Table 1: Endogenous

Variable	LaTeX	Description
r	r	r
rk	rk	rk
w	w	w
b	b	b
y	y	y
varpi	$varpi$	varpi
s	s	s
inv	inv	inv
c	c	c
cw	cw	cw
cwper	$cwper$	cwper
cr	cr	cr
crper	$crper$	crper
tauw	$tauw$	tauw
N	N	N
stoyw	$stoyw$	stoyw
PiF	PiF	PiF
Tw	Tw	Tw
hw	hw	hw
Dr	Dr	Dr
Dw	Dw	Dw
ep	ep	ep
varsig	$varsig$	varsig
zetar	$zetar$	zetar
zetay	$zetay$	zetay
gw	gw	gw
g	g	g
gE	gE	gE
iy	iy	iy
gpc	gpc	gpc
gy	gy	gy
zz	zz	zz
far	far	far
faw	faw	faw
dr	dr	dr
dw	dw	dw
mu	mu	mu
k	k	k
u	u	u
del	del	del
delprime	$delprime$	delprime
gM	gM	gM
v	v	v
j	j	j

Table 1 – Continued

Variable	LaTeX	Description
lam	lam	lam
gA	gA	gA
za	za	za
PiA	PiA	PiA
PiRD	$PiRD$	PiRD
fa	fa	fa
n	n	n
gn	gn	gn
gamma	$gamma$	gamma
er	er	er
ey	ey	ey
en	en	en
psi	psi	psi
shockr	$shockr$	shockr
shocky	$shocky$	shocky
shockn	$shockn$	shockn
fert	$fert$	fert
omegay	$omegay$	omegay
shareW	$shareW$	shareW
shareR	$shareR$	shareR
AUX_ENDO_LAG_37_1	$AUX\_ENDO\_LAG\_37\_1$	AUX_ENDO_LAG_37_1
AUX_ENDO_LAG_46_1	$AUX\_ENDO\_LAG\_46\_1$	AUX_ENDO_LAG_46_1
AUX_ENDO_LAG_59_1	$AUX\_ENDO\_LAG\_59\_1$	AUX_ENDO_LAG_59_1
AUX_ENDO_LAG_59_2	$AUX\_ENDO\_LAG\_59\_2$	AUX_ENDO_LAG_59_2
AUX_ENDO_LAG_59_3	$AUX\_ENDO\_LAG\_59\_3$	AUX_ENDO_LAG_59_3
AUX_ENDO_LAG_59_4	$AUX\_ENDO\_LAG\_59\_4$	AUX_ENDO_LAG_59_4
AUX_ENDO_LAG_59_5	$AUX\_ENDO\_LAG\_59\_5$	AUX_ENDO_LAG_59_5
AUX_ENDO_LAG_59_6	$AUX\_ENDO\_LAG\_59\_6$	AUX_ENDO_LAG_59_6
AUX_ENDO_LAG_59_7	$AUX\_ENDO\_LAG\_59\_7$	AUX_ENDO_LAG_59_7
AUX_ENDO_LAG_59_8	$AUX\_ENDO\_LAG\_59\_8$	AUX_ENDO_LAG_59_8
AUX_ENDO_LAG_59_9	$AUX\_ENDO\_LAG\_59\_9$	AUX_ENDO_LAG_59_9
AUX_ENDO_LAG_59_10	$AUX\_ENDO\_LAG\_59\_10$	AUX_ENDO_LAG_59_10
AUX_ENDO_LAG_59_11	$AUX\_ENDO\_LAG\_59\_11$	AUX_ENDO_LAG_59_11
AUX_ENDO_LAG_59_12	$AUX\_ENDO\_LAG\_59\_12$	AUX_ENDO_LAG_59_12
AUX_ENDO_LAG_59_13	$AUX\_ENDO\_LAG\_59\_13$	AUX_ENDO_LAG_59_13
AUX_ENDO_LAG_59_14	$AUX\_ENDO\_LAG\_59\_14$	AUX_ENDO_LAG_59_14
AUX_ENDO_LAG_59_15	$AUX\_ENDO\_LAG\_59\_15$	AUX_ENDO_LAG_59_15
AUX_ENDO_LAG_59_16	$AUX\_ENDO\_LAG\_59\_16$	AUX_ENDO_LAG_59_16
AUX_ENDO_LAG_59_17	$AUX\_ENDO\_LAG\_59\_17$	AUX_ENDO_LAG_59_17
AUX_ENDO_LAG_59_18	$AUX\_ENDO\_LAG\_59\_18$	AUX_ENDO_LAG_59_18
AUX_ENDO_LAG_59_19	$AUX\_ENDO\_LAG\_59\_19$	AUX_ENDO_LAG_59_19
AUX_ENDO_LAG_59_20	$AUX\_ENDO\_LAG\_59\_20$	AUX_ENDO_LAG_59_20
AUX_ENDO_LAG_59_21	$AUX\_ENDO\_LAG\_59\_21$	AUX_ENDO_LAG_59_21
AUX_ENDO_LAG_59_22	$AUX\_ENDO\_LAG\_59\_22$	AUX_ENDO_LAG_59_22
AUX_ENDO_LAG_59_23	$AUX\_ENDO\_LAG\_59\_23$	AUX_ENDO_LAG_59_23

