deltag ea_dumtrlc ea_gami ea_gami2 ea_gamim ea_gaml ea_gamoil ea_gamp
ea_gampx ea_gamw ea_gslag ea_hab ea_habl ea_igslag ea_kappa ea_llag
ea_omeg ea_pimlag ea_rho ea_rhotfp ea_rlag ea_rprem ea_s ea_sfim ea_sfp
ea_sfpx ea_sfw ea_sig ea_sig1 ea_sigc ea_sigmaoil ea_soil ea_sxd ea_s_r
ea_tau ea_taux ea_tgovb1 ea_tgovb2 ea_tgovby ea_tgovinf ea_theta
ea_thetanlc ea_trnom ea_ttrdom ea_ttrforlag0 ea_ttrforlag1 ea_ucaplag
ea_zet lev r_a1 r_a2 r_alpha r_alphag r_benex r_benpc r_benrr r_bentl
r_bentvat r_delta r_deltag r_dumtrlc r_gami r_gami2 r_gamim r_gaml
r_gamoil r_gamp r_gampx r_gamw r_gslag r_hab r_habl r_igslag r_kappa
r_llag r_omeg r_pimlag r_poildol r_rho r_rhotfp r_rlag r_s r_sfim r_sfp
r_sfpx r_sfw r_sig r_sig1 r_sigc r_sigmaoil r_soil r_sxd r_s_ea r_tau
r_taux r_tgovb1 r_tgovb2 r_tgovby r_tgovinf r_theta r_thetanlc r_trnom
r_ttrdom r_ucaplag r_zet ea_im1lag r_im1lag ea_tgy r_tgy ea_slc r_slc;

// PARAMETRISATION

dyn=1;
lev=0;

ea_slc=0.6;
ea_a1=0.0323611111111111;
ea_a2=0.05;
ea_alpha=0.65;
ea_alphag=0.9121815166591;
ea_benex=0;
ea_benpc=0;
ea_benrr=0.4;
ea_bentl=0;
ea_bentvat=1;
ea_delta=0.015;
ea_deltag=0.0125;
ea_dumtrlc=1;
ea_gami=20;
ea_gami2=75;
ea_gamim=0.9;
ea_gaml=25;
ea_gamoil=200;
ea_gamp=19.745368045331;
ea_gampx=0;//15;
ea_gamw=596.457851250621;
ea_gslag=0;
ea_hab=0.7;
ea_habl=0;
ea_igslag=0;
ea_kappa=-5;//-5;
ea_llag=0.95;
```

```
ea_omeg=0.00116498532790324;
ea_pimlag=0;//0.75;//0.9;
ea_im1lag=0;//0.9;
ea_rho=0;
ea_rhotfp=0.95;
ea_rlag=0.99;
ea_rprem=0.001;//0.1;
ea_s=0.6;//0.781542024039254;
ea_sfim=0.1;
ea_sfp=0.9;
ea_sfpx=0.8;
ea_sfw=0.9;
ea_sig=1.1;
ea_sig1=0.5;
ea_sigc=1;
ea_sigmaoil=0.05;
ea_soil=0;
ea_sxd=1;
ea_s_r=1;
ea_tau=0.25;
ea_taux=0;
ea_tgovb1=0.01;
ea_tgovb2=0.1;
ea_tgovby=0;
ea_tgovinf=0;
ea_theta=0.00323437285093475;
ea_thetanlc=6.5;
ea_trnom=1;
ea_ucaplag=0.99;
ea_zet=0.4;
ea_tgy=-0.19;
ea_ttrdom=0;
ea_ttrforlag0=0;
ea_ttrforlag1=0;

r_slc=0.6;
r_a1=0.0323611111111111;
r_a2=0.05;
r_alpha=0.65;
r_alphag=0.9121815166591;
r_benex=0;
r_benpc=0;
r_benrr=0.4;
r_bentl=0;
r_bentvat=1;
r_delta=0.015;
r_deltag=0.0125;
r_dumtrlc=1;
r_gami=20;
r_gami2=75;
r_gamim=0.9;
r_gaml=25;
r_gamoil=200;
r_gamp=19.745368045331;
r_gampx=0;//15;
r_gamw=596.457851250621;
r_gslag=0;
r_hab=0.7;
r_habl=0;
r_igslag=0;
```

```
r_kappa=-5;//-5;
r_llag=0.95;
r_omeg=0.00116498532790324;
r_pimlag=0;//0.75;//0.9;
r_im1lag=0;//0.9;
r_rho=0;
r_rhotfp=0.95;
r_rlag=0.99;
r_s=0.6;//0.781542024039254;
r_sfim=0.1;
r_sfp=0.9;
r_sfpx=0.8;
r_sfw=0.9;
r_sig=1.1;
r_sig1=0.5;
r_sigc=1;
r_sigmaoil=0.05;
r_soil=0;
r_sxd=1;
r_s_ea=1;
r_tau=0.25;
r_taux=0;
r_tgovb1=0.01;
r_tgovb2=0.1;
r_tgovby=0;
r_tgovinf=0;
r_theta=0.00323437285093475;
r_thetanlc=6.5;
r_trnom=1;
r_ucaplag=0.99;
r_zet=0.4;
r_poildol=1;
r_tgy=-0.19;
r_ttrdom=0;

rho_im=0.75;
rho_rprem=0.75;

rhoslc=0;
gamslc=1;


// MODEL EQUATIONS

model;

//**************************************************************************
// Household and firm behaviour and national fiscal policy in country 1
//**************************************************************************

          ea_lamnlc = 1/(1+ea_theta+ea_rho)*(1+ea_r-
ea_gnlc(+1))*(lev*ea_lamnlc(1)+(1-lev)*(ea_lamnlc+ea_dlamnlc(1))) ;
          ea_f = ea_br+ea_rer*ea_bwr+ea_v*(1+ea_eps_v) ;
          ea_lamnlc = ea_ucnlc/((1+ea_tvat)*ea_pc) ;
          ea_ucnlc = exp(ea_eps_cnlc)*(1-ea_hab)^ea_sigc*(ea_cnlc-
ea_hab*(ea_cnlc-ea_dcnlc))^(-ea_sigc) ;
          ea_clc = (1-
ea_tl)*ea_wr/(ea_pc*(1+ea_tvat))*ea_l+ea_ben/(ea_pc*(1+ea_tvat))*(1-
ea_npart-ea_l)+ea_trlc/(ea_pc*(1+ea_tvat))-
ea_tax/(ea_pc*(1+ea_tvat))+ea_eps_clc ;
```

```
          ea_lamlc = (1-ea_hab)^ea_sigc*(ea_clc-ea_hab*ea_clc(-1))^(-
ea_sigc)/((1+ea_tvat)*ea_pc) ;
          ea_uclc = (1-ea_hab)^ea_sigc*(ea_clc-ea_hab*ea_clc(-1))^(-
ea_sigc) ;
            ea_c = (1-ea_slc-
ea_eps_slc)*ea_cnlc+(ea_slc+ea_eps_slc)*ea_clc ;
          ea_vl = exp(ea_eps_l)*ea_omeg*(1-ea_l-
ea_habl*ea_l+ea_habl*(ea_l-ea_dl))^ea_kappa ;
          ea_vl = ((1-ea_slc-
ea_eps_slc)*ea_lamnlc+(ea_slc+ea_eps_slc)*ea_lamlc)*((1-ea_thetanlc)/(-
ea_thetanlc)*(ea_wr*(1-ea_tl)-ea_ben)-1/ea_thetanlc*(1-
ea_npart)/ea_l*ea_ben+ea_gamw/ea_thetanlc*ea_wr*ea_winf)-(lev*((1-ea_slc-
ea_eps_slc)*ea_lamnlc(1)+(ea_slc+ea_eps_slc)*ea_lamlc(1))+(1-lev)*((1-
ea_slc-
ea_eps_slc)*(ea_lamnlc+ea_dlamnlc(1))+(ea_slc+ea_eps_slc)*(ea_lamlc+ea_dl
amlc(1))))*1/(1+ea_theta+ea_rho)*ea_gamw/ea_thetanlc*ea_wr/(1+ea_infy+ea_
dinfy(1))*(ea_l+ea_dl(1))/ea_l*(ea_sfw*(lev*ea_winf(1)+(1-
lev)*(ea_winf+ea_dwinf(1)))+(1-ea_sfw)*(ea_winf-ea_dwinf)) ;
          ea_ben =
ea_benex*ea_EX_ben*ea_pc*((1+ea_tvat)/(1+ea_EX_tvat))^ea_bentvat+(1-
ea_benex)*ea_benrr*ea_wr*((1-ea_tl)/(1-
ea_EX_tl))^ea_bentl*(ea_pc*((1+ea_tvat)/(1+ea_EX_tvat))^ea_bentvat)^ea_be
npc+ea_eps_ben ;
           ea_tr = ea_trnom*ea_trshare*ea_y+(1-
ea_trnom)*ea_tryshare+ea_ttrdom*(ea_uempl-0.0705033)+ea_eps_tr ;
          ea_trlc = ea_dumtrlc*ea_tr+(1-
ea_dumtrlc)*ea_EX_trlc+ea_eps_trlc ;
           ea_g = ea_gs*ea_y/ea_pc+ea_eps_gs+ea_tgy*(ea_ly-ea_ly(-4)) ;
          ea_gs = (1-ea_gslag)*ea_EX_gs+ea_gslag*(ea_gs-ea_dgs)+ea_eps_g
;
          ea_ig = ea_igs*ea_y/ea_pc+ea_eps_igs ;
          ea_igs = (1-ea_igslag)*ea_EX_igs+ea_igslag*(ea_igs-
ea_digs)+ea_eps_ig ;
          (ea_gami+ea_eps_i)*(ea_i/(ea_k-ea_dk)-
(ea_delta+w_gtfp+w_gpop))+ea_gami2*ea_di-
ea_gami2*1/(1+ea_theta+ea_rho)*1/(1+ea_rpremk+ea_u_rpremk)*(lev*ea_lamnlc
(1)+(1-
lev)*(ea_lamnlc+ea_dlamnlc(1)))/ea_lamnlc*(1+ea_infc+ea_dinfc(1))/(1+ea_i
nfy+ea_dinfy(1))*(lev*(ea_i(1)-ea_i)+(1-lev)*ea_di(1)) = ea_q-1 ;
          ea_eta/(ea_pc*(1+ea_upi))*(1-ea_tc)*(1-
ea_alpha)*(ea_y+ea_fcy*ea_tfp)/ea_k+ea_tc*ea_delta = ea_q-(1-(ea_inom-
ea_infc-ea_dinfc(1))-ea_delta-ea_rpremk-ea_u_rpremk)*(lev*ea_q(1)+(1-
lev)*(ea_q+ea_dq(1)))+dyn*(ea_a1*(ea_ucap-1)+ea_a2*(ea_ucap-1)^2) ;
          ea_wr*(1+ea_ssc) = (ea_eta*ea_alpha*(ea_y+ea_fcy*ea_tfp)/(ea_l-
ea_fcl)-ea_gaml*ea_wr*ea_dl+ea_gaml*(lev*ea_wr(1)+(1-
lev)*(ea_wr+ea_dwr(1)))*1/(1+ea_theta+ea_rho)*1/(1+ea_rpremk+ea_u_rpremk)
*ea_lamnlc(1)/ea_lamnlc*(lev*(ea_l(1)-ea_l)+(1-
lev)*ea_dl(1)))/(1+ea_eps_w) ;
          ea_k = ea_i+(1-(ea_delta+w_gtfp+w_gpop))*(ea_k-ea_dk) ;
          ea_eta*(1-ea_alpha)*(ea_y+ea_fcy*ea_tfp)/ea_k =
ea_pc*(ea_a1+2*ea_a2*(ea_ucap-1)+ea_eps_ucap)*ea_ucap ;
          ea_eta = 1-(ea_tau+ea_eps_eta)-
ea_gamp*(1/(1+ea_theta+ea_rho)*1/(1+ea_rpremk+ea_u_rpremk)*ea_lamnlc(1)/e
a_lamnlc*ea_sfp*(lev*ea_infy(1)+(1-lev)*(ea_infy+ea_dinfy(1)))+(1-
ea_sfp)*(ea_infy-ea_dinfy)-ea_infy) ;
          ea_y = (ea_s-ea_u_im)*ea_pcy^ea_sig*(1-
ea_soil)*(ea_pc/ea_pcy)^ea_sigmaoil*(ea_c+ea_i*(1+ea_upi)^ea_sigmaoil+ea_
g+ea_ig)+ea_ex+ea_gami/2*(ea_i/(ea_k-ea_dk)-
(ea_delta+w_gtfp+w_gpop))^2*(ea_k-
ea_dk)+ea_gami2/2*ea_di^2+ea_gamp/2*ea_infy^2*ea_y+ea_gamw/2*ea_winf^2*ea
```

