


```

IF THEN ELSE (Time>Time
BI, 1 , 0 )
(004) Act Carbon=
0
(005) act CR=
IF THEN ELSE (Time>Time
CR, 1 , 0 )
(006) act Dep=
0
(007) act DG=
0
(008) act Elect[solid,industry]=
IF THEN ELSE (share En
nrg i delay[solid,industry]> jump
share Elec*2,
-jump share Elec
,
0
)
act Elect[liquid,industry]=
IF THEN ELSE (share En
nrg i delay[liquid,industry]>jump
share Elec*2, -(1.5
+0.5*act Nucl zero)*jump
share Elec, 0)
act Elect[gas,industry]=
IF THEN ELSE (share En
nrg i delay[gas,industry]>jump
share Elec*2, -(1+0.2
*act Nucl zero)*jump share
Elec,0)
act
Elect[electrRenew,industry]=
-(
IF THEN ELSE (share
En nrg i delay[gas,industry] >
jump share Elec*2, -
(1+0.2*act Nucl zero)*jump
share Elec, 0)+
IF THEN ELSE (share
En nrg i delay[liquid,industry] >
jump share Elec*2
, -(1.5+0.5*act Nucl
zero)*jump share Elec, 0)
+
IF THEN ELSE (share
En nrg i delay[solid,industry] >
jump share Elec*2,
-jump share Elec,0)
)
(009) act En mix=
IF THEN ELSE (Time>Time
ENmix, 1, 0)
(010) act JG=
IF THEN ELSE (
Time>Time JG , 1 , 0 )
(011) act Nucl zero=
0
(012) act strong DG=
0
(013) act taxCO2 post2030=
Act Carbon
(014) act WTR=
IF THEN ELSE (Time>
Time WTR, h week - ramp( WTR
reduction/5, 5 ,10), h week
)
(015) adult pop=
Tot POP-Pop 0 To 14
(016) AId[from
Industry,toIndustry]=
Id[from
Industry,toIndustry]-Acoeff[from
Industry,toIndustry]
(017) alphaV j[skill]=
0.2,0.8,0.7
(018) alphaV Kap=
0.8
(019) alphaY j[low]=
0.9*(1 - CR rate)
alphaY j[middle]=
0.85*(1-CR rate)
alphaY j[high]=
0.8*(1-CR rate)
(020) avg alpha=
Tot CYV / SUM(YVD
j[skill!])
(021) avg alpha delay= DELAY FIXED
(
avg alpha , 1 ,
initial avg alpha)

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- (022) avg byK lambda i[industry]=
 (GFCF i
 real[industry] * lambda
 i[industry] + (1 - depr k
 i[industry])
 * k i[industry] * avg byK
 lambda i delay[industry]) /
 ((1-depr k
 i[industry]) *k i[industry] +
 GFCF i real[industry])
- (023) avg byK lambda i
 delay[industry]= DELAY FIXED (
 avg byK lambda
 i[industry] , 1, initial lambda
 i[industry])
- (024) avg byNE wageh j[skill]=
 SUM(wageh
 ji[skill,industry!]*N
 Eji[skill,industry!])/SUM(N
 Eji[skill,industry
 !])
- (025) avg byNEi Wage
 ji[skill,industry]=
 (wageh max E
 ji[skill,industry]*N
 Eji[skill,industry]*H
 Ei[industry])/(SUM
 (N Eji[skill!,industry!]))
- (026) avg coef CO2[industry]=
 (CO2 i[industry]/TPES
 i[industry])
- (027) avg eta index=
 SUM(eta
 index[industry!])/10
- (028) avg etaEN=
 SUM(avg etaEN
 i[industry!]*Output i
 real[industry!])/SUM(Output i
 real[industry
 !])
- (029) avg etaEN i[industry]=
 (GFCF i
 real[industry]*eta[industry]+(1 -
 depr k i[industry])*k i[industry
]*avg etaEN i
 delay[industry]) /
 ((1-depr k
 i[industry])*k i[industry]+GFCF i
 real[industry])
- (030) avg etaEN i 0[industry]=
 19.08,
 32.17,
 9.17,
 17.07,
 1.25,
 563.39,
 31.73,
 89.68,
 25.19,
 1
- (031) avg etaEN i delay[industry]=
 DELAY FIXED (
 avg etaEN
 i[industry],1,avg etaEN i
 0[industry])
- (032) avg lambda index=
 SUM(lambda index
 i[industry!])/10
- (033) avg lambda max=
 SUM(lambda
 index[industry!])/10
- (034) avg Wage E=
 (SUM (avg byNEi Wage
 ji[skill!,industry!]))
- (035) B demand=
 Stock Vf[bonds]
- (036) "B short-term"=
 (p Bond delay*(Stock
 Bond real-Stock Bond real delay)-
 (B supply-((p Bond*
 B supply delay)/p Bond
 delay)))
- (037) B supply=
 2.69577*B demand
- (038) B supply delay=
 DELAY1(B supply, 1)
- (039) base TaxB E=
 1 - 0.068 - 0.14 - 0.1
- (040) beta eff i[industry]
 :EXCEPT: [Fossil
 Energy],[Electricity]=
 share Ci[industry] +
 share Ci[industry] /

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( 1 - 0.0234384 * (share
Ci[Fossil Energy
    ]/etaHH delay/0.0173107) -
0.0299639 * (share Ci[Electricity
    ]/etaHH delay/0.0221302)
)*
( 0.0234384 *(1-share Ci[Fossil
Energy
    ]/etaHH delay/0.0173107) +
0.0299639 * (1-share
Ci[Electricity
    ]/etaHH delay/0.0221302)
)
    beta eff i[Fossil Energy]=
        0.0234384 * (share
Ci[Fossil Energy]/etaHH
delay/0.0173107 )
    beta eff i[Electricity]=
        0.0299639*( share
Ci[Electricity]/etaHH
delay/0.0221302 )

(041) beta ELG elect=
    TPES
nrg[electrRenew]/(TPES
nrg[gas]+TPES nrg[electrRenew])

(042) beta ELG elect delay= DELAY
FIXED (
    beta ELG elect , 1 ,
0.835)

(043) beta ELG gas=
    TPES nrg[gas]/(TPES
nrg[gas]+TPES nrg[electrRenew])

(044) beta ELG gas delay= DELAY
FIXED (
    beta ELG gas , 1
,0.165)

(045) BI j[skill]=
    act BI* (BI per
cap[skill]*index avg Wage)*
(N Aj[skill] + N Pj[skill]*BI P
    )

(046) BI P=
    0

(047) BI per cap[low]=
    BI total per
capita/2.5 + ramp(BI total per
capita/10,6,12)
    BI per cap[middle]=
    BI total per
capita/2.5 + ramp(BI total per
capita/10,6,12)
    BI per cap[high]=
    BI total per
capita/2.5 + ramp(BI total per
capita/10,6,12)

(048) BI tot=
    SUM(BI j[skill!])

(049) BI total per capita=
    5580

(050) births=
    IF THEN ELSE ( Time =
pop eq, deaths,
    (
fertility * Pop 15 To 44 * 0.5 /
reproductive lifetime )
    )

(051) Bond real 0= INITIAL(
    2.0378e+012)

(052) capitalists gi=
    GFinY Kap+MixY Kap

(053) Carbon Tax rate 2030=
    (7 + ramp(7.5,0,2) +
ramp(8.5,2,6) +ramp(4.4, 6,
16))*1000 + ramp(4.4, 16
, 50)*1000*act taxCO2
post2030

(054) choice eta i[industry]=
    IF THEN
ELSE(Yups1[industry]>0, 0,
    IF THEN
ELSE( Yups2[industry]>0,IF THEN
ELSE(TCli[industry]<
TC2i[industry
    ], 0, randN eta2[industry])),
IF THEN ELSE( Yups3[industry]>0,
IF THEN ELSE(TCli[industry]
< TC3i[industry],0, randN
eta3[industry]),

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IF THEN ELSE( Yups4[industry]>0, )
IF THEN ELSE )
    (TC1i[industry]<
MIN(TC2i[industry],TC3i[industry] (056) choice of
), 0, technics[industry]=
    IF THEN ELSE(
    IF THEN ELSE Yups1[industry]>0,
(TC2i[industry]<TC3i[industry],ra TC1i[industry],
ndN eta2[industry], IF THEN
    randN eta3[industry])), ELSE( Yups2[industry]>0,
    randN eta3[industry] MIN(TC1i[industry], TC2i[industry
] ) ),
) IF THEN ELSE( Yups3[industry]>0,
) MIN(TC1i[industry
) , TC3i[industry]),
) IF THEN ELSE( Yups4[industry]>0
, MIN(TC1i[industry],
) MIN(TC2i[industry],TC3i[industry]
) ),
)
(055) choice lambda i[industry]= TC4i[industry]
    IF THEN ELSE(
Yups1[industry]>0, 0 , )
    IF THEN )
ELSE( Yups2[industry]>0, IF THEN )
ELSE(TC1i[industry]< TC2i )
[industry], 0, randN )
lambda2[industry]), )
)
IF THEN ELSE( Yups3[industry]>0, (057) CO2 Energy Ratio=
IF THEN ELSE(TC1i[industry CO2 TOT/Tot
]< TC3i[industry], 0, randN TPES/0.0200185
lambda3[industry]), )
)
IF THEN ELSE( Yups4[industry]>0, (058) CO2 for carbon
IF THEN ELSE Tax[Agriculture]=
    (TC1i[industry]< 0
    MIN(TC2i[industry], CO2 for carbon Tax[Mining]=
    TC3i[industry]), 0, CO2 i[Mining]
    IF THEN ELSE CO2 for carbon Tax[Fossil
    (TC2i[industry]<TC3i[industry],ra Energy]=
    ndN lambda2[industry],randN 0
    lambda3 CO2 for carbon
    [industry]) ), Tax[Manufacturing]=
    randN lambda2[industry] CO2 i[Manufacturing]
    ] CO2 for carbon
) Tax[Electricity]=
) 0
    CO2 for carbon
    Tax[Construction]=
    CO2 i[Construction]
    CO2 for carbon
    Tax[Nonfinancial and Social
    Economy]=

```

CO2 i[Nonfinancial and Social Economy]-4000	Tot CO2 Gas+Tot CO2 Liq+Tot CO2 Sol
CO2 for carbon Tax[Financial sector]=	(067) CO2 TOT Index=
CO2 i[Financial sector]	CO2 TOT/4667.2
CO2 for carbon Tax[Public sector]=	(068) coef CO2 HH[solid]=
0	11.1648
CO2 for carbon Tax[Other]=	coef CO2 HH[liquid]=
CO2 i[Other]	9.304
(059) CO2 for carbon total=	coef CO2 HH[gas]=
SUM(CO2 for carbon Tax[industry!])	4.1868
(060) CO2 Gas i[industry]=	(069) coef gamma2=
coefCO2 nrg	IF THEN ELSE(Time
i[gas,industry]*TPES	>Time HLP, gamma2 threshold,0.75)
i[industry]*share nrg	(070) coef gamma3=
i[gas,industry]	IF THEN ELSE(Time
(061) CO2 HH nrg[solid]=	>time HEFF,gamma3 threshold,0.5)
coef CO2	(071) coef gamma4=
HH[solid]*TPES HH nrg[solid]	IF THEN ELSE(Time
CO2 HH nrg[liquid]=	>Time HLP,gamma4 threshold,0.8)
coef CO2	(072) coef H week i[industry]=
HH[liquid]*TPES HH nrg[liquid]	1.23,
CO2 HH nrg[gas]=	0.93,
coef CO2 HH[gas]*TPES	0.91,
HH nrg[gas]	0.94,
(062) CO2 i[industry]=	0.88,
CO2 Gas	1.02,
i[industry]+CO2 Liq	0.88,
i[industry]+CO2 Sol i[industry]	0.91,
(063) CO2 Liq i[industry]=	0.89,
coefCO2 nrg	0.69
i[liquid,industry]*share nrg	(073) coef initial Debt
i[liquid,industry]*TPES	i[industry] :EXCEPT:
i[industry]	[Manufacturing],[Public sector
]],[Mining]=
(064) CO2 reduction 1990 level=	0.4
CO2 TOT/5551	coef initial Debt
(065) CO2 Sol i[industry]=	i[Manufacturing]=
coefCO2 nrg	0.2
i[solid,industry]*TPES	coef initial Debt i[Public
i[industry]*share nrg	sector]=
i[solid,industry]	0.2
]	coef initial Debt i[Mining]=
(066) CO2 TOT=	0.2
	(074) coef Job polarization
	j[skill]=
	1.5,
	-5,
	3.5