Table 1 – Continued

Variable	LaTeX	Description
AUX_ENDO_LAG_59_24	$AUX\_ENDO\_LAG\_59\_24$	AUX_ENDO_LAG_59_24
AUX_ENDO_LAG_59_25	$AUX\_ENDO\_LAG\_59\_25$	AUX_ENDO_LAG_59_25
AUX_ENDO_LAG_59_26	$AUX\_ENDO\_LAG\_59\_26$	AUX_ENDO_LAG_59_26
AUX_ENDO_LAG_59_27	$AUX\_ENDO\_LAG\_59\_27$	AUX_ENDO_LAG_59_27
AUX_ENDO_LAG_59_28	$AUX\_ENDO\_LAG\_59\_28$	AUX_ENDO_LAG_59_28
AUX_EXO_LAG_64_0	$AUX\_EXO\_LAG\_64\_0$	AUX_EXO_LAG_64_0
AUX_EXO_LAG_64_1	$AUX\_EXO\_LAG\_64\_1$	AUX_EXO_LAG_64_1
AUX_EXO_LAG_64_2	$AUX\_EXO\_LAG\_64\_2$	AUX_EXO_LAG_64_2
AUX_EXO_LAG_64_3	$AUX\_EXO\_LAG\_64\_3$	AUX_EXO_LAG_64_3
AUX_EXO_LAG_64_4	$AUX\_EXO\_LAG\_64\_4$	AUX_EXO_LAG_64_4
AUX_EXO_LAG_64_5	$AUX\_EXO\_LAG\_64\_5$	AUX_EXO_LAG_64_5
AUX_EXO_LAG_64_6	$AUX\_EXO\_LAG\_64\_6$	AUX_EXO_LAG_64_6
AUX_EXO_LAG_64_7	$AUX\_EXO\_LAG\_64\_7$	AUX_EXO_LAG_64_7
AUX_EXO_LAG_64_8	$AUX\_EXO\_LAG\_64\_8$	AUX_EXO_LAG_64_8
AUX_EXO_LAG_64_9	$AUX\_EXO\_LAG\_64\_9$	AUX_EXO_LAG_64_9
AUX_EXO_LAG_64_10	$AUX\_EXO\_LAG\_64\_10$	AUX_EXO_LAG_64_10
AUX_EXO_LAG_64_11	$AUX\_EXO\_LAG\_64\_11$	AUX_EXO_LAG_64_11
AUX_EXO_LAG_64_12	$AUX\_EXO\_LAG\_64\_12$	AUX_EXO_LAG_64_12
AUX_EXO_LAG_64_13	$AUX\_EXO\_LAG\_64\_13$	AUX_EXO_LAG_64_13
AUX_EXO_LAG_64_14	$AUX\_EXO\_LAG\_64\_14$	AUX_EXO_LAG_64_14
AUX_EXO_LAG_64_15	$AUX\_EXO\_LAG\_64\_15$	AUX_EXO_LAG_64_15
AUX_EXO_LAG_64_16	$AUX\_EXO\_LAG\_64\_16$	AUX_EXO_LAG_64_16
AUX_EXO_LAG_64_17	$AUX\_EXO\_LAG\_64\_17$	AUX_EXO_LAG_64_17
AUX_EXO_LAG_64_18	$AUX\_EXO\_LAG\_64\_18$	AUX_EXO_LAG_64_18
AUX_EXO_LAG_64_19	$AUX\_EXO\_LAG\_64\_19$	AUX_EXO_LAG_64_19
AUX_EXO_LAG_64_20	$AUX\_EXO\_LAG\_64\_20$	AUX_EXO_LAG_64_20
AUX_EXO_LAG_64_21	$AUX\_EXO\_LAG\_64\_21$	AUX_EXO_LAG_64_21
AUX_EXO_LAG_64_22	$AUX\_EXO\_LAG\_64\_22$	AUX_EXO_LAG_64_22
AUX_EXO_LAG_64_23	$AUX\_EXO\_LAG\_64\_23$	AUX_EXO_LAG_64_23
AUX_EXO_LAG_64_24	$AUX\_EXO\_LAG\_64\_24$	AUX_EXO_LAG_64_24
AUX_EXO_LAG_64_25	$AUX\_EXO\_LAG\_64\_25$	AUX_EXO_LAG_64_25
AUX_EXO_LAG_64_26	$AUX\_EXO\_LAG\_64\_26$	AUX_EXO_LAG_64_26
AUX_EXO_LAG_64_27	$AUX\_EXO\_LAG\_64\_27$	AUX_EXO_LAG_64_27
AUX_EXO_LAG_64_28	$AUX\_EXO\_LAG\_64\_28$	AUX_EXO_LAG_64_28

Table 2: Exogenous

Variable	LaTeX	Description
delall	*delall*	delall

Table 3: Parameters

Variable	LaTeX	Description
SHINNOVW	$SHINNOVW$	SHINNOVW
YINNOVSH	$YINNOVSH$	YINNOVSH
OMEGAR	$OMEGAR$	OMEGAR
ZETAYSS	$ZETAYSS$	ZETAYSS
ZETARSS	$ZETARSS$	ZETARSS
REPLACSS	$REPLACSS$	REPLACSS
RHOYW	$RHOYW$	RHOYW
LAMY	$LAMY$	LAMY
PSISS	$PSISS$	PSISS
GSS	GSS	GSS
PERS	$PERS$	PERS
RATIODEL	$RATIODEL$	RATIODEL
OMEGAYSS	$OMEGAYSS$	OMEGAYSS
RHOU	$RHOU$	RHOU
BBETA	$BBETA$	BBETA
ALPHA	$ALPHA$	ALPHA
GAMMAI	$GAMMAI$	GAMMAI
VARNU	$VARNU$	VARNU
BMEGA	$BMEGA$	BMEGA
CHI	CHI	CHI
RHO	RHO	RHO
PHI	PHI	PHI
ELASMU	$ELASMU$	ELASMU
ELASLAM	$ELASLAM$	ELASLAM
DELPRIMESS	$DELPRIMESS$	DELPRIMESS
DELSS	$DELSS$	DELSS
MUSS	$MUSS$	MUSS
LAMSS	$LAMSS$	LAMSS
USS	USS	USS
VARPISS	$VARPISS$	VARPISS
ZASS	$ZASS$	ZASS
KSS	KSS	KSS
NSS	NSS	NSS
GAMMASS	$GAMMASS$	GAMMASS
RHOE	$RHOE$	RHOE
CHIE	$CHIE$	CHIE
gn_1	gn_1	gn_1
gn_2	gn_2	gn_2
gn_3	gn_3	gn_3
gn_4	gn_4	gn_4
gn_5	gn_5	gn_5
gn_6	gn_6	gn_6
gn_7	gn_7	gn_7
gn_8	gn_8	gn_8