```
_l+ea_gaml/2*ea_dl^2*ea_wr+ea_gampx/2*ea_infx^2*ea_ex+(ea_a1*(ea_ucap-
1)+ea_a2*(ea_ucap-1)^2)*ea_pc*ea_k;
          ea_kg = ea_ig+(1-(ea_deltag+w_gtfp+w_gpop))*(ea_kg-ea_dkg) ;
          ea_y = ea_a*(ea_ucap*ea_k)^(1-ea_alpha)*((ea_l-
ea_fcl)*ea_tfp)^ea_alpha*ea_kg^(1-ea_alphag)-ea_fcy*ea_tfp;
          ea_tfp = exp(ea_ltfp) ;
          ea_ltfp = (1-ea_rhotfp)*ea_EX_ltfp+ea_rhotfp*(ea_ltfp-
ea_dltfp)+ea_eps_ltfp ;
          ea_o = 1/ea_po*(ea_y+ea_poil*ea_oil) ;
          ea_oil = ea_soil*(ea_c+ea_i+ea_g+ea_ig)*(ea_poil/ea_pc)^(-
ea_sigmaoil)-ea_gamoil*ea_doil+ea_gamoil*(lev*(ea_oil(1)-ea_oil)+(1-
lev)*ea_doil(1)) ;
          ea_ygap = (1-
ea_alpha)*log(ea_ucap/ea_EX_ucap)+ea_alpha*log(ea_l/ea_EX_l) ;
          ea_EX_l = ea_llag*(ea_EX_l-ea_dexl)+(1-ea_llag)*ea_l ;
          ea_EX_ucap = ea_ucaplag*(ea_EX_ucap-ea_dexucap)+(1-
ea_ucaplag)*ea_ucap ;
          ea_EX_r = ea_rlag*(ea_EX_r-ea_dexr)+(1-ea_rlag)*ea_r ;
          ea_m = ea_y*(1+ea_inom)^(-ea_zet) ;
          ea_pc = ((1-ea_soil)*ea_pcy^(1-ea_sigmaoil)+ea_soil*ea_poil^(1-
ea_sigmaoil))^(1/(1-ea_sigmaoil)) ;
          ea_pcy = (ea_s*1^(1-ea_sig)+(1-ea_s)*ea_pim^(1-ea_sig))^(1/(1-
ea_sig)) ;
          ea_po =
ea_y/(ea_y+ea_poil*ea_oil)+ea_poil*ea_poil*ea_oil/(ea_y+ea_poil*ea_oil) ;
          ea_wrinf = ea_dwr/(ea_wr-ea_dwr) ;
          ea_winf = ea_wr/(ea_wr-ea_dwr)*(1+ea_infy)-1 ;
          ea_r = ea_inom-(lev*ea_infy(1)+(1-lev)*(ea_infy+ea_dinfy(1))) ;
          ea_by = ea_br/4/ea_y ;
          ea_tax = ea_taxshare*ea_y ;
          ea_tl = ea_tl-ea_dtl+ea_taxdum*(ea_tgovb1*(ea_br/(4*ea_y)-
ea_btar)+ea_tgovb2*ea_dbr+ea_tgovby*(ea_gby-
ea_EX_gby)+ea_tgovinf*(ea_infc-ea_EX_inf))+ea_eps_tl ;
          ea_im = (1-ea_s+ea_u_im)*(ea_pim/ea_pc)^(-ea_sig)*(1-
ea_soil)*(ea_c+ea_i+ea_g+ea_ig)*(((lev*ea_im(1)+(1-
lev)*(ea_im+ea_dim(1)))/ea_im)^ea_sfim/(ea_im/(ea_im-ea_dim))^(1-
ea_sfim))^ea_gamim ;
          ea_tby = (ea_px*ea_ex-ea_pim*ea_im-ea_poil*ea_oil)*100/ea_y ;
          ea_inom = euro_inom-ea_rprem*ea_libdum*(ea_size*ea_bwr/r_size-
0*r_bwr)+ea_u_rpreme ;
          ea_px = 1/(1-ea_taux-ea_eps_etax-
ea_gampx*(1/(1+ea_theta+ea_rho)*ea_lamnlc(1)/ea_lamnlc*(ea_sfpx*(lev*ea_i
nfx(1)+(1-lev)*(ea_infx+ea_dinfx(1)))+(1-ea_sfpx)*(ea_infx-ea_dinfx))-
ea_infx))*1^ea_sxd*ea_pc^(1-ea_sxd) ;
          ea_infx = ea_px/(ea_px-ea_dpx)*(1+ea_infy)-1 ;
          ea_v = (1-ea_tc)*(ea_y-
(1+ea_ssc)*ea_wr*ea_l)+ea_tc*ea_delta*ea_k*ea_pc-
ea_pc*ea_i+1/((1+ea_realint-
ea_drealint+ea_rpremk+ea_u_rpremk)/((1+w_gtfp)*(1+w_gpop)))*(lev*ea_v(1)+
(1-lev)*(ea_v+ea_dv(1))) ;
          ea_poil = r_poil*ea_rer ;
          ea_tot = ea_px/((1-ea_soil)*ea_pim+ea_soil*ea_poil) ;
          ea_toty = ea_px/ea_pim ;
          ea_nomint = (1+ea_inom)*(1+w_gpop)*(1+w_gtfp)*(1+w_coreinf)-1 ;
          ea_realint = (1+ea_r)*(1+w_gpop)*(1+w_gtfp)-1 ;
          ea_inflation = (1+ea_infy)*(1+w_coreinf)-1 ;
          ea_cay = (ea_rer*ea_bwr-1/((1+w_gtfp)*(1+w_gpop))*ea_rer(-
1)*(ea_bwr-ea_dbwr)/(1+ea_infy))/ea_y*100 ;
          ea_dbwr = dyn*(ea_bwr-ea_bwr(-1))+(1-dyn)*null ;
          ea_dpx = dyn*(ea_px-ea_px(-1))+(1-dyn)*null ;
```

```
          ea_dex = dyn*(ea_ex-ea_ex(-1))+(1-dyn)*null ;
          ea_dpim = dyn*(ea_pim-ea_pim(-1))+(1-dyn)*null ;
          ea_dim = dyn*(ea_im-ea_im(-1))+(1-dyn)*null ;
          ea_dq = dyn*(ea_q-ea_q(-1))+(1-dyn)*null ;
          ea_dlamnlc = dyn*(ea_lamnlc-ea_lamnlc(-1))+(1-dyn)*null ;
          ea_dlamlc = dyn*(ea_lamlc-ea_lamlc(-1))+(1-dyn)*null ;
          ea_dk = dyn*(ea_k-ea_k(-1))+(1-dyn)*null ;
          ea_dkg = dyn*(ea_kg-ea_kg(-1))+(1-dyn)*null ;
          ea_dl = dyn*(ea_l-ea_l(-1))+(1-dyn)*null ;
          ea_di = dyn*(ea_i-ea_i(-1))+(1-dyn)*null ;
          ea_dcnlc = dyn*(ea_cnlc-ea_cnlc(-1))+(1-dyn)*null ;
          ea_infc = dyn*(ea_pc/ea_pc(-1)*(1+ea_infy)-1)+(1-dyn)*null ;
          ea_dinfc = dyn*(ea_infc-ea_infc(-1))+(1-dyn)*null ;
          ea_dinfy = dyn*(ea_infy-ea_infy(-1))+(1-dyn)*null ;
          ea_dinfx = dyn*(ea_infx-ea_infx(-1))+(1-dyn)*null ;
          ea_dwr = dyn*(ea_wr-ea_wr(-1))+(1-dyn)*null ;
          ea_dwinf = dyn*(ea_winf-ea_winf(-1))+(1-dyn)*null ;
          ea_dltfp = dyn*(ea_ltfp-ea_ltfp(-1))+(1-dyn)*null ;
          ea_dgs = dyn*(ea_gs-ea_gs(-1))+(1-dyn)*null ;
          ea_digs = dyn*(ea_igs-ea_igs(-1))+(1-dyn)*null ;
          ea_dbr = dyn*(ea_br-ea_br(-1))+(1-dyn)*null ;
          ea_dtl = dyn*(ea_tl-ea_tl(-1))+(1-dyn)*null ;
          ea_dv = dyn*(ea_v-ea_v(-1))+(1-dyn)*null ;
          ea_dc = dyn*(ea_c-ea_c(-1))+(1-dyn)*null ;
          ea_dexr = dyn*(ea_EX_r-ea_EX_r(-1))+(1-dyn)*null ;
          ea_dr = dyn*(ea_r-ea_r(-1))+(1-dyn)*null ;
          ea_drealint = dyn*(ea_realint-ea_realint(-1))+(1-dyn)*null ;
          ea_dexl = dyn*(ea_EX_l-ea_EX_l(-1))+(1-dyn)*null ;
          ea_dexucap = dyn*(ea_EX_ucap-ea_EX_ucap(-1))+(1-dyn)*null ;
          ea_dy = dyn*(ea_y-ea_y(-1))+(1-dyn)*null ;
          ea_dinom = dyn*(ea_inom-ea_inom(-1))+(1-dyn)*null ;
          ea_dnomint = dyn*(ea_nomint-ea_nomint(-1))+(1-dyn)*null ;
          ea_doil = dyn*(ea_oil-ea_oil(-1))+(1-dyn)*null ;

          ea_imr = ea_im1lag*ea_imr(-1)+(1-
ea_im1lag)*ea_s_r*(ea_rer/ea_pim)^(-ea_sig1)*ea_im ;
          ea_rer = ea_rer(-1)*(1+r_infy)/(1+ea_infy) ;
          ea_bwry = ea_rer*ea_bwr/(4*ea_y) ;
          ea_ly = log(ea_y) ;
          ea_ll = log(ea_l) ;
          ea_lc = log(ea_c) ;
          ea_lcnlc = log(ea_cnlc) ;
          ea_lclc = log(ea_clc) ;
          ea_try = ea_tr/ea_y ;
          ea_trfory = ea_trfor/ea_y ;
          ea_utilcnlc = exp(ea_eps_cnlc)*log(ea_cnlc-ea_hab*(ea_cnlc-
ea_dcnlc)) ;
          ea_utilclc = exp(ea_eps_cnlc)*log(ea_clc-ea_hab*ea_clc(-1)) ;
          ea_utill = exp(ea_eps_l)*ea_omeg/(1+ea_kappa)*(1-ea_l-
ea_habl*ea_l+ea_habl*(ea_l-ea_dl))^(1+ea_kappa) ;
          ea_welfnlc =
ea_utilcnlc+ea_utill+1/(1+ea_theta+ea_rho)*ea_welfnlc(+1) ;
          ea_welflc =
ea_utilclc+ea_utill+1/(1+ea_theta+ea_rho)*ea_welflc(+1) ;
          ea_welftot = (1-ea_slc-
ea_eps_slc)*ea_welfnlc+(ea_slc+ea_eps_slc)*ea_welflc ;
          ea_cay2=((r_inom-r_dinom)*ea_rer*(ea_bwr-
ea_dbwr)/(1+r_infy)+ea_trfor+ea_surplus+ea_px*ea_ex-ea_pim*ea_im-
ea_poil*ea_oil-ea_inom(-1)*ea_bfund)/ea_y*100;
          ea_uempl=1-ea_l/(1-ea_npart);
```

```
           ea_uemplp=ea_uempl*100;

// Endogenise the slc share:

ea_eps_slc=rhoslc*ea_eps_slc(-1)+(1-rhoslc)*gamslc*(ea_uempl-
0.0705033)*(1-ea_npart);
ea_gnlc=((1-ea_slc-ea_eps_slc)/(1-ea_slc-ea_eps_slc(-1))-1);

