

# Estimated Dynamic Optimization (EDO) Model

Gary Young (editor)

June 27, 2016



# Contents

<b>1</b>	<b>EDO model packages</b>	<b>5</b>
	<b>Appendices</b>	<b>7</b>
<b>A</b>	<b>Original Files</b>	<b>9</b>
A.1	Dynare_edo.mod . . . . .	9
A.1.1	model . . . . .	10
A.1.2	prelim . . . . .	11
A.1.3	labor . . . . .	12
A.1.4	identities . . . . .	12
A.1.5	hours . . . . .	13
A.1.6	durables . . . . .	13
A.1.7	housing . . . . .	14
A.1.8	measure . . . . .	15
A.2	Dynare_edo_steadystate.m . . . . .	16
A.2.1	result return . . . . .	17
A.3	linearized.mod . . . . .	19
A.3.1	model . . . . .	20
A.3.2	prelim . . . . .	21
A.3.3	labor . . . . .	22
A.3.4	identities . . . . .	23
A.3.5	hours . . . . .	23
A.3.6	durables . . . . .	23
A.3.7	housing . . . . .	24
A.3.8	measure . . . . .	25
A.4	linearized_steadystate.m . . . . .	26
A.4.1	result return . . . . .	27
A.5	common model . . . . .	30
A.5.1	setup . . . . .	30
A.5.2	stoch sim . . . . .	31
A.5.3	var . . . . .	32
A.5.4	varexo . . . . .	34
A.5.5	parameters . . . . .	35
A.5.6	est params . . . . .	39

A.5.7	calib params . . . . .	40
A.5.8	free params . . . . .	41
A.5.9	varobs . . . . .	41
A.5.10	shocks . . . . .	42
A.5.11	steady params . . . . .	43
A.5.12	stderr . . . . .	44
A.6	common steady state . . . . .	45
A.6.1	values . . . . .	45
A.6.2	trends . . . . .	48
A.7	readme.txt . . . . .	49
<b>B</b>	<b>Notes, Bibliography and Indexes</b>	<b>51</b>
B.1	Chunks . . . . .	51
B.2	Index . . . . .	52

# Chapter 1

## EDO model packages

The Estimated Dynamic Optimization (EDO) Model is available from the Federal Reserve Board of Governors website:

The model package zip file (link below) contains the following files:

- A readme file with basic instructions.
- Dynare mod files to run two versions of the EDO model, one with variables in levels and the other with variables in log deviations from steady state. Both versions include the nonlinear equations derived from household and firm optimization problems. The version in levels more closely follows the derivations described in the article "Unemployment During the Great Recession in the EDO Model of the U.S. Economy", while the version in log deviations facilitates the reporting of simulation results. These programs solve the model, report some basic model statistics, and run some basic impulse response simulations.

Notice that the edo (zip) is actually contained in the "EDO variable listing (ZIP)" link and the mentioned "variable listing zip file" doesn't seem to be available anywhere:

The variable listing zip file (link below) contains an HTML representation of the EDO model, showing linkages between variables, parameters, and equations.

EDO variable listing (ZIP)

NOTE: The programs for simulating the EDO model are written for use with the Dynare software package. The Dynare package can be downloaded without cost at [www.dynare.org](http://www.dynare.org). While Dynare itself is free, it requires the installation of either Matlab or Octave. Matlab is a commercial product available at [www.mathworks.com](http://www.mathworks.com). Octave is free-ware, and is available at [www.gnu.org/software/octave](http://www.gnu.org/software/octave).

Dynare and octave were available in The Ubuntu Software Center for my computer. From the readme file, to execute the model:

5) Run the command "dynare linearized" or "dynare Dynare.edo" from the Matlab/Octave command line to run the two model versions

The model fails for me and when googling for the error "dynare linearized trans\_A undefined" we get

At the moment, Octave 4 is not supported yet. See <https://github.com/DynareTeam/dynare/issues/1113>

at "Trans\_A Matrix error" and "Make Dynare compatible with Octave 4.0 #1113".

# Appendices





# Appendix A

## Original Files

### A.1 Dynare\_edo.mod

9    *<srcedo/Dynare.edo.mod 9>*≡  
      *<common setup 30>*  
      *<edo model 10>*  
      *<common stoch sim 31>*

This code is written to file `srcedo/Dynare.edo.mod`.

### A.1.1 Dynare EDO Model

10  $\langle edo\ model\ 10 \rangle \equiv$  (9)

$\langle edo\ model\ prelim\ 11 \rangle$

// XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

// labor block

// TOTAL LABOR INPUT (called "L" in the paper, I kept the "H" notation of the original)

$\langle edo\ model\ labor\ 12a \rangle$

// Identities

$\langle edo\ model\ identities\ 12b \rangle$

// XXXXXXXXXXXXXXXXXXXXXXX

// Aggregate hours equals agg hours in each sector

$\langle edo\ model\ hours\ 13a \rangle$

// See Section 8: Data Identities

// new equations

// Durable Block

$\langle edo\ model\ durables\ 13b \rangle$

// Housing Block

$\langle edo\ model\ housing\ 14 \rangle$

//measurement\_equations;

$\langle edo\ model\ measurement\ 15 \rangle$

//end\_measurement\_equations;

end;

Uses L 32.

### A.1.2 Dynare EDO Model Prelim

11

 $\langle \text{edo model prelim } 11 \rangle \equiv$ 

(10)

```

RC-MCC*YC/UC/KC(-1)*alpha_*MUK=0;
RK-MCK*YK/UK/KK(-1)*alpha_*MUK=0;
WC-MCC*YC/HC*(1-alpha_)=0;
WK-MCK*YK/HK*(1-alpha_)=0;
YC-(UC*KC(-1)/MUK)^alpha_*(HC)^(1-alpha_)=0;
YK-(UK*KK(-1)/MUK)^alpha_*(HK)^(1-alpha_)=0;
MCC*YC*theta_c-(theta_c-1)*YC-100*phi_pc*(INFC-gam_pc*INFC(-1)-(1-gam_pc)*INFCSS)*INFC*YC+beta_
MCK*YK*theta_k/PKB-(theta_k-1)*YK-100*phi_pc*(INFK-gam_pc*INFK(-1)-(1-gam_pc)*INFKSS)*INFK*YK+b
QK-beta_*(1/EFFK)*(((1-delta_)*QK(+1)+RC(+1)*UC(+1))*L(+1)/MUK(+1)/L)=0;
QK-beta_*(1/EFFK)*(((1-delta_)*QK(+1)+RK(+1)*UK(+1))*L(+1)/MUK(+1)/L)=0;
L-betas*R/rpr/INFC(+1)/MUC(+1)*L(+1)=0;
ln(R/RSS)-rho_R*ln(R(-1)/RSS)-(1-rho_R)*(r_inf*ln(INFCNA/INFCNASS)+r_dinf*(ln(INFCNA)-ln(INFCN
L-eta_cnn/(EC-h*EC(-1)/MUC)+eta_cnn*beta_*h/(MUC(+1)*EC(+1)-h*EC)=0;
KK-(1-delta_)*KK(-1)/MUK+KC-(1-delta_)*KC(-1)/MUK-1*EIK+mu_*((UK^(1+1/phi_u)-1)/(1+1/phi_u))*KK

```

Uses alpha\_ 35, beta\_ 35, betas 32, delta\_ 35, EC 32, EFFK 32, EIK 32, ePMKC 34, ePMKK 34, eR 34, eta\_cnn 35, gam\_pc 35, h 35, HC 32, HK 32, INFC 32, INFCNA 32, INFCNASS 35, INFCSS 35, INFK 32, INFKSS 35, KC 32, KCSS 35, KK 32, KKSS 35, L 32, MCC 32, MCK 32, mu\_ 35, MUC 32, MUK 32, PFGAP 32, phi\_pc 35, phi\_u 35, PKB 32, QK 32, R 32, r\_dinf 35, r\_inf 35, r\_y 35, RC 32, rho\_R 35, RK 32, rpr 35, RSS 35, theta\_c 35, theta\_k 35, UC 32, UK 32, WC 32, WK 32, YC 32, YCSS 35, YK 32, and YKSS 35.

### A.1.3 Dynare EDO Model Labor

12a  $\langle edo\ model\ labor\ 12a \rangle \equiv$  (10)

$$\begin{aligned}
& -100+UHC*\theta_{wc}-(\theta_{wc}-1)*WC-100*\phi_{wc}*(INFWC-gam_{wc}*INFWC(-1)-(1-gam_{wc})*INFWC \\
& UHSC-WC+\phi_H/10*(HSC/HSK-gam_h*HSC(-1)/HSK(-1)-(1-gam_h)*HSCSS/HSKSS); //+100*e_{\text{XiL}}=0; \\
& -100+UHK*\theta_{wk}-(\theta_{wk}-1)*WK-100*\phi_{wc}*(INFWK-gam_{wc}*INFWK(-1)-(1-gam_{wc})*INFWK \\
& UHSK-WK+\phi_H/10*(HSC/HSK-gam_h*HSC(-1)/HSK(-1)-(1-gam_h)*HSCSS/HSKSS); //+100*e_{\text{XiL}}=0; \\
& UHC*L*lpref-A_{HC}*((1+\sigma_{\text{man}})/(1+\sigma_{\text{man}}/(1+\sigma_{\text{mah}})))*(HC)^{-1+(1+\sigma_{\text{man}})/(1+\sigma_{\text{man}}/(1+\sigma_{\text{mah}}))} \\
& UHSC*L*lpref-A_{HC}*((1+\sigma_{\text{man}})/(1+\sigma_{\text{man}}/(1+\sigma_{\text{mah}})))*(HSC)^{-1+(1+\sigma_{\text{man}})/(1+\sigma_{\text{man}}/(1+\sigma_{\text{mah}}))} \\
& UHK*L*lpref-A_{HK}*((1+\sigma_{\text{man}})/(1+\sigma_{\text{man}}/(1+\sigma_{\text{mah}})))*(HK)^{-1+(1+\sigma_{\text{man}})/(1+\sigma_{\text{man}}/(1+\sigma_{\text{mah}}))} \\
& UHSK*L*lpref-A_{HK}*((1+\sigma_{\text{man}})/(1+\sigma_{\text{man}}/(1+\sigma_{\text{mah}})))*(HSK)^{-1+(1+\sigma_{\text{man}})/(1+\sigma_{\text{man}}/(1+\sigma_{\text{mah}}))} \\
& empC-((1+\sigma_{\text{mah}})/\sigma_{\text{mah}}*x_{\text{si\_NC}}/x_{\text{si\_HrC}})^{-1/(1+\sigma_{\text{mah}}+\sigma_{\text{man}})}*HC^{1/(1+\sigma_{\text{man}}/(1+\sigma_{\text{mah}}))} \\
& HrC-((1+\sigma_{\text{mah}})/\sigma_{\text{mah}}*x_{\text{si\_NC}}/x_{\text{si\_HrC}})^{1/(1+\sigma_{\text{mah}})}*empC^{(\sigma_{\text{man}}/(1+\sigma_{\text{mah}}))}=0; \\
& empK-((1+\sigma_{\text{mah}})/\sigma_{\text{mah}}*x_{\text{si\_NK}}/x_{\text{si\_HrK}})^{-1/(1+\sigma_{\text{mah}}+\sigma_{\text{man}})}*HK^{1/(1+\sigma_{\text{man}}/(1+\sigma_{\text{mah}}))} \\
& HrK-((1+\sigma_{\text{mah}})/\sigma_{\text{mah}}*x_{\text{si\_NK}}/x_{\text{si\_HrK}})^{1/(1+\sigma_{\text{mah}})}*empK^{(\sigma_{\text{man}}/(1+\sigma_{\text{mah}}))}=0; \\
& empSC-((1+\sigma_{\text{mah}})/\sigma_{\text{mah}}*x_{\text{si\_NC}}/x_{\text{si\_HrC}})^{-1/(1+\sigma_{\text{mah}}+\sigma_{\text{man}})}*HSC^{1/(1+\sigma_{\text{man}}/(1+\sigma_{\text{mah}}))} \\
& HrSC-((1+\sigma_{\text{mah}})/\sigma_{\text{mah}}*x_{\text{si\_NC}}/x_{\text{si\_HrC}})^{1/(1+\sigma_{\text{mah}})}*empSC^{(\sigma_{\text{man}}/(1+\sigma_{\text{mah}}))}=0; \\
& empSK-((1+\sigma_{\text{mah}})/\sigma_{\text{mah}}*x_{\text{si\_NK}}/x_{\text{si\_HrK}})^{-1/(1+\sigma_{\text{mah}}+\sigma_{\text{man}})}*HSK^{1/(1+\sigma_{\text{man}}/(1+\sigma_{\text{mah}}))} \\
& HrSK-((1+\sigma_{\text{mah}})/\sigma_{\text{mah}}*x_{\text{si\_NK}}/x_{\text{si\_HrK}})^{1/(1+\sigma_{\text{mah}})}*empSK^{(\sigma_{\text{man}}/(1+\sigma_{\text{mah}}))}=0; \\
& unemp-(empSC+empSK-(empC+empK))/(empSC+empSK)=0; \\
& PKB-(1-100*\phi_{ic}*(EIK-gam_{ic}*EIK(-1)-(1-gam_{ic})*EIKSS)/(KC(-1)+KK(-1))*MUK)*QK-\beta_{\text{a}} \\
& YC-EC-ECH-0.2*YCSS*HG=0; \\
& \ln(INFWC)-\ln(WC)+\ln(WC(-1))-\ln(MUC)-\ln(INFC)=0; \\
& \ln(INFWK)-\ln(WK)+\ln(WK(-1))-\ln(MUC)-\ln(INFC)=0; \\
& \ln(INFK)-\ln(INFC)-\ln(PKB)+\ln(PKB(-1))+\ln(MUK)-\ln(MUC)=0; \\
& YK-EIK-ECD-0.2*YKSS*HG=0; \\
& \ln(DIFFNORMGDP)-(1-s_k)*(\ln(YC)-\ln(YC(-1)))-s_k*(\ln(YK)-\ln(YK(-1)))=0; \\
& \ln(NORMINFGDP)-s_k*(\ln(PKB)-\ln(PKB(-1)))=0; \\
& \ln(DIFFREALGDP)-\ln(DIFFNORMGDP)-(1-s_k)*\ln(MUC)-s_k*\ln(MUK)=0; \\
& \ln(DIFFFREALGDP)-\ln(EC)+\ln(EC(-1))-\ln(MUC)=0; \\
& \ln(DIFFFREALGDP)-\ln(EIK)+\ln(EIK(-1))-\ln(MUK)=0;
\end{aligned}$$

Uses A\_HC 35, A\_HK 35, beta\_ 35, DIFFNORMGDP 32, DIFFFREALGDP 32, DIFFFREALGDP 32, EC 32, ECD 32, ECH 32, EFFK 32, EIK 32, EIKSS 35, empC 32, empK 32, empSC 32, empSK 32, e\_{\text{XiL}} 34, gam\_h 35, gam\_{ic} 35, gam\_{wc} 35, HC 32, HCSS 35, HG 32, HK 32, HKSS 35, HrC 32, HrK 32, HrSC 32, HrSK 32, HSC 32, HSCSS 35, HSK 32, HSKSS 35, INFC 32, INFK 32, INFWC 32, INFWCSS 35, INFWK 32, INFWKSS 35, KC 32, KK 32, L 32, Lpref 32, MUC 32, MUK 32, NORMINFGDP 32, phi\_H 35, phi\_{ic} 35, phi\_{wc} 35, PKB 32, QK 32, s\_k 35, sigma\_{\text{mah}} 35, sigma\_{\text{man}} 35, theta\_{wc} 35, theta\_{wk} 35, UHC 32, UHK 32, UHSC 32, UHSK 32, unemp 32, WC 32, WK 32, XiL 32, x\_{\text{si\\_HrC}} 35, x\_{\text{si\\_HrK}} 35, x\_{\text{si\\_NC}} 35, x\_{\text{si\\_NK}} 35, YC 32, YCSS 35, YK 32, and YKSS 35.

### A.1.4 Dynare EDO Model Identities

12b  $\langle edo\ model\ identities\ 12b \rangle \equiv$  (10)

$$\ln(DIFFREALW)-HCSS/AHSS*(\ln(INFWC))-HKSS/AHSS*(\ln(INFWK))+\ln(INFC)=0;$$

Uses AHSS 35, DIFFREALW 32, HCSS 35, HKSS 35, INFC 32, INFWC 32, and INFWK 32.