(075) coef k nonprod=	0.0365	(ramp(
		multip taxV g alpha* g avg alpha,
		5, 15) +
(076) coef lambda impact j[skill]=	0.99,	ramp(act
	0.985,	strong DG*g avg alpha, 15,50)
	1.052)
(077) coef Lev=	0.37	(082) cost ETS i[Agriculture]=
		0
		cost ETS i[Mining]=
		0
(078) coef pEN[industry]=	0,0,0,0,0,0,0,0,0,0,0	cost ETS i[Fossil Energy]=
		(CO2 i[Fossil Energy]-
		Free ETS i[Fossil Energy])*p ETS
		cost ETS i[Manufacturing]=
(079) coef taxD613=	0.85	(CO2
		i[Manufacturing]*0.61 - Free ETS
		i[Manufacturing])*p ETS
(080) coefCO2 nrg		cost ETS i[Electricity]=
i[solid,industry]=	31.5078,	(CO2 i[Electricity]-
	12.7689,	Free ETS i[Electricity])*p ETS
	8.12759,	cost ETS i[Construction]=
	3.80622,	0
	4.21522,	cost ETS i[Nonfinancial and
	14.8784,	Social Economy]=
	2.04149,	4000*p ETS
	2.24079,	cost ETS i[Financial
	6.76154,	sector]=
	0	0
coefCO2 nrg		cost ETS i[Public sector]=
i[liquid,industry]=	26.2565,	0
	10.6407,	cost ETS i[Other]=
	6.77299,	0
	3.17185,	(083) coverage RSAj ratio[skill]=
	3.51268,	0.451 , 0 , 0
	12.3987,	(084) coverage UB ratio=
	1.70124,	0.8
	1.86733,	(085) CPI=
	5.63461,	SUM(beta eff
	0	i[industry!]*p S14 i[industry!])
coefCO2 nrg i[gas,industry]=	11.8154,	(086) CPI delay= DELAY FIXED (
	4.78833,	CPI, 1 , 1)
	3.04785,	(087) CR rate=
	1.42733,	ramp(CR yearly, Time
	1.58071,	CR, 50) * act CR
	5.57941,	(088) CR yearly=
	0.765558,	0.0161
	0.840298,	(089) cumulative lorenz[sort1]=
	2.53558,	
	0	
(081) coeff taxV DG=	act DG *	

```

    for gini
ordered[sort1]
    cumulative lorenz[sort2]=
        for gini
ordered[sort2]+for gini
ordered[sort1]
    cumulative lorenz[sort3]=
        for gini
ordered[sort2]+for gini
ordered[sort1]+for gini
ordered[sort3]
    cumulative lorenz[sort4]=
        for gini
ordered[sort2]+for gini
ordered[sort1]+for gini
ordered[sort3]+for gini ordered
[sort4]
    cumulative lorenz[sort5]=
        for gini
ordered[sort2]+for gini
ordered[sort1]+for gini
ordered[sort3]+for gini ordered
[sort4]+for gini
ordered[sort5]
    cumulative lorenz[sort6]=
        for gini
ordered[sort2]+for gini
ordered[sort1]+for gini
ordered[sort3]+for gini ordered
[sort4]+for gini
ordered[sort5]
    +for gini ordered[sort6]
    cumulative lorenz[sort7]=
        for gini
ordered[sort2]+for gini
ordered[sort1]+for gini
ordered[sort3]+for gini ordered
[sort4]+for gini
ordered[sort5]
    +for gini ordered[sort6]+for
gini ordered[sort7]
    cumulative lorenz[sort8]=
        for gini
ordered[sort2]+for gini
ordered[sort1]+for gini
ordered[sort3]+for gini ordered
[sort4]+for gini
ordered[sort5]
    +for gini ordered[sort6]+for
gini ordered[sort7]+for gini
ordered[sort8]
    cumulative lorenz[sort9]=
        for gini
ordered[sort2]+for gini
ordered[sort1]+for gini
ordered[sort3]+for gini ordered

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```

[sort4]+for gini
ordered[sort5]
    +for gini ordered[sort6]+for
gini ordered[sort7]+for gini
ordered[sort8]+for gini ordered
[sort9]
    cumulative lorenz[sort10]=
        for gini
ordered[sort2]+for gini
ordered[sort1]+for gini
ordered[sort3]+for gini ordered
[sort4]+for gini
ordered[sort5]
    +for gini ordered[sort6]+for
gini ordered[sort7]+for gini
ordered[sort8]+for gini ordered
[sort9]+for gini
ordered[sort10
]
    cumulative lorenz[sort11]=
        for gini
ordered[sort2]+for gini
ordered[sort1]+for gini
ordered[sort3]+for gini ordered
[sort4]+for gini
ordered[sort5]
    +for gini ordered[sort6]+for
gini ordered[sort7]+for gini
ordered[sort8]+for gini ordered
[sort9]+for gini
ordered[sort10
]+for gini ordered[sort11]
    cumulative lorenz[sort12]=
        for gini
ordered[sort2]+for gini
ordered[sort1]+for gini
ordered[sort3]+for gini ordered
[sort4]+for gini
ordered[sort5]
    +for gini ordered[sort6]+for
gini ordered[sort7]+for gini
ordered[sort8]+for gini ordered
[sort9]+for gini
ordered[sort10
]+for gini
ordered[sort11]+for gini
ordered[sort12]
    cumulative lorenz[sort13]=
        for gini
ordered[sort2]+for gini
ordered[sort1]+for gini
ordered[sort3]+for gini ordered
[sort4]+for gini
ordered[sort5]

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+for gini ordered[sort6]+for gini ordered[sort7]+for gini ordered[sort8]+for gini ordered [sort9]+for gini ordered[sort10]+for gini ordered[sort11]+for gini ordered[sort12]+for gini ordered[sort13]	(100) d uML= U rate j delay[middle] - U rate j delay[low]
(090) CV Kap= CYV Kap*(1-0.091)	(101) deaths = deaths 0 to 14 + deaths 15 to 44 + deaths 45 to 64 + deaths 65 plus
(091) CVj[skill]= CYVj[skill]*(1 - magic CVj)	(102) deaths 0 to 14= Pop 0 To 14 * mortality 0 to 14
(092) CYV Kap= real CYV Kap * CPI	(103) deaths 15 to 44 = Pop 15 To 44 * mortality 15 to 44
(093) CYVj[skill]= real CYV j[skill]*CPI	(104) deaths 45 to 64 = Pop 45 To 64 * mortality 45 to 64
(094) d EONIA= sens BCE*(CPI delay - 1+Infl Target)	(105) deaths 65 plus = Pop 65 Plus * mortality 65 plus
(095) d EONIA delay= DELAY FIXED (d EONIA, 1 , d EONIA)	(106) Debt i[industry]= INTEG (newdebt i[industry], initial Debt i[industry])
(096) d inventories[industry]= 5541.64, 257.899, -264.123, 402.88, 1.07322, 929.592, 960.643, 1.43269, 0, 0	(107) Debt i delay[industry]= DELAY FIXED (Debt i[industry], 1, initial Debt i[industry])
(097) d Lev i[industry]= Lev i[industry]-Lev i delay[industry]	(108) "Deficit/GDP"= Gov Deficit/GDP
(098) d NEj delay[skill]= SUM(N Eji[skill,industry!])-SUM(N Eji delay[skill,industry!])	(109) delta B high= 0.1*rrB delay - 0.09*rrEq net delay
(099) d uHM= U rate j delay[high] - U rate j delay[middle]	(110) delta B Kap= 0.38*rrB delay - 0.12*rrEq net delay
	(111) delta Dep high=

1 - delta B high -	0.0093,
delta Eq high	0.01,
	0.01
(112) delta Dep Kap= 1-delta B Kap-delta Eq Kap	(119) Dvd i[industry] :EXCEPT: [Public sector]= MAX(NF i[industry]*Dvd ratio,0)
(113) delta Eq= (1/p Eq delay)*(SUM(GFCG i nom[industry!]) - SUM(NFi net[industry!]))*(1 - coef Lev)	Dvd i[Public sector]= 0
(114) delta Eq high= -0.16*rrB delay + 0.12*rrEq net delay	(120) Dvd j[low]= 0 Dvd j[middle]= share Eq middle * Tot Dvd Dvd j[high]= share Eq high * Tot Dvd
(115) delta Eq Kap= -0.37*rrB delay + 0.12*rrEq net delay	(121) Dvd Kap= share Eq Kap*Tot Dvd
(116) delta Vjf[low,deposits]= 0 delta Vjf[low,bonds]= 0 delta Vjf[low,equities]= 0 delta Vjf[middle,deposits]= 0 delta Vjf[middle,bonds]= 0 delta Vjf[middle,equities]= 0 delta Vjf[high,deposits]= delta Dep high delta Vjf[high,bonds]= delta B high delta Vjf[high,equities]= delta Eq high	(122) Dvd ratio= 0.3 (123) E demand= V equities (124) elast k uc= 2.5 (125) elast p exp= 0.8 (126) Elec gas= Tot Elec*s gas Elec (127) Elec HH= TPES HH*s Elec HH
(117) delta VKap[deposits]= delta Dep Kap delta VKap[bonds]= delta B Kap delta VKap[equities]= delta Eq Kap	(128) Elec Nuc= s Nuc Elect * Tot Elec (129) Elec oil= Tot Elec*s oil Elec (130) Elec Rnw= Tot Elec*s Renew Elec
(118) depr k i[industry]= 0.0134, 0.0035, 0.016, 0.0216, 0.014, 0.0037, 0.0252,	(131) Elec solid= Tot Elec*s solid Elec (132) Elect delay[nrg,industry]= DELAY FIXED (

Full List of Equations

-
- act
Elect[nrg,industry], 1 , 0)
- (133) En Eff Index=
(Tot TPES/Tot Output
real/6.10963e-008*100)/1.19368
- (134) EONIA=
EONIA delay*d EONIA
- (135) EONIA 0= INITIAL(
0.0002)
- (136) EONIA delay= DELAY FIXED (
EONIA, 1 , EONIA 0)
- (137) eps k i[industry]=
0.5,
0.19,
6.1,
1.35,
0.79,
0.21,
1.5,
1.81,
0.359,
0.5
- (138) Eq delay=
Eq Kap delay+Eq high
delay+Eq middle delay
- (139) Eq high delay= DELAY FIXED (
Stock
Vjf[high,equities] , 1 , Stock
Vjf[high,equities])
- (140) Eq Kap delay= DELAY FIXED (
Stock V Kap
f[equities] , 1 , Stock V Kap
f[equities])
- (141) Eq middle delay= DELAY FIXED
(
Stock
Vjf[middle,equities] , 1 , Stock
Vjf[middle,equities])
- (142) EqDebt ratio=
0.133
- (143) eta[industry]= INTEG (
in eta i[industry],
initial
eta[industry])
- (144) eta 1[industry]= DELAY FIXED
(
eta[industry] , 1 ,
initial eta[industry])
- (145) eta 2[sector]=
eta[sector]*(1+randN
eta2[sector])
- (146) eta 3[industry]=
eta[industry]*(1+randN
eta3[industry])
- (147) eta 4[industry]=
eta[industry]*(1+randN
eta3[industry])
- (148) eta growth exog[industry]=
0.0025
- (149) eta index[industry]=
100*eta[industry]/initial
eta[industry]
- (150) etaHH=
0.0135189*avg
etaEN*mult eta HH
- (151) etaHH delay= DELAY FIXED (
etaHH , 1 , 1.35398)
- (152) Extra Dvd i[industry]=
0
- (153) FD i nom[industry]=
Gov Cdom nom[industry]
+ Tot CYVeff i dom[industry]+
1e+006*d
inventories[industry]+
real Exp i[industry]+
GFCG i nom[industry]+
JG Ztot i[industry]
- (154) fertility=
2.11
- (155) Fi 0[industry]=
3.15e+009,
5.97e+008,
1.94e+009,
1.88e+010,
2.08e+010,
1.49e+011,
1.9e+011,
2.33e+010,

	-8.77e+009, -7.15e+009	2e+010, 1.37e+011, 1.95e+011, 2.27e+010, 0, 0
(156)	Fi res[industry]= FU i[industry] - GFCF i real[industry]	
(157)	FINAL TIME = 36	(165) g avg alpha= (avg alpha - avg alpha delay)/avg alpha delay
(158)	for gini: (G1-G13)->sfor gini	(166) g avg etaEN i cumul[industry]= avg etaEN i[industry]/avg etaEN i 0[industry]
(159)	for gini ordered[sfor gini]= share income for Gini[sfor gini]	
(160)	fossil: solid, liquid, gas	(167) g exog= ramp(g EXP exog rate,5,50)*act DG
(161)	Free ETS i[Agriculture]= 0 Free ETS i[Mining]= 0 Free ETS i[Fossil Energy]= 32458.1*share EN ETS[Fossil Energy] Free ETS i[Manufacturing]= 48000*(1- ramp(0.08333,0,6)) Free ETS i[Electricity]= 32458.1*share EN ETS[Electricity] Free ETS i[Nonfinancial and Social Economy]= 2047.42 Free ETS i[Financial sector]= 0 Free ETS i[Public sector]= 0 Free ETS i[Other]= 0	(168) g EXP exog rate= -0.0005 (169) g FD HH= (Tot FD HH-Tot FD HH delay)/Tot FD HH delay (170) g GFCF= (Tot GFCF-Tot GFCF delay)/Tot GFCF delay (171) g Gov FD exog= 0.006 (172) g lambda i[industry]= (avg byK lambda i[industry] - avg byK lambda i delay[industry]) / avg byK lambda i delay[industry]
(162)	from Industry<-> industry	(173) g lambda i delay[industry]= DELAY FIXED (g lambda i[industry] , 1 , 0)
(163)	FU i[industry]= NF i[industry] - Dvd i[industry] - ir Debt*Debt i delay[industry]	(174) g NE ji[skill,industry]= (N Eji[skill,industry] - N Eji delay[skill,industry])/N Eji delay[skill,industry]]
(164)	FU i 0[industry]= 2.24e+009, 5.12e+008, 1.9e+009, 1.76e+010,	(175) g NU j[skill]=

- (U rate j[skill] - U rate j delay[skill]) / U rate j delay[skill]
- (176) g real Exp= (real Tot Exp-real Tot Exp delay)/real Tot Exp delay
- (177) gamma ELG gas[nrg]=
0.003,
0.1574,
0.1432,
0.6963
- (178) gamma1[industry]=
1,1,1,1,1,1,1,1,1,1
- (179) gamma2[industry]=
IF THEN ELSE(randU gamma2 i[industry] >Prob gamma2 i[industry] , 1 , 0)
- (180) gamma2 threshold=
0.6
- (181) gamma3[industry]=
IF THEN ELSE(randU gamma3 i[industry] >Prob gamma3 i[industry] , 1 , 0)
- (182) gamma3 threshold=
0.3
- (183) gamma4[industry]=
IF THEN ELSE(randU gamma4 i[industry]>coef gamma4 , 1 , 0)
- (184) gamma4 threshold=
0.65
- (185) GBond j[skill]=
(p Bond-p Bond delay)/p Bond delay)*Stock V jf delay[skill,bonds]
- (186) GBond Kap=
(0.001+(p Bond-p Bond delay)/p Bond delay)*Stock V Kap f delay[bonds]
- (187) GDP=
SUM(FD i nom[industry!])
- (188) GDP delay= DELAY FIXED (GDP , 1 , initial GDP)
- (189) GDP delay real=
DELAY FIXED(GDP real , 1 , initial GDP)
- (190) GDP growth=
(GDP-GDP delay)/GDP delay
- (191) GDP growth real=
(GDP real-GDP delay real)/GDP delay real
- (192) GDP per capita growth real=
(GDP perCap real-GDP perCap real delay)/GDP perCap real delay
- (193) GDP perCap nom=
GDP/Tot POP
- (194) GDP perCap real=
GDP real/Tot POP
- (195) GDP perCap real delay= DELAY FIXED (GDP perCap real, 1 , 35900)
- (196) GDP real=
GDP/CPI
- (197) GEq j[skill]=
SMOOTH(((p Eq-p Eq delay)/p Eq delay),7)*Stock V jf delay[skill,equities]
- (198) GEq Kap=
SMOOTH((0.01+(p Eq-p Eq delay)/p Eq delay),7)*Stock V Kap f delay[equities]
- (199) GF i[industry]=
VAd i[industry] - Tax VAT i[industry] - LabC i delay[industry]
- (200) GFCF i real[industry]
:EXCEPT: [Public sector],[Other],[Agriculture]=
MAX(MIN(GFCFi max[industry]/p k,kappa

$i[\text{industry}] * k i[\text{industry}] + \text{depr } k$
 $i[$
 $\quad \text{industry}] * k i[\text{industry}], 0)$
 $\text{GFCF } i \text{ real}[\text{Public sector}] =$
 $\quad \text{MAX}(kappa i[\text{Public}$
 $\text{sector}] * k i[\text{Public sector}] + \text{depr } k$
 $i[\text{Public sector}] * k i$
 $\quad [\text{Public sector}], 0)$
 $\text{GFCF } i \text{ real}[\text{Other}] =$
 $\quad \text{depr } k i[\text{Other}] * k$
 $i[\text{Other}] + \text{coef } k \text{ nonprod} * k$
 $i[\text{Other}]$
 $\quad \text{GFCF } i \text{ real}[\text{Agriculture}] =$
 $\quad \text{MAX}(kappa$
 $i[\text{Agriculture}] * k$
 $i[\text{Agriculture}] + \text{depr } k$
 $i[\text{Agriculture}] * k i[\text{Agriculture}$
 $\quad], 0)$

(201) $\text{GFCF imp } i[\text{industry}] =$
 $\quad \text{Tot GFCF} * \text{share GFCF}$
 $\text{imp } i[\text{industry}]$

(202) $\text{GFCFi max}[\text{industry}] =$
 $\quad \text{SMOOTH}(\text{NFi net}$
 $\text{delay}[\text{industry}] / \text{EqDebt ratio}, 5)$

(203) $\text{GFCG } i \text{ nom}[\text{industry}] =$
 $\quad \text{GFCF } i$
 $\text{real}[\text{industry}] * p k$

(204) $\text{GFinY } j[\text{skill}] =$
 $\quad \text{SUM}(\text{Int } V$
 $\text{jf}[\text{skill}, \text{wealth!}] + \text{Dvd}$
 $\text{j}[\text{skill}] + \text{GBond } j[\text{skill}] + \text{GEq}$
 $\text{j}[\text{skill}]$

(205) $\text{GFinY Kap} =$
 $\quad \text{SUM}(\text{Int } V \text{ Kap}$
 $\text{f}[\text{wealth!}] + \text{Dvd Kap} + \text{GBond Kap} + \text{GEq}$
 Kap

(206) $\text{Gini}[G1] =$
 $\quad \text{low innac gi}$
 $\text{Gini}[G2] =$
 $\quad \text{mid innac gi}$
 $\text{Gini}[G3] =$
 $\quad \text{high innac gi}$
 $\text{Gini}[G4] =$
 $\quad \text{low pens gi}$
 $\text{Gini}[G5] =$
 $\quad \text{mid pens gi}$
 $\text{Gini}[G6] =$
 $\quad \text{high pens gi}$
 $\text{Gini}[G7] =$
 $\quad \text{low unemp gi}$

$\text{Gini}[G8] =$
 $\quad \text{mid unemp gi}$
 $\text{Gini}[G9] =$
 $\quad \text{high uemp gi}$
 $\text{Gini}[G10] =$
 $\quad \text{low emp gi}$
 $\text{Gini}[G11] =$
 $\quad \text{mid emp gi}$
 $\text{Gini}[G12] =$
 $\quad \text{high emp gi}$
 $\text{Gini}[G13] =$
 $\quad \text{capitalists gi}$

(207) $\text{GINI Coeff} =$
 $\quad (1 - ($
 $\quad \text{pop}$
 $\text{ordered}[\text{sort1}] * \text{cumulative}$
 $\text{lorenz}[\text{sort1}] +$
 $\quad (\text{cumulative}$
 $\text{lorenz}[\text{sort1}] + \text{cumulative}$
 $\text{lorenz}[\text{sort2}]) * \text{pop}$
 $\text{ordered}[\text{sort2}] +$
 $\quad (\text{cumulative}$
 $\text{lorenz}[\text{sort2}] + \text{cumulative}$
 $\text{lorenz}[\text{sort3}]) * \text{pop}$
 $\text{ordered}[\text{sort3}] +$
 $\quad (\text{cumulative}$
 $\text{lorenz}[\text{sort3}] + \text{cumulative}$
 $\text{lorenz}[\text{sort4}]) * \text{pop}$
 $\text{ordered}[\text{sort4}] +$
 $\quad (\text{cumulative}$
 $\text{lorenz}[\text{sort4}] + \text{cumulative}$
 $\text{lorenz}[\text{sort5}]) * \text{pop}$
 $\text{ordered}[\text{sort5}] +$
 $\quad (\text{cumulative}$
 $\text{lorenz}[\text{sort5}] + \text{cumulative}$
 $\text{lorenz}[\text{sort6}]) * \text{pop}$
 $\text{ordered}[\text{sort6}] +$
 $\quad (\text{cumulative}$
 $\text{lorenz}[\text{sort6}] + \text{cumulative}$
 $\text{lorenz}[\text{sort7}]) * \text{pop}$
 $\text{ordered}[\text{sort7}] +$
 $\quad (\text{cumulative}$
 $\text{lorenz}[\text{sort7}] + \text{cumulative}$
 $\text{lorenz}[\text{sort8}]) * \text{pop}$
 $\text{ordered}[\text{sort8}] +$
 $\quad (\text{cumulative}$
 $\text{lorenz}[\text{sort8}] + \text{cumulative}$
 $\text{lorenz}[\text{sort9}]) * \text{pop}$
 $\text{ordered}[\text{sort9}] +$
 $\quad (\text{cumulative}$
 $\text{lorenz}[\text{sort9}] + \text{cumulative}$
 $\text{lorenz}[\text{sort10}]) * \text{pop}$
 $\text{ordered}[\text{sort10}] +$
 $\quad (\text{cumulative}$
 $\text{lorenz}[\text{sort10}] + \text{cumulative}$

$$\frac{\text{lorenz}[\text{sort11}] * \text{pop}[\text{ordered}[\text{sort11}]] + (\text{cumulative}[\text{lorenz}[\text{sort11}] + \text{cumulative}[\text{lorenz}[\text{sort12}]] * \text{pop}[\text{ordered}[\text{sort12}]] + (\text{cumulative}[\text{lorenz}[\text{sort12}] + \text{cumulative}[\text{lorenz}[\text{sort13}]] * \text{pop}[\text{ordered}[\text{sort13}]])) * 100}{(208) \text{ gini coefficient skill} = \frac{1 - \left(\frac{\text{gini skill}[\text{low}] / (\text{SUM}(\text{gini skill}[\text{skill!}] + \text{capitalists gi})) * ((\text{N Aj}[\text{low}] + \text{N Pj}[\text{low}]) / (\text{SUM}(\text{N Aj}[\text{skill!}] + \text{SUM}(\text{N Pj}[\text{skill!}]))) + ((2 * \text{gini skill}[\text{low}] + \text{gini skill}[\text{middle}]) / (\text{SUM}(\text{gini skill}[\text{skill!}] + \text{capitalists gi})) * ((\text{N Aj}[\text{middle}] + \text{N Pj}[\text{middle}]) / (\text{SUM}(\text{N Aj}[\text{skill!}] + \text{SUM}(\text{N Pj}[\text{skill!}]))) + ((2 * (\text{gini skill}[\text{low}] + \text{gini skill}[\text{middle}]) + \text{gini skill}[\text{high}]) / (\text{SUM}(\text{gini skill}[\text{skill!}] + \text{capitalists gi})) * ((\text{N Aj}[\text{high}] + \text{N Pj}[\text{high}]) / (\text{SUM}(\text{N Aj}[\text{skill!}] + \text{SUM}(\text{N Pj}[\text{skill!}]))) + ((2 * (\text{gini skill}[\text{low}] + \text{gini skill}[\text{middle}] + \text{gini skill}[\text{high}]) + \text{capitalists gi}) / (\text{SUM}(\text{gini skill}[\text{skill!}] + \text{capitalists gi})) * (0.001)}{0.193 * 100}$$

$$(209) \text{ gini skill}[\text{low}] = \frac{\text{low emp gi} + \text{low unemp gi} + \text{low pens gi} + \text{low innac gi}}{\text{gini skill}[\text{middle}] = \frac{\text{mid emp gi} + \text{mid unemp gi} + \text{mid pens gi} + \text{mid innac gi}}{\text{gini skill}[\text{high}] = \frac{\text{high emp gi} + \text{high uemp gi} + \text{high pens gi} + \text{high innac gi}}{(210) \text{ gini skill per capta}[\text{low}] = \frac{(\text{low emp gi} + \text{low unemp gi} + \text{low pens gi} + \text{low innac gi}) / (\text{SUM}(\text{N Eji}[\text{low}, \text{industry}!] + \text{N inA j}[\text{low}] + \text{N Uj}[\text{low}] + \text{N Pj}[\text{low}]))}{\text{gini skill per capta}[\text{middle}] = \frac{(\text{mid emp gi} + \text{mid unemp gi} + \text{mid pens gi} + \text{mid innac gi}) / (\text{SUM}(\text{N Eji}[\text{middle}, \text{industry}!] + \text{N inA j}[\text{middle}] + \text{N Uj}[\text{middle}] + \text{N Pj}[\text{middle}]))}{\text{gini skill per capta}[\text{high}] = \frac{(\text{high emp gi} + \text{high uemp gi} + \text{high pens gi} + \text{high innac gi}) / (\text{SUM}(\text{N Eji}[\text{high}, \text{industry}!] + \text{N inA j}[\text{high}] + \text{N Uj}[\text{high}] + \text{N Pj}[\text{high}]})}$$

$$(211) \text{ Gov C} = \text{Gov C nom} + \text{Gov Ck}[\text{Public sector}] + \text{Gov CTr} + \text{Gov CW}[\text{Public sector}] + \text{Int B} + \text{Gov CJG}$$

$$(212) \text{ Gov C nom} = \text{Gov FD} * \text{CPI} * (1 - \text{share Gov C}[\text{Public sector}])$$

$$(213) \text{ "Gov C/GDP"} = \text{Gov C/GDP}$$

$$(214) \text{ Gov Cdom nom}[\text{industry}] = \text{CPI} * (1 - \text{share Gov imp}) * \text{Gov FD} * \text{share Gov C}[\text{industry}]$$

$$(215) \text{ Gov CJG} = \text{SUM}(\text{JG Ztot i}[\text{industry!}])$$

$$(216) \text{ Gov Ck}[\text{Public sector}] = \text{GFCG i nom}[\text{Public sector}]$$

$$(217) \text{ Gov CTr} =$$

SUM(TrSoc j[skill!])+SUM(GUB j[skill!])+SUM(GPB j[skill!])	JG GWBj[skill]
(218) Gov CW[Public sector]= SUM(GWB Eji[skill!,Public sector]) * (1+taxD12 rate i[Public sector])	(228) GWB Eji delay[skill,industry]= DELAY FIXED (
(219) Gov Deficit= Gov C - Gov Tax	GWB Eji[skill,industry] , 1 , initial NEji[skill,industry]*initial wageh ji [skill,industry]*H Ei[industry])
(220) Gov FD= FD delay (1+g Gov FD exog)*Gov	(229) H annual= SMOOTH(n weeks*act WTR, 5)
(221) Gov FD delay= DELAY FIXED (Gov FD , 1 , initial Gov Creal)	(230) H Ei[industry]= H annual * coef H week i[industry]
(222) Gov imp= share Gov imp * Gov FD	(231) h week= 35.093
(223) Gov Tax = Tax Lab + Tot TaxF + Tax HH + Tax VAT + Tax V + SUM(TaxC02 i[industry!]) + SUM(Tax BCA i[industry!])	(232) high emp gi= SUM(GWB Eji[high,industry!])+(TrSoc FCj[high]+TrSoc SD j[high])*prop emp[high]+BI j[high]*prop emp[high]*(1-prop pens[high])+prop emp[high]* MixY E j[high]
(224) "Gov Tax/GDP"= Gov Tax/GDP	(233) high innac gi= (TrSoc FCj[high]+TrSoc SD j[high])*prop innac[high]+BI j[high]*prop innac [high]*(1-prop pens[high])+prop innac[high]*MixY E j[high]
(225) GPB j[skill]= Pj[skill] income P j[skill]*N	(234) high pens gi= GPB j[high]+BI j[high]*BI P*prop pens[high]+prop pens[high]*MixY E j[high]]
(226) GUB j[skill]= j[skill] * N Uj[skill] coverage UB ratio * UB	(235) high uemp gi= GUB j[high]+TrSoc RSAj[high]+(TrSoc FCj[high]+TrSoc SD j[high])*prop unemp [high]+BI j[high]*prop unemp[high]*(1-prop pens[high])+prop unemp[high]*MixY E j [high]
(227) GWB Eji[skill,industry] :EXCEPT: [skill,Public sector]= wageh max E ji[skill,industry] * N Eji[skill,industry] * H Ei[industry] GWB Eji[skill,Public sector]= wageh max E ji[skill,Public sector] * N Eji[skill,Public sector] * H Ei[Public sector] +	