//*********************************************************************
// Household and firm behaviour and national fiscal policy in country 2
//*********************************************************************

          r_lamnlc = 1/(1+r_theta+r_rho)*(1+r_r-
r_gnlc(+1))*(lev*r_lamnlc(1)+(1-lev)*(r_lamnlc+r_dlamnlc(1))) ;
          r_f = r_br+r_bwr+r_v*(1+r_eps_v) ;
          r_lamnlc = r_ucnlc/((1+r_tvat)*r_pc) ;
          r_ucnlc = exp(r_eps_cnlc)*(1-r_hab)^r_sigc*(r_cnlc-
r_hab*(r_cnlc-r_dcnlc))^(-r_sigc) ;
          r_clc = (1-
r_tl)*r_wr/(r_pc*(1+r_tvat))*r_l+r_ben/(r_pc*(1+r_tvat))*(1-r_npart-
r_l)+r_trlc/(r_pc*(1+r_tvat))-r_tax/(r_pc*(1+r_tvat))+r_eps_clc ;
          r_lamlc = (1-r_hab)^r_sigc*(r_clc-r_hab*r_clc(-1))^(-
r_sigc)/((1+r_tvat)*r_pc) ;
        r_uclc = (1-r_hab)^r_sigc*(r_clc-r_hab*r_clc(-1))^(-r_sigc) ;
          r_c = (1-r_slc-r_eps_slc)*r_cnlc+(r_slc+r_eps_slc)*r_clc;
          r_vl = exp(r_eps_l)*r_omeg*(1-r_l-r_habl*r_l+r_habl*(r_l-
r_dl))^r_kappa ;
          r_vl = ((1-r_slc-
r_eps_slc)*r_lamnlc+(r_slc+r_eps_slc)*r_lamlc)*((1-r_thetanlc)/(-
r_thetanlc)*(r_wr*(1-r_tl)-r_ben)-1/r_thetanlc*(1-
r_npart)/r_l*r_ben+r_gamw/r_thetanlc*r_wr*r_winf)-(lev*((1-r_slc-
r_eps_slc)*r_lamnlc(1)+(r_slc+r_eps_slc)*r_lamlc(1))+(1-lev)*((1-r_slc-
r_eps_slc)*(r_lamnlc+r_dlamnlc(1))+(r_slc+r_eps_slc)*(r_lamlc+r_dlamlc(1)
)))*1/(1+r_theta+r_rho)*r_gamw/r_thetanlc*r_wr/(1+r_infy+r_dinfy(1))*(r_l
+r_dl(1))/r_l*(r_sfw*(lev*r_winf(1)+(1-lev)*(r_winf+r_dwinf(1)))+(1-
r_sfw)*(r_winf-r_dwinf)) ;
          r_ben =
r_benex*r_EX_ben*r_pc*((1+r_tvat)/(1+r_EX_tvat))^r_bentvat+(1-
r_benex)*r_benrr*r_wr*((1-r_tl)/(1-
r_EX_tl))^r_bentl*(r_pc*((1+r_tvat)/(1+r_EX_tvat))^r_bentvat)^r_benpc+r_e
ps_ben ;
          r_tr = r_trnom*r_trshare*r_y+(1-
r_trnom)*r_tryshare+r_ttrdom*(r_uempl-0.0705033)+r_eps_tr ;
          r_trlc = r_dumtrlc*r_tr+(1-r_dumtrlc)*r_EX_trlc+r_eps_trlc ;
          r_g = r_gs*r_y/r_pc+r_eps_gs+r_tgy*(r_ly-r_ly(-4)) ;
          r_gs = (1-r_gslag)*r_EX_gs+r_gslag*(r_gs-r_dgs)+r_eps_g ;
          r_ig = r_igs*r_y/r_pc+r_eps_igs ;
          r_igs = (1-r_igslag)*r_EX_igs+r_igslag*(r_igs-r_digs)+r_eps_ig
;
          (r_gami+r_eps_i)*(r_i/(r_k-r_dk)-
(r_delta+w_gtfp+w_gpop))+r_gami2*r_di-
r_gami2*1/(1+r_theta+r_rho)*1/(1+r_rpremk+r_u_rpremk)*(lev*r_lamnlc(1)+(1
-
lev)*(r_lamnlc+r_dlamnlc(1)))/r_lamnlc*(1+r_infc+r_dinfc(1))/(1+r_infy+r_
dinfy(1))*(lev*(r_i(1)-r_i)+(1-lev)*r_di(1)) = r_q-1 ;
          r_eta/(r_pc*(1+r_upi))*(1-r_tc)*(1-
r_alpha)*(r_y+r_fcy*r_tfp)/r_k+r_tc*r_delta = r_q-(1-(r_inom-r_infc-
r_dinfc(1))-r_delta-r_rpremk-r_u_rpremk)*(lev*r_q(1)+(1-
lev)*(r_q+r_dq(1)))+dyn*(r_a1*(r_ucap-1)+r_a2*(r_ucap-1)^2) ;
```

```
          r_wr*(1+r_ssc) = (r_eta*r_alpha*(r_y+r_fcy*r_tfp)/(r_l-r_fcl)-
r_gaml*r_wr*r_dl+r_gaml*(lev*r_wr(1)+(1-
lev)*(r_wr+r_dwr(1)))*1/(1+r_theta+r_rho)*1/(1+r_rpremk+r_u_rpremk)*r_lam
nlc(1)/r_lamnlc*(lev*(r_l(1)-r_l)+(1-lev)*r_dl(1)))/(1+r_eps_w) ;
          r_k = r_i+(1-(r_delta+w_gtfp+w_gpop))*(r_k-r_dk) ;
          r_eta*(1-r_alpha)*(r_y+r_fcy*r_tfp)/r_k =
r_pc*(r_a1+2*r_a2*(r_ucap-1)+r_eps_ucap)*r_ucap ;
          r_eta = 1-(r_tau+r_eps_eta)-
r_gamp*(1/(1+r_theta+r_rho)*1/(1+r_rpremk+r_u_rpremk)*r_lamnlc(1)/r_lamnl
c*r_sfp*(lev*r_infy(1)+(1-lev)*(r_infy+r_dinfy(1)))+(1-r_sfp)*(r_infy-
r_dinfy)-r_infy) ;
          r_y = (r_s-r_u_im)*r_pcy^r_sig*(1-
r_soil)*(r_pc/r_pcy)^r_sigmaoil*(r_c+r_i*(1+r_upi)^r_sigmaoil+r_g+r_ig)+r
_ex+r_gami/2*(r_i/(r_k-r_dk)-(r_delta+w_gtfp+w_gpop))^2*(r_k-
r_dk)+r_gami2/2*r_di^2+r_gamp/2*r_infy^2*r_y+r_gamw/2*r_winf^2*r_l+r_gaml
/2*r_dl^2*r_wr+r_gampx/2*r_infx^2*r_ex+(r_a1*(r_ucap-1)+r_a2*(r_ucap-
1)^2)*r_pc*r_k;
          r_kg = r_ig+(1-(r_deltag+w_gtfp+w_gpop))*(r_kg-r_dkg) ;
          r_y = r_a*(r_ucap*r_k)^(1-r_alpha)*((r_l-
r_fcl)*r_tfp)^r_alpha*r_kg^(1-r_alphag)-r_fcy*r_tfp ;
          r_tfp = exp(r_ltfp) ;
          r_ltfp = (1-r_rhotfp)*r_EX_ltfp+r_rhotfp*(r_ltfp-
r_dltfp)+r_eps_ltfp ;
          r_o = 1/r_po*(r_y+r_poil*r_oil+r_poil*r_exoil) ;
          r_oil = r_soil*(r_c+r_i+r_g+r_ig)*(r_poil/r_pc)^(-r_sigmaoil)-
r_gamoil*r_doil+r_gamoil*(lev*(r_oil(1)-r_oil)+(1-lev)*r_doil(1)) ;
          r_ygap = (1-
r_alpha)*log(r_ucap/r_EX_ucap)+r_alpha*log(r_l/r_EX_l) ;
          r_EX_l = r_llag*(r_EX_l-r_dexl)+(1-r_llag)*r_l ;
          r_EX_ucap = r_ucaplag*(r_EX_ucap-r_dexucap)+(1-
r_ucaplag)*r_ucap ;
          r_EX_r = r_rlag*(r_EX_r-r_dexr)+(1-r_rlag)*r_r ;
          r_inom = euro_inom-ea_rprem*ea_libdum*(-
0*ea_size*ea_bwr/r_size+r_bwr)+r_u_rpreme ;
          r_m = r_y*(1+r_inom)^(-r_zet) ;
          r_pc = ((1-r_soil)*r_pcy^(1-r_sigmaoil)+r_soil*r_poil^(1-
r_sigmaoil))^(1/(1-r_sigmaoil)) ;
          r_pcy = (r_s*1^(1-r_sig)+(1-r_s)*r_pim^(1-r_sig))^(1/(1-r_sig))
;
          r_po =
r_y/(r_y+r_poil*r_oil+r_poil*r_exoil)+r_poil*r_poil*r_oil/(r_y+r_poil*r_o
il+r_poil*r_exoil)+r_poil*r_poil*r_exoil/(r_y+r_poil*r_oil+r_poil*r_exoil
) ;
          r_wrinf = r_dwr/(r_wr-r_dwr) ;
          r_winf = r_wr/(r_wr-r_dwr)*(1+r_infy)-1;
          r_r = r_inom-(lev*r_infy(1)+(1-lev)*(r_infy+r_dinfy(1))) ;
          r_by = r_br/4/r_y ;
          r_tax = r_taxshare*r_y ;
          r_tl = r_tl-r_dtl+r_taxdum*(r_tgovb1*(r_br/(4*r_y)-
r_btar)+r_tgovb2*r_dbr+r_tgovby*(r_gby-r_EX_gby)+r_tgovinf*(r_infc-
r_EX_inf))+r_eps_tl ;
          r_im = (1-r_s+r_u_im)*(r_pim/r_pc)^(-r_sig)*(1-
r_soil)*(r_c+r_i+r_g+r_ig)*(((lev*r_im(1)+(1-
lev)*(r_im+r_dim(1)))/r_im)^r_sfim/(r_im/(r_im-r_dim))^(1-
r_sfim))^r_gamim ;
          r_tby = (r_px*r_ex-r_pim*r_im+r_poil*r_exoil)*100/r_y ;
          r_px = 1/(1-r_taux-r_eps_etax-
r_gampx*(1/(1+r_theta+r_rho)*r_lamnlc(1)/r_lamnlc*(r_sfpx*(lev*r_infx(1)+
(1-lev)*(r_infx+r_dinfx(1)))+(1-r_sfpx)*(r_infx-r_dinfx))-
r_infx))*1^r_sxd*r_pc^(1-r_sxd) ;
```

```
          r_infx = r_px/(r_px-r_dpx)*(1+r_infy)-1 ;
          r_v = (1-r_tc)*(r_y-(1+r_ssc)*r_wr*r_l)+r_tc*r_delta*r_k*r_pc-
r_pc*r_i+1/((1+r_realint-
r_drealint+r_rpremk+r_u_rpremk)/((1+w_gtfp)*(1+w_gpop)))*(lev*r_v(1)+(1-
lev)*(r_v+r_dv(1))) ;
          r_poil = 1-r_poildol+r_poildol+r_eps_poil ;
          r_tot = r_px/((1-r_soil)*r_pim+r_soil*r_poil) ;
          r_toty = r_px/r_pim ;
          r_nomint = (1+r_inom)*(1+w_gpop)*(1+w_gtfp)*(1+w_coreinf)-1 ;
          r_realint = (1+r_r)*(1+w_gpop)*(1+w_gtfp)-1 ;
          r_inflation = (1+r_infy)*(1+w_coreinf)-1 ;
          r_cay = (r_bwr-1/((1+w_gtfp)*(1+w_gpop))*(r_bwr-
r_dbwr)/(1+r_infy))/r_y*100 ;
          r_dbwr = dyn*(r_bwr-r_bwr(-1))+(1-dyn)*null ;
          r_dpx = dyn*(r_px-r_px(-1))+(1-dyn)*null ;
          r_dex = dyn*(r_ex-r_ex(-1))+(1-dyn)*null ;
          r_dpim = dyn*(r_pim-r_pim(-1))+(1-dyn)*null ;
          r_dim = dyn*(r_im-r_im(-1))+(1-dyn)*null ;
          r_dq = dyn*(r_q-r_q(-1))+(1-dyn)*null ;
          r_dlamnlc = dyn*(r_lamnlc-r_lamnlc(-1))+(1-dyn)*null ;
          r_dlamlc = dyn*(r_lamlc-r_lamlc(-1))+(1-dyn)*null ;
          r_dk = dyn*(r_k-r_k(-1))+(1-dyn)*null ;
          r_dkg = dyn*(r_kg-r_kg(-1))+(1-dyn)*null ;
          r_dl = dyn*(r_l-r_l(-1))+(1-dyn)*null ;
          r_di = dyn*(r_i-r_i(-1))+(1-dyn)*null ;
          r_dcnlc = dyn*(r_cnlc-r_cnlc(-1))+(1-dyn)*null ;
          r_infc = dyn*(r_pc/r_pc(-1)*(1+r_infy)-1)+(1-dyn)*null ;
          r_dinfc = dyn*(r_infc-r_infc(-1))+(1-dyn)*null ;
          r_dinfy = dyn*(r_infy-r_infy(-1))+(1-dyn)*null ;
          r_dinfx = dyn*(r_infx-r_infx(-1))+(1-dyn)*null ;
          r_dwr = dyn*(r_wr-r_wr(-1))+(1-dyn)*null ;
          r_dwinf = dyn*(r_winf-r_winf(-1))+(1-dyn)*null ;
          r_dltfp = dyn*(r_ltfp-r_ltfp(-1))+(1-dyn)*null ;
          r_dgs = dyn*(r_gs-r_gs(-1))+(1-dyn)*null ;
          r_digs = dyn*(r_igs-r_igs(-1))+(1-dyn)*null ;
          r_dbr = dyn*(r_br-r_br(-1))+(1-dyn)*null ;
          r_dtl = dyn*(r_tl-r_tl(-1))+(1-dyn)*null ;
          r_dv = dyn*(r_v-r_v(-1))+(1-dyn)*null ;
          r_dc = dyn*(r_c-r_c(-1))+(1-dyn)*null ;
          r_dexr = dyn*(r_EX_r-r_EX_r(-1))+(1-dyn)*null ;
          r_dr = dyn*(r_r-r_r(-1))+(1-dyn)*null ;
          r_drealint = dyn*(r_realint-r_realint(-1))+(1-dyn)*null ;
          r_dexl = dyn*(r_EX_l-r_EX_l(-1))+(1-dyn)*null ;
          r_dexucap = dyn*(r_EX_ucap-r_EX_ucap(-1))+(1-dyn)*null ;
          r_dy = dyn*(r_y-r_y(-1))+(1-dyn)*null ;
          r_dinom = dyn*(r_inom-r_inom(-1))+(1-dyn)*null ;
          r_dnomint = dyn*(r_nomint-r_nomint(-1))+(1-dyn)*null ;
          r_doil = dyn*(r_oil-r_oil(-1))+(1-dyn)*null ;
          ea_ex = r_imea*r_size/ea_size ;
          r_imea = r_im1lag*r_imea(-1)+(1-
r_im1lag)*r_s_ea*(r_rer/r_pim)^(-r_sig1)*r_im ;
          ea_pim = ea_pimlag*ea_pim(-1)/(1+ea_infy)+(1-
ea_pimlag)*(ea_s_r*(r_px*ea_rer)^(1-ea_sig1))^(1/(1-ea_sig1)) ;
          r_ex = ea_imr*ea_size/r_size ;
          r_pim = r_pimlag*r_pim(-1)/(1+r_infy)+(1-
r_pimlag)*(r_s_ea*(ea_px*r_rer)^(1-r_sig1))^(1/(1-r_sig1)) ;
          r_exoil = 1/r_poil*ea_poil*r_rer*ea_oil*ea_size/r_size ;
          r_rer = 1/ea_rer ;
          r_bwry = r_bwr/(4*r_y) ;
          r_ly = log(r_y) ;
```