### A.1.5 Dynare EDO Model Hours

13a  $\langle edo\ model\ hours\ 13a \rangle \equiv$  (10)

$$\begin{aligned}
 &AH-HC-HK=0; \\
 &\ln(INFGDP)-\ln(INFC)-\ln(YC*MUC/YC(-1))+\ln(DIFFREALGDP)-\ln((1+PKB*YK/YC)/(1+PKB(-1)*YK(-1)/YC(-1))) \\
 &\ln(INFCNA)-(1-s\_ecdc)*\ln(INFC)-s\_ecdc*\ln(INFK)=0; \\
 &\ln(INFCOR)-(1-s\_ecdc)*\ln(INFC)-s\_ecdc*\ln(INFK)=0; \\
 &\ln(GAP)-(1-s\_k)*\ln(YC/YCSS)-s\_k*\ln(YK/YKSS)=0; \\
 &\ln(PFGAP)-(1-\alpha\_)*((1-s\_k)*\ln(HC/HCSS)+s\_k*\ln(HK/HKSS))-\alpha\_*((1-s\_k)*\ln(UC/USS)+s\_k*\ln(UK/UUKSS)) \\
 &\ln(INFC10)-\beta ar1*\ln(INFC10(+1))-(1-\beta ar1)*\ln(INFCOR)=0;
 \end{aligned}$$

Uses AH 32, alpha\_ 35, betar1 35, DIFFREALGDP 32, GAP 32, HC 32, HCSS 35, HK 32, HKSS 35, INFC 32, INFC10 32, INFCNA 32, INFCOR 32, INFGDP 32, INFK 32, MUC 32, PFGAP 32, PKB 32, s\\_ecdc 35, s\\_k 35, UC 32, UK 32, USS 35, YC 32, YCSS 35, YK 32, and YKSS 35.

### A.1.6 Dynare EDO Model Durables

13b  $\langle edo\ model\ durables\ 13b \rangle \equiv$  (10)

$$\begin{aligned}
 &KD-(1-\delta cd)*KD(-1)/MUK-ECD=0; \\
 &L*RCD-\eta cd/(KD(-1)/MUK-h\_cd*LAGKD(-1)/(MUK(-1)*MUK))+\beta cd*\eta cd*h\_cd/(KD-h\_cd*KD(-1)/MUK)=0; \\
 &QCD-\beta cd*(1/EFECd)*L(+1)/L/MUK(+1)*(RCD(+1)+(1-\delta cd)*QCD(+1))=0; \\
 &PKB-QCD*(1-100*\phi cd*(ECD-gam\_icd*ECD(-1)-(1-gam\_icd)*ECDSS)/KD(-1)*MUK) - \beta cd*(1/EFECd)*100*QCD(-1)=0;
 \end{aligned}$$

Uses beta\_ 35, delta\_cd 35, ECD 32, ECDSS 35, EFECd 32, eta\_cd 35, gam\\_icd 35, h\_cd 35, KD 32, L 32, LAGKD 32, MUK 32, phi\_cd 35, PKB 32, QCD 32, and RCD 32.

## A.1.7 Dynare EDO Model Housing

14  $\langle \text{edo model housing } 14 \rangle \equiv$  (10)

```

L*RCH-eta_ch/(KCH(-1)/MUC-h_ch*LAGKCH(-1)/(MUC*MUC(-1)))+beta_*eta_ch*h_ch/(KCH-h_ch)
QCH-beta_*(1/EFFECH)*L(+1)/L/MUC(+1)*(RCH(+1)+(1-delta_ch)*QCH(+1))=0;
1*ECH+(1-delta_ch)*KCH(-1)/MUC-KCH=0;
1-QCH*(1-100*phi_ech*(ECH-gam_ech*ECH(-1)-(1-gam_ech)*ECHSS)/KCH(-1)*MUC) - beta_*(1
ln(KD(-1))-ln(LAGKD)=0;
ln(KCH(-1))-ln(LAGKCH)=0;
RK-QK*mu_*UK^(1/phi_u)=0;
RC-QK*mu_*UC^(1/phi_u)=0;
ln(DIFFREALECH)-ln(MUC)-ln(ECH)+ln(ECH(-1))=0;
ln(DIFFREALECD)-ln(MUK)-ln(ECD)+ln(ECD(-1))=0;
ln(betas/beta_)-rho_B*ln(betas(-1)/beta_)-eB=0;
ln(XiL)-rho_XiL*ln(XiL(-1))-eXiL=0;
ln(Lpref)-rho_lpref*ln(Lpref(-1))-eLpref=0;
ln(EFFK)-rho_EFFK*ln(EFFK(-1))-eEFFK=0;
ln(MUZK/MUZKSS)-eMUZK=0;
ln(MUZM/MUZMSS)-eMUZM=0;
ln(HG)-rho_HG*ln(HG(-1))-eHG=0;
ln(MUC)-ln(MUZM)-alpha_*ln(MUZK)=0;
ln(MUK)-ln(MUZM)-ln(MUZK)=0;
ln(EFFECD)-rho_EFFECD*ln(EFFECD(-1))-eEFFECD=0;
ln(EFFECH)-rho_EFFECH*ln(EFFECH(-1))-eEFFECH=0;
ln(STAR)-rho_STAR*ln(STAR(-1))-eSTAR=0;
ln(RL1) - ln(R(+1))=0;
ln(RL2) - ln(RL1(+1))=0;
ln(RL3) - ln(RL2(+1))=0;
ln(RL4) - ln(RL3(+1))=0;
ln(RL5) - ln(RL4(+1))=0;
ln(RL6) - ln(RL5(+1))=0;
ln(RL7) - ln(RL6(+1))=0;
ln(RT2) - tp2 - 0.125*(ln(R) + ln(RL1) + ln(RL2) + ln(RL3) + ln(RL4) + ln(RL5) + ln(RL6) + ln(RL7))=0;

```

Uses alpha\_ 35, beta\_ 35, betas 32, delta\_ch 35, DIFFREALECD 32, DIFFREALECH 32, eB 34, ECD 32, ECH 32, ECHSS 35, eEFFECD 34, eEFFECH 34, eEFFK 34, EFFECD 32, EFFECH 32, EFFK 32, eHG 34, eLpref 34, eMUZK 34, eMUZM 34, eSTAR 34, eta\_ch 35, eXiL 34, gam\_ech 35, h\_ch 35, HG 32, KCH 32, KD 32, L 32, LAGKCH 32, LAGKD 32, Lpref 32, mu\_ 35, MUC 32, MUK 32, MUZK 32, MUZKSS 35, MUZM 32, MUZMSS 35, phi\_ech 35, phi\_u 35, QCH 32, QK 32, R 32, RC 32, RCH 32, rho\_B 35, rho\_EFFECD 35, rho\_EFFECH 35, rho\_EFFK 35, rho\_HG 35, rho\_lpref 35, rho\_STAR 35, rho\_XiL 35, RK 32, RL1 32, RL2 32, RL3 32, RL4 32, RL5 32, RL6 32, RL7 32, RT2 32, STAR 32, tp2 35, UC 32, UK 32, and XiL 32.

### A.1.8 Dynare EDO Model Measurement

15  $\langle edo\ model\ measurement\ 15 \rangle \equiv$  (10)

$$\begin{aligned}
 \ln(\text{DIFFREALGDP\_obs}/\text{DIFFREALGDPSS\_obs}) &= \ln(\text{DIFFREALGDP}/\text{DIFFREALGDPSS}); \\
 \ln(\text{DIFFREALEC\_obs}/\text{DIFFREALECSS\_obs}) &= \ln(\text{DIFFREALEC}/\text{DIFFREALECSS}); \\
 \ln(\text{DIFFREALEIK\_obs}/\text{DIFFREALEIKSS\_obs}) &= \ln(\text{DIFFREALEIK}/\text{DIFFREALEIKSS}); \\
 \ln(\text{DIFFREALECD\_obs}/\text{DIFFREALECDSS\_obs}) &= \ln(\text{DIFFREALECD}/\text{DIFFREALECDSS}); \\
 \ln(\text{DIFFREALECH\_obs}/\text{DIFFREALECHSS\_obs}) &= \ln(\text{DIFFREALECH}/\text{DIFFREALECHSS}); \\
 \ln(\text{DIFFREALW\_obs}/\text{DIFFREALWSS\_obs}) &= \ln(\text{DIFFREALW}/\text{DIFFREALWSS}); \\
 \ln(\text{AH\_obs}) &= \ln(\text{AH}/\text{AHSS}); \\
 \ln(\text{INFCNA\_obs}/\text{INFCNASS\_obs}) &= \ln(\text{INFCNA}/\text{INFCNASS}); \\
 \ln(\text{INFCOR\_obs}/\text{INFCORSS\_obs}) &= \ln(\text{INFCOR}/\text{INFCORSS}); \\
 \ln(\text{INFK\_obs}/\text{INFKSS\_obs}) &= \ln(\text{INFK}/\text{INFKSS}); \\
 \ln(\text{R\_obs}/\text{RSS\_obs}) &= \ln(\text{R}/\text{RSS}); \\
 \ln(\text{RT2\_obs}/\text{RT2SS\_obs}) &= \ln(\text{RT2}/\text{RT2SS}); \\
 \ln(\text{unemp\_obs}/\text{unempSS\_obs}) &= \ln(\text{unemp}/\text{unempSS});
 \end{aligned}$$

Uses AH 32, AH\_obs 32, AHSS 35, DIFFREALEC 32, DIFFREALEC\_obs 32, DIFFREALECD 32, DIFFREALECD\_obs 32, DIFFREALECDSS 35, DIFFREALECDSS\_obs 35, DIFFREALECH 32, DIFFREALECH\_obs 32, DIFFREALECHSS 35, DIFFREALECHSS\_obs 35, DIFFREALECSS 35, DIFFREALECSS\_obs 35, DIFFREALEIK 32, DIFFREALEIK\_obs 32, DIFFREALEIKSS 35, DIFFREALEIKSS\_obs 35, DIFFREALGDP 32, DIFFREALGDP\_obs 32, DIFFREALGDPSS 35, DIFFREALGDPSS\_obs 35, DIFFREALW 32, DIFFREALW\_obs 32, DIFFREALWSS 35, DIFFREALWSS\_obs 35, INFCNA 32, INFCNA\_obs 32, INFCNASS 35, INFCNASS\_obs 35, INFCOR 32, INFCOR\_obs 32, INFCORSS 35, INFCORSS\_obs 35, INFK 32, INFK\_obs 32, INFKSS 35, INFKSS\_obs 35, R 32, R\_obs 32, RSS 35, RSS\_obs 35, RT2 32, RT2\_obs 32, RT2SS 35, RT2SS\_obs 35, unemp 32, unemp\_obs 32, unempSS 35, and unempSS\_obs 35.

## A.2 Dynare\_edo\_steadystate.m

```

16  <srcedo/Dynare.edo.steadystate.m 16>≡
    function [ys,check] = unlinearized_edo_steadystate(ys,exe)
        global M_

        check = 0;

        NumberofParameters=M_.param_nbr;
        for i=1:NumberofParameters
            paramname=deblank(M_.param_names(i,:));
            eval([paramname ' =M_.params(' int2str(i) ');']);
        end;

        %start_steady_state;

        <common steady state values 45>

        %end_steady_state;

        %trends;

        <common steady state trends 48>

        %end_trends;

        for i=1:NumberofParameters
            paramname=deblank(M_.param_names(i,:));
            eval(['M_.params(' int2str(i) ')=' paramname ';']);
        end;

        <edo steady state result return 17>

```

This code is written to file `srcedo/Dynare.edo.steadystate.m`.

Defines:

`unlinearized_edo_steadystate`, never used.



### A.2.1 EDO Steady State Result Return

17  $\langle edo\ steady\ state\ result\ return\ 17 \rangle \equiv$  (16)

```

ys = [
  RCSS
  RKSS
  WCSS
  WKSS
  YCSS
  YKSS
  MCCSS
  MCKSS
  KCSS
  KKSS
  PKBSS
  RSS
  LSS
  QKSS
  HCSS
  HSCSS
  HKSS
  HSKSS
  UHCSS
  UHSCSS
  UHKSS
  UHSKSS
  empCSS
  HrCSS
  empKSS
  HrKSS
  empSCSS
  HrSCSS
  empSKSS
  HrSKSS
  unempSS
  EIKSS
  ECSS
  INFWCSS
  INFWKSS
  INFCSS
  INFKSS
  ONE
  ONE
  DIFFREALGDPSS
  DIFFREALECSS
  DIFFREALEIKSS

```

DIFFREALWSS  
AHSS  
INFGDPSS  
INFCNASS  
INFCORSS  
ONE  
ONE  
INFC10SS  
ECDSS  
KCDSS  
RCDSS  
QCDSS  
KCHSS  
RCHSS  
ECHSS  
QCHSS  
KCDSS  
KCHSS  
USS  
USS  
DIFFREALECHSS  
DIFFREALECDSS  
beta\_  
ONE  
ONE  
ONE  
MUZKSS  
MUZMSS  
ONE  
MUCSS  
MUKSS  
ONE  
ONE  
ONE  
RL1SS  
RL2SS  
RL3SS  
RL4SS  
RL5SS  
RL6SS  
RL7SS  
RT2SS  
DIFFREALGDPSS\_obs  
DIFFREALECSS\_obs  
DIFFREALEIKSS\_obs  
DIFFREALECDSS\_obs

```

DIFFREALECHSS_obs
DIFFREALWSS_obs
ONE
INFCNASS_obs
INFCORSS_obs
INFKSS_obs
RSS_obs
RT2SS_obs
unempSS_obs
];

```

Uses AHSS 35, beta\_ 35, DIFFREALECDSS 35, DIFFREALECDSS\_obs 35, DIFFREALECHSS 35, DIFFREALECHSS\_obs 35, DIFFREALECSSL 35, DIFFREALECSSL\_obs 35, DIFFREALEIKSSL 35, DIFFREALEIKSSL\_obs 35, DIFFREALGDPSSL 35, DIFFREALGDPSSL\_obs 35, DIFFREALWSSL 35, DIFFREALWSSL\_obs 35, ECDSSL 35, ECHSSL 35, ECSSL 35, EIKSSL 35, empCSSL 35, empKSSL 35, empSCSSL 35, empSKSSL 35, HCSSL 35, HKSSL 35, HrCSSL 35, HrKSSL 35, HrSCSSL 35, HrSKSSL 35, HSCSSL 35, HSKSSL 35, INFC10SSL 35, INFCNASS 35, INFCNASS\_obs 35, INFCORSSL 35, INFCORSSL\_obs 35, INFCSSL 35, INFGDPSSL 35, INFKSSL 35, INFKSSL\_obs 35, INFWCSSL 35, INFWKSSL 35, KCDSSL 35, KCHSSL 35, KCSSL 35, KKSSL 35, LSSL 35, MCCSSL 35, MCKSSL 35, MUCSSL 35, MUKSSL 35, MUZKSSL 35, MUZMSSL 35, ONE 35, PKBSSL 35, QCDSSL 35, QCHSSL 35, QKSSL 35, RCDSSL 35, RCHSSL 35, RCSSL 35, RKSSL 35, RL1SSL 35, RL2SSL 35, RL3SSL 35, RL4SSL 35, RL5SSL 35, RL6SSL 35, RL7SSL 35, RSS 35, RSS\_obs 35, RT2SSL 35, RT2SSL\_obs 35, UHCSSL 35, UHKSSL 35, UHSCSSL 35, UHSKSSL 35, unempSSL 35, unempSSL\_obs 35, USS 35, WCSSL 35, WKSSL 35, YCSSL 35, and YKSSL 35.

### A.3 linearized.mod

```

19 <srcedo/linearized.mod 19>≡
    <common setup 30>
    <linearized model 20>
    <common stoch sim 31>

```

This code is written to file `srcedo/linearized.mod`.

### A.3.1 Linearized Model

20  $\langle \text{linearized model 20} \rangle \equiv$  (19)  
 $\langle \text{linearized model prelim 21} \rangle$

```
// XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
// labor block
// TOTAL LABOR INPUT (called "(LSS*exp(L))" in the paper, I kept the "H" notation of
 $\langle \text{linearized model labor 22} \rangle$ 
```

```
// Identities
 $\langle \text{linearized model identities 23a} \rangle$ 
```

```
// XXXXXXXXXXXXXXXXXXXXXXXX
// Aggregate hours equals agg hours in each sector
 $\langle \text{linearized model hours 23b} \rangle$ 
```

```
// See Section 8: Data Identities
```

```
// new equations
// Durable Block
```

```
 $\langle \text{linearized model durables 23c} \rangle$ 
```

```
// Housing Block
 $\langle \text{linearized model housing 24} \rangle$ 
```

```
//measurement_equations;
 $\langle \text{linearized model measurement 25} \rangle$ 
```

```
//end_measurement_equations;
```

```
end;
```

Uses L 32 and LSS 35.

