A Real-Financial CGE Model with reference to India

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1 A Real-Financial CGE Model with Portfolio Choice

1.1 Equations for the real side

1.1.1 Price formation

(1) $W_i = w_1 cpi^{w_2} W_{i_{t-1}}^{w_3}, \quad i = 5 - 11$

(2) $W_i = w_4 W_5, \quad i = 2, 3, 4$

(3) $V_i = W_i\lambda_i + (1+\tau_i^{im}) ep_i^{wm}\mu_i^0 + \sum_{j=1}^{11}\alpha_{ji}p_j + (\tau_i^i - \chi_i^i)p_i +$
$i_i^{bw}\omega_i \left[W_i\lambda_i + (1+\tau_i^{im}) ep_i^{wm}\mu_i^0 + \sum_{j\neq i, j=1}^{11}\alpha_{ji}p_j + (\tau_i^i - \chi_i^i)p_i \right],$
$i = 2-4, 8-11$

(4) $V_i = W_i\lambda_i + (1+\tau_i^{im}) ep_i^{wm}\mu_i^0 + \sum_{j=1}^{11}\alpha_{ji}p_j +$
$i_i^{bw}\omega_i \left[W_i\lambda_i + (1+\tau_i^{im}) ep_i^{wm}\mu_i^0 + \sum_{j=1, j\neq i}^{11}\alpha_{ji}p_j \right], \quad i = 5, 6, 7$

(5) $p_i = (1+\phi_i)(1+\tau_i^i - \chi_i^i)V_i, \quad i = 5, 6, 7$

(6) $p_i^c = \sum_{j=1}^{11}\zeta_{ji}^c p_j, \quad i = 1 - 11$

(7) $p_i^k = \sum_{j=1}^{11}\zeta_{ji}^k p_j^j, \quad i = 1 - 11$

(8) $p_i^s = (1+\tau_i^s - \chi_i^s)p_i, \quad i = 1 - 11$

(9) $p_i^j = (1+\tau_i^j - \chi_i^j)p_i, \quad i = 1 - 11$

(10) $cpi = \sum_{i=1}^{11} p_i C_i / \sum_{i=1}^{11} C_i$

(11) $p^{GDP} = \frac{GDP_{nmp}}{GDP_{rmp}}$

1.1.2 Generation of income and savings

(12) $DEP_i = \beta_i p_i^k K_{t-1}, \quad i = 1-11$

(13) $$\begin{aligned} Y^a &= p_1 X_1 + TF_1 + NFIA_1 + \iota_1 i_g \left[L_{gh_{t-1}} + L_{gb_{t-1}} + L_{gn_{t-1}}\right] \\ &\quad - \left[(1+\tau^{im}) ep^{wm} \mu_1^0 X_1 + \sum_{j=1}^{11} \alpha_{j1} p_j X_1 + (\tau_1^i - \chi_1^i) p_1 X_1\right] \end{aligned}$$

(14) $Y^w = \sum_{i=2}^{11} (W_i \lambda_i X_i) + TF_2 + NFIA_2$

(15) $Y_i^m = (p_i X_i - V_i X_i) + \iota_i i_g \left[L_{gh_{t-1}} + L_{gb_{t-1}} + L_{gn_{t-1}}\right], \quad i = 2,3,4$

(16) $$\begin{aligned} Y_i^m &= \phi_i X_i X_i + i_i^{bw} \omega_i \left[W_i \lambda_i + (1+\tau_i^{im}) ep_i^{wm} \mu_i^0 + \sum_{j \neq i, j=1}^{11} \alpha_{ji} p_j\right] X_i \\ &\quad + \iota_i i_g \left[L_{gh_{t-1}} + L_{gb_{t-1}} + L_{gn_{t-1}}\right], \quad i = 5,6,7 \end{aligned}$$

(17) $Y^g = \sum_{i=8}^{11} (p_i X_i - V_i X_i)$

(18) $S_h = \sigma^a (1-\tau^a) Y^a + \sigma^w (1-\tau^w) Y^w + \sum_{i=2}^{4} [\sigma_h^m (1-\tau^m) Y_i^m]$

(19) $S_i = \sigma_{pc}^m (1-\tau^m) Y_i^m, \quad i = 5,6,7$

1.1.3 Determination of demand

(20) $Y^{da} = (1-\sigma^a)(1-\tau^a) Y^a$

(21) $$\begin{aligned} Y^{dna} &= (1-\sigma^w)(1-\tau^w) Y^w + \sum_{i=2}^{4} [(1-\sigma_h^m)(1-\tau^m) Y_i^m] \\ &\quad \sum_{i=5}^{7} \left[(1-\sigma_{pc}^m)(1-\tau^m) Y_i^m\right] + NFIA_3 \end{aligned}$$