Table 3 – Continued

Variable	LaTeX	Description
gn_9	gn_9	gn_9
gn_10	gn_10	gn_10
gn_11	gn_11	gn_11
gn_12	gn_12	gn_12
gn_13	gn_13	gn_13
gn_14	gn_14	gn_14
gn_15	gn_15	gn_15
gn_16	gn_16	gn_16
gn_17	gn_17	gn_17
gn_18	gn_18	gn_18
gn_19	gn_19	gn_19
gn_20	gn_20	gn_20
gn_21	gn_21	gn_21
gn_22	gn_22	gn_22
gn_23	gn_23	gn_23
gn_24	gn_24	gn_24
gn_25	gn_25	gn_25
gn_26	gn_26	gn_26
gn_27	gn_27	gn_27
gn_28	gn_28	gn_28
gn_29	gn_29	gn_29
gn_30	gn_30	gn_30
dws_1	dws_1	dws_1
dws_2	dws_2	dws_2
dws_3	dws_3	dws_3
dws_4	dws_4	dws_4
dws_5	dws_5	dws_5
dws_6	dws_6	dws_6
dws_7	dws_7	dws_7
dws_8	dws_8	dws_8
dws_9	dws_9	dws_9
dws_10	dws_10	dws_10
dws_11	dws_11	dws_11
dws_12	dws_12	dws_12
dws_13	dws_13	dws_13
dws_14	dws_14	dws_14
dws_15	dws_15	dws_15
dws_16	dws_16	dws_16
dws_17	dws_17	dws_17
dws_18	dws_18	dws_18
dws_19	dws_19	dws_19
dws_20	dws_20	dws_20
dws_21	dws_21	dws_21
dws_22	dws_22	dws_22
dws_23	dws_23	dws_23

Table 3 – Continued

Variable	LaTeX	Description
dws_24	dws_24	dws_24
dws_25	dws_25	dws_25
dws_26	dws_26	dws_26
dws_27	dws_27	dws_27
dws_28	dws_28	dws_28
dws_29	dws_29	dws_29
dws_30	dws_30	dws_30
drs_1	drs_1	drs_1
drs_2	drs_2	drs_2
drs_3	drs_3	drs_3
drs_4	drs_4	drs_4
drs_5	drs_5	drs_5
drs_6	drs_6	drs_6
drs_7	drs_7	drs_7
drs_8	drs_8	drs_8
drs_9	drs_9	drs_9
drs_10	drs_10	drs_10
drs_11	drs_11	drs_11
drs_12	drs_12	drs_12
drs_13	drs_13	drs_13
drs_14	drs_14	drs_14
drs_15	drs_15	drs_15
drs_16	drs_16	drs_16
drs_17	drs_17	drs_17
drs_18	drs_18	drs_18
drs_19	drs_19	drs_19
drs_20	drs_20	drs_20
drs_21	drs_21	drs_21
drs_22	drs_22	drs_22
drs_23	drs_23	drs_23
drs_24	drs_24	drs_24
drs_25	drs_25	drs_25
drs_26	drs_26	drs_26
drs_27	drs_27	drs_27
drs_28	drs_28	drs_28
drs_29	drs_29	drs_29
drs_30	drs_30	drs_30

Table 4: Parameter Values

Parameter	**Value**
$SHINNOVW$	0.010
$YINNOVSH$	0.060
$OMEGAR$	0.975
$ZETAYSS$	0.700
$ZETARSS$	0.227
$REPLACSS$	0.756
$RHOYW$	0.512
$LAMY$	0.049
$PSISS$	0.708
GSS	1.046
$PERS$	0.900
$RATIODEL$	0.333
$OMEGAYSS$	0.950
$RHOU$	-3.000
$BBETA$	0.960
$ALPHA$	0.333
$GAMMAI$	0.500
$VARNU$	1.667
$BMEGA$	0.128
CHI	64.671
RHO	0.900
PHI	0.850
$ELASMU$	-1.000
$ELASLAM$	0.855
$DELPRIMESS$	0.301
$DELSS$	0.080
$MUSS$	1.100
$LAMSS$	0.100
USS	0.800
$VARPISS$	0.135
$ZASS$	3.126
KSS	0.658
NSS	1.010
$GAMMASS$	0.900
$RHOE$	0.900
$CHIE$	1689.513
gn_1	1.009
gn_2	1.009
gn_3	1.009
gn_4	1.009
gn_5	1.009
gn_6	1.008
gn_7	1.008

Table 4 – Continued

Parameter	**Value**
gn_8	1.007
gn_9	1.007
gn_10	1.007
gn_11	1.006
gn_12	1.006
gn_13	1.006
gn_14	1.006
gn_15	1.006
gn_16	1.006
gn_17	1.005
gn_18	1.005
gn_19	1.005
gn_20	1.005
gn_21	1.005
gn_22	1.005
gn_23	1.005
gn_24	1.005
gn_25	1.005
gn_26	1.005
gn_27	1.005
gn_28	1.005
gn_29	1.005
gn_30	1.005
dws_1	-0.002
dws_2	-0.002
dws_3	-0.002
dws_4	-0.002
dws_5	-0.002
dws_6	-0.002
dws_7	-0.001
dws_8	-0.001
dws_9	-0.001
dws_10	-0.002
dws_11	-0.002
dws_12	-0.002
dws_13	-0.003
dws_14	-0.003
dws_15	-0.002
dws_16	-0.003
dws_17	-0.003
dws_18	-0.002
dws_19	-0.002
dws_20	-0.002
dws_21	-0.002