### A.3.2 Linearized Model Prelim

21

 $\langle \text{linearized model prelim } 21 \rangle \equiv$ 

(20)

$$\begin{aligned}
 & (RCSS \cdot \exp(RC)) - (MCCSS \cdot \exp(MCC)) * (YCSS \cdot \exp(YC)) / (USS \cdot \exp(UC)) / (KCSS \cdot \exp(KC(-1))) * \alpha_ * (MUKSS \cdot \exp(MUK)) \\
 & (RKSS \cdot \exp(RK)) - (MCKSS \cdot \exp(MCK)) * (YKSS \cdot \exp(YK)) / (USS \cdot \exp(UK)) / (KKSS \cdot \exp(KK(-1))) * \alpha_ * (MUKSS \cdot \exp(MUK)) \\
 & (WCSS \cdot \exp(WC)) - (MCCSS \cdot \exp(MCC)) * (YCSS \cdot \exp(YC)) / (HCSS \cdot \exp(HC)) * (1 - \alpha_ ) = 0; \\
 & (WKSS \cdot \exp(WK)) - (MCKSS \cdot \exp(MCK)) * (YKSS \cdot \exp(YK)) / (HKSS \cdot \exp(HK)) * (1 - \alpha_ ) = 0; \\
 & (YCSS \cdot \exp(YC)) - ((USS \cdot \exp(UC)) * (KCSS \cdot \exp(KC(-1))) / (MUKSS \cdot \exp(MUK)))^{\alpha_} * ((HCSS \cdot \exp(HC)))^{(1 - \alpha_)} \\
 & (YKSS \cdot \exp(YK)) - ((USS \cdot \exp(UK)) * (KKSS \cdot \exp(KK(-1))) / (MUKSS \cdot \exp(MUK)))^{\alpha_} * ((HKSS \cdot \exp(HK)))^{(1 - \alpha_)} \\
 & (MCCSS \cdot \exp(MCC)) * (YCSS \cdot \exp(YC)) * \theta_c - (\theta_c - 1) * (YCSS \cdot \exp(YC)) - 100 * \phi_{pc} * ((INFCSS \cdot \exp(INFC)) * (MCKSS \cdot \exp(MCK)) * (YKSS \cdot \exp(YK)) * \theta_k / (PKBSS \cdot \exp(PKB)) - (\theta_k - 1) * (YKSS \cdot \exp(YK)) - 100 * \phi_{pc} * \\
 & (QKSS \cdot \exp(QK)) - \beta_ * (1 / (ONE \cdot \exp(EFFK))) * (((1 - \delta_ ) * (QKSS \cdot \exp(QK(+1))) + (RCSS \cdot \exp(RC(+1))) * (US \\
 & (QKSS \cdot \exp(QK)) - \beta_ * (1 / (ONE \cdot \exp(EFFK))) * (((1 - \delta_ ) * (QKSS \cdot \exp(QK(+1))) + (RKSS \cdot \exp(RK(+1))) * (US \\
 & (LSS \cdot \exp(L)) - (\beta_ * \exp(\beta_ )) * (RSS \cdot \exp(R)) / r_{pr} / (INFCSS \cdot \exp(INFC(+1))) / (MUCSS \cdot \exp(MUC(+1))) * (L \\
 & \ln((RSS \cdot \exp(R)) / RSS) - \rho_R * \ln((RSS \cdot \exp(R(-1))) / RSS) - (1 - \rho_R) * (r_{inf} * \ln((INFCNASS \cdot \exp(INFCNA)) / \\
 & (LSS \cdot \exp(L)) - \eta_{cnn} / (ECSS \cdot \exp(EC)) - h * (ECSS \cdot \exp(EC(-1))) / (MUCSS \cdot \exp(MUC))) + \eta_{cnn} * \beta_ * h / ((M \\
 & (KKSS \cdot \exp(KK)) - (1 - \delta_ ) * (KKSS \cdot \exp(KK(-1))) / (MUKSS \cdot \exp(MUK)) + (KCSS \cdot \exp(KC)) - (1 - \delta_ ) * (KCSS \cdot \exp(KC))
 \end{aligned}$$

Uses  $\alpha_$  35,  $\beta_$  35,  $\beta_$  32,  $\delta_$  35, EC 32, ECSS 35, EFFK 32, EIK 32, EIKSS 35, ePMKC 34, ePMKK 34, eR 34,  $\eta_{cnn}$  35,  $\gamma_{pc}$  35, h 35, HC 32, HCSS 35, HK 32, HKSS 35, INFC 32, INFCNA 32, INFCNASS 35, INFCSS 35, INFK 32, INFKSS 35, KC 32, KCSS 35, KK 32, KKSS 35, L 32, LSS 35, MCC 32, MCCSS 35, MCK 32, MCKSS 35,  $\mu_$  35, MUC 32, MUCSS 35, MUK 32, MUKSS 35, ONE 35, PFGAP 32,  $\phi_{pc}$  35,  $\phi_u$  35, PKB 32, PKBSS 35, QK 32, QKSS 35, R 32,  $r_{dinf}$  35,  $r_{inf}$  35,  $r_y$  35, RC 32, RCSS 35,  $\rho_R$  35, RK 32, RKSS 35,  $r_{pr}$  35, RSS 35,  $\theta_c$  35,  $\theta_k$  35, UC 32, UK 32, USS 35, WC 32, WCSS 35, WK 32, WKSS 35, YC 32, YCSS 35, YK 32, and YKSS 35.

$$\begin{aligned}
& -100+(\text{UHCSS}*\exp(\text{UHC}))*\text{theta\_wc}-(\text{theta\_wc}-1)*(\text{WCSS}*\exp(\text{WC}))-100*\text{phi\_wc}*((\text{INFWCSS}*\exp(\text{INFWC})) \\
& (\text{UHSCSS}*\exp(\text{UHSC}))-(\text{WCSS}*\exp(\text{WC}))+\text{phi\_H}/10*((\text{HSCSS}*\exp(\text{HSC}))/(\text{HSKSS}*\exp(\text{HSK}))- \text{gam\_h}* \\
& -100+(\text{UHKSS}*\exp(\text{UHK}))*\text{theta\_wk}-(\text{theta\_wk}-1)*(\text{WKSS}*\exp(\text{WK}))-100*\text{phi\_wc}*((\text{INFWKSS}*\exp(\text{INFWK})) \\
& (\text{UHSKSS}*\exp(\text{UHSK}))-(\text{WKSS}*\exp(\text{WK}))- \text{phi\_H}/10*((\text{HSCSS}*\exp(\text{HSC}))/(\text{HSKSS}*\exp(\text{HSK}))- \text{gam\_h}* \\
& (\text{UHCSS}*\exp(\text{UHC}))*(\text{LSS}*\exp(\text{L}))*(\text{ONE}*\exp(\text{Lpref}))- \text{A\_HC}*((1+\text{sigman})/(1+\text{sigman}/(1+\text{sigmah}))) \\
& (\text{UHSCSS}*\exp(\text{UHSC}))*(\text{LSS}*\exp(\text{L}))*(\text{ONE}*\exp(\text{Lpref}))- \text{A\_HC}*((1+\text{sigman})/(1+\text{sigman}/(1+\text{sigmah}))) \\
& (\text{UHKSS}*\exp(\text{UHK}))*(\text{LSS}*\exp(\text{L}))*(\text{ONE}*\exp(\text{Lpref}))- \text{A\_HK}*((1+\text{sigman})/(1+\text{sigman}/(1+\text{sigmah}))) \\
& (\text{UHSKSS}*\exp(\text{UHSK}))*(\text{LSS}*\exp(\text{L}))*(\text{ONE}*\exp(\text{Lpref}))- \text{A\_HK}*((1+\text{sigman})/(1+\text{sigman}/(1+\text{sigmah}))) \\
& (\text{empCSS}*\exp(\text{empC}))-((1+\text{sigmah})/\text{sigmah}* \text{xsi\_NC}/\text{xsi\_HrC})^{-(1/(1+\text{sigmah}+\text{sigman}))}*(\text{HCSS}*\exp(\text{HC})) \\
& (\text{HrCSS}*\exp(\text{HrC}))-((1+\text{sigmah})/\text{sigmah}* \text{xsi\_NC}/\text{xsi\_HrC})^{(1/(1+\text{sigmah}))}*(\text{empCSS}*\exp(\text{empC}))- \\
& (\text{empKSS}*\exp(\text{empK}))-((1+\text{sigmah})/\text{sigmah}* \text{xsi\_NK}/\text{xsi\_HrK})^{-(1/(1+\text{sigmah}+\text{sigman}))}*(\text{HKSS}*\exp(\text{HK})) \\
& (\text{HrKSS}*\exp(\text{HrK}))-((1+\text{sigmah})/\text{sigmah}* \text{xsi\_NK}/\text{xsi\_HrK})^{(1/(1+\text{sigmah}))}*(\text{empKSS}*\exp(\text{empK}))- \\
& (\text{empSCSS}*\exp(\text{empSC}))-((1+\text{sigmah})/\text{sigmah}* \text{xsi\_NC}/\text{xsi\_HrC})^{-(1/(1+\text{sigmah}+\text{sigman}))}*(\text{HSCSS}*\exp(\text{HSC})) \\
& (\text{HrSCSS}*\exp(\text{HrSC}))-((1+\text{sigmah})/\text{sigmah}* \text{xsi\_NC}/\text{xsi\_HrC})^{(1/(1+\text{sigmah}))}*(\text{empSCSS}*\exp(\text{empSC}))- \\
& (\text{empSKSS}*\exp(\text{empSK}))-((1+\text{sigmah})/\text{sigmah}* \text{xsi\_NK}/\text{xsi\_HrK})^{-(1/(1+\text{sigmah}+\text{sigman}))}*(\text{HSKSS}*\exp(\text{HSK})) \\
& (\text{HrSKSS}*\exp(\text{HrSK}))-((1+\text{sigmah})/\text{sigmah}* \text{xsi\_NK}/\text{xsi\_HrK})^{(1/(1+\text{sigmah}))}*(\text{empSKSS}*\exp(\text{empSK}))- \\
& (\text{unempSS}*\exp(\text{unemp}))-((\text{empSCSS}*\exp(\text{empSC}))+(\text{empSKSS}*\exp(\text{empSK}))-((\text{empCSS}*\exp(\text{empC}))+ \\
& (\text{PKBSS}*\exp(\text{PKB}))- (1-100*\text{phi\_ic}*((\text{EIKSS}*\exp(\text{EIK}))- \text{gam\_ic}*(\text{EIKSS}*\exp(\text{EIK}(-1))))-(1-\text{gam\_ic})* \\
& (\text{YCSS}*\exp(\text{YC}))-(\text{ECSS}*\exp(\text{EC}))-(\text{ECHSS}*\exp(\text{ECH}))-0.2*\text{YCSS}*(\text{ONE}*\exp(\text{HG})))=0; \\
& \ln((\text{INFWCSS}*\exp(\text{INFWC}))) - \ln((\text{WCSS}*\exp(\text{WC}))) + \ln((\text{WCSS}*\exp(\text{WC}(-1)))) - \ln((\text{MUCSS}*\exp(\text{MUC}))) \\
& \ln((\text{INFWKSS}*\exp(\text{INFWK}))) - \ln((\text{WKSS}*\exp(\text{WK}))) + \ln((\text{WKSS}*\exp(\text{WK}(-1)))) - \ln((\text{MUCSS}*\exp(\text{MUC}))) \\
& \ln((\text{INFKSS}*\exp(\text{INFK}))) - \ln((\text{INFCSS}*\exp(\text{INFC}))) - \ln((\text{PKBSS}*\exp(\text{PKB}))) + \ln((\text{PKBSS}*\exp(\text{PKB}(-1)))) \\
& (\text{YKSS}*\exp(\text{YK}))-(\text{EIKSS}*\exp(\text{EIK}))-(\text{ECDSS}*\exp(\text{ECD}))-0.2*\text{YKSS}*(\text{ONE}*\exp(\text{HG})))=0; \\
& \ln((\text{ONE}*\exp(\text{DIFFNORMGDP}))) - (1-\text{s\_k})*(\ln((\text{YCSS}*\exp(\text{YC}))) - \ln((\text{YCSS}*\exp(\text{YC}(-1))))) - \text{s\_k}*(\ln((\text{MUCSS}*\exp(\text{MUC}))) \\
& \ln((\text{ONE}*\exp(\text{NORMINFGDP}))) - \text{s\_k}*(\ln((\text{PKBSS}*\exp(\text{PKB}))) - \ln((\text{PKBSS}*\exp(\text{PKB}(-1)))))=0; \\
& \ln((\text{DIFFREALGDPSS}*\exp(\text{DIFFREALGDP}))) - \ln((\text{ONE}*\exp(\text{DIFFNORMGDP}))) - (1-\text{s\_k})*\ln((\text{MUCSS}*\exp(\text{MUC}))) \\
& \ln((\text{DIFFREALECSS}*\exp(\text{DIFFREALEC}))) - \ln((\text{ECSS}*\exp(\text{EC}))) + \ln((\text{ECSS}*\exp(\text{EC}(-1)))) - \ln((\text{MUCSS}*\exp(\text{MUC}))) \\
& \ln((\text{DIFFREALEIKSS}*\exp(\text{DIFFREALEIK}))) - \ln((\text{EIKSS}*\exp(\text{EIK}))) + \ln((\text{EIKSS}*\exp(\text{EIK}(-1)))) - \ln((\text{MUCSS}*\exp(\text{MUC})))
\end{aligned}$$

Uses A\_HC 35, A\_HK 35, beta\_35, DIFFNORMGDP 32, DIFFREALEC 32, DIFFREALECSS 35, DIFFREALEIK 32, DIFFREALEIKSS 35, DIFFREALGDP 32, DIFFREALGDPSS 35, EC 32, ECD 32, ECDSS 35, ECH 32, ECHSS 35, ECSS 35, EFFK 32, EIK 32, EIKSS 35, empC 32, empCSS 35, empK 32, empKSS 35, empSC 32, empSCSS 35, empSK 32, empSKSS 35, eXiL 34, gam\_h 35, gam\_ic 35, gam\_wc 35, HC 32, HCSS 35, HG 32, HK 32, HKSS 35, HrC 32, HrCSS 35, HrK 32, HrKSS 35, HrSC 32, HrSCSS 35, HrSK 32, HrSKSS 35, HSC 32, HSCSS 35, HSK 32, HSKSS 35, INFC 32, INFCSS 35, INFK 32, INFKSS 35, INFWC 32, INFWCSS 35, INFWK 32, INFWKSS 35, KC 32, KCSS 35, KK 32, KKSS 35, L 32, Lpref 32, LSS 35, MUC 32, MUCSS 35, MUK 32, MUKSS 35, NORMINFGDP 32, ONE 35, phi\_H 35, phi\_ic 35, phi\_wc 35, PKB 32, PKBSS 35, QK 32, QKSS 35, s\_k 35, sigmah 35, sigman 35, theta\_wc 35, theta\_wk 35, UHC 32, UHCSS 35, UHK 32, UHKSS 35, UHSC 32, UHSCSS 35, UHSK 32, UHSKSS 35, unemp 32, unempSS 35, WC 32, WCSS 35, WK 32, WKSS 35, XiL 32, xsi\_HrC 35, xsi\_HrK 35, xsi\_NC 35, xsi\_NK 35, YC 32, YCSS 35, YK 32, and YKSS 35.

### A.3.4 Linearized Model Identities

23a  $\langle \text{linearized model identities 23a} \rangle \equiv$  (20)

$$\ln((\text{DIFFREALWSS} * \exp(\text{DIFFREALW})) - \text{HCSS} / \text{AHSS} * (\ln((\text{INFWCSS} * \exp(\text{INFWC}))) - \text{HKSS} / \text{AHSS} * (\ln((\text{INFWKSS} * \exp(\text{INFWK})))))) = 0;$$

Uses AHSS 35, DIFFREALW 32, DIFFREALWSS 35, HCSS 35, HKSS 35, INFC 32, INFCSS 35, INFWC 32, INFWCSS 35, INFWK 32, and INFWKSS 35.