```

(236) Id[from
Industry,toIndustry]=TABBED
ARRAY (
      1      0      0      0
0      0      0      0      0
0
      0      1      0      0
0      0      0      0      0
0
      0      0      1      0
0      0      0      0      0
0
      0      0      0      1
0      0      0      0      0
0
      0      0      0      0
1      0      0      0      0
0
      0      0      0      0
0      1      0      0      0
0
      0      0      0      0
0      0      1      0      0
0
      0      0      0      0
0      0      0      1      0
0
      0      0      0      0
0      0      0      0      1
0
      0      0      0      0
0      0      0      0      0
1)

(237) Imp CO2 i[industry]=
      real Imp
i[industry]/(p i[industry]*avg
etaEN i[industry])*(CO2
i[industry
]/TPES i[industry])/1e+006

(238) in b r=
      (Gov Deficit)

(239) in eta i[industry]=
      (choice eta
i[industry] + eta growth
exog[industry])*eta[industry]

(240) in JG Ej[skill]=
      act JG*MAX(
MIN(0.5*Uj[skill],JG maxNE*share
Uj[skill])
      ,0)

(241) in k[industry]=
      GFCF i real[industry]-
coef k nonprod*k i[industry]

(242) in lambda i[industry]=
      choice lambda
i[industry]*lambda i[industry]

(243) in Tot Vf[wealth]=
      SUM(in
Vjf[skill!,wealth])+in VKap
f[wealth]

(244) in Vj[skill]=
      YVD j[skill]

(245) in Vjf[skill,wealth]=
      (1+delta
Vjf[skill,wealth])*share
Vjf[skill,wealth]*YVD j
delay[skill]

(246) in VKap f[wealth]=
      (1 + delta
VKap[wealth]) * share Vf
Kap[wealth]*YD Kap delay

(247) Income ordered for Gini[for
gini]=
      VECTOR SORT
ORDER(individual income[for
gini],1)

(248) income P j[skill]=
      PW ratio * ( SUM(GWB
Eji[skill,industry!]) / SUM(N
Eji[skill,industry!]))

