

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	L <sup>A</sup> T <sub>E</sub> X	Description
lam	<i>lam</i>	lam
gA	<i>gA</i>	gA
za	<i>za</i>	za
PiA	<i>PiA</i>	PiA
PiRD	<i>PiRD</i>	PiRD
fa	<i>fa</i>	fa
n	<i>n</i>	n
gn	<i>gn</i>	gn
gamma	<i>gamma</i>	gamma
er	<i>er</i>	er
ey	<i>ey</i>	ey
en	<i>en</i>	en
psi	<i>psi</i>	psi
shockr	<i>shockr</i>	shockr
shocky	<i>shocky</i>	shocky
shockn	<i>shockn</i>	shockn
fert	<i>fert</i>	fert
omegay	<i>omegay</i>	omegay
shareW	<i>shareW</i>	shareW
shareR	<i>shareR</i>	shareR
AUX_ENDO_LAG_37_1	<i>AUX_ENDO_LAG_37_1</i>	AUX_ENDO_LAG_37_1
AUX_ENDO_LAG_46_1	<i>AUX_ENDO_LAG_46_1</i>	AUX_ENDO_LAG_46_1
AUX_ENDO_LAG_59_1	<i>AUX_ENDO_LAG_59_1</i>	AUX_ENDO_LAG_59_1
AUX_ENDO_LAG_59_2	<i>AUX_ENDO_LAG_59_2</i>	AUX_ENDO_LAG_59_2
AUX_ENDO_LAG_59_3	<i>AUX_ENDO_LAG_59_3</i>	AUX_ENDO_LAG_59_3
AUX_ENDO_LAG_59_4	<i>AUX_ENDO_LAG_59_4</i>	AUX_ENDO_LAG_59_4
AUX_ENDO_LAG_59_5	<i>AUX_ENDO_LAG_59_5</i>	AUX_ENDO_LAG_59_5
AUX_ENDO_LAG_59_6	<i>AUX_ENDO_LAG_59_6</i>	AUX_ENDO_LAG_59_6
AUX_ENDO_LAG_59_7	<i>AUX_ENDO_LAG_59_7</i>	AUX_ENDO_LAG_59_7
AUX_ENDO_LAG_59_8	<i>AUX_ENDO_LAG_59_8</i>	AUX_ENDO_LAG_59_8
AUX_ENDO_LAG_59_9	<i>AUX_ENDO_LAG_59_9</i>	AUX_ENDO_LAG_59_9
AUX_ENDO_LAG_59_10	<i>AUX_ENDO_LAG_59_10</i>	AUX_ENDO_LAG_59_10
AUX_ENDO_LAG_59_11	<i>AUX_ENDO_LAG_59_11</i>	AUX_ENDO_LAG_59_11
AUX_ENDO_LAG_59_12	<i>AUX_ENDO_LAG_59_12</i>	AUX_ENDO_LAG_59_12
AUX_ENDO_LAG_59_13	<i>AUX_ENDO_LAG_59_13</i>	AUX_ENDO_LAG_59_13
AUX_ENDO_LAG_59_14	<i>AUX_ENDO_LAG_59_14</i>	AUX_ENDO_LAG_59_14
AUX_ENDO_LAG_59_15	<i>AUX_ENDO_LAG_59_15</i>	AUX_ENDO_LAG_59_15
AUX_ENDO_LAG_59_16	<i>AUX_ENDO_LAG_59_16</i>	AUX_ENDO_LAG_59_16
AUX_ENDO_LAG_59_17	<i>AUX_ENDO_LAG_59_17</i>	AUX_ENDO_LAG_59_17
AUX_ENDO_LAG_59_18	<i>AUX_ENDO_LAG_59_18</i>	AUX_ENDO_LAG_59_18
AUX_ENDO_LAG_59_19	<i>AUX_ENDO_LAG_59_19</i>	AUX_ENDO_LAG_59_19
AUX_ENDO_LAG_59_20	<i>AUX_ENDO_LAG_59_20</i>	AUX_ENDO_LAG_59_20
AUX_ENDO_LAG_59_21	<i>AUX_ENDO_LAG_59_21</i>	AUX_ENDO_LAG_59_21
AUX_ENDO_LAG_59_22	<i>AUX_ENDO_LAG_59_22</i>	AUX_ENDO_LAG_59_22
AUX_ENDO_LAG_59_23	<i>AUX_ENDO_LAG_59_23</i>	AUX_ENDO_LAG_59_23