### A.3.5 Linearized Model Hours

23b  $\langle \text{linearized model hours 23b} \rangle \equiv$  (20)

$$\begin{aligned} &(\text{AHSS} * \exp(\text{AH})) - (\text{HCSS} * \exp(\text{HC})) - (\text{HKSS} * \exp(\text{HK})) = 0; \\ &\ln((\text{INFGDPSS} * \exp(\text{INFGDP})) - \ln((\text{INFCSS} * \exp(\text{INFC}))) - \ln((\text{YC} * \exp(\text{YC})) * (\text{MUCSS} * \exp(\text{MUC})) / (\text{YC} * \exp(\text{YC})))) = 0; \\ &\ln((\text{INFCNASS} * \exp(\text{INFCNA})) - (1 - s_{\text{ecdc}}) * \ln((\text{INFCSS} * \exp(\text{INFC}))) - s_{\text{ecdc}} * \ln((\text{INFKSS} * \exp(\text{INFK}))) = 0; \\ &\ln((\text{INFCORSS} * \exp(\text{INFCOR})) - (1 - s_{\text{ecdc}}) * \ln((\text{INFCSS} * \exp(\text{INFC}))) - s_{\text{ecdc}} * \ln((\text{INFKSS} * \exp(\text{INFK}))) = 0; \\ &\ln((\text{ONE} * \exp(\text{GAP})) - (1 - s_k) * \ln((\text{YC} * \exp(\text{YC})) / \text{YC})) - s_k * \ln((\text{YKSS} * \exp(\text{YK})) / \text{YK}) = 0; \\ &\ln((\text{ONE} * \exp(\text{PFGAP})) - (1 - \alpha_k) * ((1 - s_k) * \ln((\text{HCSS} * \exp(\text{HC})) / \text{HCSS}) + s_k * \ln((\text{HKSS} * \exp(\text{HK})) / \text{HKSS}))) - \alpha_k * \ln((\text{INFC10SS} * \exp(\text{INFC10})) - \text{betar1} * \ln((\text{INFC10SS} * \exp(\text{INFC10} + 1)))) - (1 - \text{betar1}) * \ln((\text{INFCORSS} * \exp(\text{INFCOR})) - \text{betar1} * \ln((\text{INFCORSS} * \exp(\text{INFCOR} + 1)))) = 0; \end{aligned}$$

Uses AH 32, AHSS 35, alpha\_ 35, betar1 35, DIFFREALGDP 32, DIFFREALGDPSS 35, GAP 32, HC 32, HCSS 35, HK 32, HKSS 35, INFC 32, INFC10 32, INFC10SS 35, INFCNA 32, INFCNASS 35, INFCOR 32, INFCORSS 35, INFCSS 35, INFGDP 32, INFGDPSS 35, INFK 32, INFKSS 35, MUC 32, MUCSS 35, ONE 35, PFGAP 32, PKB 32, PKBSS 35, s\_ecdc 35, s\_k 35, UC 32, UK 32, USS 35, YC 32, YCSS 35, YK 32, and YKSS 35.

### A.3.6 Linearized Model Durables

23c  $\langle \text{linearized model durables 23c} \rangle \equiv$  (20)

$$\begin{aligned} &(\text{KCDSS} * \exp(\text{KD})) - (1 - \text{delta\_cd}) * (\text{KCDSS} * \exp(\text{KD}(-1))) / (\text{MUKSS} * \exp(\text{MUK})) - (\text{ECDSS} * \exp(\text{ECD})) = 0; \\ &(\text{LSS} * \exp(\text{L})) * (\text{RCDSS} * \exp(\text{RCD})) - \text{eta\_cd} / ((\text{KCDSS} * \exp(\text{KD}(-1))) / (\text{MUKSS} * \exp(\text{MUK})) - \text{h\_cd} * (\text{KCDSS} * \exp(\text{LAKD}))) = 0; \\ &(\text{QCDSS} * \exp(\text{QCD})) - \text{beta\_} * (1 / (\text{ONE} * \exp(\text{EFFECD}))) * (\text{LSS} * \exp(\text{L} + 1)) / (\text{LSS} * \exp(\text{L})) / (\text{MUKSS} * \exp(\text{MUK} + 1)) = 0; \\ &(\text{PKBSS} * \exp(\text{PKB})) - (\text{QCDSS} * \exp(\text{QCD})) * (1 - 100 * \text{phi\_cd} * ((\text{ECDSS} * \exp(\text{ECD})) - \text{gam\_icd} * (\text{ECDSS} * \exp(\text{ECD}(-1)))) = 0; \end{aligned}$$

Uses beta\_ 35, delta\_cd 35, ECD 32, ECDSS 35, EFFECD 32, eta\_cd 35, gam\_icd 35, h\_cd 35, KCDSS 35, KD 32, L 32, LAGD 32, LSS 35, MUK 32, MUKSS 35, ONE 35, phi\_cd 35, PKB 32, PKBSS 35, QCD 32, QCDSS 35, RCD 32, and RCDSS 35.

### A.3.7 Linearized Model Housing

$$\begin{aligned}
 \langle \text{linearized model housing } 24 \rangle \equiv & \quad (20) \\
 & (LSS * \exp(L)) * (RCHSS * \exp(RCH)) - \eta_{ch} / ((KCHSS * \exp(KCH(-1))) / (MUCSS * \exp(MUC)) - h_{ch} * (KCHSS * \exp(KCH) \\
 & (QCHSS * \exp(QCH)) - \beta_{ch} * (1 / (ONE * \exp(EFFECH))) * (LSS * \exp(L(+1))) / (LSS * \exp(L)) / (MUCSS * \exp(MUC)) \\
 & 1 * (ECHSS * \exp(ECH)) + (1 - \delta_{ch}) * (KCHSS * \exp(KCH(-1))) / (MUCSS * \exp(MUC)) - (KCHSS * \exp(KCH) \\
 & 1 - (QCHSS * \exp(QCH)) * (1 - 100 * \phi_{ech} * ((ECHSS * \exp(ECH)) - \gamma_{ech} * (ECHSS * \exp(ECH(-1))) - (1 - \gamma_{ech} * (ECHSS * \exp(ECH(-1))) \\
 & \ln((KCDSS * \exp(KD(-1)))) - \ln((KCDSS * \exp(LAGKD))) = 0; \\
 & \ln((KCHSS * \exp(KCH(-1)))) - \ln((KCHSS * \exp(LAGKCH))) = 0; \\
 & (RKSS * \exp(RK)) - (QKSS * \exp(QK)) * \mu_u * (USS * \exp(UK))^{(1/\phi_u)} = 0; \\
 & (RCSS * \exp(RC)) - (QKSS * \exp(QK)) * \mu_u * (USS * \exp(UC))^{(1/\phi_u)} = 0; \\
 & \ln((DIFFREALECHSS * \exp(DIFFREALECH))) - \ln((MUCSS * \exp(MUC))) - \ln((ECHSS * \exp(ECH))) + \ln((ECHSS * \exp(ECH(-1)))) \\
 & \ln((DIFFREALECDSS * \exp(DIFFREALECD))) - \ln((MUKSS * \exp(MUK))) - \ln((ECDSS * \exp(ECD))) + \ln((ECDSS * \exp(ECD(-1)))) \\
 & \ln((\beta_u * \exp(\beta_u)) / \beta_u) - \rho_B * \ln((\beta_u * \exp(\beta_u(-1))) / \beta_u) - e_B = 0; \\
 & \ln((ONE * \exp(XiL))) - \rho_{XiL} * \ln((ONE * \exp(XiL(-1)))) - e_{XiL} = 0; \\
 & \ln((ONE * \exp(Lpref))) - \rho_{lpref} * \ln((ONE * \exp(Lpref(-1)))) - e_{Lpref} = 0; \\
 & \ln((ONE * \exp(EFFK))) - \rho_{EFFK} * \ln((ONE * \exp(EFFK(-1)))) - e_{EFFK} = 0; \\
 & \ln((MUZKSS * \exp(MUZK))) / MUZKSS - e_{MUZK} = 0; \\
 & \ln((MUZMSS * \exp(MUZM))) / MUZMSS - e_{MUZM} = 0; \\
 & \ln((ONE * \exp(HG))) - \rho_{HG} * \ln((ONE * \exp(HG(-1)))) - e_{HG} = 0; \\
 & \ln((MUCSS * \exp(MUC))) - \ln((MUZMSS * \exp(MUZM))) - \alpha_u * \ln((MUZKSS * \exp(MUZK))) = 0; \\
 & \ln((MUKSS * \exp(MUK))) - \ln((MUZMSS * \exp(MUZM))) - \ln((MUZKSS * \exp(MUZK))) = 0; \\
 & \ln((ONE * \exp(EFFECD))) - \rho_{EFFECD} * \ln((ONE * \exp(EFFECD(-1)))) - e_{EFFECD} = 0; \\
 & \ln((ONE * \exp(EFFECH))) - \rho_{EFFECH} * \ln((ONE * \exp(EFFECH(-1)))) - e_{EFFECH} = 0; \\
 & \ln((ONE * \exp(STAR))) - \rho_{STAR} * \ln((ONE * \exp(STAR(-1)))) - e_{STAR} = 0; \\
 & \ln((RL1SS * \exp(RL1))) - \ln((RSS * \exp(R(+1)))) = 0; \\
 & \ln((RL2SS * \exp(RL2))) - \ln((RL1SS * \exp(RL1(+1)))) = 0; \\
 & \ln((RL3SS * \exp(RL3))) - \ln((RL2SS * \exp(RL2(+1)))) = 0; \\
 & \ln((RL4SS * \exp(RL4))) - \ln((RL3SS * \exp(RL3(+1)))) = 0; \\
 & \ln((RL5SS * \exp(RL5))) - \ln((RL4SS * \exp(RL4(+1)))) = 0; \\
 & \ln((RL6SS * \exp(RL6))) - \ln((RL5SS * \exp(RL5(+1)))) = 0; \\
 & \ln((RL7SS * \exp(RL7))) - \ln((RL6SS * \exp(RL6(+1)))) = 0; \\
 & \ln((RT2SS * \exp(RT2))) - tp2 - 0.125 * (\ln((RSS * \exp(R))) + \ln((RL1SS * \exp(RL1))) + \ln((RL2SS * \exp(RL2))))
 \end{aligned}$$

Uses alpha\_35, beta\_35, betas\_32, delta\_ch\_35, DIFFREALECD\_32, DIFFREALECDSS\_35, DIFFREALECH\_32, DIFFREALECHSS\_35, eB\_34, ECD\_32, ECDSS\_35, ECH\_32, ECHSS\_35, eEFFECD\_34, eEFFECH\_34, eEFFK\_34, EFFECD\_32, EFFECH\_32, EFFK\_32, eHG\_34, eLpref\_34, eMUZK\_34, eMUZM\_34, eSTAR\_34, eta\_ch\_35, eXiL\_34, gam\_ech\_35, h\_ch\_35, HG\_32, KCDSS\_35, KCH\_32, KCHSS\_35, KD\_32, L\_32, LAGKCH\_32, LAGKD\_32, Lpref\_32, LSS\_35, mu\_35, MUC\_32, MUCSS\_35, MUK\_32, MUKSS\_35, MUZK\_32, MUZKSS\_35, MUZM\_32, MUZMSS\_35, ONE\_35, phi\_ech\_35, phi\_u\_35, QCH\_32, QCHSS\_35, QK\_32, QKSS\_35, R\_32, RC\_32, RCH\_32, RCHSS\_35, RCSS\_35, rho\_B\_35, rho\_EFFECD\_35, rho\_EFFECH\_35, rho\_EFFK\_35, rho\_HG\_35, rho\_lpref\_35, rho\_STAR\_35, rho\_XiL\_35, RK\_32, RKSS\_35, RL1\_32, RL1SS\_35, RL2\_32, RL2SS\_35, RL3\_32, RL3SS\_35, RL4\_32, RL4SS\_35, RL5\_32, RL5SS\_35, RL6\_32, RL6SS\_35, RL7\_32, RL7SS\_35, RSS\_35, RT2\_32, RT2SS\_35, STAR\_32, tp2\_35, UC\_32, UK\_32, USS\_35, and XiL\_32.



### A.3.8 Linearized Model Measurement

25  $\langle \text{linearized model measurement } 25 \rangle \equiv$  (20)

```

DIFFREALGDP_obs = DIFFREALGDP + DIFFREALGDPSS_obs;
DIFFFREALLEC_obs = DIFFFREALLEC + DIFFFREALLECSS_obs;
DIFFFREALLEIK_obs = DIFFFREALLEIK + DIFFFREALLEIKSS_obs;
DIFFFREALLECD_obs = DIFFFREALLECD + DIFFFREALLECDSS_obs;
DIFFFREALLECH_obs = DIFFFREALLECH + DIFFFREALLECHSS_obs;
DIFFFREALW_obs = DIFFFREALW + DIFFFREALWSS_obs;
AH_obs = AH;
INFCNA_obs = INFCNA + INFCNASS_obs;
INFCOR_obs = INFCOR + INFCORSS_obs;
INFK_obs = INFK + INFKSS_obs;
R_obs = R + RSS_obs;
RT2_obs = RT2 + RT2SS_obs;
unemp_obs = unemp + unempSS_obs;

```

Uses AH 32, AH\_obs 32, DIFFFREALLEC 32, DIFFFREALLEC\_obs 32, DIFFFREALLECD 32, DIFFFREALLECD\_obs 32, DIFFFREALLECDSS\_obs 35, DIFFFREALLECH 32, DIFFFREALLECH\_obs 32, DIFFFREALLECHSS\_obs 35, DIFFFREALLECSS\_obs 35, DIFFFREALLEIK 32, DIFFFREALLEIK\_obs 32, DIFFFREALLEIKSS\_obs 35, DIFFFREALGDP 32, DIFFFREALGDP\_obs 32, DIFFFREALGDPSS\_obs 35, DIFFFREALW 32, DIFFFREALW\_obs 32, DIFFFREALWSS\_obs 35, INFCNA 32, INFCNA\_obs 32, INFCNASS\_obs 35, INFCOR 32, INFCOR\_obs 32, INFCORSS\_obs 35, INFK 32, INFK\_obs 32, INFKSS\_obs 35, R 32, R\_obs 32, RSS\_obs 35, RT2 32, RT2\_obs 32, RT2SS\_obs 35, unemp 32, unemp\_obs 32, and unempSS\_obs 35.

## A.4 linearized\_steadystate.m

```

26  <srcedo/linearized.steadystate.m 26>≡
    function [ys,check] = linearized_steadystate(ys,exe)
        global M_

    check = 0;

    NumberofParameters=M_.param_nbr;
    for i=1:NumberofParameters
        paramname=deblank(M_.param_names(i,:));
        eval([paramname ' =M_.params(' int2str(i) ');']);
    end;

    %start_steady_state;

    <common steady state values 45>

    %end_steady_state;

    %trends;

    <common steady state trends 48>

    %end_trends;

    for i=1:NumberofParameters
        paramname=deblank(M_.param_names(i,:));
        eval(['M_.params(' int2str(i) ')=' paramname ';']);
    end;

    <linearized steady state result return 27>

```

This code is written to file srcedo/linearized.steadystate.m.

#### A.4.1 Linearized Steady State Result Return

[illegible]

[illegible]

```
DIFFREALECHSS_obs  
DIFFREALWSS_obs  
0  
INFCNASS_obs  
INFCORSS_obs  
INFKSS_obs  
RSS_obs  
RT2SS_obs  
unempSS_obs  
];
```

Uses DIFFREALECDSS\_obs 35, DIFFREALECHSS\_obs 35, DIFFREALECSS\_obs 35,  
DIFFREALEIKSS\_obs 35, DIFFREALGDPSS\_obs 35, DIFFREALWSS\_obs 35, INFCNASS\_obs 35,  
INFCORSS\_obs 35, INFKSS\_obs 35, RSS\_obs 35, RT2SS\_obs 35, and unempSS\_obs 35.