(249) index avg Wage =
      avg Wage E/initial avg
Wage

(250) individual income[for gini]=
      Gini[for gini]/pop
groups[for gini]

(251) individual income
ordered[sfor gini]=
      VECTOR
REORDER(individual income[for
gini] ,sort order for gini[for
gini]
      )

(252) industry:

```

Agriculture, Mining, Fossil Energy, Manufacturing, Electricity, Construction , Nonfinancial and Social Economy, Financial sector, Public sector, Other	3.34868e+011, 1.02022e+009, 0, 1.87492e+011, 4.39507e+009, 0, 0
(253) Infl Target= 0.02	(260) initial FDi [industry]= 3.2855e+010, 3.163e+009, 3.0603e+010, 4.53082e+011, 3.27e+010, 4.44217e+011, 8.28301e+011, 5.7952e+010, 4.70313e+011, 3.477e+009
(254) Inflation= (CPI-CPI delay)/CPI delay	(261) initial GDP= 2.3501e+012
(255) initial avg alpha= INITIAL(avg alpha)	(262) initial Gov Cnom= INITIAL(5.14007e+011)
(256) initial avg Wage= 8725*4	(263) initial Gov Creal= initial Gov Cnom/CPI
(257) initial Debt i[industry] :EXCEPT: [Manufacturing],[Public sector],[Mining]= coef initial Debt i[industry]*initial k i[industry] initial Debt i[Manufacturing]= coef initial Debt i[Manufacturing]*initial k i[Manufacturing] initial Debt i[Public sector]= coef initial Debt i[Public sector]*initial k i[Public sector] initial Debt i[Mining]= coef initial Debt i[Mining]*initial k i[Mining]	(264) initial k i[industry]= 2.27783e+011, 4.2605e+010, 8.988e+009, 6.35416e+011, 2.11045e+011, 2.94728e+012, 1.16356e+012, 1.54033e+011, 2.06418e+012, 1e+010
(258) initial eta[industry]= 19.08, 32.17, 9.17, 17.07, 1.25, 563.39, 31.73, 89.68, 25.19, 1	(265) initial lambda i[industry]= 66.8975, 138.291, 2956.19, 159.081, 419.157, 180.298, 122.672, 185.381, 43.1775 , 9.82732
(259) Initial Exp i[industry]= 1.45515e+010, 2.90549e+009, 1.2275e+010,	(266) initial MixY= 1.87e+011
	(267) initial N U j[skill]= 1.02e+006,1.82e+006,597000
	(268) initial NEji[low,industry]=

Full List of Equations

198914,	1.13915e+007
11624.6,	
2304.24,	(274) initial real VDj[skill]=
611724,	0,
13408.6,	2.21e+009,
422845,	8.65e+010
1.67107e+006,	
43891.9,	(275) initial real VDKap=
1.40803e+006,	6.5e+010
108000	
initial	(276) initial real YD j[skill]=
NEji[middle,industry]=	2.27e+011,
487016,	3.95e+011,
14135.9,	4.98e+011
6383.83,	
1.6673e+006,	(277) initial share nrg
106828,	i[solid,industry]=
1.06041e+006,	0,
4.059e+006,	0,
240381,	0.206,
3.874e+006,	0.101,
191350	0.024,
initial NEji[high,industry]=	0,
133521,	0,
6920.64,	0.00767,
3420.89,	0.00767,
884584,	0.00767
111240,	initial share nrg
376000,	i[liquid,industry]=
3.25003e+006,	0.763,
580493,	0.485,
4.382e+006,	0.149,
99000	0.357,
(269) initial Output i[industry]=	0.029,
1e+011,	0.574,
6.27e+009,	0.918,
4.78e+010,	0.115894,
7.1e+011,	0.115894,
1.31e+011,	0.115894
5.16e+011,	initial share nrg
1.46e+012,	i[gas,industry]=
2.17e+011,	0.038,
5.65e+011,	0.148,
3.45e+009	0.047,
	0.281,
	0.043,
(270) initial pop 0 to 14=	0.247,
1.35409e+007	0.002,
	0.304756,
(271) initial pop 15 to 44=	0.304756,
2.39557e+007	0.304756
	initial share nrg
(272) initial pop 54 to 64=	i[electrRenew,industry]=
1.70542e+007	0.199,
	0.367,
(273) initial pop 65 plus=	0.598,

	0.261,		0.063
	0.904,		
	0.179,	(291) initial uc i[industry]=	
	0.08,		0.75,
	0.57168,		0.75,
	0.57168,		0.75,
	0.57168		0.8,
(278) initial tax floor 2=			0.7,
9690			0.83,
			0.85,
(279) initial tax floor 3=			0.7,
26764			0.77,
			0.7
(280) initial tax floor 4=		(292) initial wageh	
71754		ji[skill,industry]=TABBED ARRAY (
(281) initial tax floor 5=		12.58 22.2 24.2 17.62	
151956		26.51 19.64 18.22 26.54 18.01	
		20.11	
(282) INITIAL TIME = 0		15.11 24.62 29.57 21.53	
		28.93 24.04 20.63 30.2 20.36	
		25.45	
(283) initial Tot V= INITIAL(19.04 33.18 54.73 39.85	
2.81566e+012)		40.28 30.77 31.3 32.6 24.74	
		33.1)	
(284) initial Tot Vf[wealth]=		(293) initial YD Kap= INITIAL(
SUM(V0		7.17e+010)	
jf[skill!,wealth]) + V0 Kap			
f[wealth]		(294) initial Zi[industry]=	
(285) initial Tot Vj[skill]=		5.02e+010,	
SUM(share Vj		2.58e+009,	
0[skill!]*initial Tot V)		1.35e+010,	
		3.33e+011,	
(286) initial Tot VKap=		6.8e+010,	
initial Tot V * share		1.62e+011,	
VKap 0		5.62e+011,	
		1.14e+011,	
(287) initial TrSoc FC j[skill]=		1.12e+011,	
2119.6,		95524.8	
2119.6,			
2119.6		(295) initial Zimp i[industry]=	
		1.16e+010,	
(288) initial TrSoc RSA j[skill]=		8.87e+008,	
5567.6,		2.79e+010,	
5567.6,		1.48e+011,	
5567.6		0,	
		0,	
(289) initial TrSoc SD j[skill]=		9.96e+010,	
877.48,		0,	
877.48,		0,	
877.48		0	
(290) initial U rate j[skill]=		(296) Int B=	
0.173,		Stock Bond real*ir LTB	
0.107,		delay	

Full List of Equations

- (297) Int V jf[skill,wealth]=
ir ff[wealth,wealth] *
Stock V jf delay[skill,wealth]
- (298) Int V Kap f[wealth]=
ir
ff[wealth,wealth]*Stock V Kap f
delay[wealth]
- (299) inV=
YVD Kap + SUM(YVD
j[skill!])
- (300) inV c=
YVD Kap
- (301) Investment rate=
Tot GFCF/GDP
- (302) ir Debt=
MAX(ir Debt delay +
0.201806*d EONIA+0.335394*d EONIA
delay, 0)*0+0.01
- (303) ir Debt 0=
0.007
- (304) ir Debt delay= DELAY FIXED (
ir Debt , 1 , ir Debt
0)
- (305) ir Dep=
MAX(0.828*ir Debt-
0.004223, 0) * act Dep
- (306) ir ff[deposits,wealth]=
ir Dep
ir ff[bonds,wealth]=
ir LTB
ir ff[equities,wealth]=
0.01
- (307) ir LTB=
0*IF THEN ELSE(Time>0,
IF THEN ELSE(Time>1,IF THEN
ELSE(Time >2,IF THEN ELSE
(Time >3, IF THEN ELSE(Time
>4,0.011 ,0.009),0.008)
,0.005),0.008) ,ir LTB delay
) +ir LTB delay-0.0166925*(p
Bond-p Bond delay)
- (308) ir LTB 0=
0.03
- (309) ir LTB delay= DELAY FIXED (
ir LTB , 1 , ir LTB 0)
- (310) JG Eco output=
JG Lab Eco + JG ZEco
- (311) JG Eco output share=
JG Eco output/Tot
Output real
- (312) JG Eco output share delay=
DELAY FIXED (
JG Eco output share, 1
, 0)
- (313) JG Eco share=
1-JG Serv share
- (314) JG Ej[skill]= INTEG (
in JG Ej[skill]-out JG
Ej[skill],
0)
- (315) JG GWBj[skill]=
JG Ej[skill]*JG wage*H
Ei[Public sector]
- (316) JG Lab Eco=
(1 + taxD12 rate
i[Public sector])*SUM(JG
GWBj[skill!])*JG Eco share
- (317) JG Lab Serv=
(1 + taxD12 rate
i[Public sector])*SUM(JG
GWBj[skill!])*JG Serv share
- (318) JG maxNE=
300000
- (319) JG P13 Serv delay= DELAY
FIXED (
JG Serv output, 1 , 0)
- (320) JG PubPriv ratio=
IF THEN ELSE(SUM(JG
Ej[skill!])>0, JG P13 Serv
delay/out Services delay ,
0)
- (321) JG Serv output=
JG Lab Serv + JG Zserv
- (322) JG Serv share=
0.5

- (323) JG share Ej0[skill]=
 (JG Ej[skill]+in JG
 Ej[skill])/(JG Ej[skill]+in JG
 Ej[skill]+Uj[skill])
- (324) JG Tot output=
 JG Serv output + JG
 Eco output
- (325) JG wage=
 10.7*CPI
- (326) JG Z h=
 13.09
- (327) JG ZEco=
 JG Z h * H Ei[Public
 sector] * SUM(JG Ej[skill!]) * JG
 Eco share
- (328) JG ZEco i[industry]=
 JG ZEco*JG ZEco share
 i[industry]
- (329) JG ZEco share i[industry]=
 0.00132328,
 0.000301994,
 0.00601242,
 0.192798,
 0.00480445,
 0.315638,
 0,
 0.479121,
 5.49079e-009,
 0
- (330) JG Zserv=
 JG Z h * H Ei[Public
 sector] * SUM(JG Ej[skill!]) * JG
 Serv share
- (331) JG Zserv i[industry]=
 JG Zserv*JG Zserv
 share i[industry]
- (332) JG Zserv share i[industry]=
 0.00455526,
 1.99355e-005,
 0.0153918,
 0.0901731,
 0.0202328,
 0.0831259,
 0.534385,
 0.252116,
 1.66129e-009,
 0
- (333) JG Ztot i[industry]=
 JG Zserv i[industry] +
 JG ZEco i[industry]
- (334) jump Nucl=
 MAX((1-act Nucl
 zero)*0.0171943,
 act Nucl
 zero*(0.775108/(Time Nucl zero -
 Time ENmix))
)
- (335) jump share Elec=
 0.005
- (336) k deprec i[industry]=
 depr k i[industry]*k
 i[industry]
- (337) k i[industry]= INTEG (
 in k[industry] -
 outk[industry],
 initial k
 i[industry])
- (338) kappa Fi delay[industry]=
 DELAY FIXED (
 sens GFCGi
 cash[industry]*NF i[industry]/Ki
 nom[industry], 1 , sens GFCGi
 cash
 [industry]*Fi
 0[industry]/initial k
 i[industry])
- (339) kappa i[industry]=
 kappa uc i[industry] +
 kappa Fi delay[industry]
- (340) kappa pk i[industry]=
 0,0,0,0.1624,0,0.4616,0.376,
 0,0,0
- (341) kappa uc i[industry]=
 coef k nonprod + elast
 k uc*sens k uc i[industry] * (uc
 i delay[industry]
 - uc i normal[industry])
- (342) Ki nom[industry]=
 p k*k i[industry]
- (343) Ki nom delay[industry]=
 DELAY FIXED (
)

- (344)
$$\text{LAB industry rate}[\text{industry}] = \frac{\text{LabC i}[\text{industry}] - \text{LabC i delay}[\text{industry}]}{\text{LabC i delay}[\text{industry}]}$$
- (345)
$$\text{LabC i}[\text{industry}] = \text{SUM}(\text{GWB Eji}[\text{skill!}, \text{industry}]) * (1 + \text{taxD12 rate i}[\text{industry}])$$
- (346)
$$\text{LabC i delay}[\text{industry}] = \text{SUM}(\text{GWB Eji delay}[\text{skill!}, \text{industry}]) * (1 + \text{taxD12 rate i}[\text{industry}])$$
- (347)
$$\text{labour share} = \frac{\text{SUM}(\text{GWB Eji}[\text{skill!}, \text{industry!}])}{\text{SUM}(\text{GWB Eji}[\text{skill!}, \text{industry!}]) + \text{SUM}(\text{NF i}[\text{industry!}])}$$
- (348)
$$\text{lambda 1}[\text{industry}] = \text{DELAY FIXED} (\text{lambda i}[\text{industry}], 1, \text{initial lambda i}[\text{industry}])$$
- (349)
$$\text{lambda 2}[\text{industry}] = \text{lambda i}[\text{industry}] * (1 + \text{randN lambda2}[\text{industry}])$$
- (350)
$$\text{lambda 3}[\text{industry}] = \text{lambda i}[\text{industry}] * (1 + \text{randN lambda3}[\text{industry}])$$
- (351)
$$\text{lambda 4}[\text{industry}] = \text{lambda i}[\text{industry}] * (1 + \text{randN lambda2}[\text{industry}])$$
- (352)
$$\text{lambda i}[\text{industry}] = \text{INTEG} (\text{in lambda i}[\text{industry}], \text{initial lambda i}[\text{industry}])$$
- (353)
$$\text{lambda index}[\text{industry}] = \frac{100 * \text{lambda i}[\text{industry}]}{\text{initial lambda i}[\text{industry}]}$$
- (354)
$$\text{lambda index i}[\text{industry}] = \frac{100 * \text{avg byK lambda i}[\text{industry}]}{\text{initial lambda i}[\text{industry}]}$$
- (355)
$$\text{lambda sens p i}[\text{industry}] = 10, 10, 50, 50, 50, 50, 30, 30, 0, 0$$
- (356)
$$\text{Leont ii}[\text{from Industry, toIndustry}] = \text{INVERT MATRIX}(\text{AId}[\text{from Industry, toIndustry}], 10)$$
- (357)
$$\text{Lev i}[\text{industry}] = \frac{\text{Debt i}[\text{industry}]}{\text{Ki nom}[\text{industry}]}$$
- (358)
$$\text{Lev i delay}[\text{industry}] = \text{DELAY FIXED} (\text{Lev i}[\text{industry}], 1, \text{initial Debt i}[\text{industry}] / \text{initial k i}[\text{industry}])$$
- (359)
$$\text{LFP rate} = \text{MIN}(0.711 * (1 - \text{SMOOTH}(3.5 * (\text{"Unemployment rate-1"} - 0.1029), 4)), 1)$$
- (360)
$$\text{LFS high} = \text{Tot LFS} - \text{LFS middle} - \text{LFS low}$$
- (361)
$$\begin{aligned} \text{LFS j}[\text{low}] &= \text{LFS low} \\ \text{LFS j}[\text{middle}] &= \text{LFS middle} \\ \text{LFS j}[\text{high}] &= \text{LFS high} \end{aligned}$$
- (362)
$$\text{LFS low} = \text{share low} * \text{Tot LFS}$$
- (363)
$$\text{LFS middle} = \text{share middle} * \text{Tot LFS}$$
- (364)
$$\text{life expectancy} = 80$$
- (365)
$$\text{low emp gi} = \text{SUM}(\text{GWB Eji}[\text{low}, \text{industry!}]) + (\text{TrSoc FCj}[\text{low}] + \text{TrSoc SD j}[\text{low}]) * \text{prop emp}[\text{low}] + \text{BI j}[\text{low}] * \text{prop emp}[\text{low}] * (1 - \text{prop pens}[\text{low}]) + \text{prop emp}[\text{low}] * \text{MixY E j}[\text{low}]$$
- (366)
$$\text{low innac gi} =$$

Full List of Equations

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(TrSoc FCj[low]+TrSoc
SD j[low])*prop innac[low]+BI
j[low]*prop innac[low
]*(1-prop pens[low])+prop
innac[low]*MixY E j[low]