Table 1 – Continued

Variable	$\LaTeX$	Description
AUX_ENDO_LAG_59_24	<i>AUX_ENDO_LAG_59_24</i>	AUX_ENDO_LAG_59_24
AUX_ENDO_LAG_59_25	<i>AUX_ENDO_LAG_59_25</i>	AUX_ENDO_LAG_59_25
AUX_ENDO_LAG_59_26	<i>AUX_ENDO_LAG_59_26</i>	AUX_ENDO_LAG_59_26
AUX_ENDO_LAG_59_27	<i>AUX_ENDO_LAG_59_27</i>	AUX_ENDO_LAG_59_27
AUX_ENDO_LAG_59_28	<i>AUX_ENDO_LAG_59_28</i>	AUX_ENDO_LAG_59_28

Table 2: Exogenous

Variable	$\LaTeX$	Description
delall	<i>delall</i>	delall

Table 3: Parameters

Variable	$\LaTeX$	Description
SHINNOVW	<i>SHINNOVW</i>	SHINNOVW
YINNOVSH	<i>YINNOVSH</i>	YINNOVSH
OMEGAR	<i>OMEGAR</i>	OMEGAR
ZETAYSS	<i>ZETAYSS</i>	ZETAYSS
ZETARSS	<i>ZETARSS</i>	ZETARSS
REPLACSS	<i>REPLACSS</i>	REPLACSS
RHOYW	<i>RHOYW</i>	RHOYW
LAMY	<i>LAMY</i>	LAMY
PSISS	<i>PSISS</i>	PSISS
GSS	<i>GSS</i>	GSS
PERS	<i>PERS</i>	PERS
RATIODEL	<i>RATIODEL</i>	RATIODEL
OMEGAYSS	<i>OMEGAYSS</i>	OMEGAYSS
RHOU	<i>RHOU</i>	RHOU
BBETA	<i>BBETA</i>	BBETA
ALPHA	<i>ALPHA</i>	ALPHA
GAMMAI	<i>GAMMAI</i>	GAMMAI
VARNU	<i>VARNU</i>	VARNU
BMEGA	<i>BMEGA</i>	BMEGA
CHI	<i>CHI</i>	CHI
RHO	<i>RHO</i>	RHO
PHI	<i>PHI</i>	PHI
ELASMU	<i>ELASMU</i>	ELASMU
ELASLAM	<i>ELASLAM</i>	ELASLAM
DELPRIMESS	<i>DELPRIMESS</i>	DELPRIMESS
DELSS	<i>DELSS</i>	DELSS