## A.5 Common Model Routines

### A.5.1 Common Model Setup

30      $\langle common\ setup\ 30 \rangle \equiv$  (9 19)

$\langle common\ var\ 32 \rangle$

$\langle common\ varexo\ 34 \rangle$

$\langle common\ parameters\ 35 \rangle$

      //estimated\_params;  
       $\langle common\ estimated\ params\ 39 \rangle$   
      //end\_estimated\_params;

      //calibrated\_params;  
       $\langle common\ calibrated\ params\ 40 \rangle$   
      //end\_calibrated\_params;

      //free\_params;  
       $\langle common\ free\ params\ 41a \rangle$   
      //end\_free\_params;

      //calibrated ME

      //\*\*\*\*\*  
      //MODEL BLOCK  
      //\*\*\*\*\*

model;

### A.5.2 Common Stochastic Simulation

31  $\langle \text{common stoch sim 31} \rangle \equiv$  (9 19)

$\langle \text{common varobs 41b} \rangle$

```
shocks;
 $\langle \text{common shocks 42} \rangle$ 
end;
```

```
steady;
```

```
estimated_params;
 $\langle \text{common steady estimated params 43} \rangle$ 
```

```
 $\langle \text{common stderr 44} \rangle$ 
end;
```

```
options_.order = 1;
options_.jacobian_flag = 1;
options_.nonlin = 1;
```

```
stoch_simul(order=1,irf=40,nograph);
```

Defines:

```
jacobian_flag, never used.
nonlin, never used.
options_, never used.
order, never used.
stoch_simul, never used.
```

### A.5.3 Common Var

32  $\langle \text{common var } 32 \rangle \equiv$  (30)

```

var RC RK WC WK YC YK MCC MCK KC KK PKB R L QK HC HSC HK HSK UHC UHSC UHK UHSK er
DIFFREALGDP_obs DIFFREALEC_obs DIFFREALEIK_obs DIFFREALECD_obs DIFFREALECH_obs DIFFR
```

Defines:

AH, used in chunks 13a, 15, 23b, and 25.  
 AH\_obs, used in chunks 15, 25, 41b, and 42.  
 betas, used in chunks 11, 14, 21, and 24.  
 DIFFNORMGDP, used in chunks 12a and 22.  
 DIFFREALEC, used in chunks 12a, 15, 22, and 25.  
 DIFFREALEC\_obs, used in chunks 15, 25, 41b, and 42.  
 DIFFREALECD, used in chunks 14, 15, 24, and 25.  
 DIFFREALECD\_obs, used in chunks 15, 25, 41b, and 42.  
 DIFFREALECH, used in chunks 14, 15, 24, and 25.  
 DIFFREALECH\_obs, used in chunks 15, 25, 41b, and 42.  
 DIFFREALEIK, used in chunks 12a, 15, 22, and 25.  
 DIFFREALEIK\_obs, used in chunks 15, 25, 41b, and 42.  
 DIFFREALGDP, used in chunks 12a, 13a, 15, 22, 23b, and 25.  
 DIFFREALGDP\_obs, used in chunks 15, 25, 41b, and 42.  
 DIFFREALW, used in chunks 12b, 15, 23a, and 25.  
 DIFFREALW\_obs, used in chunks 15, 25, 41b, and 42.  
 EC, used in chunks 11, 12a, 21, and 22.  
 ECD, used in chunks 12–14 and 22–24.  
 ECH, used in chunks 12a, 14, 22, and 24.  
 EFECd, used in chunks 13b, 14, 23c, and 24.  
 EFECCH, used in chunks 14 and 24.  
 EFFK, used in chunks 11, 12a, 14, 21, 22, and 24.  
 EIK, used in chunks 11, 12a, 21, and 22.  
 empC, used in chunks 12a and 22.  
 empK, used in chunks 12a and 22.  
 empSC, used in chunks 12a and 22.  
 empSK, used in chunks 12a and 22.  
 GAP, used in chunks 13a and 23b.  
 HC, used in chunks 11–13 and 21–23.  
 HG, used in chunks 12a, 14, 22, and 24.  
 HK, used in chunks 11–13 and 21–23.  
 HrC, used in chunks 12a and 22.  
 HrK, used in chunks 12a and 22.  
 HrSC, used in chunks 12a and 22.  
 HrSK, used in chunks 12a and 22.  
 HSC, used in chunks 12a and 22.  
 HSK, used in chunks 12a and 22.  
 INFC, used in chunks 11–13 and 21–23.  
 INFC10, used in chunks 13a and 23b.  
 INFCNA, used in chunks 11, 13a, 15, 21, 23b, and 25.  
 INFCNA\_obs, used in chunks 15, 25, 41b, and 42.  
 INFCOR, used in chunks 13a, 15, 23b, and 25.  
 INFCOR\_obs, used in chunks 15, 25, 41b, and 42.  
 INFGDP, used in chunks 13a and 23b.  
 INFK, used in chunks 11–13, 15, 21–23, and 25.  
 INFK\_obs, used in chunks 15, 25, 41b, and 42.  
 INFWC, used in chunks 12, 22, and 23a.  
 INFWK, used in chunks 12, 22, and 23a.  
 KC, used in chunks 11, 12a, 21, and 22.  
 KCH, used in chunks 14 and 24.  
 KD, used in chunks 13b, 14, 23c, and 24.



KK, used in chunks 11, 12a, 21, and 22.  
L, used in chunks 10–14 and 20–24.  
LAGKCH, used in chunks 14 and 24.  
LAGKD, used in chunks 13b, 14, 23c, and 24.  
Lpref, used in chunks 12a, 14, 22, and 24.  
MCC, used in chunks 11 and 21.  
MCK, used in chunks 11 and 21.  
MUC, used in chunks 11–14 and 21–24.  
MUK, used in chunks 11–14 and 21–24.  
MUZK, used in chunks 14 and 24.  
MUZM, used in chunks 14 and 24.  
NORMINFGDP, used in chunks 12a and 22.  
PFGAP, used in chunks 11, 13a, 21, and 23b.  
PKB, used in chunks 11–13 and 21–23.  
QCD, used in chunks 13b and 23c.  
QCH, used in chunks 14 and 24.  
QK, used in chunks 11, 12a, 14, 21, 22, and 24.  
R, used in chunks 11, 14, 15, 21, 24, and 25.  
R\_obs, used in chunks 15, 25, and 41b.  
RC, used in chunks 11, 14, 21, and 24.  
RCD, used in chunks 13b and 23c.  
RCH, used in chunks 14 and 24.  
RK, used in chunks 11, 14, 21, and 24.  
RL1, used in chunks 14 and 24.  
RL2, used in chunks 14 and 24.  
RL3, used in chunks 14 and 24.  
RL4, used in chunks 14 and 24.  
RL5, used in chunks 14 and 24.  
RL6, used in chunks 14 and 24.  
RL7, used in chunks 14 and 24.  
RT2, used in chunks 14, 15, 24, and 25.  
RT2\_obs, used in chunks 15, 25, 41b, and 42.  
STAR, used in chunks 14 and 24.  
UC, used in chunks 11, 13a, 14, 21, 23b, and 24.  
UHC, used in chunks 12a and 22.  
UHK, used in chunks 12a and 22.  
UHSC, used in chunks 12a and 22.  
UHSK, used in chunks 12a and 22.  
UK, used in chunks 11, 13a, 14, 21, 23b, and 24.  
unemp, used in chunks 12a, 15, 22, and 25.  
unemp\_obs, used in chunks 15, 25, 41b, and 42.  
WC, used in chunks 11, 12a, 21, and 22.  
WK, used in chunks 11, 12a, 21, and 22.  
XiL, used in chunks 12a, 14, 22, and 24.  
YC, used in chunks 11–13 and 21–23.  
YK, used in chunks 11–13 and 21–23.

### A.5.4 Common VarExo

$$34 \quad \langle \text{common varexo } 34 \rangle \equiv \quad (30)$$

$$\text{varexo eHG eXiL eLpref eR eMUZK eMUZM ePMKC ePMKK eEFFECH eEFFECD eEFFK eB eSTAR;}$$

Defines:

eB, used in chunks 14, 24, 42, and 44.  
 eEFFECD, used in chunks 14, 24, 42, and 44.  
 eEFFECH, used in chunks 14, 24, 42, and 44.  
 eEFFK, used in chunks 14, 24, 42, and 44.  
 eHG, used in chunks 14, 24, 42, and 44.  
 eLpref, used in chunks 14, 24, 42, and 44.  
 eMUZK, used in chunks 14, 24, 42, and 44.  
 eMUZM, used in chunks 14, 24, 42, and 44.  
 ePMKC, used in chunks 11, 21, 42, and 44.  
 ePMKK, used in chunks 11, 21, 42, and 44.  
 eR, used in chunks 11, 21, 42, and 44.  
 eSTAR, used in chunks 14, 24, 42, and 44.  
 eXiL, used in chunks 12a, 14, 22, 24, 42, and 44.

### A.5.5 Common Parameters

35  $\langle common\ parameters\ 35 \rangle \equiv$

(30)

```
parameters
h r_inf r_y r_dy phi_pc phi_H phi_wc phi_ic phi_cd phi_ech gam_pc gam_wc gam_ic gam_icd rho_R r
rho_EFFECD rho_HG rho_EFFECH tp2 ONE MUZMSS MUZKSS r_dinf rpr phi_u rho_MUZK rho_MUZZM pbeta de
theta_k theta_wc theta_wk g_y a_ks s_AS gam_h gam_ech s_k s_ecdc eta_cnn eta_cd eta_ch
icoef mu_ betarl MUZCSS RCSS RKSS WCSS WKSS YCSS YKSS MCCSS MCKSS KCSS KKSS LSS HCSS HKSS QKSS
MUCSS MUKSS AHSS ECDSS KCDSS QCDSS RCDSS ECHSS KCHSS QCHSS RCHSS UKSS UCSS USS MUKSShabit MUCSS
INFCNASS INFCORSS INFC10SS RT2SS beta_0 beta_2 beta_ PYSS AA DD RR
eta_cd_eta_cnn eta_ch_eta_cnn Rnr ycbi_ykb hc_hk HSS ycbi ykb YYSS s_k_ecd s_c_ech s_k_eik s_yc
sig_HG sig_XiL sig_lpref sig_R sig_MUZK sig_MUZZM sig_PMKC sig_PMKK sig_EFFECH sig_EFFECD sig_E
HSKSS HSCSS HrcSS HrKSS A_HC sigman sigmah A_HK xsi_NC xsi_HrC xsi_NK xsi_HrK rho_XiL rho_lpref
empCSS empKSS HrSKSS HrSCSS empSCSS empSKSS UHCSS UHKSS UHSCSS UHSKSS unempSS DIFFREALGDPSS DIF
DIFFREALECHSS DIFFREALEIKSS DIFFREALWSS RL1SS RL2SS RL3SS RL4SS RL5SS
RL6SS RL7SS DIFFREALGDPSS_obs DIFFREALECSS_obs DIFFREALEIKSS_obs DIFFREALECDSS_obs
DIFFREALECHSS_obs DIFFREALWSS_obs INFCNASS_obs INFCORSS_obs INFKSS_obs
RSS_obs RT2SS_obs unempSS_obs;
```

Defines:

A\_HC, used in chunks 12a, 22, 41a, and 45.  
A\_HK, used in chunks 12a, 22, 41a, and 45.  
a\_ks, used in chunk 40.  
AA, used in chunk 45.  
AHSS, used in chunks 12b, 15, 17, 23, and 45.  
alpha\_, used in chunks 11, 13a, 14, 21, 23b, 24, 40, and 45.  
beta\_, used in chunks 11–14, 17, 21–24, and 45.  
beta\_0, used in chunk 45.  
beta\_2, used in chunk 45.  
betarl, used in chunks 13a, 23b, and 40.  
DD, used in chunk 45.  
delta\_, used in chunks 11, 21, 40, and 45.  
delta\_cd, used in chunks 13b, 23c, 40, and 45.  
delta\_ch, used in chunks 14, 24, 40, and 45.  
DIFFREALECDSS, used in chunks 15, 17, 24, and 45.  
DIFFREALECDSS\_obs, used in chunks 15, 17, 25, 27, and 48.  
DIFFREALECHSS, used in chunks 15, 17, 24, and 45.  
DIFFREALECHSS\_obs, used in chunks 15, 17, 25, 27, and 48.  
DIFFREALECSS, used in chunks 15, 17, 22, and 45.  
DIFFREALECSS\_obs, used in chunks 15, 17, 25, 27, and 48.  
DIFFREALEIKSS, used in chunks 15, 17, 22, and 45.  
DIFFREALEIKSS\_obs, used in chunks 15, 17, 25, 27, and 48.  
DIFFREALGDPSS, used in chunks 15, 17, 22, 23b, and 45.  
DIFFREALGDPSS\_obs, used in chunks 15, 17, 25, 27, and 48.  
DIFFREALWSS, used in chunks 15, 17, 23a, and 45.  
DIFFREALWSS\_obs, used in chunks 15, 17, 25, 27, and 48.  
ECDSS, used in chunks 13b, 17, 22–24, and 45.  
ECHSS, used in chunks 14, 17, 22, 24, and 45.  
ECSS, used in chunks 17, 21, 22, and 45.  
EIKSS, used in chunks 12a, 17, 21, 22, and 45.  
empCSS, used in chunks 17, 22, and 45.  
empKSS, used in chunks 17, 22, and 45.  
empSCSS, used in chunks 17, 22, and 45.  
empSKSS, used in chunks 17, 22, and 45.

eta\_cd, used in chunks 13b, 23c, 41a, and 45.  
 eta\_cd\_eta\_cnn, used in chunk 45.  
 eta\_ch, used in chunks 14, 24, 41a, and 45.  
 eta\_ch\_eta\_cnn, used in chunk 45.  
 eta\_cnn, used in chunks 11, 21, 41a, and 45.  
 g\_y, used in chunk 40.  
 gam\_ech, used in chunks 14, 24, and 40.  
 gam\_h, used in chunks 12a, 22, and 40.  
 gam\_ic, used in chunks 12a, 22, and 40.  
 gam\_icd, used in chunks 13b, 23c, and 40.  
 gam\_pc, used in chunks 11, 21, 39, and 43.  
 gam\_wc, used in chunks 12a, 22, 39, and 43.  
 h, used in chunks 11, 21, 39, 43, and 45.  
 h\_cd, used in chunks 13b, 23c, 40, and 45.  
 h\_ch, used in chunks 14, 24, 40, and 45.  
 hc\_hk, used in chunk 45.  
 HCSS, used in chunks 12, 13a, 17, 21–23, and 45.  
 HKSS, used in chunks 12, 13a, 17, 21–23, and 45.  
 HrCSS, used in chunks 17, 22, and 45.  
 HrKSS, used in chunks 17, 22, and 45.  
 HrSCSS, used in chunks 17, 22, and 45.  
 HrSKSS, used in chunks 17, 22, and 45.  
 HSCSS, used in chunks 12a, 17, 22, and 45.  
 HSKSS, used in chunks 12a, 17, 22, and 45.  
 HSS, used in chunk 45.  
 icoef, used in chunk 40.  
 IMPHSSS, used in chunk 45.  
 INFC10SS, used in chunks 17, 23b, and 45.  
 INFCNASS, used in chunks 11, 15, 17, 21, 23b, and 45.  
 INFCNASS\_obs, used in chunks 15, 17, 25, 27, and 48.  
 INFCORSS, used in chunks 15, 17, 23b, and 45.  
 INFCORSS\_obs, used in chunks 15, 17, 25, 27, and 48.  
 INFCSS, used in chunks 11, 17, 21–23, 45, and 48.  
 INFGDPSS, used in chunks 17, 23b, and 45.  
 INFKSS, used in chunks 11, 15, 17, 21–23, 45, and 48.  
 INFKSS\_obs, used in chunks 15, 17, 25, 27, and 48.  
 INFWCSS, used in chunks 12a, 17, 22, 23a, and 45.  
 INFWKSS, used in chunks 12a, 17, 22, 23a, and 45.  
 KCDSS, used in chunks 17, 23c, 24, and 45.  
 KCHSS, used in chunks 17, 24, and 45.  
 KCSS, used in chunks 11, 17, 21, 22, and 45.  
 KKSS, used in chunks 11, 17, 21, 22, and 45.  
 LSS, used in chunks 17, 20–24, and 45.  
 MCCSS, used in chunks 17, 21, and 45.  
 MCKSS, used in chunks 17, 21, and 45.  
 mu\_, used in chunks 11, 14, 21, 24, 41a, and 45.  
 MUCSS, used in chunks 17, 21–24, 45, and 48.  
 MUCSShabit, used in chunk 45.  
 MUKSS, used in chunks 17, 21–24, 45, and 48.  
 MUKSShabit, used in chunk 45.  
 MUZCSS, used in chunk 45.  
 MUZKSS, used in chunks 14, 17, 24, 40, and 45.  
 MUZMSS, used in chunks 14, 17, 24, 40, and 45.  
 ONE, used in chunks 17, 21–24, 40, and 45.  
 pbeta, used in chunks 40 and 45.  
 phi\_cd, used in chunks 13b, 23c, 39, and 43.  
 phi\_ech, used in chunks 14, 24, 39, and 43.