```
          r_ll = log(r_l) ;
          r_lc = log(r_c) ;
          r_lcnlc = log(r_cnlc) ;
          r_lclc = log(r_clc) ;
          r_try = r_tr/r_y ;
          r_trfory = r_trfor/r_y ;
          r_utilcnlc = exp(r_eps_cnlc)*log(r_cnlc-r_hab*(r_cnlc-r_dcnlc))
;
          r_utilclc = exp(r_eps_cnlc)*log(r_clc-r_hab*r_clc(-1)) ;
          r_utill = exp(r_eps_l)*r_omeg/(1+r_kappa)*(1-r_l-
r_habl*r_l+r_habl*(r_l-r_dl))^(1+r_kappa) ;
          r_welfnlc =
r_utilcnlc+r_utill+1/(1+r_theta+r_rho)*r_welfnlc(+1) ;
          r_welflc = r_utilclc+r_utill+1/(1+r_theta+r_rho)*r_welflc(+1) ;
          r_welftot = (1-r_slc-
r_eps_slc)*r_welfnlc+(r_slc+r_eps_slc)*r_welflc ;
          all_welf =
(ea_size*ea_welftot+r_size*r_welftot)/(ea_size+r_size);
          r_tby2 = -ea_tby*ea_y/r_y*r_rer*ea_size/r_size;
          r_cay2=((r_inom-r_dinom)*(r_bwr-
r_dbwr)/(1+r_infy)+r_trfor+r_surplus+r_px*r_ex-r_pim*r_im-r_poil*r_oil-
r_inom(-1)*r_bfund)/r_y*100;
          r_uempl=1-r_l/(1-r_npart);
        r_uemplp=r_uempl*100;

// Endogenise the slc share:

r_eps_slc=rhoslc*r_eps_slc(-1)+(1-rhoslc)*gamslc*(r_uempl-0.0705033)*(1-
r_npart);
r_gnlc=((1-r_slc-r_eps_slc)/(1-r_slc-r_eps_slc(-1))-1);


//*****************************************************************
// EA aggregates
//*****************************************************************

EURO_INFC = ea_infc*ea_size/euro_size+r_infc*r_size/euro_size ;
euro_EX_r = ea_EX_r*ea_size/euro_size+r_EX_r*r_size/euro_size ;
euro_ygap = ea_ygap*ea_size/euro_size+r_ygap*r_size/euro_size ;

euro_inom = r_ilag*euro_inom(-1)+(1-
r_ilag)*(euro_EX_r+euro_EX_inf+r_tinf*(EURO_INFC-
euro_EX_inf)+r_ty*euro_ygap)+r_eps_m ;

//*****************************************************************
// Cross-border transfer design
//*****************************************************************

          ea_inom(-1)*ea_bfund*ea_size/r_size/ea_rer+r_inom(-
1)*r_bfund=ea_trfor*ea_size/r_size/ea_rer+r_trfor+ea_surplus*ea_size/r_si
ze/ea_rer+r_surplus;
          ea_trfor = ea_ttrforlag0*(ea_uempl-0.0705033);
          r_trfor = ea_ttrforlag0*(r_uempl-0.0705033);
          ea_surplus/ea_rer=r_surplus;

// Implications for country 1 and 2 resource constraints

ea_rer*ea_bwr = (1+r_inom-r_dinom)*ea_rer*(ea_bwr-
ea_dbwr)/(1+r_infy)+ea_trfor+ea_px*ea_ex-ea_pim*ea_im-
ea_poil*ea_oil+ea_surplus-ea_inom(-1)*ea_bfund;
```

```
          r_bwr = -ea_bwr*ea_size/r_size ;
          ea_br = (1+ea_realint-ea_drealint+ea_rpremb*(ea_br/(4*ea_y)-
ea_EX_by)+ea_eps_rpremb)/((1+w_gtfp)*(1+w_gpop))*(ea_br-
ea_dbr)+ea_pc*ea_g+ea_pc*ea_ig+(1-ea_slc-
ea_eps_slc)*ea_tr+(ea_slc+ea_eps_slc)*ea_trlc+ea_ben*(1-ea_npart-ea_l)-
ea_tl*ea_wr*ea_l-ea_ssc*ea_wr*ea_l-ea_tvat*ea_pc*ea_c-(ea_tc*(ea_y-
(1+ea_ssc)*ea_wr*ea_l)-ea_tc*ea_delta*ea_k*ea_pc)-ea_tax-ea_trfor-
ea_surplus;
          ea_gby = (-(ea_nomint-ea_dnomint+ea_rpremb*(ea_br/(4*ea_y)-
ea_EX_by)+ea_eps_rpremb)/((1+w_gtfp)*(1+w_gpop)*(1+w_coreinf))*(ea_br-
ea_dbr)/(1+ea_infy)-ea_pc*ea_g-ea_pc*ea_ig-(1-ea_slc-ea_eps_slc)*ea_tr-
(ea_slc+ea_eps_slc)*ea_trlc-ea_ben*(1-ea_npart-
ea_l)+ea_tl*ea_wr*ea_l+ea_ssc*ea_wr*ea_l+ea_tvat*ea_pc*ea_c+ea_tc*(ea_y-
(1+ea_ssc)*ea_wr*ea_l)-
ea_tc*ea_delta*ea_k*ea_pc+ea_tax+ea_trfor+ea_surplus)/ea_y ;

          r_br = (1+r_realint-r_drealint+r_rpremb*(r_br/(4*r_y)-
r_EX_by)+r_eps_rpremb)/((1+w_gtfp)*(1+w_gpop))*(r_br-
r_dbr)+r_pc*r_g+r_pc*r_ig+(1-r_slc-
r_eps_slc)*r_tr+(r_slc+r_eps_slc)*r_trlc+r_ben*(1-r_npart-r_l)-
r_tl*r_wr*r_l-r_ssc*r_wr*r_l-r_tvat*r_pc*r_c-(r_tc*(r_y-
(1+r_ssc)*r_wr*r_l)-r_tc*r_delta*r_k*r_pc)-r_tax-r_trfor-r_surplus ;
          r_gby = (-(r_nomint-r_dnomint+r_rpremb*(r_br/(4*r_y)-
r_EX_by)+r_eps_rpremb)/((1+w_gtfp)*(1+w_gpop)*(1+w_coreinf))*(r_br-
r_dbr)/(1+r_infy)-r_pc*r_g-r_pc*r_ig-(1-r_slc-r_eps_slc)*r_tr-
(r_slc+r_eps_slc)*r_trlc-r_ben*(1-r_npart-
r_l)+r_tl*r_wr*r_l+r_ssc*r_wr*r_l+r_tvat*r_pc*r_c+r_tc*(r_y-
(1+r_ssc)*r_wr*r_l)-r_tc*r_delta*r_k*r_pc+r_tax+r_trfor+r_surplus)/r_y ;

//*****************************************************************
// AR(1) shocks
//*****************************************************************

ea_u_im=rho_im*ea_u_im(-1)+ea_eps_im;
r_u_im=rho_im*r_u_im(-1)+r_eps_im;
ea_u_rpreme=rho_rprem*ea_u_rpreme(-1)+ea_eps_rpreme;
r_u_rpreme=rho_rprem*r_u_rpreme(-1)+r_eps_rpreme;

ea_u_rpremk=rho_rprem*ea_u_rpremk(-1)+ea_eps_rpremk;
r_u_rpremk=rho_rprem*r_u_rpremk(-1)+r_eps_rpremk;

trfor_ib=(ea_trfor*ea_size/r_size/ea_rer+r_trfor)/(ea_inom(-
1)*ea_bfund*ea_size/r_size/ea_rer+r_inom(-1)*r_bfund);

//*****************************************************************
// Definition of growth rates for Asdrubali et al decomposition
//*****************************************************************

ea_gc=ea_lc-ea_lc(-1);
ea_gy=ea_ly-ea_ly(-1);
r_gc=r_lc-r_lc(-1);
r_gy=r_ly-r_ly(-1);

ea_gcnlc=log(ea_cnlc/ea_cnlc(-1));
ea_gclc=log(ea_clc/ea_clc(-1));

r_gcnlc=log(r_cnlc/r_cnlc(-1));
r_gclc=log(r_clc/r_clc(-1));

ea_gcg=log(ea_c+ea_g)-log(ea_c(-1)+ea_g(-1));
```

```
ea_gnp = ea_y+(r_inom-r_dinom)*ea_rer*(ea_bwr-ea_dbwr)/(1+r_infy);
ea_gnptr=ea_gnp+ea_trfor+ea_surplus-ea_inom(-1)*ea_bfund;

ea_ggnp=log(ea_gnp)-log(ea_gnp(-1));
ea_ggnptr=log(ea_gnptr)-log(ea_gnptr(-1));

ea_gfi=ea_gy-ea_ggnp;
ea_gtr=ea_ggnp-ea_ggnptr;
ea_gcred=ea_ggnptr-ea_gc;

ea_gcredcnlc=ea_ggnptr-ea_gcnlc;
ea_gcredclc=ea_ggnptr-ea_gclc;

ea_gcredg=ea_ggnptr-ea_gcg;

ea_rcpi = ea_inom-(lev*ea_infc(1)+(1-lev)*(ea_infc+ea_dinfc(1))) ;

ea_cay_net_tr = ea_cay2-(ea_trfor-ea_surplus+ea_inom(-
1)*ea_bfund)/ea_y*100;
r_cay_net_tr = r_cay2-(r_trfor-r_surplus+r_inom(-1)*r_bfund)/r_y*100;

ea_tb=ea_tby*ea_y/100;
ea_cnom=ea_c*ea_pc;
ea_gnom=ea_g*ea_pc;
ea_ignom=ea_ig*ea_pc;
ea_invnom=ea_i*ea_pc;

ea_y_pc=ea_y/ea_pc;
ea_tb_pc=ea_tb/ea_pc;

// Log-linear growth expression for domestic demand excluding consumption

ea_gdemc=0.18*log(ea_g/ea_g(-1))+(0.162349/1.0707)*log(ea_i/ea_i(-
1))+0.04*log(ea_ig/ea_ig(-
1))+(0.18+0.04+0.6728/1.0707+0.162349/1.0707)*log(ea_pc/ea_pc(-
1))+0.428281/1.0707*log(ea_ex/ea_ex(-
1))+0.428281/1.0707*log(ea_px/ea_px(-1))-
0.428281/1.0707*log(ea_im/ea_im(-1))-0.428281/1.0707*log(ea_pim/ea_pim(-
1));

ea_gdemcg=(0.162349/1.0707)*log(ea_i/ea_i(-1))+0.04*log(ea_ig/ea_ig(-
1))+(0.18+0.04+0.6728/1.0707+0.162349/1.0707)*log(ea_pc/ea_pc(-
1))+0.428281/1.0707*log(ea_ex/ea_ex(-
1))+0.428281/1.0707*log(ea_px/ea_px(-1))-
0.428281/1.0707*log(ea_im/ea_im(-1))-0.428281/1.0707*log(ea_pim/ea_pim(-
1));