(367) low pens gi=
      GPB j[low]+BI
j[low]*BI P*prop pens[low]+prop
pens[low]*MixY E j[low]

(368) low unemp gi=
      GUB j[low]+TrSoc
RSAj[low]+(TrSoc FCj[low]+TrSoc
SD j[low])*prop unemp[low
]+BI j[low]*prop
unemp[low]*(1-prop
pens[low])+prop unemp[low]*MixY E
j[low
]

(369) magic CVj=
      0.091

(370) markup i[industry]=
      0.003,
      -0.0138,
      0.0763,
      0.0431,
      0.1237,
      0.104,
      0.0557,
      0,
      0,
      0

(371) maturation 14 to 15=
      ( ( Pop 0 To 14 ) ) *
( 1 - mortality 0 to 14 ) / 15

(372) maturation 44 to 45=
      ( ( Pop 15 To 44 ) ) *
( 1 - mortality 15 to 44 ) / 30

(373) maturation 64 to 65=
      ( ( Pop 45 To 64 ) ) *
( 1 - mortality 45 to 64 ) / 20

(374) mid emp gi=
      SUM(GWB
Eji[middle,industry!])+(+TrSoc
FCj[middle]+TrSoc SD
j[middle])*prop emp
[middle]+BI j[middle]*prop
emp[middle]*(1-prop
pens[middle])+
      prop emp[middle]*MixY E
j[middle]

(375) mid innac gi=
      (TrSoc
FCj[middle]+TrSoc SD
j[middle])*prop innac[middle]+BI
j[middle]*prop innac
[middle]*(1-prop
pens[middle])+prop
innac[middle]*MixY E j[middle]

(376) mid pens gi=
      GPB j[middle]+BI
j[middle]*BI P*prop
pens[middle]+prop
pens[middle]*MixY E j
[middle]

(377) mid unemp gi=
      GUB j[middle]+TrSoc
RSAj[middle]+(TrSoc
FCj[middle]+TrSoc SD
j[middle])*prop unemp
[middle]+BI j[middle]*prop
unemp[middle]*(1-prop
pens[middle])+prop unemp[
middle]*MixY E j[middle]

(378) MixY=
      initial MixY*(1 +
(GDP-initial GDP)/initial GDP)

(379) MixY E j[skill]=
      share Vj 0[skill]*MixY

(380) MixY Kap=
      share VKap 0*MixY

(381) mortality 0 to 14=
      mortality 0 to 14
table ( life expectancy )

(382) mortality 0 to 14 table(
      [(20,0)-
(80,0.06)],(20.3666,0.0305714),(2
1.833,0.0268571),(30.2648,0.01857
14
), (39.9185,0.0131429),(50.18
33,0.0102857),(60,0.0082),(70,0.0
023),(80,0.001
))

(383) mortality 15 to 44=
      mortality 15 to 44
table ( life expectancy)

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Full List of Equations

(384) mortality 15 to 44 table([(20,0)- (80,0.03)],(20.1222,0.0152857),(2 9.2872,0.00985714),(40.0407,0.006 42857), (49.6945,0.004), (59.9593,0 .00271429), (70,0.001), (80,0.0005))	sigma ji[skill,industry]*share E full time i[industry]* (yFC i[industry]*uc i normal[industry] / (avg byK lambda i[industry]*H Ei [industry]))
(385) mortality 45 to 64= mortality 45 to 64 table (life expectancy)	(395) N Ei[industry]= SUM(N Eji[skill!,industry])
(386) mortality 45 to 64 table([(20,0)- (80,0.04)],(20.3666,0.00990476),(29.5316,0.00704762),(39.7963,0.00 419047), (50.0611,0.0032381), (59.83 71,0.00209524), (69.7352,0.0017142 9), (80,0.00171429))	(396) N Ej[skill]= SUM(N Eji[skill,industry!])
(387) mortality 65 plus= mortality 65 plus table (life expectancy)	(397) N Eji[low,industry]= SMOOTH(MAX(0, ((1 + coef Job polarization j[low]*g lambda i[industry])*sigma ji [low,industry]*Output i real[industry]))/ (coef lambda impact j[low]*avg byK lambda i[industry]*H Ei [industry]))
(388) mortality 65 plus table ((398) N Eji delay[skill,industry]= DELAY FIXED (
(20,0.13), (30,0.11), (40,0.09), (50 ,0.07), (60,0.06), (70,0.05) , (80,0.04))	,4) N Eji[middle,industry]= SMOOTH(MAX(0, ((1+coef Job polarization j[middle]*g lambda i[industry])*sigma ji [middle,industry]*Output i real[industry]))/ (coef lambda impact j[middle]*avg byK lambda i[industry]*H Ei [industry]))
(389) mu GFCFi[industry]= 0.2,0.2,0.2,0.2,0.2,0.2,0.2, 0.2,0.2,0.2	,2) N Eji[high,industry]= SMOOTH(MAX(0, ((1 + coef Job polarization j[high]*g lambda i[industry])*sigma ji [high,industry]*Output i real[industry]))/ (coef lambda impact j[high]*avg byK lambda i[industry]*H Ei [industry]))
(390) mu S14 i[industry]= share Cimp i[industry]	
(391) mult eta HH= 1 + JG Eco output share delay	
(392) multip taxV g alpha= -550	
(393) N Aj[skill]= SUM(N Eji[skill,industry!]) + N Uj[skill] + N inA j[skill]	
(394) N E yFC ji[skill,industry]=	

<p>(399) $N_{Fj[skill]} = 1.1 * N_{Aj[skill]}$</p> <p>(400) $N_{inA j[low]} = (1 - LFP \text{ rate}) * POP$ Working age*share low $N_{inA j[middle]} = (1 - LFP \text{ rate}) * POP$ Working age*share middle $N_{inA j[high]} = (1 - LFP \text{ rate}) * POP$ Working age*share high - N_{Kap}</p> <p>(401) $N_{Kap} = 0.001 * Tot \text{ POP}$</p> <p>(402) $N_{Pj[low]} = Pop \ 65 \ Plus * 0.575$ $N_{Pj[middle]} = Pop \ 65 \ Plus * 0.279$ $N_{Pj[high]} = Pop \ 65 \ Plus * 0.146$</p> <p>(403) $N_{Uj[skill]} = LFS \ j[skill] - SUM(N_{Eji[skill, industry!]}) - JG \ Ej[skill]$</p> <p>(404) $n \ weeks = 43$</p> <p>(405) $new \ Eq = MAX(\delta \ Eq, 0)$</p> <p>(406) $newdebt \ i[industry] = GFCG \ i \ nom[industry] - FU \ i[industry]$</p> <p>(407) $NF \ i[industry] = GF \ i[industry] - TaxF \ i[industry]$</p> <p>(408) $NFi \ net[industry] = MAX(FU \ i[industry] + Dvd \ i[industry], 0)$</p> <p>(409) $NFi \ net \ delay[industry] = DELAY \ FIXED (NFi \ net[industry], 1, FU \ i \ 0[industry])$</p> <p>(410) $NPB \ j[skill] =$</p>	<p>$(GPB \ j[skill] - TaxA \ Pj[skill] - TaxB \ Pj[skill] - TaxD613 \ Pj[skill])$</p> <p>(411) $nrg:$ solid, liquid, gas, electrRenew</p> <p>(412) $NUB \ j[skill] = MAX((GUB \ j[skill] - TaxA \ Uj[skill] - TaxB \ U \ j[skill] - TaxD613 \ Uj[skill]) * (1 - act \ BI), 0)$</p> <p>(413) $NWB \ Ej[skill] = (SUM (GWB \ Eji[skill, industry!])) - (SUM (TaxA \ Eji[skill, industry!])) - (SUM (TaxB \ Eji[skill, industry!])) - (SUM (TaxD613 \ Eji[skill, industry!]))$</p> <p>(414) $\omega \ gNE \ j[skill] = 0.5, 0.5, 0.7$</p> <p>(415) $\omega \ gNU \ j[skill] = 0.15, 0.15, 0.25$</p> <p>(416) $\omega \ lambda \ j[skill] = 0.7, 0.7, 0.9$</p> <p>(417) $\omega \ g1 = 0$</p> <p>(418) $out \ JG \ Ej[skill] = IF \ THEN \ ELSE (JG \ Ej[skill] + in \ JG \ Ej[skill] > 0, IF \ THEN \ ELSE (d \ NEj \ delay[skill] > 0, MIN(d \ NEj \ delay[skill] * JG \ share \ Ej0[skill], JG \ Ej[skill] + in \ JG \ Ej[skill]), 0), 0)$</p>
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Full List of Equations

- (419) out Services delay= DELAY
FIXED (
 Output i
real[Nonfinancial and Social
Economy], 1 , 0)
- (420) out Vf[wealth]=
 SUM(out
Vjf[skill!,wealth])+out VKap
f[wealth]
- (421) out Vjf[skill,wealth]=
 (1 + delta
Vjf[skill,wealth]) * share
Vjf[skill,wealth] * CVj[skill]
- (422) out VKap f[wealth]=
 (1+delta
VKap[wealth])*share Vf
Kap[wealth]*CV Kap
- (423) outk[industry]=
 k i[industry]*depr k
i[industry]
- (424) Output FD i[industry]=
 SUM(Leont
ii[industry,industry!]*FD i
nom[industry!])
- (425) Output i delay[industry]=
DELAY FIXED (
 Output i
real[industry] , 1 , initial
Output i[industry])
- (426) Output i real[industry]=
 MIN(SUM(Leont
ii[industry,industry!]*FD i
nom[industry!]/p i[industry]),
 yFC i[industry])
- (427) outV=
 Tot CYV
- (428) outV c=
 CYV Kap
- (429) outVj[skill]=
 CYVj[skill]
- (430) p Bond=
 (p Bond delay+0.001*B
supply/Stock Bond real)+0/p Bond
0
- (431) p Bond 0=
 0.563
- (432) p Bond delay= DELAY FIXED (
 p Bond , 1 , 1)
- (433) p dom i[industry]=
 p i[industry]
- (434) p elast=
 1
- (435) p ELG i[industry]=
 1.04783,
 1.38832,
 0.348861,
 0.618738,
 0.513925,
 1.99795,
 2.99241,
 0.201499,
 0.210256,
 1
- (436) p En rate i[industry]
:EXCEPT:
[Electricity],[Fossil Energy]=
 coef pEN[industry]
 p En rate i[Fossil Energy]=
 p nrg rate
exog[liquid]
 p En rate i[Electricity]=
 p nrg rate
exog[electrRenew]*beta ELG elect
delay +
 p nrg rate
exog[gas]*beta ELG gas delay
- (437) p Eq= INTEG (
 MIN(MAX(0.001*E
demand/Stock Eq supply,-0.02*p
Eq),0.02*p Eq),
 1)
- (438) p Eq delay= DELAY FIXED (
 p Eq, 1 , 1)
- (439) p ETS=
 7*1000
- (440) p FF i[industry]=
 0.304167,
 0.772913,
 0.709829,
 0.210828,
 0.0548595,

- 1.85902,
0.203779,
0.353011,
0.289806,
1
- (441) $p_{gfcf}[industry] = (1 - \mu_{GFCFi}[industry]) * p_{dom} i[industry] + \mu_{GFCFi}[industry] * p_{imp} i[industry]$
- (442) $p_i[industry] = \text{SMOOTH} \left(\left(1 + (1 + \lambda_{sens} p_i[industry] * g_{\lambda} i_{delay}[industry]) * \text{markup}_i[industry] + \text{MAX}(p_{elast} * (uc_i_{delay}[industry] - uc_i_{normal}[industry]) + \text{taxVAT}_{rate} i[industry], 0) \right) * (ULC_{delay}[industry] + UMC_{delay}[industry]) / p_{i0}[industry] \right)$
- (443) $p_{i0}[industry] = 1.025, 0.9107, 1.136, 1.099, 0.9102, 0.6339, 0.9392, 0.9365, 1.071, 4.042$
- (444) $p_{i0norm}[industry] = 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1$
- (445) $p_{i_{delay}}[industry] = \text{DELAY FIXED} (p_i[industry], 1, p_{i0norm}[industry])$
- (446) $p_{i_{rate}}[industry] = (p_i[industry] - p_{i_{delay}}[industry]) / p_{i_{delay}}[industry]$
- (447) $p_{imp} i[industry] = p_{dom} i[industry]$
- (448) $p_k = \text{SUM}(\kappa_{pk} i[industry!]) * p_{gfcf}[industry!]$
- (449) $p_{nrg} = p_{nrg0}[nrg] * (1 + p_{nrg_{rate\ exog}}[nrg] * \text{Time})$
- (450) $p_{nrg0}[nrg] = 1, 1, 1, 1$
- (451) $p_{nrg_{rate\ exog}}[nrg] = 0, 0, 0, 0$
- (452) $p_{nrg_{share}}[nrg] = p_{nrg}[nrg] / \text{SUM}(p_{nrg}[nrg!]) + 1/4$
- (453) $p_{S14} i[industry] = \mu_{S14} i[industry] * p_{imp} i[industry] + (1 - \mu_{S14} i[industry]) * p_{dom} i[industry]$
- (454) $\text{per capita GDP index} = \text{GDP}_{perCap} / \text{nom} / 36190 * 100$
- (455) $\text{per capita GDP index real} = \text{GDP}_{perCap} / \text{real} / 36190 * 100$
- (456) $\text{Per capita GDP real index} = \text{GDP}_{perCap} / \text{real} / 361.929$
- (457) $\text{Pop 0 To 14} = \text{INTEG} ((\text{births} - \text{deaths}_{0\ to\ 14} - \text{maturation}_{14\ to\ 15}) , \text{initial pop 0 to 14})$
- (458) $\text{Pop 15 To 44} = \text{INTEG} ((\text{maturation}_{14\ to\ 15} - \text{deaths}_{15\ to\ 44} - \text{maturation}_{44\ to\ 45}) , \text{initial pop 15 to 44})$

- (459) Pop 45 To 64= INTEG (maturation 44 to 45 - deaths 45 to 64 - maturation 64 to 65), initial pop 54 to 64)
- (460) Pop 65 Plus= INTEG (maturation 64 to 65 - deaths 65 plus), initial pop 65 plus)
- (461) pop eq= 2100
- (462) pop for gini[G1]= N inA j[low]/adult pop
pop for gini[G2]= N inA j[middle]/adult pop
pop for gini[G3]= N inA j[high]/adult pop
pop for gini[G4]= N Pj[low]/adult pop
pop for gini[G5]= N Pj[middle]/adult pop
pop for gini[G6]= N Pj[high]/adult pop
pop for gini[G7]= N Uj[low]/adult pop
pop for gini[G8]= N Uj[middle]/adult pop
pop for gini[G9]= N Uj[high]/adult pop
pop for gini[G10]= (SUM(N Eji[low,industry!])+JG Ej[low])/adult pop
pop for gini[G11]= (SUM(N Eji[middle,industry!])+JG Ej[middle])/adult pop
pop for gini[G12]= (SUM(N Eji[high,industry!])+JG Ej[high])/adult pop
pop for gini[G13]= N Kap/adult pop
- (463) pop groups[for gini]= adult pop*pop for gini[for gini]
- (464) POP Index= Tot POP/659423
- (465) pop ordered[sfor gini]= share pop for Gini[sfor gini]
- (466) POP Working age= Pop 15 To 44 + Pop 45 To 64
- (467) popAGE: pop014, pop1544, pop4564, pop65p
- (468) Prob gamma2 i[industry]= coef gamma2*(1+20*Xi[industry])
- (469) Prob gamma3 i[industry]= coef gamma3*(1-20*Xi[industry])
- (470) prop emp[skill]= SUM(N Eji[skill,industry!])/N Aj[skill]
- (471) prop innac[skill]= N inA j[skill]/N Aj[skill]
- (472) prop pens[skill]= N Pj[skill]/(N Aj[skill]+N Pj[skill])
- (473) prop unemp[skill]= N Uj[skill]/N Aj[skill]
- (474) PUBLIC EX TRANS UB= SUM(TrSoc j[skill!])+SUM(GUB j[skill!])
- (475) PW ratio= 0.799
- (476) randN eta2[industry]= RANDOM NORMAL(-0.05 , 0.2 , 0.05 , 0.005 , 1)
- (477) randN eta3[Agriculture]=

Full List of Equations