Table 3 – Continued

Variable	$\LaTeX$	Description
MUSS	<i>MUSS</i>	MUSS
LAMSS	<i>LAMSS</i>	LAMSS
USS	<i>USS</i>	USS
VARPISS	<i>VARPISS</i>	VARPISS
ZASS	<i>ZASS</i>	ZASS
KSS	<i>KSS</i>	KSS
NSS	<i>NSS</i>	NSS
GAMMASS	<i>GAMMASS</i>	GAMMASS
RHOE	<i>RHOE</i>	RHOE
CHIE	<i>CHIE</i>	CHIE
gn_1	<i>gn_1</i>	gn_1
gn_2	<i>gn_2</i>	gn_2
gn_3	<i>gn_3</i>	gn_3
gn_4	<i>gn_4</i>	gn_4
gn_5	<i>gn_5</i>	gn_5
gn_6	<i>gn_6</i>	gn_6
gn_7	<i>gn_7</i>	gn_7
gn_8	<i>gn_8</i>	gn_8
gn_9	<i>gn_9</i>	gn_9
gn_10	<i>gn_10</i>	gn_10
gn_11	<i>gn_11</i>	gn_11
gn_12	<i>gn_12</i>	gn_12
gn_13	<i>gn_13</i>	gn_13
gn_14	<i>gn_14</i>	gn_14
gn_15	<i>gn_15</i>	gn_15
gn_16	<i>gn_16</i>	gn_16
gn_17	<i>gn_17</i>	gn_17
gn_18	<i>gn_18</i>	gn_18
gn_19	<i>gn_19</i>	gn_19
gn_20	<i>gn_20</i>	gn_20
gn_21	<i>gn_21</i>	gn_21
gn_22	<i>gn_22</i>	gn_22
gn_23	<i>gn_23</i>	gn_23
gn_24	<i>gn_24</i>	gn_24
gn_25	<i>gn_25</i>	gn_25
gn_26	<i>gn_26</i>	gn_26
gn_27	<i>gn_27</i>	gn_27
gn_28	<i>gn_28</i>	gn_28
gn_29	<i>gn_29</i>	gn_29
gn_30	<i>gn_30</i>	gn_30
dws_1	<i>dws_1</i>	dws_1
dws_2	<i>dws_2</i>	dws_2
dws_3	<i>dws_3</i>	dws_3
dws_4	<i>dws_4</i>	dws_4
dws_5	<i>dws_5</i>	dws_5

Table 3 – Continued

Variable	L <sup>A</sup> T <sub>E</sub> X	Description
dws_6	<i>dws_6</i>	dws_6
dws_7	<i>dws_7</i>	dws_7
dws_8	<i>dws_8</i>	dws_8
dws_9	<i>dws_9</i>	dws_9
dws_10	<i>dws_10</i>	dws_10
dws_11	<i>dws_11</i>	dws_11
dws_12	<i>dws_12</i>	dws_12
dws_13	<i>dws_13</i>	dws_13
dws_14	<i>dws_14</i>	dws_14
dws_15	<i>dws_15</i>	dws_15
dws_16	<i>dws_16</i>	dws_16
dws_17	<i>dws_17</i>	dws_17
dws_18	<i>dws_18</i>	dws_18
dws_19	<i>dws_19</i>	dws_19
dws_20	<i>dws_20</i>	dws_20
dws_21	<i>dws_21</i>	dws_21
dws_22	<i>dws_22</i>	dws_22
dws_23	<i>dws_23</i>	dws_23
dws_24	<i>dws_24</i>	dws_24
dws_25	<i>dws_25</i>	dws_25
dws_26	<i>dws_26</i>	dws_26
dws_27	<i>dws_27</i>	dws_27
dws_28	<i>dws_28</i>	dws_28
dws_29	<i>dws_29</i>	dws_29
dws_30	<i>dws_30</i>	dws_30
drs_1	<i>drs_1</i>	drs_1
drs_2	<i>drs_2</i>	drs_2
drs_3	<i>drs_3</i>	drs_3
drs_4	<i>drs_4</i>	drs_4
drs_5	<i>drs_5</i>	drs_5
drs_6	<i>drs_6</i>	drs_6
drs_7	<i>drs_7</i>	drs_7
drs_8	<i>drs_8</i>	drs_8
drs_9	<i>drs_9</i>	drs_9
drs_10	<i>drs_10</i>	drs_10
drs_11	<i>drs_11</i>	drs_11
drs_12	<i>drs_12</i>	drs_12
drs_13	<i>drs_13</i>	drs_13
drs_14	<i>drs_14</i>	drs_14
drs_15	<i>drs_15</i>	drs_15
drs_16	<i>drs_16</i>	drs_16
drs_17	<i>drs_17</i>	drs_17
drs_18	<i>drs_18</i>	drs_18
drs_19	<i>drs_19</i>	drs_19
drs_20	<i>drs_20</i>	drs_20