Table 4 – Continued

Parameter	**Value**
dws_22	-0.001
dws_23	-0.001
dws_24	-0.000
dws_25	-0.001
dws_26	-0.001
dws_27	-0.001
dws_28	-0.001
dws_29	-0.001
dws_30	-0.001
drs_1	0.002
drs_2	0.003
drs_3	0.004
drs_4	0.004
drs_5	0.004
drs_6	0.004
drs_7	0.004
drs_8	0.004
drs_9	0.004
drs_10	0.005
drs_11	0.005
drs_12	0.005
drs_13	0.005
drs_14	0.005
drs_15	0.005
drs_16	0.004
drs_17	0.004
drs_18	0.004
drs_19	0.003
drs_20	0.003
drs_21	0.003
drs_22	0.002
drs_23	0.002
drs_24	0.002
drs_25	0.002
drs_26	0.001
drs_27	0.001
drs_28	0.001
drs_29	0.001
drs_30	0.001

$$hw_t = w_t + \frac{OMEGAR}{r_t\, zz_t}\,\frac{g_{t+1}}{gw_t}\, hw_{t+1} \tag{1}$$

$$Tw_t = tauw_t + \frac{OMEGAR}{r_t\, zz_t}\,\frac{g_{t+1}}{gw_t}\, Tw_{t+1} \tag{2}$$

$$Dr_t = dr_t + \frac{g_{t+1}\, Dr_{t+1}\, gamma_t\, zetar_{t-1}}{gw_t\, r_t\, zetar_t} \tag{3}$$

$$Dw_t = dw_t + \frac{OMEGAR}{r_t\, zz_t}\,\frac{g_{t+1}}{gw_t}\, Dw_{t+1} + Dr_{t+1}\,\frac{(1-OMEGAR)\; ep_{t+1}^{\frac{RHOU-1}{RHOU}}}{r_t\, zz_t}\,\frac{g_{t+1}}{gw_t\, zetar_t} \tag{4}$$

$$cw_t = varsig_t\,\left(Dw_t + hw_t + \frac{r_{t-1}\, faw_{t-1}}{g_t} - Tw_t\right) \tag{5}$$

$$cr_t = varsig_t\, ep_t\,\left(Dr_t + \frac{r_{t-1}\, far_{t-1}}{g_t}\right) \tag{6}$$

$$1 - varsig_t\, ep_t = \frac{gamma_t\;(r_t\, BBETA)^{\frac{1}{1-RHOU}}}{r_t}\,\frac{varsig_t\, ep_t}{ep_{t+1}\, varsig_{t+1}} \tag{7}$$

$$1 - varsig_t = \frac{(zz_t\, r_t\, BBETA)^{\frac{1}{1-RHOU}}}{r_t\, zz_t}\,\frac{varsig_t}{varsig_{t+1}} \tag{8}$$

$$zz_t = OMEGAR + (1-OMEGAR)\; ep_{t+1}^{\frac{RHOU-1}{RHOU}} \tag{9}$$

$$cwper_t = cw_t\;(zetar_t + 1 + zetay_t) \tag{10}$$

$$crper_t = \frac{cr_t\;(zetar_t + 1 + zetay_t)}{zetar_t} \tag{11}$$

$$gw_t = OMEGAR + (1 - omegay_t)\; zetay_{t-1} \tag{12}$$

$$n_t = gw_t\,\frac{zetay_t}{zetay_{t-1}} \tag{13}$$

$$gw_t\, zetar_t = 1 - OMEGAR + gamma_t\, zetar_{t-1} \tag{14}$$

$$gn_t = \left(gw_t\, zetar_t + gw_t + zetay_{t-1}\, n_t\right)\;\left(zetay_{t-1} + 1 + zetar_{t-1}\right)^{(-1)} \tag{15}$$

$$gE_t = \frac{OMEGAR + (1 - omegay_t)\ zetay_{t-1}\ \left(RHOE + \frac{CHIE}{2}\, iy_t^2\right)}{gw_t} \tag{16}$$

$$tauw_t = w_t\, iy_t \tag{17}$$

$$varsig_t^{\frac{(-1)}{RHOU}} = \frac{g_{t+1}\, iy_t\, CHIE\, zetay_t\, BBETA\, varsig_{t+1}^{\frac{(-1)}{RHOU}}\ \left(1 - omegay_{t+1}\right)\ w_{t+1}}{n_t\, gE_t\, w_t\, gw_t} \tag{18}$$

$$fert_t = n_t - omegay_t \tag{19}$$

$$(1 - ALPHA)\ (1 - GAMMAI) = w_t\, mu_t \tag{20}$$

$$ALPHA\ (1 - GAMMAI) = mu_t\ (rk_t + del_t)\ \frac{k_{t-1}}{g_t} \tag{21}$$

$$ALPHA\ (1 - GAMMAI) = \frac{k_{t-1}}{g_t}\, mu_t\, delprime_t\, u_t \tag{22}$$

$$g_t = \frac{mu_t}{mu_{t-1}}\, gM_t\, gA_{t-1}^{1-VARNU} \tag{23}$$

$$g_t \tag{24}$$
$$= gM_t^{GAMMAI}\ \left(gE_{t-1}\, gw_{t-1}\right)^{(1-ALPHA)\,(1-GAMMAI)}\ \frac{N_t^{mu_t - 1}}{N_{t-1}^{mu_{t-1}-1}}\ \left(\frac{k_{t-1}\, u_t\, g_{t-1}}{u_{t-1}\, AUX\_ENDO\_LAG\_37\_1_{t-1}}\right)^{ALPHA\,(1-G}$$