```

RANDOM NORMAL(0, 0.15,
0.075, 0.025, 1 )
randN eta3[Mining]=
RANDOM NORMAL(0 , 0.06
, 0.03 , 0.01 , 1 )
randN eta3[Fossil Energy]=
RANDOM NORMAL(0 , 0.06
, 0.03 , 0.01 , 1 )
randN eta3[Manufacturing]=
RANDOM NORMAL(0 , 0.06
, 0.03 , 0.01 , 1 )
randN eta3[Electricity]=
RANDOM NORMAL(0 , 0.06
, 0.03 , 0.01 , 1 )
randN eta3[Construction]=
RANDOM NORMAL(0 , 0.06
, 0.03 , 0.01 , 1 )
randN eta3[Nonfinancial and
Social Economy]=
RANDOM NORMAL(0 , 0.06
, 0.03 , 0.01 , 1 )
randN eta3[Financial
sector]=
RANDOM NORMAL(0 , 0.06
, 0.03 , 0.01 , 1 )
randN eta3[Public sector]=
RANDOM NORMAL(0 , 0.06
, 0.03 , 0.01 , 1 )
randN eta3[Other]=
RANDOM NORMAL(0 , 0.06
, 0.03 , 0.01 , 1 )

(478) randN lambda2[industry]=
RANDOM NORMAL(0 , 0.06
, 0.03 , 0.01 , 1 )

(479) randN lambda3[industry]=
RANDOM NORMAL(-0.1 ,
0.1 , 0 , 0.005 , 1 )

(480) randU gamma2 i[industry]=
RANDOM UNIFORM(0 , 1 ,
seed)

(481) randU gamma3 i[industry]=
RANDOM UNIFORM(0 , 1 ,
seed)

(482) randU gamma4 i[industry]=
RANDOM UNIFORM(0 , 1
,seed)

(483) rate p ex=
(p Eq-p Eq delay)/p Eq
delay

(484) real CYV j[skill]=
alphaY j[skill]*real
YDj delay[skill] +
alphaV j[skill]*real
VDj delay[skill]

(485) real CYV Kap=
alphaV Kap * real YVD
Kap delay

(486) real CYVeff
ji[skill,industry]=
beta eff
i[industry]*real CYV j[skill]

(487) real CYVeff Kap i[industry]=
beta eff
i[industry]*real CYV Kap

(488) real Exp i[industry]=
Initial Exp
i[industry]*
(1 - elast p exp*p i
rate[industry])*
( 1 +(0.01 + g
exog)*(Time))

(489) real Imp i[industry]
:EXCEPT: [Nonfinancial and
Social Economy]=
Tot CYVeff i
imp[industry] +
Tot Zimp i[industry]*p
i[industry]+
GFCF imp i[industry]
real Imp i[Nonfinancial and
Social Economy]=
Tot CYVeff i
imp[Nonfinancial and Social
Economy]+
Tot Zimp
i[Nonfinancial and Social
Economy]+
GFCF imp
i[Nonfinancial and Social
Economy]+
Gov imp*p
i[Nonfinancial and Social
Economy]

(490) real Tot Exp=
SUM(real Exp
i[industry!])

(491) real Tot Exp delay= DELAY
FIXED (

```

```

    real Tot Exp, 1 ,
5.57523e+011*(0.992))
(492) real Tot Imp=
    SUM(real Imp
i[industry!])
(493) real Trade Bal i[industry]=
    real Exp i[industry] -
    real Imp i[industry]
(494) real VD j[skill]=
    VD j[skill]/CPI
(495) real VDj delay[skill]= DELAY
FIXED (
    real VD j[skill], 1 ,
initial real VDj[skill])
(496) real YD j[skill]=
    YD j[skill]/CPI
(497) real YDj delay[skill]= DELAY
FIXED (
    real YD j[skill] , 1
, (initial real YD j[skill]))
(498) real YVD Kap=
    YVD Kap/CPI
(499) real YVD Kap delay= DELAY
FIXED (
    real YVD Kap , 1 ,
initial real VDKap)
(500) real YVDj[skill]=
    YVD j[skill]/CPI
(501) reproductive lifetime = 30
(502) Rnw HH=
    s Rnw HH*TPES HH
(503) rrB=
    ((p Bond-p Bond
delay)/p Bond delay)-((CPI-CPI
delay)/CPI delay)+ir LTB
(504) rrB delay= DELAY FIXED (
    rrB net, 1 , rrB net)
(505) rrB net=
    (1-taxFin rate)*rrB
(506) rrB net delay=
    DELAY1(rrB net, 1 )
(507) rrEq=
    (SUM(GEq j[skill!]) +
GEq Kap + SUM(Dvd i[industry!]))
/ Stock Eq supply
(508) rrEq 0=
    0.025
(509) rrEq delay[industry]= DELAY
FIXED (
    rrEq , 1 , 0.03)
(510) rrEq delay3[industry]= DELAY
FIXED (
    rrEq delay[industry] ,
2 , 0.03)
(511) rrEq net=
    (1 - taxFin rate) *
rrEq - Inflation
(512) rrEq net delay= DELAY FIXED
(
    rrEq net , 1 , rrEq 0)
(513) s Elec HH=
    0.35324 +
    act En
mix*ramp(0.00025,5,30)
(514) s ELG Elec[solid]=
    s solid Elec
s ELG Elec[liquid]=
    s oil Elec
s ELG Elec[gas]=
    s gas Elec
s ELG Elec[electrRenew]=
    s Nuc Elect + s Renew
Elec
(515) s gas Elec=
    MAX(0.022638 - act En
mix*ramp(0.0005,5,36),0)
(516) s Gas HH=
    0.30142
(517) s Liq HH=
    0.16923-act En
mix*ramp(0.0005,5,50)
(518) s Nuc Elect=
    MAX(0.775108 -
act En
mix* ramp(jump Nucl, 5,36),0)

```

- (519) s NUCLEAR TPES=
Elec Nuc/TPES io
- (520) s oil Elec=
0.003726
- (521) s Renew Elec=
1 - (s gas Elec + s
Nuc Elect + s oil Elec + s solid
Elec)
- (522) s Rnw HH=
0.16977+act En
mix*ramp(0.0005,5,30)
- (523) s Rnw TPES=
Elec Rnw/TPES io
- (524) s Sol HH=
0.00633-act En
mix*ramp(0.00025,5,30)
- (525) s solid Elec=
MAX(0.028699 - act En
mix*ramp(0.001,5,36),0)
- (526) SAVEPER =
TIME STEP
- (527) sector:
Agriculture,
Mining,
Fossil Energy,
Manufacturing,
Electricity,
Construction,
Nonfinancial and
Social Economy,
Financial sector,
Public sector,
Other
- (528) seed=
1
- (529) sens BCE=
0.5
- (530) sens GFcGi cash[industry]=
0.01,0.1,0.01,0.1,0.1,0.1,0.
1,0.1,0,0
- (531) sens HM=
0.85+ramp(0.05,2,9)
- (532) sens k uc i[industry]=
0.05,
0.05,
0.05,
0.03,
0.01,
0.02,
0.03,
0.05,
0.02,
0
- (533) sens LM=
0.75+ramp(0.05,2,9)
- (534) sens MH=
0.45+ramp(0.05,2,20)
- (535) sens ML=
1 + ramp(0.05,2,9)
- (536) sfor gini:
(sort1-sort13)->for
gini
- (537) share Ci[Agriculture]=
0.0166039
share Ci[Mining]=
0.000140174
share Ci[Fossil Energy]=
0.0234384
share Ci[Manufacturing]=
0.173117
share Ci[Electricity]=
0.0299639
share Ci[Construction]=
0.234827
share Ci[Nonfinancial and
Social Economy]=
0.403315 *
(1 - MIN(
SMOOTH(JG PubPriv ratio*subs
PubPriv Serv,3)
,share Services)
)
share Ci[Financial sector]=
0.0506149
share Ci[Public sector]=
0.0650389
share Ci[Other]=
0.00294085
- (538) share Cimp i[industry]=

```

0.3265,
0,
0.2487,
0.5204,
0,
0,
0.0746,
0,
0,
0
(539) share E full time
i[industry]=
0.7,
0.7,
0.7,
0.7,
0.7,
0.7,
0.7,
0.7,
0.7,
0.7
(540) share Elect i[industry]=
0.198986,
0.366864,
0.598153,
0.260951,
0.901985,
0.179163,
0.0803069,
0.571632,
0.571632,
0.571632
(541) share ELG i[industry]=
share nrg
i[electrRenew,industry]+share nrg
i[gas,industry]
(542) share ELG nrg[nrg]=
gamma ELG gas[nrg]*
beta ELG gas delay+s ELG
Elec[nrg]* beta ELG elect delay
(543) share EN ETS[Fossil Energy]=
CO2 i[Fossil
Energy]/(CO2 i[Fossil Energy]+CO2
i[Electricity])
share EN ETS[Electricity]=
CO2
i[Electricity]/(CO2 i[Fossil
Energy]+CO2 i[Electricity])
(544) share En nrg i
delay[nrg,industry]= DELAY FIXED
(
share nrg
i[nrg,industry] , 1 ,initial
share nrg i[nrg,industry])
(545) share Eq high=
Eq high delay/Eq delay
(546) share Eq Kap=
Eq Kap delay/Eq delay
(547) share Eq middle=
Eq middle delay/Eq
delay
(548) share FD HH[industry]=
Tot CYVeff i
dom[industry]/Tot FD HH
(549) share FF i[industry]=
share nrg
i[liquid,industry] + share nrg
i[solid,industry]
(550) share GFCF imp i[industry]=
5.32569e-005,
8.01851e-005,
7.97326e-005,
0.102489,
0,
0,
0.0249391,
0,
0,
0
(551) share GFCG i nom[industry]=
GFCG i
nom[industry]/Tot GFCF
(552) share Gov C[industry]=
0,
0,
0,
0,
0,
0.19279,
0,
0.806463,
0.000747403
(553) share Gov imp=
0.0311997

```

(554) share GWB Ej[skill]=
SUM(GWB
Eji[skill,industry!])/Tot GWB E

(555) share high=
LFS high / Tot LFS

(556) share income for Gini[sfor
gini]=
VECTOR REORDER(share
of income for gini[for gini] ,
Income ordered for Gini
[for gini])

(557) share low=
0.195*
(1-
ramp(0.0015,1,100))*
(1+transitions LM)

(558) share middle=
0.4808*
(1-
ramp(0.0002,1,100))*
(1+transitions LM+transitions MH)

(559) share nrg i[solid,industry]=
share En nrg i
delay[solid,industry] +
act En mix * Elect
delay[solid,industry]
share nrg
i[liquid,industry]=
share En nrg i
delay[liquid,industry]+
act En mix * Elect
delay[liquid,industry]
share nrg i[gas,industry]=
share En nrg i
delay[gas,industry]+
act En mix * Elect
delay[gas,industry]
share nrg
i[electrRenew,industry]=
share En nrg i
delay[electrRenew,industry] +
act En mix * Elect
delay[electrRenew,industry]

(560) Share Nuclear Electr tpes=
s Nuc Elect/(s Nuc
Elect+s Renew Elec)*share TPES
energy[electrRenew]

(561) share of GWB j[skill]=
SUM(GWB
Eji[skill,industry!])/SUM(GWB
Eji[skill!,industry!])

(562) share of income for gini[for
gini]=
Gini[for gini]/total
income

(563) share of income ordered[sfor
gini]=
VECTOR REORDER(share of
income for gini[for gini] , sort
order for gini[for gini
])

(564) SHARE OF JG=
SUM(JG
Ej[skill!])/(SUM(JG
Ej[skill!])+Tot N E)

(565) share pop for Gini[sfor
gini]=
VECTOR REORDER(pop for
gini[for gini] , Income ordered
for Gini[for gini]
)

(566) share Renewable electricity
tpes=
s Renew Elec/(s Nuc
Elect+s Renew Elec)*share TPES
energy[electrRenew]

(567) share Services=
0.25

(568) share skill[low]=
share low
share skill[middle]=
share middle
share skill[high]=
share high

(569) share Tot CYVimp=
Tot CYV imp/Tot CYV

(570) share TPES energy[nrg]=
TPES nrg[nrg]/TPES io

(571) share Uj[skill]=
Uj[skill]/Tot U