`phi_H`, used in chunks 12a, 22, 39, and 43.  
`phi_ic`, used in chunks 12a, 22, 39, and 43.  
`phi_pc`, used in chunks 11, 21, 39, and 43.  
`phi_u`, used in chunks 11, 14, 21, 24, and 40.  
`phi_wc`, used in chunks 12a, 22, 39, and 43.  
`PKBSS`, used in chunks 17, 21–23, and 45.  
`PYSS`, used in chunk 45.  
`QCDSS`, used in chunks 17, 23c, and 45.  
`QCHSS`, used in chunks 17, 24, and 45.  
`QKSS`, used in chunks 17, 21, 22, 24, and 45.  
`r_dinf`, used in chunks 11, 21, and 40.  
`r_dy`, used in chunk 40.  
`r_inf`, used in chunks 11, 21, 39, and 43.  
`r_y`, used in chunks 11, 21, 39, and 43.  
`RCDSS`, used in chunks 17, 23c, and 45.  
`RCHSS`, used in chunks 17, 24, and 45.  
`RCSS`, used in chunks 17, 21, 24, and 45.  
`rho_B`, used in chunks 14, 24, 39, and 43.  
`rho_EFFECD`, used in chunks 14, 24, 39, and 43.  
`rho_EFFECH`, used in chunks 14, 24, 39, and 43.  
`rho_EFFK`, used in chunks 14, 24, 39, and 43.  
`rho_HG`, used in chunks 14, 24, 39, and 43.  
`rho_lpref`, used in chunks 14, 24, 39, and 43.  
`rho_MUZZ`, used in chunk 40.  
`rho_MUZZ`, used in chunk 40.  
`rho_R`, used in chunks 11, 21, 39, and 43.  
`rho_STAR`, used in chunks 14, 24, 39, and 43.  
`rho_XiL`, used in chunks 14, 24, 39, and 43.  
`RKSS`, used in chunks 17, 21, 24, and 45.  
`RL1SS`, used in chunks 17, 24, and 45.  
`RL2SS`, used in chunks 17, 24, and 45.  
`RL3SS`, used in chunks 17, 24, and 45.  
`RL4SS`, used in chunks 17, 24, and 45.  
`RL5SS`, used in chunks 17, 24, and 45.  
`RL6SS`, used in chunks 17, 24, and 45.  
`RL7SS`, used in chunks 17, 24, and 45.  
`Rnr`, used in chunk 45.  
`rpr`, used in chunks 11, 21, 40, and 45.  
`RR`, used in chunk 45.  
`RSS`, used in chunks 11, 15, 17, 21, 24, 45, and 48.  
`RSS_obs`, used in chunks 15, 17, 25, 27, and 48.  
`RT2SS`, used in chunks 15, 17, 24, 45, and 48.  
`RT2SS_obs`, used in chunks 15, 17, 25, 27, and 48.  
`s_AS`, used in chunks 40 and 45.  
`s_c_ech`, used in chunk 45.  
`s_ecdc`, used in chunks 13a, 23b, 41a, 45, and 48.  
`s_k`, used in chunks 12a, 13a, 22, 23b, 41a, 45, and 48.  
`s_k_ecd`, used in chunk 45.  
`s_k_eik`, used in chunk 45.  
`s_yc`, used in chunk 45.  
`sig_B`, used in chunks 39 and 42.  
`sig_EFFECD`, used in chunks 39 and 42.  
`sig_EFFECH`, used in chunks 39 and 42.  
`sig_EFFK`, used in chunks 39 and 42.  
`sig_HG`, used in chunks 39 and 42.  
`sig_lpref`, used in chunks 39 and 42.  
`sig_MUZZ`, used in chunks 39 and 42.

`sig_MUZH`, used in chunks 39 and 42.  
`sig_PMKC`, used in chunks 39 and 42.  
`sig_PMKK`, used in chunks 39 and 42.  
`sig_R`, used in chunks 39 and 42.  
`sig_STAR`, used in chunks 39 and 42.  
`sig_XiL`, used in chunks 39 and 42.  
`sigmah`, used in chunks 12a, 22, 39, 43, and 45.  
`sigman`, used in chunks 12a, 22, 39, 43, and 45.  
`theta_c`, used in chunks 11, 21, 40, and 45.  
`theta_k`, used in chunks 11, 21, 40, and 45.  
`theta_wc`, used in chunks 12a, 22, 41a, and 45.  
`theta_wk`, used in chunks 12a, 22, 41a, and 45.  
`tp2`, used in chunks 14, 24, 39, 43, and 45.  
`UCSS`, used in chunk 45.  
`UHCSS`, used in chunks 17, 22, and 45.  
`UHKSS`, used in chunks 17, 22, and 45.  
`UHSCSS`, used in chunks 17, 22, and 45.  
`UHSKSS`, used in chunks 17, 22, and 45.  
`UKSS`, used in chunk 45.  
`unempSS`, used in chunks 15, 17, 22, 40, 45, and 48.  
`unempSS_obs`, used in chunks 15, 17, 25, 27, and 48.  
`USS`, used in chunks 13a, 17, 21, 23b, 24, and 45.  
`WCSS`, used in chunks 17, 21, 22, and 45.  
`WKSS`, used in chunks 17, 21, 22, and 45.  
`xsi_HrC`, used in chunks 12a, 22, 41a, and 45.  
`xsi_HrK`, used in chunks 12a, 22, 41a, and 45.  
`xsi_NC`, used in chunks 12a, 22, 41a, and 45.  
`xsi_NK`, used in chunks 12a, 22, 41a, and 45.  
`ycbi`, used in chunk 45.  
`ycbi_ykb`, used in chunk 45.  
`YCSS`, used in chunks 11–13, 17, 21–23, and 45.  
`ykb`, used in chunk 45.  
`YKSS`, used in chunks 11–13, 17, 21–23, and 45.  
`YYSS`, used in chunk 45.

### A.5.6 Common Estimated Params

$$\begin{aligned}
 39 \quad \langle \text{common estimated params } 39 \rangle \equiv & \quad (30) \\
 & \begin{aligned}
 h &= 0.715162417869797; \\
 r\_inf &= 1.46344163969035; \\
 r\_y &= 0.263123294207851; \\
 phi\_pc &= 3.54471453295450; \\
 phi\_H &= 3.22894079106560; \\
 phi\_wc &= 5.49395755514723; \\
 phi\_ic &= 0.253308786976374; \\
 phi\_cd &= 0.470089385005009; \\
 phi\_ech &= 9.13986886546163; \\
 gam\_pc &= 0.314488926051065; \\
 gam\_wc &= -0.230018833252054; \\
 sigman &= 39.4075260618789; \\
 sigmah &= 21.8859803402692; \\
 rho\_R &= 0.833200065745674; \\
 rho\_XiL &= 0.263567746111198; \\
 rho\_lpref &= 0.979092048897712; \\
 rho\_B &= 0.895267027146152; \\
 rho\_STAR &= 0.909187927454138; \\
 rho\_EFFK &= 0.937829274540004; \\
 rho\_EFFECD &= -0.240286975088701; \\
 rho\_HG &= 0.582395471123139; \\
 rho\_EFFECH &= 0.877235725078934; \\
 tp2 &= 0.000307314910763576; \\
 sig\_HG &= 0.579315931803017; \\
 sig\_XiL &= 2.49313873916751; \\
 sig\_lpref &= 5.66476748114241; \\
 sig\_R &= 0.124100461010359; \\
 sig\_MUZK &= 0.936167718269030; \\
 sig\_MUZM &= 0.597390920898135; \\
 sig\_PMKC &= 0.451830653200989; \\
 sig\_PMKK &= 0.685376191952156; \\
 sig\_EFFECH &= 0.514704527091087; \\
 sig\_EFFECD &= 9.11199585973990; \\
 sig\_EFFK &= 0.402779878811407; \\
 sig\_B &= 0.295232712196573; \\
 sig\_STAR &= 0.104877885500673;
 \end{aligned}
 \end{aligned}$$

Uses gam.pc 35, gam.wc 35, h 35, phi.cd 35, phi.ech 35, phi.H 35, phi.ic 35, phi.pc 35, phi.wc 35, r.inf 35, r.y 35, rho.B 35, rho.EFFECD 35, rho.EFFECH 35, rho.EFFK 35, rho.HG 35, rho.lpref 35, rho.R 35, rho.STAR 35, rho.XiL 35, sig.B 35, sig.EFFECD 35, sig.EFFECH 35, sig.EFFK 35, sig.HG 35, sig.lpref 35, sig.MUZK 35, sig.MUZM 35, sig.PMKC 35, sig.PMKK 35, sig.R 35, sig.STAR 35, sig.XiL 35, sigmah 35, sigman 35, and tp2 35.

### A.5.7 Common Calibrated params

40  $\langle \text{common calibrated params } 40 \rangle \equiv$  (30)

```

r_dy = 0;
ONE = 1;
MUZKSS = 1.009250;
MUZMSS = 1.001000;
gam_ic = 1.0;
gam_icd = 1.0;
r_dinf = 0;
rpr = 0.965;
phi_u = 1;
rho_MUZK = 0;
rho_MUZH = 0;
pbeta = 0.99862;
delta_ = 0.03;
h_cd = 0.0;
h_ch = 0.0;
delta_cd = 0.055;
delta_ch = 0.0035;
alpha_ = 0.26;
theta_c = 7;
theta_k = 7;
unempSS = .06;
g_y = 0.0;
a_ks = 0.2;
s_AS = 0.2;
gam_h = 1;
gam_ech = 1;
icoef = 3;
betarl = .958;

```

Uses a\_ks 35, alpha\_ 35, betarl 35, delta\_ 35, delta\_cd 35, delta\_ch 35, g\_y 35, gam\_ech 35, gam\_h 35, gam\_ic 35, gam\_icd 35, h\_cd 35, h\_ch 35, icoef 35, MUZKSS 35, MUZMSS 35, ONE 35, pbeta 35, phi\_u 35, r\_dinf 35, r\_dy 35, rho\_MUZK 35, rho\_MUZH 35, rpr 35, s\_AS 35, theta\_c 35, theta\_k 35, and unempSS 35.



### A.5.8 Common Free Params

41a  $\langle \text{common free params 41a} \rangle \equiv$  (30)

```

//A_HC;
//A_HK;
//xsi_NC;
//xsi_HrC;
//xsi_NK;
//xsi_HrK;
//theta_wc;
//theta_wk;
//infkbar;
//infcbars;
//infwcbar;
//infwkbar;
//Pybar;
//Yybar;
//mu_yc;
//mu_yk;
//s_k;
//s_ecdc;
//eta_cnn;
//eta_cd;
//eta_ch;
//mu_;

```

Uses A\_HC 35, A\_HK 35, eta\_cd 35, eta\_ch 35, eta\_cnn 35, mu\_ 35, s\_ecdc 35, s\_k 35, theta\_wc 35, theta\_wk 35, xsi\_HrC 35, xsi\_HrK 35, xsi\_NC 35, and xsi\_NK 35.

### A.5.9 common Varobs

41b  $\langle \text{common varobs 41b} \rangle \equiv$  (31)

```

varobs DIFFREALGDP_obs DIFFREALEC_obs DIFFREALEIK_obs DIFFREALECD_obs DIFFREALECH_obs DIFFREALW_obs

```

Uses AH\_obs 32, DIFFREALEC\_obs 32, DIFFREALECD\_obs 32, DIFFREALECH\_obs 32, DIFFREALEIK\_obs 32, DIFFREALGDP\_obs 32, DIFFREALW\_obs 32, INFCNA\_obs 32, INFCOR\_obs 32, INFK\_obs 32, R\_obs 32, RT2\_obs 32, and unemp\_obs 32.

### A.5.10 Common Shocks

42      $\langle \text{common shocks } 42 \rangle \equiv$  (31)

```

var eHG;
stderr sig_HG;
var eXiL;
stderr sig_XiL;
var eLpref;
stderr sig_lpref;
var eR;
stderr sig_R;
var eMUZK;
stderr sig_MUZK;
var eMUZM;
stderr sig_MUZM;
var ePMKC;
stderr sig_PMKC;
var ePMKK;
stderr sig_PMKK;
var eEFFECH;
stderr sig_EFFECH;
var eEFFECD;
stderr sig_EFFECD;
var eEFFK;
stderr sig_EFFK;
var eB;
stderr sig_B;
var eSTAR;
stderr sig_STAR;

var DIFFREALGDP_obs;
stderr 0.3;
var DIFFFREALEC_obs;
stderr 0.1;
var DIFFFREALEIK_obs;
stderr 1.5;
var DIFFFREALECD_obs;
stderr 1.5;
var DIFFFREALECH_obs;
stderr 1.5;
var DIFFREALW_obs;
stderr 0.3;
var AH_obs;
stderr 0.3;
var INFCNA_obs;
```

```

stderr 0.5;
var INFCOR_obs;
stderr 0.05;
var INFK_obs;
stderr 0.2;
var RT2_obs;
stderr 0.1;
var unemp_obs;
stderr 4;

```

Uses AH\_obs 32, DIFFREALEC\_obs 32, DIFFREALECD\_obs 32, DIFFREALECH\_obs 32,  
 DIFFREALEIK\_obs 32, DIFFREALGDP\_obs 32, DIFFREALW\_obs 32, eB 34, eEFFECD 34,  
 eEFFECH 34, eEFFK 34, eHG 34, eLpref 34, eMUZK 34, eMUZM 34, ePMKC 34, ePMKK 34,  
 eR 34, eSTAR 34, eXiL 34, INFCNA\_obs 32, INFCOR\_obs 32, INFK\_obs 32, RT2\_obs 32,  
 sig\_B 35, sig\_EFFECD 35, sig\_EFFECH 35, sig\_EFFK 35, sig\_HG 35, sig\_lpref 35,  
 sig\_MUZK 35, sig\_MUZM 35, sig\_PMKC 35, sig\_PMKK 35, sig\_R 35, sig\_STAR 35, sig\_XiL 35,  
 and unemp\_obs 32.

### A.5.11 Common Steady Estimated params

43 *(common steady estimated params 43)≡* (31)

h	, .673	, -1	, 1	, uniform_pdf	, , , -1	, 1;
r_inf	, 1.461	, -999	, 999	, normal_pdf	, 1.5000	, 0.062
r_y	, 0.214	, -999	, 999	, normal_pdf	, 0.125	, 0.125
phi_pc	, 3.126	, 0	, 999	, gamma_pdf	, 4.0000	, 4.000
phi_H	, 4.064	, 0	, 999	, gamma_pdf	, 4.0000	, 4.000
phi_wc	, 5.119	, 0	, 999	, gamma_pdf	, 4.0000	, 4.000
phi_ic	, .325	, 0	, 999	, gamma_pdf	, 4.0000	, 4.000
phi_cd	, .651	, 0	, 999	, gamma_pdf	, 4.0000	, 4.000
phi_ech	, 10.948	, 0	, 999	, gamma_pdf	, 4.0000	, 4.000
gam_pc	, 0.386	, -999	, 999	, normal_pdf	, 0.000	, 0.250
gam_wc	, 0.213	, -999	, 999	, normal_pdf	, 0.000	, 0.250
sigman	, 1.25	, 0	, 999	, gamma_pdf	, 1.25	, 12.5
sigmah	, 10	, 0	, 999	, gamma_pdf	, 10	, 100
rho_R	, 0.654	, -1	, 1	, normal_pdf	, 0.5	, 0.25;
rho_XiL	, 0.654	, -1	, 1	, normal_pdf	, 0.5	, 0.25;
rho_lpref	, 0.954	, -1	, 1	, normal_pdf	, 0.5	, 0.25;
rho_B	, 0.825	, -1	, 1	, normal_pdf	, 0	, 0.5;
rho_STAR	, 0.825	, -1	, 1	, normal_pdf	, 0	, 0.5;
rho_EFFK	, 0.850	, -1	, 1	, normal_pdf	, 0	, 0.5;
rho_EFFECD	, .230	, -1	, 1	, normal_pdf	, 0	, 0.5;
rho_HG	, 0.596	, 0	, 1	, beta_pdf	, 0.5	, 0.015
rho_EFFECH	, 0.844	, -1	, 1	, normal_pdf	, 0	, 0.5;
tp2	, 0.001	, -999	, 999	, normal_pdf	, 0.0	, 0.000

Uses gam\_pc 35, gam\_wc 35, h 35, phi\_cd 35, phi\_ech 35, phi\_H 35, phi\_ic 35, phi\_pc 35,  
 phi\_wc 35, r\_inf 35, r\_y 35, rho\_B 35, rho\_EFFECD 35, rho\_EFFECH 35, rho\_EFFK 35,  
 rho\_HG 35, rho\_lpref 35, rho\_R 35, rho\_STAR 35, rho\_XiL 35, sigmah 35, sigman 35,  
 and tp2 35.

### A.5.12 Common Stderr

44	$\langle \text{common stderr } 44 \rangle \equiv$	(31)
	stderr eHG , .745 , 0.0001 , 999 , inv_gamma_pdf , 1.772454	
	stderr eXiL , 3.621 , 0.0001 , 999 , inv_gamma_pdf , 1.772454	
	stderr eLpref , 1.621 , 0.0001 , 999 , inv_gamma_pdf , 1.772454	
	stderr eR , 0.165 , 0.0001 , 999 , inv_gamma_pdf , 0.354491	
	stderr eMUZK , .834 , 0.0001 , 999 , inv_gamma_pdf , 0.443113	
	stderr eMUZM , .484 , 0.0001 , 999 , inv_gamma_pdf , 0.443113	
	stderr ePMKC , .391 , 0.0001 , 999 , inv_gamma_pdf , 0.354491	
	stderr ePMKK , .552 , 0.0001 , 999 , inv_gamma_pdf , 0.354491	
	stderr eEFFECH , .526 , 0.0001 , 999 , inv_gamma_pdf , 1.772454	
	stderr eEFFECD , 13.349 , 0.0001 , 999 , inv_gamma_pdf , 1.772454	
	stderr eEFFK , .499 , 0.0001 , 999 , inv_gamma_pdf , 1.772454	
	stderr eB , 0.5 , 0.0001 , 999 , inv_gamma_pdf , 1.772454	
	stderr eSTAR , 0.05 , 0.0001 , 999 , inv_gamma_pdf , 0.354491	

Uses eB 34, eEFFECD 34, eEFFECH 34, eEFFK 34, eHG 34, eLpref 34, eMUZK 34, eMUZM 34, ePMKC 34, ePMKK 34, eR 34, eSTAR 34, and eXiL 34.