// Log-linear growth expression for domestic total consumption

ea_glincg=0.18*log(ea_g/ea_g(-1))+0.6728/1.0707*log(ea_c/ea_c(-1));

// Nominal growth rates

ea_gcrednom=ea_ggnptr-ea_gcnom;
ea_gcnom=ea_gc+log(ea_pc/ea_pc(-1));


// Country gaps
```

```
gapcnlc=log((1+ea_tvat)*ea_pc/ea_rer/ea_ucnlc)-
log((1+r_tvat)*r_pc/r_ucnlc);
gapclc=log((1+ea_tvat)*ea_pc/ea_rer/ea_uclc)-log((1+r_tvat)*r_pc/r_uclc);
gapc=log((1+ea_tvat)*ea_pc/ea_rer/(ea_slc*ea_uclc+(1-ea_slc)*ea_ucnlc))-
log((1+r_tvat)*r_pc/(r_slc*r_uclc+(1-r_slc)*r_ucnlc));

gapgs=log(ea_gs)-log(r_gs);
gaptfp=ea_ltfp-r_ltfp;

ea_gapgc=ea_gclc-ea_gcnlc;
ea_gapguc=log(ea_uclc(-1))-log(ea_uclc)-log(ea_ucnlc(-1))+log(ea_ucnlc);

ea_lwr=log(ea_wr);

end;

// INITIAL VALUES (CALIBRATION)

initval;
ea_gapgc=0; ea_gapguc=0;
gapcnlc=0; gapclc=0; gapc=0; gapgs=0; gaptfp=0;
ea_gnlc=0; r_gnlc=0; ea_gcredg=0; ea_gdemc=0; ea_gdemcg=0; ea_glincg=0;
ea_gcnlc=0; ea_gclc=0; r_gcnlc=0; r_gclc=0; ea_gcredcnlc=0;
ea_gcredclc=0;
ea_y_pc=ea_y; ea_tb_pc=ea_tb;
ea_gcrednom=0; ea_gcnom=0; ea_gcg=0;
ea_eps_slc=0; r_eps_slc=0;
ea_tb=0; ea_cnom=ea_c; ea_invnom=ea_i; ea_gnom=ea_g; ea_ignom=ea_ig;
ea_cay_net_tr=0; ea_cay_net_tr=0;
ea_gy=0; r_gy=0; ea_gc=0; r_gc=0;
ea_eps_rpreme=0;
ea_u_rpreme=0;
ea_u_rpremk=0;
r_u_rpremk=0;
ea_ben=0.347236353606391;
ea_br=2.39999999999999;
ea_bwr=0;
ea_bwry=0;
ea_by=0.599999999999997;
ea_c=0.582692901947837;
ea_cay=0;
ea_clc=0.495791678914299;
ea_cnlc=0.582692901947837;
ea_dbr=0;
ea_dbwr=0;
ea_dc=0;
ea_dcnlc=0;
ea_dex=0;
ea_dexl=0;
ea_dexr=0;
ea_dexucap=0;
ea_dgs=0;
ea_di=0;
ea_digs=0;
ea_dim=0;
ea_dinfc=0;
ea_dinfx=0;
ea_dinfy=0;
ea_dinom=0;
ea_dk=0;
```

```
ea_dkg=0;
ea_dl=0;
ea_dlamlc=0;
ea_dlamnlc=0;
ea_dltfp=0;
ea_dnomint=0;
ea_doil=0;
ea_dpim=0;
ea_dpx=0;
ea_dq=0;
ea_dr=0;
ea_drealint=0;
ea_dtl=0;
ea_dv=0;
ea_dwinf=0;
ea_dwr=0;
ea_dy=0;
ea_eta=0.749999999999999;
ea_ex=0.218457975960748;
ea_EX_l=0.656432118684563;
ea_EX_r=0.00323437285093475;
ea_EX_ucap=1;
ea_f=10.0305194057837;
ea_g=0.18;
ea_gby=-0.0220510402407389;
ea_gs=0.18;
ea_i=0.197307098052164;
ea_ig=0.0399999999999997;
ea_igs=0.0399999999999997;
ea_im=0.218457975960748;
ea_imr=0.218457975960748;
ea_infc=0;
ea_inflation=0.00499999999999989;
ea_infx=0;
ea_infy=0;
ea_inom=0.00323437285093475;
ea_k=10.2497193793332;
ea_kg=2.38805970149254;
ea_l=0.656432118684563;
ea_lamlc=1.72391125355814;
ea_lamnlc=1.46681185208151;
ea_lc=-0.540094986222151;
ea_lclc=-0.701599442671746;
ea_lcnlc=-0.540094986222151;
ea_ll=-0.420935989390241;
ea_ltfp=0;
ea_ly=0;
ea_m=0.998709172428258;
ea_nomint=0.0125375000000001;
ea_o=1;
ea_oil=0;
ea_pc=1;
ea_pcy=1;
ea_pim=1;
ea_po=1;
ea_poil=1;
ea_px=1;
ea_q=1;
ea_r=0.00323437285093475;
ea_realint=0.0075;
```

```
ea_rer=1;
ea_tax=0;
ea_tby=0;
ea_tfp=1;
ea_tl=0.295462551974026;
ea_tot=1;
ea_toty=1;
ea_tr=0.159999999999999;
ea_trfor=0;
ea_trfory=0;
ea_trlc=0.159999999999999;
ea_try=0.159999999999999;
ea_ucap=1;
ea_ucnlc=1.71616986693536;
ea_uclc=ea_lamlc*(1+ea_tvat)*ea_pc;
ea_utilclc=-1.90557224699768;
ea_utilcnlc=-1.74406779054809;
ea_utill=-0.0209030778266619;
ea_v=7.63051940578377;
ea_vl=0.243364749308104;
ea_welflc=-597.552092287192;
ea_welfnlc=-547.456809663232;
ea_welftot=-547.456809663232;
ea_winf=0;
ea_wr=0.868090884015973;
ea_wrinf=0;
ea_y=1;
ea_ygap=0;
euro_EX_r=0.00323437285093475;
EURO_INFC=0;
euro_ygap=0;
r_ben=0.347236353606391;
r_br=2.39999999999999;
r_bwr=0;
r_bwry=0;
r_by=0.599999999999997;
r_c=0.582692901947837;
r_cay=0;
r_clc=0.495791678914299;
r_cnlc=0.582692901947837;
r_dbr=0;
r_dbwr=0;
r_dc=0;
r_dcnlc=0;
r_dex=0;
r_dexl=0;
r_dexr=0;
r_dexucap=0;
r_dgs=0;
r_di=0;
r_digs=0;
r_dim=0;
r_dinfc=0;
r_dinfx=0;
r_dinfy=0;
r_dinom=0;
r_dk=0;
r_dkg=0;
r_dl=0;
r_dlamlc=0;
```

```
r_dlamnlc=0;
r_dltfp=0;
r_dnomint=0;
r_doil=0;
r_dpim=0;
r_dpx=0;
r_dq=0;
r_dr=0;
r_drealint=0;
r_dtl=0;
r_dv=0;
r_dwinf=0;
r_dwr=0;
r_dy=0;
r_eta=0.749999999999999;
r_ex=0.218457975960748;
r_EX_l=0.656432118684563;
r_EX_r=0.00323437285093475;
r_EX_ucap=1;
r_f=10.0305194057837;
r_g=0.18;
r_gby=-0.0220510402407389;
r_gs=0.18;
r_i=0.197307098052164;
r_ig=0.0399999999999997;
r_igs=0.0399999999999997;
r_im=0.218457975960748;
r_imea=0.218457975960748;
r_infc=0;
r_inflation=0.00499999999999989;
r_infx=0;
r_infy=0;
r_inom=0.00323437285093475;
r_k=10.2497193793332;
r_kg=2.38805970149254;
r_l=0.656432118684563;
r_lamlc=1.72391125355814;
r_lamnlc=1.46681185208151;
r_lc=-0.540094986222151;
r_lclc=-0.701599442671746;
r_lcnlc=-0.540094986222151;
r_ll=-0.420935989390241;
r_ltfp=0;
r_ly=0;
r_m=0.998709172428258;
r_nomint=0.0125375000000001;
r_o=1;
r_oil=0;
r_pc=1;
r_pcy=1;
r_pim=1;
r_po=1;
r_poil=1;
r_px=1;
r_q=1;
r_r=0.00323437285093475;
r_realint=0.0075;
r_rer=1;
r_tax=0;
r_tby=0;
```

```
r_tfp=1;
r_tl=0.295462551974026;
r_tot=1;
r_toty=1;
r_tr=0.159999999999999;
r_trfor=0;
r_trfory=0;
r_trlc=0.159999999999999;
r_try=0.159999999999999;
r_ucap=1;
r_ucnlc=1.71616986693536;
r_uclc=r_lamlc*(1+r_tvat)*r_pc;
r_utilclc=-1.90557224699768;
r_utilcnlc=-1.74406779054809;
r_utill=-0.0209030778266619;
r_v=7.63051940578377;
r_vl=0.243364749308104;
r_welflc=-597.552092287192;
r_welfnlc=-547.456809663232;
r_welftot=-547.456809663232;
r_winf=0;
r_wr=0.868090884015973;
r_wrinf=0;
r_y=1;
r_ygap=0;
ea_a=0.709497806192587;
ea_btar=0.599999999999997;
ea_bwyt=0;
ea_eps_ben=0;
ea_eps_clc=0;
ea_eps_cnlc=0;
ea_eps_eta=0;
ea_eps_etax=0;
ea_eps_g=0;
ea_eps_gs=0;
ea_eps_i=0;
ea_eps_ig=0;
ea_eps_igs=0;
ea_eps_im=0;
ea_u_im=0;
ea_eps_l=0;
ea_eps_ltfp=0;
ea_eps_m=0;
ea_eps_rpremb=0;
ea_eps_rpremk=0;
ea_eps_rpremk=0;
ea_eps_tl=0;
ea_eps_tr=0;
ea_eps_trlc=0;
ea_eps_ucap=0;
ea_eps_v=0;
ea_eps_w=0;
ea_EX_ben=0.347236353606391;
ea_EX_by=0.599999999999997;
ea_EX_gby=-0.0220510402407389;
ea_EX_gs=0.18;
ea_EX_igs=0.0399999999999997;
ea_EX_inf=0;
ea_EX_ltfp=0;
ea_EX_tl=0.295462551974026;
```

```
ea_EX_trlc=0.159999999999999;
ea_EX_tvat=0.170000000000001;
ea_fcl=0.0393859271210739;
ea_fcy=0.263589743589742;
ea_ilag=0.819999999999995;
ea_libdum=1;
ea_npart=0.290000000000001;
ea_rpremb=0;
ea_rpremk=0.00926562714906521;
ea_size=13104996000;
ea_ssc=0.149999999999999;
ea_taxdum=1;
ea_taxshare=0;
ea_tc=0.280000000000001;
ea_tinf=1.5;
ea_trshare=0.159999999999999;
ea_tryshare=0.159999999999999;
ea_tvat=0.170000000000001;
ea_ty=0.0500000000000003;
ea_upi=0;
r_a=0.709497806192587;
r_btar=0.599999999999997;
r_eps_ben=0;
r_eps_clc=0;
r_eps_cnlc=0;
r_eps_eta=0;
r_eps_etax=0;
r_eps_g=0;
r_eps_gs=0;
r_eps_i=0;
r_eps_ig=0;
r_eps_igs=0;
r_eps_im=0;
r_u_im=0;
r_eps_l=0;
r_eps_ltfp=0;
r_eps_m=0;
r_eps_rpremb=0;
r_eps_rpremk=0;
r_eps_tl=0;
r_eps_tr=0;
r_eps_trlc=0;
r_eps_ucap=0;
r_eps_v=0;
r_eps_w=0;
r_EX_ben=0.347236353606391;
r_EX_by=0.599999999999997;
r_EX_gby=-0.0220510402407389;
r_EX_gs=0.18;
r_EX_igs=0.0399999999999997;
r_EX_inf=0;
r_EX_ltfp=0;
r_EX_tl=0.295462551974026;
r_EX_trlc=0.159999999999999;
r_EX_tvat=0.170000000000001;
r_fcl=0.0393859271210739;
r_fcy=0.263589743589742;
r_ilag=0.819999999999995;
r_npart=0.290000000000001;
r_rpremb=0;
```