(22) $C_8^k = c_8^{0k} + \frac{c_8^{1k}}{p_8^s} Y^{dk}, \quad k = a, na$

(23) $Y^{dk*} = Y^{dk} - C_8^k, \quad k = a, na$

(24) $C_i^k = c_i^{0k} + \frac{c_i^{1k}}{p_i^s} \left[Y^{dk*} - \sum_{i \neq 8, i=1}^{11} p_i^s c_i^{0k}\right], \quad i = 1-7, 9-11: \quad k = a, na$

(25) $C_i = C_i^a + C_i^{na}, \quad i = 1-11$

$$(26)\quad \begin{aligned} J_1^{pd} &= \gamma_1^0 + \gamma_1^1 \left[Y_{t-1}^a / p_1^k \right] \\ J_i^{pd} &= \gamma_i^2 + \gamma_i^3 \sum_{i=1}^{11} J_{i_{t-1}}^g, \quad i = 2,3,4 \\ J_i^{pd} &= \gamma_i^4 + \gamma_i^5 \left[Y_{i_{t-1}}^m / p_i^k \right] \quad i = 5,6,7 \end{aligned}$$

$$(27)\quad J_i^{pc} = \frac{\left[L_{ib}^{v,s} + L_{in} - L_{i_{t-1}}^{v,d} \right]}{\nu_i p_i^k} + \frac{1}{p_i^k} \left[\beta_i p_i^k K_{i_{t-1}} - p_i^c CIS_i^d \right], \quad i = 1-4$$

$$(28)\quad J_i^{pc} = \frac{\left[L_{ib}^{v,s} + L_{in} + L_{ih}^{v,s} - L_{i_{t-1}}^{v,d} \right]}{\nu_i p_i^k} + \frac{1}{p_i^k} \left[\beta_i p_i^k K_{i_{t-1}} - p_i^c CIS_i^d \right], \; i = 5-7$$

$$(29)\quad J_i^p = \min(J_i^{pd}, J_i^{pc}), \quad i = 1-7$$

$$(30)\quad J_i = J_i^p + J_i^g, \quad i = 1-11$$

$$(31)\quad K_i = (1-\beta_i) K_{i_{t-1}} + J_i, \quad i = 1-11$$

$$(32)\quad U_i = \frac{X_i}{K_i / \kappa_i}, \quad i = 1-11$$

$$(33)\quad I_i = \sum_{j=1}^{11} \zeta_{ij}^k J_j, \quad i = 1-11$$

$$(34)\quad CIS_i^o = \sum_{j=1}^{11} \zeta_{ij}^c CIS_j^d, \quad i = 1-11$$

1.1.4 Current balance of payments account

$$(35)\quad E_i = \varepsilon_i^0 \left[\frac{p_i (1+\tau_i^{ie})}{ep_i^{we}} \right]^{\varepsilon_i^1}, \quad i = 1-11$$

$$(36)\quad M_i^{fin} = \mu_i^1 (GDP_{rmp})^{\mu_i^2}, \quad i = 1-7$$

$$(37)\quad CA = \sum_{i=1}^{11} \left[p_i (1+\tau_i^{ie}) E_i - p_i M_i^{fin} - ep_i^{wm} \mu_i^0 X_i^s \right] + \sum_{i=1}^{3} NFIA_i$$

1.1.5 Governmental balance

$$\begin{aligned} (38)\quad S_g &= \tau^a Y^a + \tau^w Y^w + \sum_{i=1}^{7} \tau^m Y^m + \sum_{i=1}^{11} (\tau_i^s - \chi_i^s) p_i C_i + \sum_{i=1}^{11} (\tau_i^j - \chi_i^j) p_i (I_i^g + I_i^p) \\ &+ \sum_{i=1}^{4} (\tau_i^i - \chi_i^i) p_i X_i + \sum_{i=5}^{7} (\tau_i^i - \chi_i^i)(1+\phi_i) V_i X_i + \sum_{i=8}^{11} (\tau_i^i - \chi_i^i) p_i X_i \\ &+ \sum_{i=1}^{11} \tau_i^{im} ep_i^{wm} \mu_i^0 X_i + \sum_{i=1}^{11} \left[(\tau_i^{imf} ep_i^{wmf}) M_i^{fin} + \tau_i^{ie} p_i E_i \right] + Y^g \\ &- \sum_{i=1}^{2} TF_i - \sum_{i=1}^{11} p_i G_i - \left[L_{gh_{t-1}} + L_{gb_{t-1}} + L_{gn_{t-1}} + L_{gf_{t-1}} \right] \end{aligned}$$