```

(572) share Vf Kap[wealth]=
      0.0176702, 0.509867,
0.472463

(573) share Vj 0[skill]=
      0.022,
      0.113,
      0.704

(574) share
Vjf[skill,wealth]=TABBED ARRAY(
      1      0      0
      0.687906  0.312094
      0
      0.180301  0.765709
      0.0539907)

(575) share VKap 0=
      0.161

(576) share Zimp ii[Agriculture,
industry]=
      0.0125766,
      6.36127e-005,
      0.00011268,
      0.00446792,
      0.00011993,
      0.000206554,
      0.000291762,
      2.56876e-005,
      4.93477e-005,
      0
      share Zimp
ii[Mining,industry]=
      0.00137329,
      0.0107327,
      0.368257,
      0.00538495,
      0.0810478,
      0.00199799,
      0.000218595,
      4.43599e-005,
      0.000220516,
      0
      share Zimp ii[Fossil
Energy,industry]=
      0.015658,
      0.0135959,
      0.033025,
      0.0077773,
      0.00402143,
      0.00327355,
      0.00663166,
      0.000550322,
      0.00166223,
      0

      share Zimp
ii[Manufacturing,industry]=
      0.0725953,
      0.0925579,
      0.0805233,
      0.164392,
      0.0389104,
      0.0615788,
      0.0265154,
      0.00374814,
      0.018303,
      0
      share Zimp ii[Nonfinancial
and Social Economy,industry]=
      0.0148958,
      0.0257121,
      0.0929613,
      0.0277415,
      0.0275472,
      0.0196021,
      0.0326719,
      0.023365,
      0.0138821,
      0

(577) sigma
ji[skill,industry]=TABBED ARRAY(
      0.241 0.351 0.191 0.191
      0.056 0.228 0.182 0.049 0.141
      0.268
      0.587 0.425 0.515 0.515
      0.447 0.56 0.441 0.267 0.388
      0.471
      0.172 0.224 0.294 0.294
      0.497 0.212 0.377 0.689 0.471
      0.261)

(578) skill:
      low, middle, high

(579) sort order for gini[for
gini]=
      0

(580) Stock Bond real= INTEG (
      in b r,
      Bond real 0)

(581) Stock Bond real delay= DELAY
FIXED (
      Stock Bond real , 1 ,
      0)