Table 3 – Continued

Variable	$\LaTeX$	Description
drs_21	<i>drs_21</i>	drs_21
drs_22	<i>drs_22</i>	drs_22
drs_23	<i>drs_23</i>	drs_23
drs_24	<i>drs_24</i>	drs_24
drs_25	<i>drs_25</i>	drs_25
drs_26	<i>drs_26</i>	drs_26
drs_27	<i>drs_27</i>	drs_27
drs_28	<i>drs_28</i>	drs_28
drs_29	<i>drs_29</i>	drs_29
drs_30	<i>drs_30</i>	drs_30

Table 4: Parameter Values

Parameter	Value
<i>SHINNOVW</i>	0.010
<i>YINNOVSH</i>	0.060
<i>OMEGAR</i>	0.975
<i>ZETAYSS</i>	0.700
<i>ZETARSS</i>	0.227
<i>REPLACSS</i>	0.756
<i>RHOYW</i>	0.512
<i>LAMY</i>	0.049
<i>PSISS</i>	0.708
<i>GSS</i>	1.046
<i>PERS</i>	0.900
<i>RATIODEL</i>	0.333
<i>OMEGAYSS</i>	0.950
<i>RHOU</i>	-3.000
<i>BBETA</i>	0.960
<i>ALPHA</i>	0.333
<i>GAMMAI</i>	0.500
<i>VARNU</i>	1.667
<i>BMEGA</i>	0.128
<i>CHI</i>	64.671
<i>RHO</i>	0.900
<i>PHI</i>	0.850
<i>ELASMU</i>	-1.000
<i>ELASLAM</i>	0.855
<i>DELPRIMESS</i>	0.301
<i>DELSS</i>	0.080
<i>MUSS</i>	1.100
<i>LAMSS</i>	0.100
<i>USS</i>	0.800
<i>VARPISS</i>	0.135
<i>ZASS</i>	3.126
<i>KSS</i>	0.658
<i>NSS</i>	1.010
<i>GAMMASS</i>	0.900
<i>RHOE</i>	0.900
<i>CHIE</i>	1689.513
<i>gn_1</i>	1.009
<i>gn_2</i>	1.009
<i>gn_3</i>	1.009
<i>gn_4</i>	1.009
<i>gn_5</i>	1.008
<i>gn_6</i>	1.008
<i>gn_7</i>	1.007

Table 4 – Continued

Parameter	Value
<i>gn_8</i>	1.007
<i>gn_9</i>	1.007
<i>gn_10</i>	1.007
<i>gn_11</i>	1.007
<i>gn_12</i>	1.007
<i>gn_13</i>	1.007
<i>gn_14</i>	1.007
<i>gn_15</i>	1.007
<i>gn_16</i>	1.007
<i>gn_17</i>	1.007
<i>gn_18</i>	1.007
<i>gn_19</i>	1.007
<i>gn_20</i>	1.007
<i>gn_21</i>	1.007
<i>gn_22</i>	1.007
<i>gn_23</i>	1.006
<i>gn_24</i>	1.006
<i>gn_25</i>	1.006
<i>gn_26</i>	1.006
<i>gn_27</i>	1.006
<i>gn_28</i>	1.006
<i>gn_29</i>	1.005
<i>gn_30</i>	1.005
<i>dws_1</i>	-0.002
<i>dws_2</i>	-0.002
<i>dws_3</i>	-0.002
<i>dws_4</i>	-0.002
<i>dws_5</i>	-0.002
<i>dws_6</i>	-0.002
<i>dws_7</i>	-0.001
<i>dws_8</i>	-0.001
<i>dws_9</i>	-0.001
<i>dws_10</i>	-0.002
<i>dws_11</i>	-0.002
<i>dws_12</i>	-0.003
<i>dws_13</i>	-0.003
<i>dws_14</i>	-0.003
<i>dws_15</i>	-0.003
<i>dws_16</i>	-0.004
<i>dws_17</i>	-0.003
<i>dws_18</i>	-0.003
<i>dws_19</i>	-0.002
<i>dws_20</i>	-0.002
<i>dws_21</i>	-0.002