## A.6 Common Steady State Routines

### A.6.1 Common Steady State Values

45  $\langle \text{common steady state values} \rangle \equiv$  (16 26)

```

    beta_0 = pbeta;
    beta_2 = pbeta*rpr; % s.s. funds rate premium
    beta_ = beta_2;
    MUZCSS=1;
    ONE=1;
    USS=1;
    MUKSS=MUKKSS*MUZMSS;
    MUCSS=MUKKSS^alpha_*MUZMSS;
    MUKSShabit=MUKSS;
    MUCSShabit=MUCSS;
    PKBSS=theta_k/(theta_k-1)*(theta_c-1)/theta_c;
    PYSS=1;
    MCCSS=(theta_c-1)/theta_c;
    MCKSS=(theta_k-1)/theta_k;
    RKSS=MUKSS/beta_2-(1-delta_);
    RCSS=MUKSS/beta_2-(1-delta_);
    RCHSS=MUCSS/beta_2-(1-delta_ch); % Housing sector
    RCDSS=MUKSS/beta_2-(1-delta_cd); % Durable sector
    USS=1;
    mu_=RCSS;
    AA=alpha_/RKSS*MCKSS;
    DD = 0.135;
    RR = 0.075;
    eta_cnn=1;
    eta_cd_eta_cnn=DD/((MUKSShabit-beta_2*h_cd)/(1-beta_2*h/MUCSShabit)*(1-h/MUCSShabit)/(1-h_cd/MUCSShabit));
    eta_ch_eta_cnn=RR/((MUCSShabit-beta_2*h_ch)/(1-beta_2*h/MUCSShabit)*(1-h/MUCSShabit)/(1-h_ch/MUCSShabit));
    eta_ch=eta_ch_eta_cnn;
    eta_cd=eta_cd_eta_cnn;
    DD=eta_cd_eta_cnn*(MUKSShabit-beta_2*h_cd)/(1-beta_2*h/MUCSShabit)*(1-h/MUCSShabit)/(1-h_cd/MUCSShabit);
    RR=eta_ch_eta_cnn*(MUCSShabit-beta_2*h_ch)/(1-beta_2*h/MUCSShabit)*(1-h/MUCSShabit)/(1-h_ch/MUCSShabit);
    Rnr=(1-(1-delta_)/MUKSS)*AA*MUKSS;
    ycbi_ykb=((1-s_AS)-Rnr)/((DD*(1-s_AS)/(1+RR))+Rnr);
    hc_hk=ycbi_ykb*(RCSS*MCKSS/(RKSS*MCCSS))^(alpha_/(1-alpha_));
    HSS=0.25;
    AHSS=HSS;
    HKSS=HSS/(1+hc_hk);
    HCSS=HSS-HKSS;
    HrCSS=1/3;
    HrKSS=1/3;
    empCSS=HCSS/HrCSS;
    empKSS=HKSS/HrKSS;

```

```

ycbi=HCSS*(AA)^(alpha_/(1-alpha_));
ykb=HKSS*(AA)^(alpha_/(1-alpha_));
YCSS=ycbi;
YKSS=ykb;
KCSS=AA*ycbi*MUKSS;
KKSS=AA*ykb*MUKSS;
ECHSS=RR/(1+RR)*ycbi*(1-s_AS);
ECSS=1/(1+RR)*ycbi*(1-s_AS);
ECDSS=DD*PKBSS*ECSS;
EIKSS=(1-(1-delta_)/MUKSS)*(KCSS+KKSS);
KCDSS=ECDSS/(1-(1-delta_cd)/MUKSS);
KCHSS=ECHSS/(1-(1-delta_ch)/MUCSS);
YYSS=(YCSS+YKSS*PKBSS)/PYSS;
s_k_ecd=ECDSS/YKSS;
s_c_ech=ECHSS/YCSS;
s_k_eik=EIKSS/YKSS;
s_yc = (YCSS/YYSS);
s_ecdc=PKBSS*ECDSS/(ECSS+PKBSS*ECDSS+(MUCSS/beta_2-1+delta_ch)*KCHSS);
INFCNASS=exp(.02/4);
INFCSS = INFCNASS*((MUZCSS/MUZKSS)^(1-alpha_))^(s_ecdc);
INFCORSS=INFCNASS;
INFKSS=INFCSS*(MUZCSS/MUZKSS)^(1-alpha_);
INFWCSS=INFCSS*MUZKSS^alpha_*MUZMSS;
INFWKSS=INFWCSS;
RSS=INFCSS/beta_0*MUCSS;
RT2SS=exp(tp2)*RSS;
INFC10SS = INFCNASS;
IMPHSSS = RCHSS*KCHSS;
s_k=PKBSS*YKSS/YYSS;
INFGDPSS=INFCSS*(YCSS/YYSS)*INFKSS^(YKSS*PKBSS/(YYSS));
LSS=eta_cnn/(ECSS*(1-h/MUCSShabit))-eta_cnn*beta_2*h/(ECSS*(MUCSShabit-h));
WCSS=MCCSS*(1-alpha_)*YCSS/HCSS;
WKSS=MCKSS*(1-alpha_)*YKSS/HKSS;
xsiN_xsiH_C = ((HrCSS/empCSS)^(1+sigmah))/(1+1/sigmah);
xsiN_xsiH_K = ((HrKSS/empKSS)^(1+sigmah))/(1+1/sigmah);
gC = (1/(1+sigman) + 1/sigmah)*(xsiN_xsiH_C*(1+sigmah)/sigmah)^(-(1+sigman)/(1+sigman));
markup_xsiN_C = (HCSS^((1+sigmah)*(1+sigman)/(1+sigmah+sigman)-1))*gC/(LSS*WCSS);
gK = (1/(1+sigman) + 1/sigmah)*(xsiN_xsiH_K*(1+sigmah)/sigmah)^(-(1+sigman)/(1+sigman));
markup_xsiN_K = (HKSS^((1+sigmah)*(1+sigman)/(1+sigmah+sigman)-1))*gK/(LSS*WKSS);
markup_w = (1-unempSS)^((1+sigmah+sigman)/(1+sigmah) - 1 - sigman);
theta_wc = markup_w/(markup_w - 1); theta_wk = theta_wc;
A_HC=LSS*(theta_wc-1)/theta_wc*WCSS/(((1+sigman)/(1+sigman/(1+sigmah))))*HCSS^(-1+(1+sigman));
A_HK=LSS*(theta_wk-1)/theta_wk*WKSS/(((1+sigman)/(1+sigman/(1+sigmah))))*HKSS^(-1+(1+sigman));
xsi_NC=A_HC/((1/(1+sigman))+1/sigmah)*(HCSS^sigman/HrCSS^(1+sigman+sigmah))^((1+sigman)/(1+sigman));
xsi_NK=A_HK/((1/(1+sigman))+1/sigmah)*(HKSS^sigman/HrKSS^(1+sigman+sigmah))^((1+sigman)/(1+sigman));
xsi_HrC=xsi_NC*(1+sigmah)/sigmah*(HCSS^sigman/HrCSS^(1+sigman+sigmah));

```

```

xsi_HrK=xsi_NK*(1+sigmah)/sigmah*(HKSS^sigman/HrKSS^(1+sigman+sigmah));
UHCSS=A_HC*((1+sigman)/(1+sigman/(1+sigmah)))*HCSS^(-1+(1+sigman)/(1+sigman/(1+sigmah)))/LSS;
UHKSS=A_HK*((1+sigman)/(1+sigman/(1+sigmah)))*HKSS^(-1+(1+sigman)/(1+sigman/(1+sigmah)))/LSS;
HSCSS=(WCSS*LSS/(A_HC*((1+sigman)/(1+sigman/(1+sigmah)))))^(1/(-1+(1+sigman)/(1+sigman/(1+sigmah))));
HSKSS=(WKSS*LSS/(A_HK*((1+sigman)/(1+sigman/(1+sigmah)))))^(1/(-1+(1+sigman)/(1+sigman/(1+sigmah))));
empSCSS=((1+sigmah)/sigmah*xsi_NC/xsi_HrC)^(-1/(1+sigmah+sigman))*HSCSS^(1/(1+sigman/(1+sigmah)));
empSKSS=((1+sigmah)/sigmah*xsi_NK/xsi_HrK)^(-1/(1+sigmah+sigman))*HSKSS^(1/(1+sigman/(1+sigmah)));
HrSCSS=HSCSS/empSCSS;
HrSKSS=HSKSS/empSKSS;
UHSCSS=A_HC*((1+sigman)/(1+sigman/(1+sigmah)))*HSCSS^(-1+(1+sigman)/(1+sigman/(1+sigmah)))/LSS;
UHSKSS=A_HK*((1+sigman)/(1+sigman/(1+sigmah)))*HSKSS^(-1+(1+sigman)/(1+sigman/(1+sigmah)))/LSS;
unempSS=(empSCSS+empSKSS-(empCSS+empKSS))/(empSCSS+empSKSS);
QKSS=1;
QCDSS=1;
QCHSS=1;
UCSS=1;
UKSS=1;
XiBSS=1;
XiDSS=1;
XiHSS=1;
RL1SS=RSS;
RL2SS=RSS;
RL3SS=RSS;
RL4SS=RSS;
RL5SS=RSS;
RL6SS=RSS;
RL7SS=RSS;
DIFFREALECSS =exp( log(MUCSS));
DIFFREALEIKSS =exp( log(MUKSS));
DIFFREALECDSS =exp( log(MUKSS));
DIFFREALECHSS =exp( log(MUCSS));
DIFFREALWSS =exp( log(MUCSS) );
DIFFREALGDPSS =exp( (1-s_k)*log(MUCSS)+(s_k)*log(MUKSS));

```

Uses A\_HC 35, A\_HK 35, AA 35, AHSS 35, alpha\_ 35, beta\_ 35, beta\_0 35, beta\_2 35, DD 35, delta\_ 35, delta\_cd 35, delta\_ch 35, DIFFREALECDSS 35, DIFFREALECHSS 35, DIFFREALECSS 35, DIFFREALEIKSS 35, DIFFREALGDPSS 35, DIFFREALWSS 35, ECDSS 35, ECHSS 35, ECSS 35, EIKSS 35, empCSS 35, empKSS 35, empSCSS 35, empSKSS 35, eta\_cd 35, eta\_cd\_eta\_cnn 35, eta\_ch 35, eta\_ch\_eta\_cnn 35, eta\_cnn 35, h 35, h\_cd 35, h\_ch 35, hc\_hk 35, HCSS 35, HKSS 35, HrCSS 35, HrKSS 35, HrSCSS 35, HrSKSS 35, HSCSS 35, HSKSS 35, HSS 35, IMPHSS 35, INFC10SS 35, INFCNASS 35, INFCORSS 35, INFCSS 35, INFGDPSS 35, INFKSS 35, INFWCSS 35, INFWKSS 35, KCDSS 35, KCHSS 35, KCSS 35, KKSS 35, LSS 35, MCCSS 35, MCKSS 35, mu\_ 35, MUCSS 35, MUCSShabit 35, MUKSS 35, MUKSShabit 35, MUZCSS 35, MUZKSS 35, MUZMSS 35, ONE 35, pbeta 35, PKBSS 35, PYSS 35, QCDSS 35, QCHSS 35, QKSS 35, RCDSS 35, RCHSS 35, RCSS 35, RKSS 35, RL1SS 35, RL2SS 35, RL3SS 35, RL4SS 35, RL5SS 35, RL6SS 35, RL7SS 35, Rnr 35, rpr 35, RR 35, RSS 35, RT2SS 35, s\_AS 35, s\_c\_ech 35, s\_ecdc 35, s\_k 35, s\_k\_eed 35, s\_k\_eik 35, s\_yc 35, sigmah 35, sigman 35, theta\_c 35, theta\_k 35, theta\_wc 35, theta\_wk 35, tp2 35, UCSS 35, UHCSS 35, UHKSS 35, UHSCSS 35, UHSKSS 35, UKSS 35, unempSS 35, USS 35, WCSS 35, WKSS 35, xsi\_HrC 35, xsi\_HrK 35, xsi\_NC 35, xsi\_NK 35, ycbi 35, ycbi\_ykb 35, YCSS 35, ykb 35, YKSS 35, and YYSS 35.

### A.6.2 Common Steady State Trends

48  $\langle \text{common steady state trends 48} \rangle \equiv$  (16 26)

```

DIFFREALGDPSS_obs=(1-s_k)*log(MUCSS)*100+(s_k)*log(MUKSS)*100;
DIFFREALECSS_obs=log(MUCSS)*100;
DIFFREALEIKSS_obs=log(MUKSS)*100;
DIFFREALECDSS_obs=log(MUKSS)*100;
DIFFREALECHSS_obs=log(MUCSS)*100;
DIFFREALWSS_obs=log(MUCSS)*100;
INFCNASS_obs=(1-s_ecdc)*log(INFCSS)*100+s_ecdc*log(INFKSS)*100;
INFCORSS_obs=(1-s_ecdc)*log(INFCSS)*100+s_ecdc*log(INFKSS)*100;
INFKSS_obs=log(INFCSS)*100-log(MUKSS)*100+log(MUCSS)*100;
RSS_obs=log(RSS)*100;
RT2SS_obs=log(RT2SS)*100;
unempSS_obs=100*log(unempSS);

```

Uses DIFFREALECDSS\_obs 35, DIFFREALECHSS\_obs 35, DIFFREALECSS\_obs 35,  
DIFFREALEIKSS\_obs 35, DIFFREALGDPSS\_obs 35, DIFFREALWSS\_obs 35, INFCNASS\_obs 35,  
INFCORSS\_obs 35, INFCSS 35, INFKSS 35, INFKSS\_obs 35, MUCSS 35, MUKSS 35, RSS 35,  
RSS\_obs 35, RT2SS 35, RT2SS\_obs 35, s\_ecdc 35, s\_k 35, unempSS 35, and unempSS\_obs 35.



## A.7 readme.txt

49  $\langle \text{srcedo/readme.txt 49} \rangle \equiv$

How to run the model:  
=====

In Matlab/Octave:

- 1) Download Dynare Version 4 from the Dynare website: <http://www.dynare.org/>
- 2) Download the EDO files in a folder you choose.
- 3) Start Matlab/Octave and change the current directory to the folder in step 2.
- 4) Link in Matlab/Octave the Dynare folder in the menu under file/Set Path (or use the command "addpath path/to/dynare").
- 5) Run the command "dynare linearized" or "dynare Dynare\_edo" from the Matlab/Octave command li

Content of the EDO folder:  
=====

Dynare\_edo.mod: Dynare model file containing the latest estimated parameters and nonlinear mode

Dynare\_edo\_steadystate.mod: Dynare steady-state file computes the steady state of the model var

linearized.mod: Dynare model file containing the latest estimated parameters and nonlinear mode

linearized\_steadystate.mod: Dynare steady-state file computes the steady state of the model var

readme.txt: The file you are currently reading.

This code is written to file srcedo/readme.txt.