$$\frac{mu_t - 1}{mu_t}\, N_t^{(-mu_t)} = BMEGA\, v_t \tag{25}$$

$$mu_t = MUSS\ (1 + ELASMU\ (N_t - 1)) \tag{26}$$

$$del_t = DELSS + delprime_t\ (u_t - USS) \tag{27}$$

$$delprime_t = DELPRIMESS + \frac{(u_t - USS)\ DELPRIMESS\, RATIODEL}{USS} \tag{28}$$

$$\frac{gA_t\, za_t}{za_{t-1}} = stoyw_t^{RHOYW}\, CHI\ \left(\frac{s_t}{psi_t}\right)^{RHO} + PHI \tag{29}$$

$$stoyw_t = \frac{zetay_{t-1}\ (1 - omegay_t)\ YINNOVSH}{zetar_{t-1} + 1 + zetay_{t-1}} + \frac{OMEGAR\ (1 - LAMY)}{gn_t}\, stoyw_{t-1} \tag{30}$$

$$gA_t = PHI + PHI\, lam_t\ (za_{t-1} - 1) \tag{31}$$

$$s_t = PHI\, \frac{g_{t+1}}{r_t}\, j_{t+1}\ \left(1 - \frac{za_{t-1}\, PHI}{gA_t\, za_t}\right) \tag{32}$$

$$v_t = \frac{GAMMAI\ \left(1 - \frac{1}{VARNU}\right)}{mu_t} + \frac{g_{t+1}}{gA_t}\, \frac{PHI}{r_t}\, v_{t+1} \tag{33}$$

$$varpi_t = \frac{PHI}{r_t}\, \frac{g_{t+1}}{gA_t}\, za_{t-1}\, lam_t\, ELASLAM\ \left(v_{t+1} - \frac{j_{t+1}}{za_t}\right) \tag{34}$$

$$j_t = \frac{PHI}{r_t}\, za_{t-1}\, \frac{g_{t+1}}{gA_t}\ \left(lam_t\, v_{t+1} + \frac{j_{t+1}\ (1 - lam_t)}{za_t}\right) - varpi_t \tag{35}$$

$$lam_t = LAMSS\ \left(1 + ELASLAM\ \left(\frac{varpi_t - VARPISS}{VARPISS} - \frac{za_{t-1} - ZASS}{ZASS} - \frac{psi_t - PSISS}{PSISS}\right)\right) \tag{36}$$

$$\begin{aligned} PiA_t = {} & \frac{GAMMAI\ \left(1 - \frac{1}{VARNU}\right)}{mu_t} - PHI\, j_t\ \left(1 - \frac{PHI\, AUX\_ENDO\_LAG\_46\_1_{t-1}}{gA_{t-1}\, za_{t-1}}\right) \\ & - \frac{r_{t-1}\, varpi_{t-1}\ \left(1 - \frac{1}{AUX\_ENDO\_LAG\_46\_1_{t-1}}\right)}{g_t} \end{aligned} \tag{37}$$

$$PiRD_t = PHI\, j_t\ \left(1 - \frac{PHI\, AUX\_ENDO\_LAG\_46\_1_{t-1}}{gA_{t-1}\, za_{t-1}}\right) - \frac{r_{t-1}\, s_{t-1}}{g_t} \tag{38}$$

$$psi_t = v_t \tag{39}$$

$$r_t = 1 + rk_{t+1} \tag{40}$$

$$dr_t = \frac{far_{t-1}\, PiF_t}{fa_{t-1}} \tag{41}$$

$$dw_t = \frac{faw_{t-1}\, PiF_t}{fa_{t-1}} + SHINNOVW\ (PiA_t + PiRD_t) \tag{42}$$

$$b_t = s_t + varpi_t\ \left(1 - \frac{1}{za_{t-1}}\right) \tag{43}$$

$$PiF_t = \frac{k_{t-1}}{g_t}\,(1+rk_t) + \frac{r_{t-1}\,b_{t-1}}{g_t} - \frac{r_{t-1}\,fa_{t-1}}{g_t} - k_t - b_t + fa_t + (PiA_t + PiRD_t)\,(1 - SHINNOVW) \tag{44}$$

$$k_t = \frac{k_{t-1}}{g_t}\,(1 - del_t) + inv_t \tag{45}$$

$$y_t = 1 - \frac{GAMMAI}{mu_t\,VARNU} - psi_t\,N_t\,BMEGA \tag{46}$$

$$y_t = tauw_t + varpi_t\left(1 - \frac{1}{za_{t-1}}\right) + s_t + inv_t + c_t \tag{47}$$

$$c_t = cw_t + cr_t \tag{48}$$

$$fa_t = b_t + k_t \tag{49}$$

$$far_t = dr_t + \frac{r_{t-1}\,far_{t-1}}{g_t} - cr_t + (1 - OMEGAR)\left(dw_t + w_t + \frac{r_{t-1}\,faw_{t-1}}{g_t} - cw_t - tauw_t\right) \tag{50}$$

$$fa_t = far_t + faw_t \tag{51}$$

$$gpc_t = \frac{g_{t-1}\,\frac{y_t}{y_{t-1}}}{gn_{t-1}} \tag{52}$$

$$gy_t = g_t\,\frac{y_t}{y_{t-1}} \tag{53}$$

$$gn_t = NSS + en_t \tag{54}$$

$$shareW_t = \frac{1}{zetar_t + 1 + zetay_t} \tag{55}$$

$$shareR_t = \frac{zetar_t}{zetar_t + 1 + zetay_t} \tag{56}$$

$$\frac{1}{zetar_t + 1 + zetay_t} = \frac{1}{1 + ZETAYSS + ZETARSS} + ey_t \tag{57}$$

$$\frac{zetar_t}{zetar_t + 1 + zetay_t} = \frac{ZETARSS}{1 + ZETAYSS + ZETARSS} + er_t \tag{58}$$