Table 4 – Continued

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

$$hw_t = w_t + \frac{OMEGAR}{r_t zz_t} \frac{g_{t+1}}{gw_t} hw_{t+1} \quad (1)$$

$$Tw_t = tauw_t + \frac{OMEGAR}{r_t zz_t} \frac{g_{t+1}}{gw_t} Tw_{t+1} \quad (2)$$

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

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

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

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

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

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

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

$$cwper_t = cw_t (zetar_t + 1 + zetay_t) \quad (10)$$

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

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

$$n_t = gw_t \frac{zetay_t}{zetay_{t-1}} \quad (13)$$

$$gw_t zetar_t = 1 - OMEGAR + gamma_t zetar_{t-1} \quad (14)$$

$$gn_t = (gw_t zetar_t + gw_t + zetay_{t-1} n_t) (zetay_{t-1} + 1 + zetar_{t-1})^{(-1)} \quad (15)$$

$$gE_t = \frac{OMEGAR + (1 - omegay_t) \text{zetay}_{t-1} (RHOE + \frac{CHIE}{2} iy_t^2)}{gw_t} \quad (16)$$

$$\text{tau}w_t = w_t iy_t \quad (17)$$

$$\text{varsig}_t^{\frac{(-1)}{RHOV}} = \frac{g_{t+1} iy_t CHIE \text{zetay}_t BBETA \text{varsig}_{t+1}^{\frac{(-1)}{RHOV}} (1 - omegay_{t+1}) w_{t+1}}{n_t gE_t w_t gw_t} \quad (18)$$

$$\text{fert}_t = n_t - omegay_t \quad (19)$$

$$(1 - ALPHA) (1 - GAMMAI) = w_t mu_t \quad (20)$$

$$ALPHA (1 - GAMMAI) = mu_t (rk_t + \text{del}_t) \frac{k_{t-1}}{g_t} \quad (21)$$

$$ALPHA (1 - GAMMAI) = \frac{k_{t-1}}{g_t} mu_t \text{delprime}_t u_t \quad (22)$$

$$g_t = \frac{mu_t}{mu_{t-1}} gM_t gA_{t-1}^{1-VARNU} \quad (23)$$

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

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

$$mu_t = MUSS (1 + ELASMU (N_t - 1)) \quad (26)$$

$$\text{del}_t = DELSS + \text{delprime}_t (u_t - USS) \quad (27)$$

$$\text{delprime}_t = DELPRIMESS + \frac{(u_t - USS) DELPRIMESS \text{RATIODEL}}{USS} \quad (28)$$

$$\frac{gA_t za_t}{za_{t-1}} = \text{stoy}w_t^{RHOYW} CHI \left( \frac{s_t}{psi_t} \right)^{RHO} + PHI \quad (29)$$

$$\text{stoy}w_t = \frac{\text{zetay}_{t-1} (1 - omegay_t) YINNOVSH}{\text{zetar}_{t-1} + 1 + \text{zetay}_{t-1}} + \frac{OMEGAR (1 - LAMY)}{gn_t} \text{stoy}w_{t-1} \quad (30)$$