```
r_rpremk=0.00926562714906521;
r_size=13104996000;
r_ssc=0.149999999999999;
r_taxdum=1;
r_taxshare=0;
r_tc=0.280000000000001;
r_tinf=1.5;
r_trshare=0.159999999999999;
r_tryshare=0.159999999999999;
r_tvat=0.170000000000001;
r_ty=0;
r_upi=0;
null=0;
w_coreinf=0;
w_gpop=0;
w_gtfp=0;
euro_size=ea_size+r_size;
all_welf = (ea_size*ea_welftot+r_size*r_welftot)/(ea_size+r_size);
r_tby2=r_tby;
ea_cay2=ea_cay; r_cay2=r_cay;
euro_inom=r_inom;
ea_uempl=1-ea_npart-ea_l; r_uempl=1-r_npart-r_l;
ea_bfund=1/3*ea_br;
ea_trfor=0;
ea_surplus=ea_inom*ea_bfund-ea_trfor;
r_bfund=1/3*r_br;
r_trfor=0;
r_surplus=r_inom*r_bfund-r_trfor;
trfor_ib=0;
ea_trfory=0; r_trfory=0;
ea_gnp = ea_y+ea_inom*ea_rer*ea_bwr;
ea_gnptr=ea_gnp;
ea_ggnp=0;
ea_ggnptr=0;
ea_gfi=0;
ea_gtr=0;
ea_gcred=0;
ea_rcpi=ea_r;
ea_lwr=log(ea_wr);
end;

// TERMINAL VALUES (EQUAL TO INITIAL VALUES GIVEN THE FOCUS ON TEMPORARY
SHOCKS)

endval;
ea_gapgc=0; ea_gapguc=0;
gapcnlc=0; gapclc=0; gapc=0; gapgs=0; gaptfp=0;
ea_gnlc=0; r_gnlc=0; ea_gcredg=0; ea_gdemc=0; ea_gdemcg=0; ea_glincg=0;
ea_gcnlc=0; ea_gclc=0; r_gcnlc=0; r_gclc=0; ea_gcredcnlc=0;
ea_gcredclc=0;
ea_y_pc=ea_y; ea_tb_pc=ea_tb;
ea_gcrednom=0; ea_gcnom=0; ea_gcg=0;
ea_eps_slc=0; r_eps_slc=0;
ea_tb=0; ea_tb=0; ea_cnom=ea_c; ea_invnom=ea_i; ea_gnom=ea_g;
ea_ignom=ea_ig;
ea_cay_net_tr=0; r_cay_net_tr=0;
ea_gy=0; r_gy=0; ea_gc=0; r_gc=0;
ea_eps_rpreme=0;
ea_u_rpreme=0;
ea_u_rpremk=0;
```

```
r_u_rpremk=0;
ea_ben=0.347236353606391;
ea_br=2.39999999999999;
ea_bwr=0;
ea_bwry=0;
ea_by=0.599999999999997;
ea_c=0.582692901947837;
ea_cay=0;
ea_clc=0.495791678914299;
ea_cnlc=0.582692901947837;
ea_dbr=0;
ea_dbwr=0;
ea_dc=0;
ea_dcnlc=0;
ea_dex=0;
ea_dexl=0;
ea_dexr=0;
ea_dexucap=0;
ea_dgs=0;
ea_di=0;
ea_digs=0;
ea_dim=0;
ea_dinfc=0;
ea_dinfx=0;
ea_dinfy=0;
ea_dinom=0;
ea_dk=0;
ea_dkg=0;
ea_dl=0;
ea_dlamlc=0;
ea_dlamnlc=0;
ea_dltfp=0;
ea_dnomint=0;
ea_doil=0;
ea_dpim=0;
ea_dpx=0;
ea_dq=0;
ea_dr=0;
ea_drealint=0;
ea_dtl=0;
ea_dv=0;
ea_dwinf=0;
ea_dwr=0;
ea_dy=0;
ea_eta=0.749999999999999;
ea_ex=0.218457975960748;
ea_EX_l=0.656432118684563;
ea_EX_r=0.00323437285093475;
ea_EX_ucap=1;
ea_f=10.0305194057837;
ea_g=0.18;
ea_gby=-0.0220510402407389;
ea_gs=0.18;
ea_i=0.197307098052164;
ea_ig=0.0399999999999997;
ea_igs=0.0399999999999997;
ea_im=0.218457975960748;
ea_imr=0.218457975960748;
ea_infc=0;
ea_inflation=0.00499999999999989;
```

```
ea_infx=0;
ea_infy=0;
ea_inom=0.00323437285093475;
ea_k=10.2497193793332;
ea_kg=2.38805970149254;
ea_l=0.656432118684563;
ea_lamlc=1.72391125355814;
ea_lamnlc=1.46681185208151;
ea_lc=-0.540094986222151;
ea_lclc=-0.701599442671746;
ea_lcnlc=-0.540094986222151;
ea_ll=-0.420935989390241;
ea_ltfp=0;
ea_ly=0;
ea_m=0.998709172428258;
ea_nomint=0.0125375000000001;
ea_o=1;
ea_oil=0;
ea_pc=1;
ea_pcy=1;
ea_pim=1;
ea_po=1;
ea_poil=1;
ea_px=1;
ea_q=1;
ea_r=0.00323437285093475;
ea_realint=0.0075;
ea_rer=1;
ea_tax=0;
ea_tby=0;
ea_tfp=1;
ea_tl=0.295462551974026;
ea_tot=1;
ea_toty=1;
ea_tr=0.159999999999999;
ea_trfor=0;
ea_trfory=0;
ea_trlc=0.159999999999999;
ea_try=0.159999999999999;
ea_ucap=1;
ea_ucnlc=1.71616986693536;
ea_uclc=ea_lamlc*(1+ea_tvat)*ea_pc;
ea_utilclc=-1.90557224699768;
ea_utilcnlc=-1.74406779054809;
ea_utill=-0.0209030778266619;
ea_v=7.63051940578377;
ea_vl=0.243364749308104;
ea_welflc=-597.552092287192;
ea_welfnlc=-547.456809663232;
ea_welftot=-547.456809663232;
ea_winf=0;
ea_wr=0.868090884015973;
ea_wrinf=0;
ea_y=1;
ea_ygap=0;
euro_EX_r=0.00323437285093475;
EURO_INFC=0;
euro_ygap=0;
r_ben=0.347236353606391;
r_br=2.39999999999999;
```

```
r_bwr=0;
r_bwry=0;
r_by=0.599999999999997;
r_c=0.582692901947837;
r_cay=0;
r_clc=0.495791678914299;
r_cnlc=0.582692901947837;
r_dbr=0;
r_dbwr=0;
r_dc=0;
r_dcnlc=0;
r_dex=0;
r_dexl=0;
r_dexr=0;
r_dexucap=0;
r_dgs=0;
r_di=0;
r_digs=0;
r_dim=0;
r_dinfc=0;
r_dinfx=0;
r_dinfy=0;
r_dinom=0;
r_dk=0;
r_dkg=0;
r_dl=0;
r_dlamlc=0;
r_dlamnlc=0;
r_dltfp=0;
r_dnomint=0;
r_doil=0;
r_dpim=0;
r_dpx=0;
r_dq=0;
r_dr=0;
r_drealint=0;
r_dtl=0;
r_dv=0;
r_dwinf=0;
r_dwr=0;
r_dy=0;
r_eta=0.749999999999999;
r_ex=0.218457975960748;
r_EX_l=0.656432118684563;
r_EX_r=0.00323437285093475;
r_EX_ucap=1;
r_f=10.0305194057837;
r_g=0.18;
r_gby=-0.0220510402407389;
r_gs=0.18;
r_i=0.197307098052164;
r_ig=0.0399999999999997;
r_igs=0.0399999999999997;
r_im=0.218457975960748;
r_imea=0.218457975960748;
r_infc=0;
r_inflation=0.00499999999999989;
r_infx=0;
r_infy=0;
r_inom=0.00323437285093475;
```

```
r_k=10.2497193793332;
r_kg=2.38805970149254;
r_l=0.656432118684563;
r_lamlc=1.72391125355814;
r_lamnlc=1.46681185208151;
r_lc=-0.540094986222151;
r_lclc=-0.701599442671746;
r_lcnlc=-0.540094986222151;
r_ll=-0.420935989390241;
r_ltfp=0;
r_ly=0;
r_m=0.998709172428258;
r_nomint=0.0125375000000001;
r_o=1;
r_oil=0;
r_pc=1;
r_pcy=1;
r_pim=1;
r_po=1;
r_poil=1;
r_px=1;
r_q=1;
r_r=0.00323437285093475;
r_realint=0.0075;
r_rer=1;
r_tax=0;
r_tby=0;
r_tfp=1;
r_tl=0.295462551974026;
r_tot=1;
r_toty=1;
r_tr=0.159999999999999;
r_trfor=0;
r_trfory=0;
r_trlc=0.159999999999999;
r_try=0.159999999999999;
r_ucap=1;
r_ucnlc=1.71616986693536;
r_uclc=r_lamlc*(1+r_tvat)*r_pc;
r_utilclc=-1.90557224699768;
r_utilcnlc=-1.74406779054809;
r_utill=-0.0209030778266619;
r_v=7.63051940578377;
r_vl=0.243364749308104;
r_welflc=-597.552092287192;
r_welfnlc=-547.456809663232;
r_welftot=-547.456809663232;
r_winf=0;
r_wr=0.868090884015973;
r_wrinf=0;
r_y=1;
r_ygap=0;
ea_a=0.709497806192587;
ea_btar=0.599999999999997;
ea_bwyt=0;
ea_eps_ben=0;
ea_eps_clc=0;
ea_eps_cnlc=0;
ea_eps_eta=0;
ea_eps_etax=0;
```

```
ea_eps_g=0;
ea_eps_gs=0;
ea_eps_i=0;
ea_eps_ig=0;
ea_eps_igs=0;
ea_eps_im=0;
ea_u_im=0;
ea_eps_l=0;
ea_eps_ltfp=0;
ea_eps_m=0;
ea_eps_rpremb=0;
ea_eps_rpremk=0;
ea_eps_rpremk=0;
ea_eps_tl=0;
ea_eps_tr=0;
ea_eps_trlc=0;
ea_eps_ucap=0;
ea_eps_v=0;
ea_eps_w=0;
ea_EX_ben=0.347236353606391;
ea_EX_by=0.599999999999997;
ea_EX_gby=-0.0220510402407389;
ea_EX_gs=0.18;
ea_EX_igs=0.0399999999999997;
ea_EX_inf=0;
ea_EX_ltfp=0;
ea_EX_tl=0.295462551974026;
ea_EX_trlc=0.159999999999999;
ea_EX_tvat=0.170000000000001;
ea_fcl=0.0393859271210739;
ea_fcy=0.263589743589742;
ea_ilag=0.819999999999995;
ea_libdum=1;
ea_npart=0.290000000000001;
ea_rpremb=0;
ea_rpremk=0.00926562714906521;
ea_size=13104996000;
ea_ssc=0.149999999999999;
ea_taxdum=1;
ea_taxshare=0;
ea_tc=0.280000000000001;
ea_tinf=1.5;
ea_trshare=0.159999999999999;
ea_tryshare=0.159999999999999;
ea_tvat=0.170000000000001;
ea_ty=0.0500000000000003;
ea_upi=0;
r_a=0.709497806192587;
r_btar=0.599999999999997;
r_eps_ben=0;
r_eps_clc=0;
r_eps_cnlc=0;
r_eps_eta=0;
r_eps_etax=0;
r_eps_g=0;
r_eps_gs=0;
r_eps_i=0;
r_eps_ig=0;
r_eps_igs=0;
r_eps_im=0;
```

```
r_u_im=0;
r_eps_l=0;
r_eps_ltfp=0;
r_eps_m=0;
r_eps_rpremb=0;
r_eps_rpremk=0;
r_eps_tl=0;
r_eps_tr=0;
r_eps_trlc=0;
r_eps_ucap=0;
r_eps_v=0;
r_eps_w=0;
r_EX_ben=0.347236353606391;
r_EX_by=0.599999999999997;
r_EX_gby=-0.0220510402407389;
r_EX_gs=0.18;
r_EX_igs=0.0399999999999997;
r_EX_inf=0;
r_EX_ltfp=0;
r_EX_tl=0.295462551974026;
r_EX_trlc=0.159999999999999;
r_EX_tvat=0.170000000000001;
r_fcl=0.0393859271210739;
r_fcy=0.263589743589742;
r_ilag=0.819999999999995;
r_npart=0.290000000000001;
r_rpremb=0;
r_rpremk=0.00926562714906521;
r_size=13104996000;
r_ssc=0.149999999999999;
r_taxdum=1;
r_taxshare=0;
r_tc=0.280000000000001;
r_tinf=1.5;
r_trshare=0.159999999999999;
r_tryshare=0.159999999999999;
r_tvat=0.170000000000001;
r_ty=0;
r_upi=0;
null=0;
w_coreinf=0;
w_gpop=0;
w_gtfp=0;
euro_size=ea_size+r_size;
all_welf = (ea_size*ea_welftot+r_size*r_welftot)/(ea_size+r_size);
r_tby2=r_tby;
ea_cay2=ea_cay; r_cay2=r_cay;
euro_inom=r_inom;
ea_uempl=1-ea_l/(1-ea_npart); r_uempl=1-r_l/(1-r_npart);
ea_bfund=1/3*ea_br;
ea_trfor=0;
ea_surplus=ea_inom*ea_bfund-ea_trfor;
r_bfund=1/3*r_br;
r_trfor=0;
r_surplus=r_inom*r_bfund-r_trfor;
trfor_ib=0;
ea_trfory=0; r_trfory=0;
ea_gnp = ea_y+ea_inom*ea_rer*ea_bwr;
ea_gnptr=ea_gnp;
ea_ggnp=0;
```