1.1.6 Production

(39) $X_i = C_i + G_i + I_i^g + I_i^p + CIS_i^o + E_i - M_i^{fin} + \sum_{j=1}^{11} \alpha_{ij} X_j, \quad i = 1 - 11$

(40) $X_i^{sk} = \frac{1}{\kappa_i} K_{i_{t-1}}, \quad i = 1 - 11$

(41) $X_i^{sl} = \frac{L_i^{w,s}}{\omega_i \left[W_i \lambda_i + (1 + \tau_i^{im}) ep_i^{wm} \mu_i^0 + \sum_{j=1, j \neq 1}^{11} \alpha_{ji} p_j + (\tau_i^i - \chi_i^i) p_i \right]}, \; i = 1 - 7$

(42) $Z_8 = (1 - \alpha_{88}) X_8^{sk} - \sum_{i=9}^{11} \alpha_{8i} X_i - C_8 - G_8 - I_8^g - I_8^p - CIS_8 - E_8 + M_8^{fin}$

(43) $z_{8i} = \frac{\alpha_{8i} X_i}{\sum_{i=1}^{7} \alpha_{8i} X_i} Z_8, \quad i = 1 - 7$

(44) $X_i^{sz} = \frac{z_{8i}}{\alpha_{8i}}, \quad i = 1 - 7$

(45) $X_i^{sc} = \min(X_i^{sk}, X_i^{sl}, X_i^{sz}), \quad i = 1 - 8$

(46) $X_i - X_i^{sc} = 0, \quad i = 1 - 4$

(47) $X_i - X_i^{sc} \leq 0; \quad \Delta\phi_i \leq 0; \quad \Delta\phi_i (X_i - X_i^{sc}) = 0$

$$
\begin{aligned}
(48)\quad GDP_{nmp} \;=\; & Y^a + Y^g + Y^m + Y^w - \sum_{i=1}^{2} TF_i - \sum_{i=1}^{3} NFIA_i \\
& + \sum_{i=1}^{4} (\tau_i^i - \chi_i^i) p_i X_i + \sum_{i=5}^{7} (\tau_i^i - \chi_i^i)(1 + \phi_i) V_i X_i + \sum_{i=8}^{11} (\tau_i^i - \chi_i^i) p_i X_i \\
& + \sum_{i=1}^{11} (\tau_i^s - \chi_i^s) p_i (C_i + G_i) + \sum_{i=1}^{11} (\tau_i^j - \chi_i^j) p_i (I_i^g + I_i^p) \\
& + \sum_{i=1}^{11} (\tau_i^{imf} ep_i^{wmf}) M_i^{fin} + \sum_{i=1}^{11} (\tau_i^{ie} p_i E_i) + \sum_{i=1}^{7} \iota_i i_g \left[L_{gh_{t-1}} + L_{gb_{t-1}} + L_{gn_{t-1}} \right]
\end{aligned}
$$

$$
\begin{aligned}
(49)\quad GDP_{rmp} \;=\; & \sum_{i=1}^{11} \left[p_i X_i - \alpha_{ji} p_j X_i - (1 + \tau_i^{im}) ep_i^{wm} \mu_i^0 X_i + (\tau_i^s - \chi_i^s) p_i (C_i + G_i) \right] \frac{1}{p_i} \\
& + \sum_{i=1}^{11} \left[(\tau_i^j - \chi_i^j) p_i (I_i^g + I_i^p) + (\tau_i^{imf} ep_i^{wmf}) M_i^{fin} + \tau_i^{ie} p_i E_i \right] \frac{1}{p_i}
\end{aligned}
$$