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

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

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

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

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

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

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

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

$$psi_t = v_t \quad (39)$$

$$r_t = 1 + rk_{t+1} \quad (40)$$

$$dr_t = \frac{far_{t-1} PiF_t}{fa_{t-1}} \quad (41)$$

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

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

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

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

$$y_t = 1 - \frac{GAMMAI}{mu_t VARNU} - psi_t N_t BMEGA \quad (46)$$

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

$$c_t = cw_t + cr_t \quad (48)$$

$$fa_t = b_t + k_t \quad (49)$$

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

$$fa_t = far_t + faw_t \quad (51)$$

$$gpc_t = \frac{g_{t-1} \frac{y_t}{y_{t-1}}}{gn_{t-1}} \quad (52)$$

$$gy_t = g_t \frac{y_t}{y_{t-1}} \quad (53)$$

$$gn_t = NSS + en_t \quad (54)$$

$$shareW_t = \frac{1}{zetar_t + 1 + zetay_t} \quad (55)$$

$$shareR_t = \frac{zetar_t}{zetar_t + 1 + zetay_t} \quad (56)$$

$$\frac{1}{zetar_t + 1 + zetay_t} = \frac{1}{1 + ZETAYSS + ZETARSS} + ey_t \quad (57)$$

$$\frac{zetar_t}{zetar_t + 1 + zetay_t} = \frac{ZETARSS}{1 + ZETAYSS + ZETARSS} + er_t \quad (58)$$

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

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

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

$$\begin{aligned}
shocky_t = & shocky_{t-1} + delall_t dws\_1 + delall_{t-1} dws\_2 + delall_{t-2} dws\_3 \\
& + delall_{t-3} dws\_4 + delall_{t-4} dws\_5 + delall_{t-5} dws\_6 + delall_{t-6} dws\_7 \\
& + delall_{t-7} dws\_8 + delall_{t-8} dws\_9 + delall_{t-9} dws\_10 + delall_{t-10} dws\_11 \\
& + delall_{t-11} dws\_12 + delall_{t-12} dws\_13 + delall_{t-13} dws\_14 + delall_{t-14} dws\_15 \\
& + delall_{t-15} dws\_16 + delall_{t-16} dws\_17 + delall_{t-17} dws\_18 + delall_{t-18} dws\_19 \\
& + delall_{t-19} dws\_20 + delall_{t-20} dws\_21 + delall_{t-21} dws\_22 + delall_{t-22} dws\_23 \\
& + delall_{t-23} dws\_24 + delall_{t-24} dws\_25 + delall_{t-25} dws\_26 + delall_{t-26} dws\_27 \\
& + delall_{t-27} dws\_28 + delall_{t-28} dws\_29 + delall_{t-29} dws\_30
\end{aligned} \tag{62}$$

$$\begin{aligned}
shockr_t = & delall_t dws\_1 + shockr_{t-1} + delall_{t-1} drs\_2 + delall_{t-2} drs\_3 \\
& + delall_{t-3} drs\_4 + delall_{t-4} drs\_5 + delall_{t-5} drs\_6 + delall_{t-6} drs\_7 \\
& + delall_{t-7} drs\_8 + delall_{t-8} drs\_9 + delall_{t-9} drs\_10 + delall_{t-10} drs\_11 \\
& + delall_{t-11} drs\_12 + delall_{t-12} drs\_13 + delall_{t-13} drs\_14 + delall_{t-14} drs\_15 \\
& + delall_{t-15} drs\_16 + delall_{t-16} drs\_17 + delall_{t-17} drs\_18 + delall_{t-18} drs\_19 \\
& + delall_{t-19} drs\_20 + delall_{t-20} drs\_21 + delall_{t-21} drs\_22 + delall_{t-22} drs\_23 \\
& + delall_{t-23} drs\_24 + delall_{t-24} drs\_25 + delall_{t-25} drs\_26 + delall_{t-26} drs\_27 \\
& + delall_{t-27} drs\_28 + delall_{t-28} drs\_29 + delall_{t-29} drs\_30
\end{aligned} \tag{63}$$