```
ea_ggnptr=0;
ea_gfi=0;
ea_gtr=0;
ea_gcred=0;
ea_rcpi=ea_r;
ea_lwr=log(ea_wr);
end;

steady;
check;

// DECLARATION OF SHOCKS

shocks;
var ea_eps_ltfp; stderr 0.005;
var r_eps_ltfp; stderr 0.005;
corr ea_eps_rpremk, r_eps_ltfp = 0;

var ea_eps_g; stderr 0.00757;
var r_eps_g; stderr 0.00757;
corr ea_eps_g, r_eps_g = 0;

end;

// STOCHASTIC SIMULATIONS: LOOPING THROUGH ALTERNATIVE VALUES FOR THE
PARAMETER IN THE CROSS-BORDER TRANSFER RULE

ea_ttrforlag0s = 0:0.25:5;
for i=1:length(ea_ttrforlag0s);
    ea_ttrforlag0 = ea_ttrforlag0s(i);

// call the 1st-order apprixmation solver for the model, specify the
variables to monitor

stoch_simul(order=1, periods=0, IRF=0, ar=0, noprint) ea_gy ea_gc ea_gfi
ea_gtr ea_gcred ea_gnp ea_gnptr ea_ggnp ea_ggnptr ea_r ea_rcpi ea_tl
ea_ly ea_lc ea_dtl ea_gcrednom ea_gcnom ea_y ea_cnom ea_invnom ea_gnom
ea_ignom ea_tb ea_gcg ea_gcredg ea_gdemc ea_gdemcg ea_glincg ea_gcnlc
ea_gclc ea_gcredcnlc ea_gcredclc gapcnlc gapclc gapc gapgs gaptfp
ea_gapgc ea_gapguc ea_u_rpreme;
format long g;

// SAVE OUPUT OF EACH SIMULATION STEP

VARGY(i)= (oo_.var(1,1)); %var
VARGC(i)= (oo_.var(2,2)); %var
COVGCGY(i)= (oo_.var(1,2)); %var
COVGFGY(i)= (oo_.var(1,3)); %var
COVGTGY(i)= (oo_.var(1,4)); %var
COVGSGY(i)= (oo_.var(1,5)); %var

VARRINTPY(i)= (oo_.var(10,10)); %var
VARRINTPC(i)= (oo_.var(11,11)); %var
COVRINTPYGY(i)= (oo_.var(1,10)); %var
COVRINTPCGY(i)= (oo_.var(1,11)); %var

VARTL(i)= (oo_.var(12,12)); %var
COVTLGY(i)= (oo_.var(1,12)); %var
COVTLGC(i)= (oo_.var(2,12)); %var
COVTLLY(i)= (oo_.var(1,13)); %var
```

```
COVTLLC(i)= (oo_.var(1,14)); %var

VARLY(i)= (oo_.var(13,13)); %var
VARLC(i)= (oo_.var(14,14)); %var
COVLCLY(i)= (oo_.var(13,14)); %var

VARDTL(i)= (oo_.var(15,15)); %var
COVDTLGY(i)= (oo_.var(1,15)); %var
COVDTLGC(i)= (oo_.var(2,15)); %var

COVGCNOMGY(i)= (oo_.var(1,17)); %var
COVGSNOMGY(i)= (oo_.var(1,16)); %var

VARY(i)= (oo_.var(18,18)); %var
VARC(i)= (oo_.var(19,19)); %var
VARI(i)= (oo_.var(20,20)); %var
VARG(i)= (oo_.var(21,21)); %var
VARIG(i)= (oo_.var(22,22)); %var
VARTB(i)= (oo_.var(23,23)); %var

COVCY(i)= (oo_.var(18,19)); %var
COVCI(i)= (oo_.var(19,20)); %var
COVCG(i)= (oo_.var(19,21)); %var
COVCIG(i)= (oo_.var(19,22)); %var
COVCTB(i)= (oo_.var(19,23)); %var

COVIY(i)= (oo_.var(18,20)); %var
COVGY(i)= (oo_.var(18,21)); %var
COVIGY(i)= (oo_.var(18,22)); %var
COVTBY(i)= (oo_.var(18,23)); %var

COVIG(i)= (oo_.var(20,21)); %var
COVIIG(i)= (oo_.var(20,22)); %var
COVITB(i)= (oo_.var(20,23)); %var

COVGIG(i)= (oo_.var(21,22)); %var
COVGTB(i)= (oo_.var(21,23)); %var

COVIGTB(i)= (oo_.var(22,23)); %var

COVGCGGY(i)= (oo_.var(1,24)); %var
COVGSGGY(i)= (oo_.var(1,25)); %var

VARGDEMC(i)= (oo_.var(26,26)); %var
VARGDEMCG(i)= (oo_.var(27,27)); %var
COVGCGYLIN(i)= (oo_.var(1,28)); %var
VARGCGLIN(i)= (oo_.var(28,28)); %var
VARGCG(i)= (oo_.var(24,24)); %var

COVGCNLCGY(i)= (oo_.var(1,29)); %var
COVGCLCGY(i)= (oo_.var(1,30)); %var

COVGSNLCGY(i)= (oo_.var(1,31)); %var
COVGSLCGY(i)= (oo_.var(1,32)); %var

VARGCNLC(i)= (oo_.var(29,29)); %var
VARGCLC(i)= (oo_.var(30,30)); %var

COvGAPCNLCGAPGS(i)= (oo_.var(33,36)); %var
COvGAPCLCGAPGS(i)= (oo_.var(34,36)); %var
```

```
COvGAPCGAPGS(i)= (oo_.var(35,36)); %var

COvGAPCNLCGAPTFP(i)= (oo_.var(33,37)); %var
COvGAPCLCGAPTFP(i)= (oo_.var(34,37)); %var
COvGAPCGAPTFP(i)= (oo_.var(35,37)); %var

COVGAPGSGAPTFP(i)= (oo_.var(36,37)); %var

VARGAPCNLC(i)= (oo_.var(33,33)); %var
VARGAPCLC(i)= (oo_.var(34,34)); %var
VARGAPC(i)= (oo_.var(35,35)); %var

VARGAPGS(i)= (oo_.var(36,36)); %var
VARGAPTFP(i)= (oo_.var(37,37)); %var

COVEAGAPGCGY(i)= (oo_.var(38,1)); %var
COVEAGAPGUCGY(i)= (oo_.var(39,1)); %var

VAREAGAPGC(i)= (oo_.var(38,38)); %var
VAREAGAPGUC(i)= (oo_.var(39,39)); %var

end;

// WRITE OUTPUT TO XLS FILE

xlswrite('results.xls', VARGY, 'simul_gtfp', 'B2');
xlswrite('results.xls', VARGC, 'simul_gtfp', 'B3');

xlswrite('results.xls', COVGCGY, 'simul_gtfp', 'B4');
xlswrite('results.xls', COVGFGY, 'simul_gtfp', 'B5');
xlswrite('results.xls', COVGTGY, 'simul_gtfp', 'B6');
xlswrite('results.xls', COVGSGY, 'simul_gtfp', 'B7');

xlswrite('results.xls', VARRINTPY, 'simul_gtfp', 'B9');
xlswrite('results.xls', VARRINTPC, 'simul_gtfp', 'B10');
xlswrite('results.xls', COVRINTPYGY, 'simul_gtfp', 'B11');
xlswrite('results.xls', COVRINTPCGY, 'simul_gtfp', 'B12');

xlswrite('results.xls', VARTL, 'simul_gtfp', 'B14');
xlswrite('results.xls', COVTLGY, 'simul_gtfp', 'B15');
xlswrite('results.xls', COVTLGC, 'simul_gtfp', 'B16');
xlswrite('results.xls', COVTLLY, 'simul_gtfp', 'B17');
xlswrite('results.xls', COVTLLC, 'simul_gtfp', 'B18');

xlswrite('results.xls', VARLY, 'simul_gtfp', 'B20');
xlswrite('results.xls', VARLC, 'simul_gtfp', 'B21');
xlswrite('results.xls', COVLCLY, 'simul_gtfp', 'B22');

xlswrite('results.xls', VARDTL, 'simul_gtfp', 'B24');
xlswrite('results.xls', COVDTLGY, 'simul_gtfp', 'B25');
xlswrite('results.xls', COVDTLGC, 'simul_gtfp', 'B26');

xlswrite('results.xls', COVGCNOMGY, 'simul_gtfp', 'B28');
xlswrite('results.xls', COVGSNOMGY, 'simul_gtfp', 'B29');

xlswrite('results.xls', VARY, 'simul_gtfp', 'B31');
xlswrite('results.xls', VARC, 'simul_gtfp', 'B32');
xlswrite('results.xls', VARI, 'simul_gtfp', 'B33');
xlswrite('results.xls', VARG, 'simul_gtfp', 'B34');
xlswrite('results.xls', VARIG, 'simul_gtfp', 'B35');
```

```
xlswrite('results.xls', VARTB, 'simul_gtfp', 'B36');

xlswrite('results.xls', COVCY, 'simul_gtfp', 'B38');
xlswrite('results.xls', COVCI, 'simul_gtfp', 'B39');
xlswrite('results.xls', COVCG, 'simul_gtfp', 'B40');
xlswrite('results.xls', COVCIG, 'simul_gtfp', 'B41');
xlswrite('results.xls', COVCTB, 'simul_gtfp', 'B42');

xlswrite('results.xls', COVIY, 'simul_gtfp', 'B44');
xlswrite('results.xls', COVGY, 'simul_gtfp', 'B45');
xlswrite('results.xls', COVIGY, 'simul_gtfp', 'B46');
xlswrite('results.xls', COVTBY, 'simul_gtfp', 'B47');

xlswrite('results.xls', COVIG, 'simul_gtfp', 'B49');
xlswrite('results.xls', COVIIG, 'simul_gtfp', 'B50');
xlswrite('results.xls', COVITB, 'simul_gtfp', 'B51');

xlswrite('results.xls', COVGIG, 'simul_gtfp', 'B53');
xlswrite('results.xls', COVGTB, 'simul_gtfp', 'B54');

xlswrite('results.xls', COVIGTB, 'simul_gtfp', 'B56');

xlswrite('results.xls', COVGCGGY, 'simul_gtfp', 'B58');
xlswrite('results.xls', COVGSGGY, 'simul_gtfp', 'B59');

xlswrite('results.xls', VARGDEMC, 'simul_gtfp', 'B61');
xlswrite('results.xls', VARGDEMCG, 'simul_gtfp', 'B62');
xlswrite('results.xls', COVGCGYLIN, 'simul_gtfp', 'B63');
xlswrite('results.xls', VARGCGLIN, 'simul_gtfp', 'B64');
xlswrite('results.xls', VARGCG, 'simul_gtfp', 'B65');

xlswrite('results.xls', COVGCNLCGY, 'simul_gtfp', 'B67');
xlswrite('results.xls', COVGCLCGY, 'simul_gtfp', 'B68');

xlswrite('results.xls', COVGSNLCGY, 'simul_gtfp', 'B70');
xlswrite('results.xls', COVGSLCGY, 'simul_gtfp', 'B71');

xlswrite('results.xls', VARGCNLC, 'simul_gtfp', 'B73');
xlswrite('results.xls', VARGCLC, 'simul_gtfp', 'B74');

xlswrite('results.xls', COvGAPCNLCGAPGS, 'simul_gtfp', 'B76');
xlswrite('results.xls', COvGAPCLCGAPGS, 'simul_gtfp', 'B77');
xlswrite('results.xls', COvGAPCGAPGS, 'simul_gtfp', 'B78');

xlswrite('results.xls', COvGAPCNLCGAPTFP, 'simul_gtfp', 'B80');
xlswrite('results.xls', COvGAPCLCGAPTFP, 'simul_gtfp', 'B81');
xlswrite('results.xls', COvGAPCGAPTFP, 'simul_gtfp', 'B82');

xlswrite('results.xls', COVGAPGSGAPTFP, 'simul_gtfp', 'B84');