(582) Stock Eq supply= INTEG (
      new Eq,
      2.13e+011)

```

- (583) Stock Tot V= INTEG (inV - outV, initial Tot V)
- (584) Stock V jf delay[skill,wealth]= DELAY FIXED (Stock Vjf[skill,wealth], 1, Stock Vjf[skill,wealth])
- (585) Stock V Kap= INTEG (inV c-outV c, initial Tot VKap)
- (586) Stock V Kap f[wealth]= INTEG (in VKap f[wealth]-out VKap f[wealth], V0 Kap f[wealth])
- (587) Stock V Kap f delay[wealth]= DELAY FIXED (Stock V Kap f[wealth], 1, Stock V Kap f[wealth])
- (588) Stock Vf[wealth]= INTEG (in Tot Vf[wealth]-out Vf[wealth], initial Tot Vf[wealth])
- (589) Stock Vj[skill]= INTEG (in Vj[skill]-outVj[skill], initial Tot Vj[skill])
- (590) Stock Vjf[skill,wealth]= INTEG (in Vjf[skill,wealth] - out Vjf[skill,wealth], V0 jf[skill,wealth])
- (591) subs PubPriv Serv= 1
- (592) Tax BCA i[industry] :EXCEPT: [Agriculture]= Imp CO2 i[industry]*Carbon Tax rate 2030*act BCA
- Tax BCA i[Agriculture]= 0
- (593) Tax FinG j[skill]= taxFin rate*(SUM(Int V jf[skill,wealth!])+Dvd j[skill]+MAX(GBond j[skill], 0)+MAX(GEq j[skill], 0))
- (594) Tax FinG Kap= taxFin rate*(SUM(Int V Kap f[wealth!]) + Dvd Kap +MAX(GBond Kap, 0)+MAX(GEq Kap, 0))
- (595) tax floor 2[skill]= (initial tax floor 2-act BI*BI per cap[skill])*index avg Wage
- (596) tax floor 3[skill]= (initial tax floor 3-act BI*BI per cap[skill])*index avg Wage
- (597) tax floor 4[skill]= (initial tax floor 4-act BI*BI per cap[skill])*index avg Wage
- (598) tax floor 5[skill]= (initial tax floor 5-act BI*BI per cap[skill])*index avg Wage
- (599) Tax HH= SUM(TaxA Eji[skill!,industry!]) + SUM(TaxA Pj[skill!]) + SUM(TaxA Uj[skill!]) + SUM(TaxB Eji[skill!,industry!]) + SUM(TaxB Pj[skill!]) + SUM(TaxB Uj[skill!]) + SUM(TaxD613 Eji[skill!,industry!]) + SUM(TaxD613 Pj[skill!]) + SUM(TaxD613 Uj[skill!]) + SUM(Tax FinG j[skill!]) + Tax FinG Kap
- (600) Tax Lab= SUM(Tax Lab i[industry!])-Tax Lab i[Public sector]

(601) Tax Lab i [industry]= taxD12 rate i [industry]*SUM(GWB E j [skill!, industry])	(617) TaxB E j [skill, industry]= (taxB E 2 rate* MIN(tax floor 3[skill]-tax floor 2[skill],
(602) Tax V= Stock Tot V * taxV rate	MAX(base TaxB E*(wageh max E j i [skill, industry]*H E i [industry])-tax floor 2[skill], 0)) +
(603) Tax VAT= SUM(Tax VAT i [industry!])	taxB E 3 rate* MIN(tax floor 4[skill]-tax floor 3[skill],
(604) Tax VAT i [industry]= VAd i [industry]*taxVAT rate i [industry]	MAX(base TaxB E*(wageh max E j i [skill, industry]*H E i [industry])-tax floor 3[skill], 0)) +
(605) taxA E base= 0.9825	taxB E 4 rate* MIN(tax floor 5[skill]-tax floor 4[skill],
(606) taxA E rate= 0.097	MAX(base TaxB E*(wageh max E j i [skill, industry]*H E i [industry])-tax floor 4[skill], 0)) +
(607) TaxA E j [skill, industry]= taxA E rate*taxA E base*GWB E j [skill, industry]	taxB E 5 rate*MAX(base TaxB E*(wageh max E j i [skill, industry]*H E i [industry])-tax floor 5[skill], 0)) * N
(608) taxA P rate= 0.088	E j [skill, industry]
(609) TaxA P j [skill]= taxA P rate*GPB j [skill]	(618) taxB P base= 1-0.059-0.073
(610) taxA U base= 0.9825	(619) TaxB P j [skill]= (taxB E 2 rate*MIN(tax floor 3[skill]-tax floor 2[skill], MAX(taxB P base *income P j [skill]-tax floor 2[skill] , 0)) +
(611) taxA U rate= 0.067	taxB E 3 rate*MIN(tax floor 4[skill]-tax floor 3[skill], MAX(taxB P base *income P j [skill]-tax floor 3[skill] , 0)) +
(612) TaxA U j [skill]= taxA U rate*taxA U base*GUB j [skill]	taxB E 4 rate*MIN(tax floor 5[skill]-tax floor 4[skill], MAX(taxB P base *income P j [skill]-tax floor 4[skill] , 0)) +
(613) taxB E 2 rate= 0.14	taxB E 5 rate*MAX(taxB P base*income P j [skill]-tax floor 5[skill] , 0) * N P j [skill]
(614) taxB E 3 rate= 0.3	
(615) taxB E 4 rate= 0.41	
(616) taxB E 5 rate= 0.45	

(620) taxB U base= 1-0.038-0.053	taxD613 P rate*GPB j[skill]*coef taxD613
(621) TaxB U j[skill]= (taxB E 2 rate*MIN(tax floor 3[skill]-tax floor 2[skill], MAX(taxB U base *UB j[skill]-tax floor 2[skill], 0)) + taxB E 3 rate*MIN(tax floor 4[skill]-tax floor 3[skill], MAX(taxB U base *UB j[skill]-tax floor 3[skill], 0)) + taxB E 4 rate*MIN(tax floor 5[skill]-tax floor 4[skill], MAX(taxB U base *UB j[skill]-tax floor 4[skill], 0)) + taxB E 5 rate*MAX(taxB U base*UB j[skill]- tax floor 5[skill], 0)) *coverage UB ratio*N Uj[skill]	(628) taxD613 U rate= 0.053
(622) TaxC02 i[industry]= Carbon Tax rate 2030 * CO2 for carbon Tax[industry]	(629) TaxD613 Uj[skill]= taxD613 U rate*GUB j[skill]*coef taxD613
(623) taxD12 rate i[industry]= 0.4313, 0.3991, 0.6987, 0.372, 0.8171, 0.2596, 0.3186, 0.4355, 0.5065, 0.1706	(630) TaxF i[industry]= MAX(taxF rate i[industry]*GF i[industry], 0)
(624) taxD613 E rate= 0.14	(631) taxF rate i[industry]= IF THEN ELSE(Time>7, 0.25, IF THEN ELSE(Time>6, 0.265, IF THEN ELSE(Time>5, 0.28, IF THEN ELSE(GF i[industry]>500000 , IF THEN ELSE(Time>4, 0.31, 0.3333), 0.28
(625) TaxD613 Eji[skill,industry]= (taxD613 E rate)*GWB Eji[skill,industry]*coef taxD613	(632) taxFin rate= 0.3
(626) taxD613 P rate= 0.073	(633) taxV rate= 0.00015*(1 + coeff taxV DG)
(627) TaxD613 Pj[skill]=	(634) taxVAT rate i[industry]= 0.045, 0.1, 0.2, 0.15, 0.2, 0.12, 0.177, 0.2, 0.055, 0.1
	(635) TC1i[industry]=

$$\frac{\text{SUM}(\text{wageh}_{ji[\text{skill!}, \text{industry}] * \sigma_{ji[\text{skill!}, \text{industry}]} * \text{Output}_i \text{real}[\text{industry}] + \text{real}[\text{industry}] / \lambda_1[\text{industry}] +$$

$$p_{\text{ELG}} i[\text{industry}] * \text{Output}_i \text{real}[\text{industry}] * \text{share}_{\text{ELG}} i[\text{industry}] / \eta_1[\text{industry}] +$$

$$p_{\text{FF}} i[\text{industry}] * \text{Output}_i \text{real}[\text{industry}] * \text{share}_{\text{FF}} i[\text{industry}] / \eta_1[\text{industry}] +$$

$$(\text{TaxC02}_i i[\text{industry}] + \text{cost}_{\text{ETS}} i[\text{industry}]) / \eta_1[\text{industry}]$$

(636) $\text{TC2}_i i[\text{industry}] = \frac{\text{SUM}(\text{wageh}_{ji[\text{skill!}, \text{industry}] * \sigma_{ji[\text{skill!}, \text{industry}]} * \text{Output}_i \text{real}[\text{industry}] + \text{real}[\text{industry}] / \lambda_2[\text{industry}] +$

$$p_{\text{ELG}} i[\text{industry}] * \text{Output}_i \text{real}[\text{industry}] * \text{share}_{\text{ELG}} i[\text{industry}] / \eta_2[\text{industry}] +$$

$$p_{\text{FF}} i[\text{industry}] * \text{Output}_i \text{real}[\text{industry}] * \text{share}_{\text{FF}} i[\text{industry}] / \eta_2[\text{industry}] +$$

$$(\text{TaxC02}_i i[\text{industry}] + \text{cost}_{\text{ETS}} i[\text{industry}]) / \eta_2[\text{industry}]$$

(637) $\text{TC3}_i i[\text{industry}] = \frac{\text{SUM}(\text{wageh}_{ji[\text{skill!}, \text{industry}] * \sigma_{ji[\text{skill!}, \text{industry}]} * \text{Output}_i \text{real}[\text{industry}] + \text{real}[\text{industry}] / \lambda_3[\text{industry}] +$

$$p_{\text{ELG}} i[\text{industry}] * \text{Output}_i \text{real}[\text{industry}] * \text{share}_{\text{ELG}} i[\text{industry}] / \eta_3[\text{industry}] +$$

$$p_{\text{FF}} i[\text{industry}] * \text{Output}_i$$

$$\text{real}[\text{industry}] * \text{share}_{\text{FF}} i[\text{industry}] / \eta_3[\text{industry}] + (\text{TaxC02}_i i[\text{industry}] + \text{cost}_{\text{ETS}} i[\text{industry}]) / \eta_3[\text{industry}]$$

(638) $\text{TC4}_i i[\text{industry}] = \frac{\text{SUM}(\text{wageh}_{ji[\text{skill!}, \text{industry}] * \sigma_{ji[\text{skill!}, \text{industry}]} * \text{Output}_i \text{real}[\text{industry}] + \text{real}[\text{industry}] / \lambda_4[\text{industry}] + p_{\text{ELG}} i[\text{industry}] * \text{Output}_i \text{real}[\text{industry}] * \text{share}_{\text{ELG}} i[\text{industry}] / \eta_4[\text{industry}] +$

$$p_{\text{FF}} i[\text{industry}] * \text{Output}_i \text{real}[\text{industry}] * \text{share}_{\text{FF}} i[\text{industry}] / \eta_4[\text{industry}] +$$

$$(\text{TaxC02}_i i[\text{industry}] + \text{cost}_{\text{ETS}} i[\text{industry}]) / \eta_4[\text{industry}]$$

(639) Time BI= 50

(640) Time CR= 50

(641) Time ENmix= 50

(642) time HEFF= 50

(643) Time HLP= 50

(644) Time JG= 50

(645) Time Nucl zero= 2050 - 2014

(646) TIME STEP = 1

(647) Time WTR= 50

(648) time2030: y2014, y2015,

y2016,	share Cimp
y2017,	i[industry]*Tot CYVeff
y2018,	i[industry]
y2019,	
y2020,	(660) Tot Debt=
y2021,	SUM(Debt i[industry!])
y2022,	
y2023,	(661) Tot Dvd=
y2024,	SUM(Tot Dvd
y2025,	i[industry!])
y2026,	
y2027,	(662) Tot Dvd i[industry]=
y2028,	Extra Dvd i[industry]
y2029,	+ Dvd i[industry]
y2030	
(649) toIndustry<->	(663) Tot Elec=
industry	Elec HH + TPES Elec
(650) Tot CO2 Gas=	(664) Tot ETS=
SUM(CO2 Gas	SUM(cost ETS
i[industry!]) + CO2 HH nrg[gas]	i[industry!])
(651) TOT CO2 HH=	(665) Tot FD HH=
CO2 HH nrg[solid] +	SUM(Tot CYVeff i
CO2 HH nrg[liquid] +CO2 HH	dom[industry!])
nrg[gas]	
	(666) Tot FD HH delay= DELAY FIXED
(652) Tot CO2 Liq=	(
SUM(CO2 Liq	Tot FD HH, 1 ,
i[industry!])+ CO2 HH nrg[liquid]	9.07653e+011)
(653) Tot CO2 Sect=	(667) Tot GFCF=
SUM(CO2 i[industry!])	SUM(GFCG i
	nom[industry!])
(654) Tot CO2 Sol=	(668) Tot GFCF delay= DELAY FIXED
SUM(CO2 Sol	(
i[industry!])+ CO2 HH nrg[solid]	Tot GFCF, 1 ,
	4.09e+011)
(655) Tot CYV=	(669) Tot GWB E=
CYV Kap +	SUM(GWB
SUM(CYVj[skill!])	Eji[skill!,industry!])
(656) Tot CYV imp=	(670) Tot in JG Ej=
SUM(Tot CYVeff i	SUM(in JG Ej[skill!])
imp[industry!])	
(657) Tot CYVeff i[industry]=	(671) Tot LFS=
Tot CYV * beta eff	POP Working age * LFP
i[industry]	rate
(658) Tot CYVeff i dom[industry]=	(672) Tot N E=
Tot CYVeff i[industry]	SUM(N Ei[industry!])
* (1-share Cimp i[industry])	
(659) Tot CYVeff i imp[industry]=	(673) Tot NEyFC ji[skill]=

<p>(674) Tot NF= SUM(NF i[industry!])</p> <p>(675) Tot Output real= SUM(Output i real[industry!])</p> <p>(676) Tot POP= Pop 0 To 14 + Pop 15 To 44 + Pop 45 To 64 + Pop 65 Plus</p> <p>(677) Tot real C noKap= SUM(real CYV j[skill!])</p> <p>(678) Tot real CYV= SUM(real CYV j[skill!]) + real CYV Kap</p> <p>(679) Tot real Trade Bal= SUM(real Trade Bal i[industry!])</p> <p>(680) Tot real YVD= real YVD Kap + Tot real YVD noKap</p> <p>(681) Tot real YVD noKap= SUM(real YVDj[skill!])</p> <p>(682) Tot realCYVeff i[industry]= SUM(real CYVeff ji[skill!,industry]) + real CYVeff Kap i[industry]</p> <p>(683) "Tot Rnw/TPES"= (Elec Rnw+Rnw HH)/Tot TPES</p> <p>(684) Tot Tax BCA= SUM(Tax BCA i[industry!])</p> <p>(685) Tot Tax CO2= SUM(TaxCO2 i[industry!])</p> <p>(686) Tot TaxF=</p>	<p>SUM(TaxF i[industry!]) - TaxF i[Public sector]</p> <p>(687) Tot TPES= TPES HH+TPES io</p> <p>(688) Tot TrB= SUM(TrB j[skill!])</p> <p>(689) Tot U= SUM(LFS j[skill!]) - Tot N E - SUM(JG Ej[skill!])</p> <p>(690) Tot U rate= Tot U/SUM(LFS j[skill!])</p> <p>(691) Tot Wage j[skill]= SUM(wageh max E ji[skill,industry!]*N Eji[skill,industry!]*H Ei[industry!])</p> <p>(692) Tot YVD= SUM(YVD j[skill!]) + YVD Kap</p> <p>(693) Tot Zimp i [Agriculture]= SUM(Zimp ii[Agriculture,industry!]) Tot Zimp i[Mining]= SUM(Zimp ii[Mining,industry!]) Tot Zimp i[Fossil Energy]= SUM(Zimp ii[Fossil Energy,industry!]) Tot Zimp i[Manufacturing]= SUM(Zimp ii[Manufacturing,industry!]) Tot Zimp i[Electricity]= 0 Tot Zimp i[Construction]= 0 Tot Zimp i[Nonfinancial and Social Economy]= SUM(Zimp ii[Nonfinancial and Social Economy,industry!]) Tot Zimp i[Financial sector]= 0 Tot Zimp i[Public sector]= 0 Tot Zimp i[Other]=</p>
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0 ,

(694) total income= sens LM*d uML)
SUM(Gini[for gini!]))

(695) TPES Elec= ,4) ,
SUM(TPES i[industry!]*share Elect -0.043)
i[industry!])

(696) TPES HH= (702) transitions MH=
(Tot realCYVeff IF THEN
i[Fossil Energy]+Tot realCYVeff ELSE(Time>0,(1+ramp(0.005,1,10))*
i[Electricity])/etaHH/1e+006 SMOOTH(IF THEN ELSE(d uHM=0, 0 ,
IF THEN ELSE(d uHM>0, sens
HM*d uHM , sens MH*d uHM)),4),-
0.019)

(697) TPES HH nrg[solid]= (703) TrB j[skill]=
s Sol HH*TPES HH GPB j[skill] + GUB
TPES HH nrg[liquid]= j[skill] + TrSoc j[skill]
s Liq HH*TPES HH
TPES HH nrg[gas]=
s Gas HH*TPES HH

(698) TPES i[industry]= (704) TrSoc FC j delay[skill]=
Output i DELAY FIXED (
real[industry]/avg etaEN TrSoc FCj[skill] , 1 ,
i[industry]/1e+006 initial TrSoc FC j[skill]*N
Fj[skill])

(699) TPES io= (705) TrSoc FCj[skill]=
SUM(TPES i[industry!]) TrSoc FC j
delay[skill]*(1+Inflation)

(700) TPES nrg[solid]= (706) TrSoc j[skill]=
SUM(TPES TrSoc SD
i[industry!]*share nrg j[skill]+TrSoc FCj[skill]+TrSoc
i[solid,industry!]) RSAj[skill]+BI j[skill]
TPES nrg[liquid]=
SUM(TPES
i[industry!]*share nrg
i[liquid,industry!])
TPES nrg[gas]=
SUM(TPES
i[industry!]*share nrg
i[gas,industry!])
TPES nrg[electrRenew]=
SUM(TPES
i[industry!]*share nrg
i[electrRenew,industry!])

(701) transitions LM= (707) TrSoc RSAj[skill]=
IF THEN (1-act BI)*coverage
ELSE(Time>0,(1+ramp(0.01,1,10))* RSAj ratio[skill]*initial TrSoc
SMOOTH(IF THEN ELSE(d uML = 0, RSA j[skill]*(N inA j
0, [skill]+(1-act JG)*N
Uj[skill]))*(CPI)

(708) TrSoc SD j[skill]=
(MAX(TrSoc SD j
delay[skill]*(1+Inflation)-
0.0774*BI j[skill], 0))

(709) TrSoc SD j delay[skill]=
DELAY FIXED (
TrSoc SD j[skill] , 1
, initial TrSoc SD j[skill]*N
Aj[skill])

(710) U rate j[skill]=
Uj[skill]/LFS j[skill]

(711) U rate j delay[skill]= DELAY FIXED (U rate j[skill], 1 , initial U rate j[skill])	0.1029)	Tot U rate, 1 ,
(712) UB j[skill]= UBW ratio * ((SUM (GWB Eji[skill,industry!]))/ (SUM (N Eji[skill,industry!])))		(721) V equities= Stock Vf[equities]
(713) UBW ratio= 0.57		(722) V0 jf[skill,wealth]= initial Tot V*V0jf weights[skill,wealth]
(714) uc i[industry]= (Output FD i[industry]/p i[industry])/(yFC i[industry])		(723) V0 Kap f[wealth]= initial Tot V*V0f weights[wealth]
(715) uc i delay[industry]= DELAY FIXED (uc i[industry] , 1 , initial uc i[industry])		(724) V0f weights[wealth]= 0.00122222, 0.0352667, 0.0326795
(716) uc i normal[industry]= 0.75, 0.75, 0.75, 0.8, 0.7, 0.8, 0.8, 0.7, 0.75, 0.7		(725) V0jf weights[skill,wealth]=TABBED ARRAY(0.022 0 0 0.0777333 0.0352667 0 0.143489 0.609375 0.0429675)
(717) Uj[skill]= LFS j[skill] - N Ej[skill] - JG Ej[skill]		(726) VAd i[industry]= Output i real[industry] - Z i[industry] - Zimp i[industry]
(718) ULC delay[industry]= LabC i delay[industry]/Output i delay[industry]		(727) VD j[skill]= GFinY j[skill]-Tax FinG j[skill]
(719) UMC delay[industry]= (Zi delay[industry]+Zimp i delay[industry]+k deprec i[industry])/(Output i delay [industry])		(728) VD Kap= GFinY Kap - Tax FinG Kap
(720) "Unemployment rate-1"= DELAY FIXED ((729) W JG= 10.79*CPI
		(730) wageh ji[skill,industry]= (1- omegal) * (1 + omega lambda j[skill] * SMOOTH(g lambda i[industry], 3) + omega gNE j[skill] * g NE ji[skill,industry] - 0*omega gNU j[skill]*g NU j[skill]) *wageh ji delay[skill,industry]

- (731) wageh ji
 delay[skill,industry]= DELAY
 FIXED (wageh
 ji[skill,industry], 1 , initial
 wageh ji[skill,industry])
- (732) wageh max E
 ji[skill,industry]=
 MAX(wageh
 ji[skill,industry], act JG*W JG)
- (733) wealth:
 deposits , bonds ,
 equities
- (734) WTR reduction=
 5.09
- (735) Xi[industry]=
 ZEn rate i[industry] -
 LAB industry rate[industry]
- (736) YD j[skill]=
 NWB Ej[skill] + NUB
 j[skill] + NPB j[skill] +
 TrSoc j[skill] + MixY
 E j[skill]
- (737) YD Kap delay= DELAY FIXED (YD Kap,
 1 , initial
 YD Kap)
- (738) yFC i[industry]=
 eps k i[industry]*k
 i[industry]
- (739) Yups1[industry]=
 gamma1[industry]*(1-
 gamma2[industry])*(1-
 gamma3[industry])*(1-
 gamma4[industry
])
- (740) Yups2[industry]=
 gamma1[industry]*gamma2[indu
 stry]*(1-gamma3[industry])*(1-
 gamma4[industry
])
- (741) Yups3[industry]=
 gamma1[industry]*gamma3[indu
 stry]*(1-gamma2[industry])*(1-
 gamma4[industry
])
- (742) Yups4[industry]=
 gamma1[industry]*gamma2[indu
 stry]*gamma3[industry]*(1-
 gamma4[industry])
- (743) Yups5[industry]=
 gamma4[industry]
- (744) YVD j[skill]=
 YD j[skill] + VD
 j[skill]
- (745) YVD j delay [skill]= DELAY
 FIXED (YVD j[skill], 1 ,
 initial real YD j[skill])
- (746) YVD Kap=
 VD Kap + MixY Kap
- (747) Z E 0[industry]=
 2.38e+009,
 2.5e+008,
 2.26e+009,
 1.65e+010,
 4.98e+010,
 1.72e+009,
 1.97e+010,
 5.43e+008,
 5.02e+009,
 0
- (748) Z i[industry]=
 SUM(Zii[industry!,industry])
 + TaxC02 i[industry] + cost ETS
 i[industry]
 + Tax BCA i[industry]
- (749) ZEn delay i[industry]= DELAY
 FIXED (ZEn i[industry] , 1 ,
 Z E 0[industry])
- (750) ZEn i[industry]=
 (Zii[Fossil
 Energy,industry]+Zii[Electricity,
 industry])+TaxC02 i[industry
]+cost ETS i[industry]
- (751) ZEn rate i[industry]=

(ZEn i[industry] - ZEn delay i[industry])/MAX(ZEn delay i[industry],0.1)

(752) Zi delay[industry]= DELAY FIXED (Z i[industry] ,1 , initial Zi[industry])

(753) Zii[Agriculture,industry]= Acoeff[Agriculture,industry]*Output i real[industry] Zii[Mining,industry]= Acoeff[Mining,industry]*MAX(Output i real[industry],0) Zii[Fossil Energy,industry]= Acoeff[Fossil Energy,industry]*MAX(Output i real[industry],0) Zii[Manufacturing,industry]=

Acoeff[Manufacturing,industry]*MAX(Output i real[industry],0) Zii[Electricity,industry]=

Acoeff[Electricity,industry]*MAX(Output i real[industry],0) Zii[Construction,industry]=

Acoeff[Construction,industry]*MAX(Output i real[industry],0) Zii[Nonfinancial and Social Economy,industry]=

Acoeff[Nonfinancial and Social Economy,industry]*MAX(Output i real[industry],0)

Zii[Financial sector,industry]= Acoeff[Financial sector,industry]*MAX(Output i real[industry],0) Zii[Public sector,industry]= Acoeff[Public sector,industry]*MAX(Output i real[industry],0) Zii[Other,industry]=

Acoeff[Other,industry]*MAX(Output i real[industry],0)

(754) Zimp i[industry] :EXCEPT:[Electricity],[Construction],[Financial sector]

],[Public sector],[Other]= SUM(Zimp ii[industry!,industry]) Zimp i[Electricity]= 0 Zimp i[Construction]= 0 Zimp i[Financial sector]= 0 Zimp i[Public sector]= 0 Zimp i[Other]= 0

(755) Zimp i delay[industry]= DELAY FIXED (Zimp i[industry],1,initial Zimp i[industry])

(756) Zimp ii[Agriculture,industry]= share Zimp ii[Agriculture,industry]*Output i real[industry] Zimp ii[Mining,industry]= share Zimp ii[Mining,industry]*Output i real[industry] Zimp ii[Fossil Energy,industry]=

share Zimp ii[Fossil Energy,industry]*Output i real[industry] Zimp

ii[Manufacturing,industry]= share Zimp ii[Manufacturing,industry]*Output i real[industry]

Zimp ii[Nonfinancial and Social Economy,industry]=

share Zimp ii[Nonfinancial and Social Economy,industry]*Output i real[industry]

] Zimp ii[Electricity,industry]=

0,
0,
0,
0,
0,