$$shockn_t = delall_t \quad (64)$$

$$AUX\_ENDO\_LAG\_37\_1_t = k_{t-1} \quad (65)$$

$$AUX\_ENDO\_LAG\_46\_1_t = za_{t-1} \quad (66)$$

$$AUX\_ENDO\_LAG\_59\_1_t = shockn_{t-1} \quad (67)$$

$$AUX\_ENDO\_LAG\_59\_2_t = AUX\_ENDO\_LAG\_59\_1_{t-1} \quad (68)$$

$$AUX\_ENDO\_LAG\_59\_3_t = AUX\_ENDO\_LAG\_59\_2_{t-1} \quad (69)$$

$$AUX\_ENDO\_LAG\_59\_4_t = AUX\_ENDO\_LAG\_59\_3_{t-1} \quad (70)$$

$$AUX\_ENDO\_LAG\_59\_5_t = AUX\_ENDO\_LAG\_59\_4_{t-1} \quad (71)$$

$$AUX\_ENDO\_LAG\_59\_6_t = AUX\_ENDO\_LAG\_59\_5_{t-1} \quad (72)$$

$$AUX\_ENDO\_LAG\_59\_7_t = AUX\_ENDO\_LAG\_59\_6_{t-1} \quad (73)$$

$$AUX\_ENDO\_LAG\_59\_8_t = AUX\_ENDO\_LAG\_59\_7_{t-1} \quad (74)$$

$$AUX\_ENDO\_LAG\_59\_9_t = AUX\_ENDO\_LAG\_59\_8_{t-1} \quad (75)$$

$$AUX\_ENDO\_LAG\_59\_10_t = AUX\_ENDO\_LAG\_59\_9_{t-1} \quad (76)$$

$$AUX\_ENDO\_LAG\_59\_11_t = AUX\_ENDO\_LAG\_59\_10_{t-1} \quad (77)$$

$$AUX\_ENDO\_LAG\_59\_12_t = AUX\_ENDO\_LAG\_59\_11_{t-1} \quad (78)$$

$$AUX\_ENDO\_LAG\_59\_13_t = AUX\_ENDO\_LAG\_59\_12_{t-1} \quad (79)$$

$$AUX\_ENDO\_LAG\_59\_14_t = AUX\_ENDO\_LAG\_59\_13_{t-1} \quad (80)$$

$$AUX\_ENDO\_LAG\_59\_15_t = AUX\_ENDO\_LAG\_59\_14_{t-1} \quad (81)$$

$$AUX\_ENDO\_LAG\_59\_16_t = AUX\_ENDO\_LAG\_59\_15_{t-1} \quad (82)$$

$$AUX\_ENDO\_LAG\_59\_17_t = AUX\_ENDO\_LAG\_59\_16_{t-1} \quad (83)$$

$$AUX\_ENDO\_LAG\_59\_18_t = AUX\_ENDO\_LAG\_59\_17_{t-1} \quad (84)$$

$$AUX\_ENDO\_LAG\_59\_19_t = AUX\_ENDO\_LAG\_59\_18_{t-1} \quad (85)$$

$$AUX\_ENDO\_LAG\_59\_20_t = AUX\_ENDO\_LAG\_59\_19_{t-1} \quad (86)$$

$$AUX\_ENDO\_LAG\_59\_21_t = AUX\_ENDO\_LAG\_59\_20_{t-1} \quad (87)$$

$$AUX\_ENDO\_LAG\_59\_22_t = AUX\_ENDO\_LAG\_59\_21_{t-1} \quad (88)$$

$$AUX\_ENDO\_LAG\_59\_23_t = AUX\_ENDO\_LAG\_59\_22_{t-1} \quad (89)$$

$$AUX\_ENDO\_LAG\_59\_24_t = AUX\_ENDO\_LAG\_59\_23_{t-1} \quad (90)$$

$$AUX\_ENDO\_LAG\_59\_25_t = AUX\_ENDO\_LAG\_59\_24_{t-1} \quad (91)$$

$$AUX\_ENDO\_LAG\_59\_26_t = AUX\_ENDO\_LAG\_59\_25_{t-1} \quad (92)$$

$$AUX\_ENDO\_LAG\_59\_27_t = AUX\_ENDO\_LAG\_59\_26_{t-1} \quad (93)$$

$$AUX\_ENDO\_LAG\_59\_28_t = AUX\_ENDO\_LAG\_59\_27_{t-1} \quad (94)$$