1.2 Equations for the financial side

1.2.1 Household sector portfolio

$$(50)\quad NW_h = \sum_{i=1}^{4}\left[p_i^k K_{i_{t-1}} + p_i^c INV_{i_{t-1}}\right] + \sum_{i=5}^{7} L_{ih_{t-1}} + L_{gh_{t-1}} + D^b_{h_{t-1}} + D^p_{t-1} + D^o_{t-1} + CUR_{t-1} - \sum_{i=1}^{4}\left[L^{w,d}_{i_{t-1}} + L^{v,d}_{ib_{t-1}} + L_{in_{t-1}}\right] + S_h$$

$$(51)\quad L_i^{w,d} = \omega_i \left[W_i\lambda_i + (1+\tau_i^{im}) ep_i^{wm}\mu_i^0 + \sum_{j=1, j\neq i}^{11} \alpha_{ji} p_j + (\tau_i^i - \chi_i^i) p_i \right] X_i, \qquad i = 1-4$$

$$(52)\quad \Delta L_i^{v,d} = \nu_i \left[\, p_i^k (J_i^p - \beta_i K_{i_{t-1}}) + p_i^c CIS_i^d \right], \qquad i = 1-4$$

$$(53)\quad L_i^{v,d} = L^v_{i_{t-1}} + \Delta L_i^{v,d}, \qquad i = 1-4$$

$$(54)\quad L_{ib}^{v,d} = L_i^{v,d} - L_{in}, \qquad i = 1-4$$

$$(55)\quad CUR = \gamma GDP_{nmp}$$

$$(56)\quad \Delta D^p = \eta Y^w$$

$$(57)\quad D^p = D^p_{t-1} + \Delta D^p$$

$$(58)\quad A^h = NW_h + \sum_{i=1}^{4} L_i^{w,d} + \sum_{i=1}^{4} L_i^{v,d} - D^p - CUR - \sum_{i=1}^{4}\left[p_i^c INV_{i_{t-1}} + p_i^c CIS_i^d\right] - \sum_{i=1}^{4}\left[(1-\beta_i) p_i^k K_{i_{t-1}} + p_i^k J_i^p\right]$$

$$(59)\quad q_h = \delta_b^{h^{\psi_h}} \left(\frac{i_b}{\bar{i}_b}\right)^{\psi_h - 1} \delta_o^{h^{\psi_h}} \left(\frac{i_n}{\bar{i}_n}\right)^{\psi_h - 1} \delta_g^{h^{\psi_h}} \left(\frac{i_g}{\bar{i}_g}\right)^{\psi_h - 1} \delta_5^{h^{\psi_h}} \left(\frac{i_5}{\bar{i}_5}\right)^{\psi_h - 1} \delta_6^{h^{\psi_h}} \left(\frac{i_6}{\bar{i}_6}\right)^{\psi_h - 1} \delta_7^{h^{\psi_h}} \left(\frac{i_7}{\bar{i}_7}\right)^{\psi_h - 1}$$

$$(60)\quad \theta_j^h = \delta_j^{h^{\psi_h}} \frac{(i_j/\bar{i}_j)^{\psi_h - 1}}{q_h}, \qquad j = b, g, 5, 6, 7$$

$$(61)\quad \theta_j^o = \delta_o^{h^{\psi_h}} \frac{(i_n/\bar{i}_n)^{\psi_h - 1}}{q_h}$$

$$(62)\quad D_h^b = \theta_b^h A_h$$

$$(63)\quad D^o = \theta_o^h A_h$$

$$(64)\quad L_{gh} = \theta_g^h A_h$$

$$(65)\quad L_{ih} = \theta_i^h A_h, \qquad i = 5-7$$

1.2.2 Private corporate sector portfolio

(66) $L_i^{w,d} = \omega_i \left[W_i \lambda_i + (1+\tau_i^{im}) ep_i^{wm} \mu_i^0 + \sum_{j=1, j\neq i}^{11} \alpha_{ji} p_j \right] X_i, \quad i = 5-7$

(67) $\Delta L_i^{v,d} = \nu_i \left[p_i^k (J_i^p - \beta_i K_{i_{t-1}}) + p_i^c CIS_i^d \right], \quad i = 5-7$

(68) $L_i^{v,d} = L_{i_{t-1}}^v + \Delta L_i^{v,d}, \quad i = 5-7$

(69) $L_{ib}^{v,d} = L_i^{v,d} - L_{in} - L_{ih}, \quad i = 5-7$

(70) $NW_i = p_i^k K_{i_{t-1}} + p_i^c INV_{i_{t-1}} + D_{i_{t-1}}^b - L_{i_{t-1}}^{w,d} - L_{ib_{t-1}}^{v,d} - L_{in_{t-1}} - L_{ih_{t-1}} - L_{if_{t-1}} + S_i, \quad i = 5-7$