## Appendix B

# Notes, Bibliography and Indexes

### B.1 Chunks

*<common calibrated params 40>*  
*<common estimated params 39>*  
*<common free params 41a>*  
*<common parameters 35>*  
*<common setup 30>*  
*<common shocks 42>*  
*<common stderr 44>*  
*<common steady estimated params 43>*  
*<common steady state trends 48>*  
*<common steady state values 45>*  
*<common stoch sim 31>*  
*<common var 32>*  
*<common varexo 34>*  
*<common varobs 41b>*  
*<edo model 10>*  
*<edo model durables 13b>*  
*<edo model hours 13a>*  
*<edo model housing 14>*  
*<edo model identities 12b>*  
*<edo model labor 12a>*  
*<edo model measurement 15>*  
*<edo model prelim 11>*  
*<edo steady state result return 17>*  
*<linearized model 20>*  
*<linearized model durables 23c>*  
*<linearized model hours 23b>*

⟨linearized model housing 24⟩  
 ⟨linearized model identities 23a⟩  
 ⟨linearized model labor 22⟩  
 ⟨linearized model measurement 25⟩  
 ⟨linearized model prelim 21⟩  
 ⟨linearized steady state result return 27⟩  
 ⟨srcedo/Dynare.edo.mod 9⟩  
 ⟨srcedo/Dynare.edo.steadystate.m 16⟩  
 ⟨srcedo/linearized.mod 19⟩  
 ⟨srcedo/linearized.steadystate.m 26⟩  
 ⟨srcedo/readme.txt 49⟩

## B.2 Index

A\_HC: 12a, 22, 35, 41a, 45  
 A\_HK: 12a, 22, 35, 41a, 45  
 a\_ks: 35, 40  
 AA: 35, 45  
 AH: 13a, 15, 23b, 25, 32  
 AH\_obs: 15, 25, 32, 41b, 42  
 AHSS: 12b, 15, 17, 23a, 23b, 35, 45  
 alpha\_: 11, 13a, 14, 21, 23b, 24, 35, 40, 45  
 beta\_: 11, 12a, 13b, 14, 17, 21, 22, 23c, 24, 35, 45  
 beta\_0: 35, 45  
 beta\_2: 35, 45  
 betarl: 13a, 23b, 35, 40  
 betas: 11, 14, 21, 24, 32  
 DD: 35, 45  
 delta\_: 11, 21, 35, 40, 45  
 delta\_cd: 13b, 23c, 35, 40, 45  
 delta\_ch: 14, 24, 35, 40, 45  
 DIFFNORMGDP: 12a, 22, 32  
 DIFFFREALEC: 12a, 15, 22, 25, 32  
 DIFFFREALEC\_obs: 15, 25, 32, 41b, 42  
 DIFFFREALECD: 14, 15, 24, 25, 32  
 DIFFFREALECD\_obs: 15, 25, 32, 41b, 42  
 DIFFFREALECDSS: 15, 17, 24, 35, 45  
 DIFFFREALECDSS\_obs: 15, 17, 25, 27, 35, 48  
 DIFFFREALECH: 14, 15, 24, 25, 32  
 DIFFFREALECH\_obs: 15, 25, 32, 41b, 42  
 DIFFFREALECHSS: 15, 17, 24, 35, 45  
 DIFFFREALECHSS\_obs: 15, 17, 25, 27, 35, 48  
 DIFFFREALECSS: 15, 17, 22, 35, 45  
 DIFFFREALECSS\_obs: 15, 17, 25, 27, 35, 48  
 DIFFFREALEIK: 12a, 15, 22, 25, 32

DIFFREALEIK\_obs: 15, 25, 32, 41b, 42  
DIFFREALEIKSS: 15, 17, 22, 35, 45  
DIFFREALEIKSS\_obs: 15, 17, 25, 27, 35, 48  
DIFFREALGDP: 12a, 13a, 15, 22, 23b, 25, 32  
DIFFREALGDP\_obs: 15, 25, 32, 41b, 42  
DIFFREALGDPSS: 15, 17, 22, 23b, 35, 45  
DIFFREALGDPSS\_obs: 15, 17, 25, 27, 35, 48  
DIFFREALW: 12b, 15, 23a, 25, 32  
DIFFREALW\_obs: 15, 25, 32, 41b, 42  
DIFFREALWSS: 15, 17, 23a, 35, 45  
DIFFREALWSS\_obs: 15, 17, 25, 27, 35, 48  
eB: 14, 24, 34, 42, 44  
EC: 11, 12a, 21, 22, 32  
ECD: 12a, 13b, 14, 22, 23c, 24, 32  
ECDSS: 13b, 17, 22, 23c, 24, 35, 45  
ECH: 12a, 14, 22, 24, 32  
ECHSS: 14, 17, 22, 24, 35, 45  
ECSS: 17, 21, 22, 35, 45  
eEFFECD: 14, 24, 34, 42, 44  
eEFFECH: 14, 24, 34, 42, 44  
eEFFK: 14, 24, 34, 42, 44  
EFFECD: 13b, 14, 23c, 24, 32  
EFFECH: 14, 24, 32  
EFFK: 11, 12a, 14, 21, 22, 24, 32  
eHG: 14, 24, 34, 42, 44  
EIK: 11, 12a, 21, 22, 32  
EIKSS: 12a, 17, 21, 22, 35, 45  
eLpref: 14, 24, 34, 42, 44  
empC: 12a, 22, 32  
empCSS: 17, 22, 35, 45  
empK: 12a, 22, 32  
empKSS: 17, 22, 35, 45  
empSC: 12a, 22, 32  
empSCSS: 17, 22, 35, 45  
empSK: 12a, 22, 32  
empSKSS: 17, 22, 35, 45  
eMUZK: 14, 24, 34, 42, 44  
eMUZM: 14, 24, 34, 42, 44  
ePMKC: 11, 21, 34, 42, 44  
ePMKK: 11, 21, 34, 42, 44  
eR: 11, 21, 34, 42, 44  
eSTAR: 14, 24, 34, 42, 44  
eta\_cd: 13b, 23c, 35, 41a, 45  
eta\_cd.eta\_cnn: 35, 45  
eta\_ch: 14, 24, 35, 41a, 45  
eta\_ch.eta\_cnn: 35, 45

eta\_cnn: 11, 21, 35, 41a, 45  
 eXiL: 12a, 14, 22, 24, 34, 42, 44  
 g\_y: 35, 40  
 gam\_ech: 14, 24, 35, 40  
 gam\_h: 12a, 22, 35, 40  
 gam\_ic: 12a, 22, 35, 40  
 gam\_icd: 13b, 23c, 35, 40  
 gam\_pc: 11, 21, 35, 39, 43  
 gam\_wc: 12a, 22, 35, 39, 43  
 GAP: 13a, 23b, 32  
 h: 11, 21, 35, 39, 43, 45  
 h\_cd: 13b, 23c, 35, 40, 45  
 h\_ch: 14, 24, 35, 40, 45  
 HC: 11, 12a, 13a, 21, 22, 23b, 32  
 hc\_hk: 35, 45  
 HCSS: 12a, 12b, 13a, 17, 21, 22, 23a, 23b, 35, 45  
 HG: 12a, 14, 22, 24, 32  
 HK: 11, 12a, 13a, 21, 22, 23b, 32  
 HKSS: 12a, 12b, 13a, 17, 21, 22, 23a, 23b, 35, 45  
 HrC: 12a, 22, 32  
 HrCSS: 17, 22, 35, 45  
 HrK: 12a, 22, 32  
 HrKSS: 17, 22, 35, 45  
 HrSC: 12a, 22, 32  
 HrSCSS: 17, 22, 35, 45  
 HrSK: 12a, 22, 32  
 HrSKSS: 17, 22, 35, 45  
 HSC: 12a, 22, 32  
 HSCSS: 12a, 17, 22, 35, 45  
 HSK: 12a, 22, 32  
 HSKSS: 12a, 17, 22, 35, 45  
 HSS: 35, 45  
 icoef: 35, 40  
 IMPHSS: 35, 45  
 INFC: 11, 12a, 12b, 13a, 21, 22, 23a, 23b, 32  
 INFC10: 13a, 23b, 32  
 INFC10SS: 17, 23b, 35, 45  
 INFCNA: 11, 13a, 15, 21, 23b, 25, 32  
 INFCNA\_obs: 15, 25, 32, 41b, 42  
 INFCNASS: 11, 15, 17, 21, 23b, 35, 45  
 INFCNASS\_obs: 15, 17, 25, 27, 35, 48  
 INFCOR: 13a, 15, 23b, 25, 32  
 INFCOR\_obs: 15, 25, 32, 41b, 42  
 INFCORSS: 15, 17, 23b, 35, 45  
 INFCORSS\_obs: 15, 17, 25, 27, 35, 48  
 INFCSS: 11, 17, 21, 22, 23a, 23b, 35, 45, 48

INFGDP: 13a, 23b, 32  
INFGDPSS: 17, 23b, 35, 45  
INFK: 11, 12a, 13a, 15, 21, 22, 23b, 25, 32  
INFK\_obs: 15, 25, 32, 41b, 42  
INFKSS: 11, 15, 17, 21, 22, 23b, 35, 45, 48  
INFKSS\_obs: 15, 17, 25, 27, 35, 48  
INFWC: 12a, 12b, 22, 23a, 32  
INFWCSS: 12a, 17, 22, 23a, 35, 45  
INFWK: 12a, 12b, 22, 23a, 32  
INFWKSS: 12a, 17, 22, 23a, 35, 45  
jacobian.flag: 31  
KC: 11, 12a, 21, 22, 32  
KCDSS: 17, 23c, 24, 35, 45  
KCH: 14, 24, 32  
KCHSS: 17, 24, 35, 45  
KCSS: 11, 17, 21, 22, 35, 45  
KD: 13b, 14, 23c, 24, 32  
KK: 11, 12a, 21, 22, 32  
KKSS: 11, 17, 21, 22, 35, 45  
L: 10, 11, 12a, 13b, 14, 20, 21, 22, 23c, 24, 32  
LAGKCH: 14, 24, 32  
LAGKD: 13b, 14, 23c, 24, 32  
Lpref: 12a, 14, 22, 24, 32  
LSS: 17, 20, 21, 22, 23c, 24, 35, 45  
MCC: 11, 21, 32  
MCCSS: 17, 21, 35, 45  
MCK: 11, 21, 32  
MCKSS: 17, 21, 35, 45  
mu\_: 11, 14, 21, 24, 35, 41a, 45  
MUC: 11, 12a, 13a, 14, 21, 22, 23b, 24, 32  
MUCSS: 17, 21, 22, 23b, 24, 35, 45, 48  
MUCSShabit: 35, 45  
MUK: 11, 12a, 13b, 14, 21, 22, 23c, 24, 32  
MUKSS: 17, 21, 22, 23c, 24, 35, 45, 48  
MUKSShabit: 35, 45  
MUZCSS: 35, 45  
MUZK: 14, 24, 32  
MUZKSS: 14, 17, 24, 35, 40, 45  
MUZM: 14, 24, 32  
MUZMSS: 14, 17, 24, 35, 40, 45  
nonlin: 31  
NORMINFGDP: 12a, 22, 32  
ONE: 17, 21, 22, 23b, 23c, 24, 35, 40, 45  
options\_: 31  
order: 31  
pbeta: 35, 40, 45

PFGAP: 11, 13a, 21, 23b, 32  
 phi\_cd: 13b, 23c, 35, 39, 43  
 phi\_ech: 14, 24, 35, 39, 43  
 phi\_H: 12a, 22, 35, 39, 43  
 phi\_ic: 12a, 22, 35, 39, 43  
 phi\_pc: 11, 21, 35, 39, 43  
 phi\_u: 11, 14, 21, 24, 35, 40  
 phi\_wc: 12a, 22, 35, 39, 43  
 PKB: 11, 12a, 13a, 13b, 21, 22, 23b, 23c, 32  
 PKBSS: 17, 21, 22, 23b, 23c, 35, 45  
 PYSS: 35, 45  
 QCD: 13b, 23c, 32  
 QCDSS: 17, 23c, 35, 45  
 QCH: 14, 24, 32  
 QCHSS: 17, 24, 35, 45  
 QK: 11, 12a, 14, 21, 22, 24, 32  
 QKSS: 17, 21, 22, 24, 35, 45  
 R: 11, 14, 15, 21, 24, 25, 32  
 r\_dinf: 11, 21, 35, 40  
 r\_dy: 35, 40  
 r\_inf: 11, 21, 35, 39, 43  
 R\_obs: 15, 25, 32, 41b  
 r\_y: 11, 21, 35, 39, 43  
 RC: 11, 14, 21, 24, 32  
 RCD: 13b, 23c, 32  
 RCDSS: 17, 23c, 35, 45  
 RCH: 14, 24, 32  
 RCHSS: 17, 24, 35, 45  
 RCSS: 17, 21, 24, 35, 45  
 rho\_B: 14, 24, 35, 39, 43  
 rho\_EFFECD: 14, 24, 35, 39, 43  
 rho\_EFFECH: 14, 24, 35, 39, 43  
 rho\_EFFK: 14, 24, 35, 39, 43  
 rho\_HG: 14, 24, 35, 39, 43  
 rho\_lpref: 14, 24, 35, 39, 43  
 rho\_MUZE: 35, 40  
 rho\_MUZE: 35, 40  
 rho\_R: 11, 21, 35, 39, 43  
 rho\_STAR: 14, 24, 35, 39, 43  
 rho\_XiL: 14, 24, 35, 39, 43  
 RK: 11, 14, 21, 24, 32  
 RKSS: 17, 21, 24, 35, 45  
 RL1: 14, 24, 32  
 RL1SS: 17, 24, 35, 45  
 RL2: 14, 24, 32  
 RL2SS: 17, 24, 35, 45



RL3: 14, 24, 32  
RL3SS: 17, 24, 35, 45  
RL4: 14, 24, 32  
RL4SS: 17, 24, 35, 45  
RL5: 14, 24, 32  
RL5SS: 17, 24, 35, 45  
RL6: 14, 24, 32  
RL6SS: 17, 24, 35, 45  
RL7: 14, 24, 32  
RL7SS: 17, 24, 35, 45  
Rnr: 35, 45  
rpr: 11, 21, 35, 40, 45  
RR: 35, 45  
RSS: 11, 15, 17, 21, 24, 35, 45, 48  
RSS\_obs: 15, 17, 25, 27, 35, 48  
RT2: 14, 15, 24, 25, 32  
RT2\_obs: 15, 25, 32, 41b, 42  
RT2SS: 15, 17, 24, 35, 45, 48  
RT2SS\_obs: 15, 17, 25, 27, 35, 48  
s\_AS: 35, 40, 45  
s\_c\_ech: 35, 45  
s\_ecdc: 13a, 23b, 35, 41a, 45, 48  
s\_k: 12a, 13a, 22, 23b, 35, 41a, 45, 48  
s\_k\_ecd: 35, 45  
s\_k\_eik: 35, 45  
s\_yc: 35, 45  
sig\_B: 35, 39, 42  
sig\_EFFECD: 35, 39, 42  
sig\_EFFECH: 35, 39, 42  
sig\_EFFK: 35, 39, 42  
sig\_HG: 35, 39, 42  
sig\_lpref: 35, 39, 42  
sig\_MUZY: 35, 39, 42  
sig\_MUZY: 35, 39, 42  
sig\_PMKY: 35, 39, 42  
sig\_PMKY: 35, 39, 42  
sig\_R: 35, 39, 42  
sig\_STAR: 35, 39, 42  
sig\_XiL: 35, 39, 42  
sigmah: 12a, 22, 35, 39, 43, 45  
sigman: 12a, 22, 35, 39, 43, 45  
STAR: 14, 24, 32  
stoch\_simul: 31  
theta\_c: 11, 21, 35, 40, 45  
theta\_k: 11, 21, 35, 40, 45  
theta\_wc: 12a, 22, 35, 41a, 45

theta\_wk: 12a, 22, 35, 41a, 45  
 tp2: 14, 24, 35, 39, 43, 45  
 UC: 11, 13a, 14, 21, 23b, 24, 32  
 UCSS: 35, 45  
 UHC: 12a, 22, 32  
 UHCSS: 17, 22, 35, 45  
 UHK: 12a, 22, 32  
 UHKSS: 17, 22, 35, 45  
 UHSC: 12a, 22, 32  
 UHSCSS: 17, 22, 35, 45  
 UHSK: 12a, 22, 32  
 UHSKSS: 17, 22, 35, 45  
 UK: 11, 13a, 14, 21, 23b, 24, 32  
 UKSS: 35, 45  
 unemp: 12a, 15, 22, 25, 32  
 unemp\_obs: 15, 25, 32, 41b, 42  
 unempSS: 15, 17, 22, 35, 40, 45, 48  
 unempSS\_obs: 15, 17, 25, 27, 35, 48  
 unlinearized\_edo\_steadystate: 16  
 USS: 13a, 17, 21, 23b, 24, 35, 45  
 WC: 11, 12a, 21, 22, 32  
 WCSS: 17, 21, 22, 35, 45  
 WK: 11, 12a, 21, 22, 32  
 WKSS: 17, 21, 22, 35, 45  
 XiL: 12a, 14, 22, 24, 32  
 xsi\_HrC: 12a, 22, 35, 41a, 45  
 xsi\_HrK: 12a, 22, 35, 41a, 45  
 xsi\_NC: 12a, 22, 35, 41a, 45  
 xsi\_NK: 12a, 22, 35, 41a, 45  
 YC: 11, 12a, 13a, 21, 22, 23b, 32  
 ycbi: 35, 45  
 ycbi\_ykb: 35, 45  
 YCSS: 11, 12a, 13a, 17, 21, 22, 23b, 35, 45  
 YK: 11, 12a, 13a, 21, 22, 23b, 32  
 ykb: 35, 45  
 YKSS: 11, 12a, 13a, 17, 21, 22, 23b, 35, 45  
 YYSS: 35, 45