$$
\begin{aligned}
en_t = {} & shockn_t\ (gn\_1 - NSS) + shockn_{t-1}\ (gn\_2 - NSS) \\
& + (gn\_3 - NSS)\ AUX\_ENDO\_LAG\_59\_1_{t-1} + (gn\_4 - NSS)\ AUX\_ENDO\_LAG\_59\_2_{t-1} \\
& + (gn\_5 - NSS)\ AUX\_ENDO\_LAG\_59\_3_{t-1} + (gn\_6 - NSS)\ AUX\_ENDO\_LAG\_59\_4_{t-1} \\
& + (gn\_7 - NSS)\ AUX\_ENDO\_LAG\_59\_5_{t-1} + (gn\_8 - NSS)\ AUX\_ENDO\_LAG\_59\_6_{t-1} \\
& + (gn\_9 - NSS)\ AUX\_ENDO\_LAG\_59\_7_{t-1} + (gn\_10 - NSS)\ AUX\_ENDO\_LAG\_59\_8_{t-1} \\
& + (gn\_11 - NSS)\ AUX\_ENDO\_LAG\_59\_9_{t-1} \\
& + (gn\_12 - NSS)\ AUX\_ENDO\_LAG\_59\_10_{t-1} \\
& + (gn\_13 - NSS)\ AUX\_ENDO\_LAG\_59\_11_{t-1} \\
& + (gn\_14 - NSS)\ AUX\_ENDO\_LAG\_59\_12_{t-1} \\
& + (gn\_15 - NSS)\ AUX\_ENDO\_LAG\_59\_13_{t-1} \\
& + (gn\_16 - NSS)\ AUX\_ENDO\_LAG\_59\_14_{t-1} \\
& + (gn\_17 - NSS)\ AUX\_ENDO\_LAG\_59\_15_{t-1} \\
& + (gn\_18 - NSS)\ AUX\_ENDO\_LAG\_59\_16_{t-1} \\
& + (gn\_19 - NSS)\ AUX\_ENDO\_LAG\_59\_17_{t-1} \\
& + (gn\_20 - NSS)\ AUX\_ENDO\_LAG\_59\_18_{t-1} \\
& + (gn\_21 - NSS)\ AUX\_ENDO\_LAG\_59\_19_{t-1} \\
& + (gn\_22 - NSS)\ AUX\_ENDO\_LAG\_59\_20_{t-1} \\
& + (gn\_23 - NSS)\ AUX\_ENDO\_LAG\_59\_21_{t-1} \\
& + (gn\_24 - NSS)\ AUX\_ENDO\_LAG\_59\_22_{t-1} \\
& + (gn\_25 - NSS)\ AUX\_ENDO\_LAG\_59\_23_{t-1} \\
& + (gn\_26 - NSS)\ AUX\_ENDO\_LAG\_59\_24_{t-1} \\
& + (gn\_27 - NSS)\ AUX\_ENDO\_LAG\_59\_25_{t-1} \\
& + (gn\_28 - NSS)\ AUX\_ENDO\_LAG\_59\_26_{t-1} \\
& + (gn\_29 - NSS)\ AUX\_ENDO\_LAG\_59\_27_{t-1} \\
& + (gn\_30 - NSS)\ AUX\_ENDO\_LAG\_59\_28_{t-1}
\end{aligned}
\tag{59}
$$

$$
er_t = shockr_t \tag{60}
$$

$$
ey_t = shocky_t \tag{61}
$$

$$
\begin{aligned}
shocky_t = {} & shocky_{t-1} + delall_t\, dws\_1 + dws\_2\, AUX\_EXO\_LAG\_64\_0_{t-1} \\
& + dws\_3\, AUX\_EXO\_LAG\_64\_1_{t-1} + dws\_4\, AUX\_EXO\_LAG\_64\_2_{t-1} \\
& + dws\_5\, AUX\_EXO\_LAG\_64\_3_{t-1} + dws\_6\, AUX\_EXO\_LAG\_64\_4_{t-1} \\
& + dws\_7\, AUX\_EXO\_LAG\_64\_5_{t-1} + dws\_8\, AUX\_EXO\_LAG\_64\_6_{t-1} \\
& + dws\_9\, AUX\_EXO\_LAG\_64\_7_{t-1} + dws\_10\, AUX\_EXO\_LAG\_64\_8_{t-1} \\
& + dws\_11\, AUX\_EXO\_LAG\_64\_9_{t-1} + dws\_12\, AUX\_EXO\_LAG\_64\_10_{t-1} \\
& + dws\_13\, AUX\_EXO\_LAG\_64\_11_{t-1} + dws\_14\, AUX\_EXO\_LAG\_64\_12_{t-1} \\
& + dws\_15\, AUX\_EXO\_LAG\_64\_13_{t-1} + dws\_16\, AUX\_EXO\_LAG\_64\_14_{t-1} \\
& + dws\_17\, AUX\_EXO\_LAG\_64\_15_{t-1} + dws\_18\, AUX\_EXO\_LAG\_64\_16_{t-1} \\
& + dws\_19\, AUX\_EXO\_LAG\_64\_17_{t-1} + dws\_20\, AUX\_EXO\_LAG\_64\_18_{t-1} \\
& + dws\_21\, AUX\_EXO\_LAG\_64\_19_{t-1} + dws\_22\, AUX\_EXO\_LAG\_64\_20_{t-1} \\
& + dws\_23\, AUX\_EXO\_LAG\_64\_21_{t-1} + dws\_24\, AUX\_EXO\_LAG\_64\_22_{t-1} \\
& + dws\_25\, AUX\_EXO\_LAG\_64\_23_{t-1} + dws\_26\, AUX\_EXO\_LAG\_64\_24_{t-1} \\
& + dws\_27\, AUX\_EXO\_LAG\_64\_25_{t-1} + dws\_28\, AUX\_EXO\_LAG\_64\_26_{t-1} \\
& + dws\_29\, AUX\_EXO\_LAG\_64\_27_{t-1} + dws\_30\, AUX\_EXO\_LAG\_64\_28_{t-1}
\end{aligned}
\tag{62}
$$