xlswrite('results.xls', VARGAPCNLC, 'simul_gtfp', 'B86');
xlswrite('results.xls', VARGAPCLC, 'simul_gtfp', 'B87');
xlswrite('results.xls', VARGAPC, 'simul_gtfp', 'B88');

xlswrite('results.xls', VARGAPGS, 'simul_gtfp', 'B90');
xlswrite('results.xls', VARGAPTFP, 'simul_gtfp', 'B91');

xlswrite('results.xls', COVEAGAPGCGY, 'simul_gtfp', 'B93');
xlswrite('results.xls', COVEAGAPGUCGY, 'simul_gtfp', 'B94');
```

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xlswrite('results.xls', VAREAGAPGC, 'simul_gtfp', 'B96');
xlswrite('results.xls', VAREAGAPGUC, 'simul_gtfp', 'B97');

//**************************************************************************
// End of Dynare code
//**************************************************************************


//**************************************************************************
//Declaration of endogenous and exogenous variables
//**************************************************************************

/*

// ENDOGENOUS VARIABLES

// GDP, output and domestic demand

ea_y r_y – real GDP
ea_ly r_ly – ln(y)
ea_dy r_dy – change in y
ea_gy r_gy – growth rate of y
ea_y_pc – GDP deflated by pc
ea_ygap r_ygap euro_ygap – output gap
ea_o r_o – output
ea_oil r_oil – commodities
ea_doil r_doil – change in oil
ea_exoil r_exoil – long-term demand for oil

ea_gnp – net national income net of cross-border transfers
ea_gnptr – net national income with cross-border transfers
ea_ggnp – growth rate of gnp
ea_ggnptr – growth rate of gnptr

// Private domestic demand

ea_c r_c - private consumption
ea_clc r_clc - LC-household consumption
ea_cnlc r_cnlc - NLC-household consumption
ea_dc r_dc – change in c
ea_dcnlc r_dcnlc – change in cnlc
ea_lc r_lc – ln(c)
ea_lclc r_lclc– ln (clc)
ea_lcnlc r_lcnlc – ln(cnlc)
ea_gc r_gc – growth rate of c
ea_gclc r_gclc – growth rate of clc
ea_gcnlc r_gcnlc – growth rate of cnlc
ea_cnom – nominal private consumption
ea_eps_slc r_eps_slc – variation in share of LC households
ea_gnlc r_gnlc – growth rate of NLC household share
ea_gcnom – growth rate of cnom
ea_gcg – growth rate of total consumption (c+g)

ea_i r_i – private sector investment
ea_di r_di – change in i
ea_invnom r_invnom – nominal investment

ea_gdemc – growth rate of domestic demand excluding private consumption
ea_gdemcg – growth rate of domestic demand excluding private and
government consumption
```

ea_glincg – growth rate of total (private and government) consumption

ea_gfi – (growth rate of) financial market income smoothing
ea_gtr - (growth rate of) cross-border transfer income smoothing
ea_gcred - (growth rate of) credit market private household income smoothing
ea_gcredg - (growth rate of) credit market private household and government income smoothing
ea_gcrednom - (growth rate of) credit market private household income smoothing in nominal terms
ea_gcredcnlc – (negative) credit growth of NLC households (including fiscal)
ea_gcredclc - (negative) credit growth of LC households (including fiscal)

// Trade

ea_ex r_ex - exports
ea_dex r_dex – change in ex
ea_px r_px – export price
ea_dpx r_dpx – change in px
ea_infx r_infx – px inflation without trend inflation
ea_dinfx r_dinfx – change in infx

ea_im r_im – imports
ea_imr r_imea – bilateral imports
ea_dim r_dim – change in im
ea_pim r_pim – import price
ea_dpim r_dpim – change in pim
ea_u_im r_u_im - shock to import demand

ea_rer r_rer – real effective exhange rate
ea_tot r_tot – terms of trade
ea_toty r_toty – terms of trade excluding commodities

ea_cay r_cay - current account to GDP
ea_cay_net_tr r_cay_net_tr – cay excluding net cross-border transfers
ea_cay2 r_cay2 – cay in alternative definition (check)
ea_tby r_tby – trade balance to GDP
ea_tby2 r_tby2 – tby in alternative definition (check)
ea_tb – real net export level
ea_tb_pc – tb deflated by pc

ea_bwr r_bwr - NFA position
ea_dbwr r_dbwr – change in bwr
ea_bwry r_bwry - NFA position to GDP

// Fiscal policy

ea_tl r_tl - labour income tax
ea_dtl r_dtl – change in tl
ea_tax r_tax - lump-sum tax
ea_ben r_ben – unemployment benefits
ea_tr r_tr – lump-sum transfers to NLC households
ea_trlc r_trlc – lump-sum transfers to LC households
ea_try r_try – transfers to GDP

ea_g r_g – government consumption
ea_gs r_gs - government consumption share
ea_dgs r_dgs - change in gs

ea_ig r_ig – government investment
ea_igs r_igs – government investment share
ea_digs r_digs – change in igs

ea_gnom – nominal government consumption
ea_ignom – nominal government investment

ea_gby r_gby – government budget balance to GDP
ea_br r_br - public debt in real terms
ea_by r_by - public debt to GDP
ea_dbr r_dbr – change in br

// Cross-border transfers

ea_trfor r_trfor – cross-border transfers
ea_trfory r_trfory – cross-border transfers to GDP
trfor_ib – total cross-border transfers (gross position) relative to fund own resources
ea_surplus r_surplus - surplus of cross-country transfer scheme

// Prices

ea_pc r_pc – consumer price (headline)
ea_pcy r_pcy – consumer price excluding commodities (core)
ea_po r_po – output price
ea_poil r_poil – oil price
ea_infc r_infc EURO_INFC – pc inflation without trend inflation
ea_infy r_infy – py inflation without trend inflation
ea_inflation r_inflation – py inflation with trend inflation
ea_dinfc r_dinfc – change in infc
ea_dinfy r_dinfy – change in infy
ea_eta r_eta – (inverse of) price mark-up

// Production

ea_k r_k – private capital stock
ea_dk r_dk – change in k
ea_kg r_kg – public capital stock
ea_dkg r_dkg – change in kg

ea_l r_l – employment
ea_ll r_ll - ln(l)
ea_dl r_dl – change in l
ea_EX_l r_EX_l – long-term equilibrium employment
ea_dexl r_dexl – change in ex_l
ea_uempl r_uempl – unemployment rate
ea_uemplp r_uemplp – unemployment rate in per cent

ea_ucap r_ucap – capacity utilisation
ea_EX_ucap r_EX_ucap – long-term equilibrium capacity utilisation
ea_dexucap r_dexucap – change in ex_ucap

ea_tfp r_tfp – TFP level
ea_ltfp r_ltfp – ln(tfp)
ea_dltfp r_dltfp – change in ltfp

ea_wr r_wr – real wage
ea_dwr r_dwr – change in wr
ea_lwr – ln(wr)
ea_winf r_winf – nominal wage inflation without trend inflation

ea_wrinf r_wrinf – real wage inflation without trend inflation
ea_dwinf r_dwinf – change in winf

// Interest rates and assets

euro_inom - monetary policy rate without trend growth and inflation
ea_inom r_inom – nominal interest rate without trend growth and inflation
ea_dinom r_dinom – change in inom
ea_r r_r – real interest rate without trend growth
ea_dr r_dr – change in r
ea_EX_r r_EX_r euro_EX_r – long-term equilibrium real interest rate
ea_dexr r_dexr – change in ex_r
ea_rcpi – real interest rate on basis of expected CPI inflation

ea_nomint r_nomint – nominal interest rate with trend growth and inflation
ea_dnomint r_dnomint – change in nomint
ea_realint r_realint – real interest rate with trend growth
ea_drealint r_drealint – change in realint
ea_m r_m – money

ea_u_rpremk r_u_rpremk - time-varying risk premium on productive capital
ea_u_rpreme r_u_rpreme - time-varying country risk premium

ea_q r_q – Tobin q
ea_dq r_dq – change in q
ea_v r_v – value of firms
ea_dv r_dv – change in v
ea_f r_f – financial wealth

// Welfare

ea_ucnlc – marginal utility of NLC consumption
ea_uclc r_uclc – marginal utility of LC consumption
ea_vl - marginal (dis-)utility of work
ea_utill r_utill – employment (dis-)utility
ea_utilclc r_utilclc – utility for LC households
ea_utilcnlc r_utilcnlc – utility for NLC households
ea_welflc r_welflc – welfare LC households
ea_welfnlc r_welfnlc – welfare NLC households
ea_welftot r_welftot – average per-capita welfare
all_welf – average per-capita area-wide welfare
ea_gapguc = gap betweem ucnlc and uclc growth

ea_lamlc r_lamlc – Lagrange multiplier on LC budget constraint
ea_lamnlc r_lamnlc – Lagrange multiplier on NLC budget constraint
ea_dlamlc r_dlamlc – change in lamlc
ea_dlamnlc r_dlamnlc – change in lamnlc

// Gaps between the two countries

gapc – private consumption gap between the two countries
gapcnlc – NLC consumption gap between the two countries
gapclc – LC consumption gap between the two countries
gapclc – gap between the two countries w.r.t. to government consumption to GDP
gaptfp – gap between the two countries w.r.t. to ltfp
ea_gapgc – gap between LC and NLC consumption growth

// EXOGENOUS VARIABLES

w_coreinf – trend inflation
w_gpop – trend population growth
w_gtfp – trend TFP growth

ea_size r_size euro_size – size of region

null – zero dummy
ea_libdum – unity dummy

r_e – nominal exchange rate (constant)

ea_a r_a - scalar
ea_btar r_btar – government debt-to-GDP target
ea_bwyt – NFA-to-GDP target

ea_EX_by r_EX_by – steady-state level of government debt-to-GDP
ea_EX_gby r_EX_gby – steady-state government budget balance to GDP
ea_EX_gs r_EX_gs – steady-state level of government consumption
ea_EX_igs r_EX_igs – steady-state level of government investment
ea_EX_ben r_EX_ben – steady-state level of benefits
ea_EX_tl r_EX_tl – steady-state level of labour income tax
ea_ssc r_ssc – rate of social security contributions
ea_tc r_tc – corporate tax rate
ea_tvat r_tvat – VAT rate
ea_EX_tvat r_EX_tvat – steady-state level of VAT
ea_taxshare r_taxshare – steady-state share of lump-sum taxes to GDP
ea_taxdum r_taxdum – budget-closure dummy
ea_EX_trlc r_EX_trlc – steady-state level of transfers to LC households
ea_trshare r_trshare – steady-state level of government transfers
ea_tryshare r_tryshare – steady-state level of government transfers to GDP
ea_bfund r_bfund – endownment of cross-border transfer scheme

ea_ilag r_ilag – endogenous policy rate persistence
ea_tinf r_tinf – response to inflation in Taylor rule
ea_ty r_ty – response to output gap in Taylor rule

ea_fcl r_fcl – overhead labour
ea_fcy r_fcy – fix costs of producing
ea_EX_ltfp r_EX_ltfp – steady-state level of TFP
ea_npart r_npart – labour force non-participation

ea_rpremb r_rpremb – steady-state government bond premium
ea_rpremk r_rpremk – steady-state equity premium

ea_EX_inf r_EX_inf euro_EX_inf – steady-state inflation (net of trend inflation)

ea_upi r_upi – investment-specific technology shock
ea_eps_ben r_eps_ben – shock to government benefits
ea_eps_etax r_eps_etax – shock to lump-sum tax
ea_eps_g r_eps_g – shock to government consumption
ea_eps_gs r_eps_gs – shock to government consumption share
ea_eps_ig r_eps_ig – shock to government investment
ea_eps_igs r_eps_igs – shock to government investment share
ea_eps_tl r_eps_tl – shock to labour tax rate
ea_eps_tr r_eps_tr – shock to government transfers

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ea_eps_trlc r_eps_trlc – shock to government transfers targeted to LC
households

ea_eps_m r_eps_m – monetary policy shock
ea_eps_rpreme r_eps_rpreme – shock to country risk premium
ea_eps_rpremb r_eps_rpremb – shock to government bond premium
ea_eps_rpremk r_eps_rpremk – shock to equity premium
ea_eps_v r_eps_v – shock to firm value

ea_eps_clc r_eps_clc – shock to LC consumption
ea_eps_cnlc r_eps_cnlc – shock to NLC consumption
ea_eps_i r_eps_i – shock to investment adjustment costs
ea_eps_im r_eps_im – shock to import demand

ea_eps_ltfp r_eps_ltfp – shock to TFP
ea_eps_eta r_eps_eta – shock to domestic price mark-up
ea_eps_ucap r_eps_ucap – shock to capacity utilisation
ea_eps_l r_eps_l – shock to labour supply
ea_eps_w r_eps_w – shock to labour demand
r_eps_poil - oil price shock

*/
```