$$
\begin{aligned}
shockr_t = {} & delall_t\, dws\_1 + shockr_{t-1} + drs\_2\, AUX\_EXO\_LAG\_64\_0_{t-1} \\
& + drs\_3\, AUX\_EXO\_LAG\_64\_1_{t-1} + drs\_4\, AUX\_EXO\_LAG\_64\_2_{t-1} \\
& + drs\_5\, AUX\_EXO\_LAG\_64\_3_{t-1} + drs\_6\, AUX\_EXO\_LAG\_64\_4_{t-1} \\
& + drs\_7\, AUX\_EXO\_LAG\_64\_5_{t-1} + drs\_8\, AUX\_EXO\_LAG\_64\_6_{t-1} \\
& + drs\_9\, AUX\_EXO\_LAG\_64\_7_{t-1} + drs\_10\, AUX\_EXO\_LAG\_64\_8_{t-1} \\
& + drs\_11\, AUX\_EXO\_LAG\_64\_9_{t-1} + drs\_12\, AUX\_EXO\_LAG\_64\_10_{t-1} \\
& + drs\_13\, AUX\_EXO\_LAG\_64\_11_{t-1} + drs\_14\, AUX\_EXO\_LAG\_64\_12_{t-1} \\
& + drs\_15\, AUX\_EXO\_LAG\_64\_13_{t-1} + drs\_16\, AUX\_EXO\_LAG\_64\_14_{t-1} \\
& + drs\_17\, AUX\_EXO\_LAG\_64\_15_{t-1} + drs\_18\, AUX\_EXO\_LAG\_64\_16_{t-1} \\
& + drs\_19\, AUX\_EXO\_LAG\_64\_17_{t-1} + drs\_20\, AUX\_EXO\_LAG\_64\_18_{t-1} \\
& + drs\_21\, AUX\_EXO\_LAG\_64\_19_{t-1} + drs\_22\, AUX\_EXO\_LAG\_64\_20_{t-1} \\
& + drs\_23\, AUX\_EXO\_LAG\_64\_21_{t-1} + drs\_24\, AUX\_EXO\_LAG\_64\_22_{t-1} \\
& + drs\_25\, AUX\_EXO\_LAG\_64\_23_{t-1} + drs\_26\, AUX\_EXO\_LAG\_64\_24_{t-1} \\
& + drs\_27\, AUX\_EXO\_LAG\_64\_25_{t-1} + drs\_28\, AUX\_EXO\_LAG\_64\_26_{t-1} \\
& + drs\_29\, AUX\_EXO\_LAG\_64\_27_{t-1} + drs\_30\, AUX\_EXO\_LAG\_64\_28_{t-1}
\end{aligned} \tag{63}
$$

$$shockn_t = delall_t \tag{64}$$

$$AUX\_ENDO\_LAG\_37\_1_t = k_{t-1} \tag{65}$$

$$AUX\_ENDO\_LAG\_46\_1_t = za_{t-1} \tag{66}$$

$$AUX\_ENDO\_LAG\_59\_1_t = shockn_{t-1} \tag{67}$$

$$AUX\_ENDO\_LAG\_59\_2_t = AUX\_ENDO\_LAG\_59\_1_{t-1} \tag{68}$$

$$AUX\_ENDO\_LAG\_59\_3_t = AUX\_ENDO\_LAG\_59\_2_{t-1} \tag{69}$$

$$AUX\_ENDO\_LAG\_59\_4_t = AUX\_ENDO\_LAG\_59\_3_{t-1} \tag{70}$$

$$AUX\_ENDO\_LAG\_59\_5_t = AUX\_ENDO\_LAG\_59\_4_{t-1} \tag{71}$$

$$AUX\_ENDO\_LAG\_59\_6_t = AUX\_ENDO\_LAG\_59\_5_{t-1} \tag{72}$$

$$AUX\_ENDO\_LAG\_59\_7_t = AUX\_ENDO\_LAG\_59\_6_{t-1} \tag{73}$$

$$AUX\_ENDO\_LAG\_59\_8_t = AUX\_ENDO\_LAG\_59\_7_{t-1} \tag{74}$$

$$AUX\_ENDO\_LAG\_59\_9_t = AUX\_ENDO\_LAG\_59\_8_{t-1} \tag{75}$$

$$AUX\_ENDO\_LAG\_59\_10_t = AUX\_ENDO\_LAG\_59\_9_{t-1} \tag{76}$$

$$AUX\_ENDO\_LAG\_59\_11_t = AUX\_ENDO\_LAG\_59\_10_{t-1} \tag{77}$$

$$AUX\_ENDO\_LAG\_59\_12_t = AUX\_ENDO\_LAG\_59\_11_{t-1} \tag{78}$$

$$AUX\_ENDO\_LAG\_59\_13_t = AUX\_ENDO\_LAG\_59\_12_{t-1} \tag{79}$$

$$AUX\_ENDO\_LAG\_59\_14_t = AUX\_ENDO\_LAG\_59\_13_{t-1} \tag{80}$$

$$AUX\_ENDO\_LAG\_59\_15_t = AUX\_ENDO\_LAG\_59\_14_{t-1} \tag{81}$$

$$AUX\_ENDO\_LAG\_59\_16_t = AUX\_ENDO\_LAG\_59\_15_{t-1} \tag{82}$$

$$AUX\_ENDO\_LAG\_59\_17_t = AUX\_ENDO\_LAG\_59\_16_{t-1} \tag{83}$$

$$AUX\_ENDO\_LAG\_59\_18_t = AUX\_ENDO\_LAG\_59\_17_{t-1} \tag{84}$$

$$AUX\_ENDO\_LAG\_59\_19_t = AUX\_ENDO\_LAG\_59\_18_{t-1} \tag{85}$$

$$AUX\_ENDO\_LAG\_59\_20_t = AUX\_ENDO\_LAG\_59\_19_{t-1} \tag{86}$$

$$AUX\_ENDO\_LAG\_59\_21_t = AUX\_ENDO\_LAG\_59\_20_{t-1} \tag{87}$$

$$AUX\_ENDO\_LAG\_59\_22_t = AUX\_ENDO\_LAG\_59\_21_{t-1} \tag{88}$$

$$AUX\_ENDO\_LAG\_59\_23_t = AUX\_ENDO\_LAG\_59\_22_{t-1} \tag{89}$$

$$AUX\_ENDO\_LAG\_59\_24_t = AUX\_ENDO\_LAG\_59\_23_{t-1} \tag{90}$$

$$AUX\_ENDO\_LAG\_59\_25_t = AUX\_ENDO\_LAG\_59\_24_{t-1} \tag{91}$$

$$AUX\_ENDO\_LAG\_59\_26_t = AUX\_ENDO\_LAG\_59\_25_{t-1} \tag{92}$$

$$AUX\_ENDO\_LAG\_59\_27_t = AUX\_ENDO\_LAG\_59\_26_{t-1} \tag{93}$$

$$AUX\_ENDO\_LAG\_59\_28_t = AUX\_ENDO\_LAG\_59\_27_{t-1} \tag{94}$$

$$AUX\_EXO\_LAG\_64\_0_t = delall_t \tag{95}$$

$$AUX\_EXO\_LAG\_64\_1_t = AUX\_EXO\_LAG\_64\_0_{t-1} \tag{96}$$

$$AUX\_EXO\_LAG\_64\_2_t = AUX\_EXO\_LAG\_64\_1_{t-1} \quad (97)$$

$$AUX\_EXO\_LAG\_64\_3_t = AUX\_EXO\_LAG\_64\_2_{t-1} \quad (98)$$

$$AUX\_EXO\_LAG\_64\_4_t = AUX\_EXO\_LAG\_64\_3_{t-1} \quad (99)$$

$$AUX\_EXO\_LAG\_64\_5_t = AUX\_EXO\_LAG\_64\_4_{t-1} \quad (100)$$

$$AUX\_EXO\_LAG\_64\_6_t = AUX\_EXO\_LAG\_64\_5_{t-1} \quad (101)$$

$$AUX\_EXO\_LAG\_64\_7_t = AUX\_EXO\_LAG\_64\_6_{t-1} \quad (102)$$

$$AUX\_EXO\_LAG\_64\_8_t = AUX\_EXO\_LAG\_64\_7_{t-1} \quad (103)$$

$$AUX\_EXO\_LAG\_64\_9_t = AUX\_EXO\_LAG\_64\_8_{t-1} \quad (104)$$

$$AUX\_EXO\_LAG\_64\_10_t = AUX\_EXO\_LAG\_64\_9_{t-1} \quad (105)$$

$$AUX\_EXO\_LAG\_64\_11_t = AUX\_EXO\_LAG\_64\_10_{t-1} \quad (106)$$

$$AUX\_EXO\_LAG\_64\_12_t = AUX\_EXO\_LAG\_64\_11_{t-1} \quad (107)$$

$$AUX\_EXO\_LAG\_64\_13_t = AUX\_EXO\_LAG\_64\_12_{t-1} \quad (108)$$

$$AUX\_EXO\_LAG\_64\_14_t = AUX\_EXO\_LAG\_64\_13_{t-1} \quad (109)$$

$$AUX\_EXO\_LAG\_64\_15_t = AUX\_EXO\_LAG\_64\_14_{t-1} \quad (110)$$

$$AUX\_EXO\_LAG\_64\_16_t = AUX\_EXO\_LAG\_64\_15_{t-1} \quad (111)$$

$$AUX\_EXO\_LAG\_64\_17_t = AUX\_EXO\_LAG\_64\_16_{t-1} \quad (112)$$

$$AUX\_EXO\_LAG\_64\_18_t = AUX\_EXO\_LAG\_64\_17_{t-1} \quad (113)$$

$$AUX\_EXO\_LAG\_64\_19_t = AUX\_EXO\_LAG\_64\_18_{t-1} \quad (114)$$

$$AUX\_EXO\_LAG\_64\_20_t = AUX\_EXO\_LAG\_64\_19_{t-1} \quad (115)$$

$$AUX\_EXO\_LAG\_64\_21_t = AUX\_EXO\_LAG\_64\_20_{t-1} \quad (116)$$

$$AUX\_EXO\_LAG\_64\_22_t = AUX\_EXO\_LAG\_64\_21_{t-1} \quad (117)$$

$$AUX\_EXO\_LAG\_64\_23_t = AUX\_EXO\_LAG\_64\_22_{t-1} \quad (118)$$

$$AUX\_EXO\_LAG\_64\_24_t = AUX\_EXO\_LAG\_64\_23_{t-1} \quad (119)$$

$$AUX\_EXO\_LAG\_64\_25_t = AUX\_EXO\_LAG\_64\_24_{t-1} \quad (120)$$

$$AUX\_EXO\_LAG\_64\_26_t = AUX\_EXO\_LAG\_64\_25_{t-1} \quad (121)$$

$$AUX\_EXO\_LAG\_64\_27_t = AUX\_EXO\_LAG\_64\_26_{t-1} \quad (122)$$

$$AUX\_EXO\_LAG\_64\_28_t = AUX\_EXO\_LAG\_64\_27_{t-1} \quad (123)$$