(71) $D_i^b = NW_i + L_i^{w,d} + L_i^{v,d} + L_{ih} + L_{in} + L_{if} - pi^c INV_{i_{t-1}} - p_i^c CIS_i^d - p_i^k J_i^p - (1-\beta_i) p_i^k K_{i_{t-1}}, \quad i = 5-7$

1.2.3 Government portfolio

(72) $\Delta L_{gi} = L_{gi} - L_{gi_{t-1}}, \quad i = b, h, n$

(73) $\Delta L_{gc} = \sum_{i=1}^{11} \left[p_i^k (J_i^g - \beta_i K_{i_{t-1}}) \right] - S_g - \Delta L_{gb} - \Delta L_{gn} - \Delta L_{gh} - \Delta L_{gf}$

(74) $\Delta L_{gf} = \Delta \bar{L}_{gf} - L_e$

1.2.4 Commercial and cooperative banks' portfolio

(75) $D^b = D_h^b + D_5^b + D_6^b + D_7^b$

(76) $L_b^{s*} = (1-crr) D^b + R_{bo} + BNNML - slr_b D^b$

(77) $L_b^{s**} = \left[1 - \sum_{i=1}^{4} \pi_i^w - \sum_{i=1}^{4} \pi_i^v \right] L_b^{s*}$

(78) $r_i^{bw} = \left(i_i^{bw} - c_i^{bw} \right) / \left(\bar{i}_i^{bw} - \bar{c}_i^{bw} \right), \quad i = 1-7$

(79) $r_i^{bv} = \left(i_i^{bv} - c_i^{bv} \right) / \left(\bar{i}_i^{bv} - \bar{c}_i^{bv} \right), \quad i = 1-7$

(80) $r_g = i_g / \bar{i}_g$

(81) $q_b = \sum_{i=1}^{7} \delta_i^{bw^{\psi_b}} r_i^{bw^{\psi_b - 1}} + \sum_{i=1}^{7} \delta_i^{bv^{\psi_b}} r_i^{bv^{\psi_b - 1}} + \delta_g^{b^{\psi_b}} r_i^{\psi_b - 1}$

(82) $\theta_i^{bw} = \delta_i^{bw^{\psi_b}} \dfrac{r_i^{bw^{\psi_b - 1}}}{q_b}, \quad i = 1-7$

(83) $\theta_i^{bv} = \delta_i^{bv^{\psi_b}} \frac{r_i^{bw^{\psi_b - 1}}}{q_b}, \quad i = 1 - 7$

(84) $\theta_g^b = \delta_g^{b^{\psi_b}} \frac{r_g^{bw^{\psi_b - 1}}}{q_b}$

(85) $L_i^{w,s} = \theta_i^{bw} L_b^{s**} + \pi_i^w L_b^{s*}, \quad i = 1 - 4$

(86) $L_i^{w,s} = \theta_i^{bw} L_b^{s**}, \quad i = 5 - 7$

(87) $L_{ib}^{v,s} = \theta_i^{bv} L_b^{s**} + \pi_i^v L_b^{s*}, \quad i = 1 - 4$

(88) $L_{ib}^{v,s} = \theta_i^{bv} L_b^{s**}, \quad i = 5 - 7$

(89) $L_{gb} = \theta_g^b L_b^{s**} + slr_b D^b + L^e$

1.2.5 Non-bank financial institutions' portfolio

(90) $D^n = D^p + D^o$

(91) $r_i^n = \left(i_i^n - c_i^n\right) / \left(\bar{i}_i^n - \bar{c}_i^n\right), \quad i = 1 - 7$

(92) $q_b = \sum_{i=1}^{7} \delta_i^{n^{\psi_n}} r_i^{n^{\psi_n - 1}} + \delta_g^{n^{\psi_n}} r_g^{\psi_n - 1}$

(93) $\theta_i^n = \delta_i^{n^{\psi_n}} \frac{r_i^{n^{\psi_n - 1}}}{q_n}, \quad i = 1 - 7$

(94) $\theta_g^n = \delta_g^{n^{\psi_n}} \frac{r_g^{n^{\psi_n - 1}}}{q_n}$

(95) $L_{in} = \theta_i^n (1 - slr_n) D^n, \quad i = 1 - 7$

(96) $L_{gn} = \theta_g^n (1 - slr_n) D^n + slr_n D^n$

1.2.6 Central bank portfolio

(97) $L_{gc} = L_{gc_{t-1}} + \Delta L_{gc}$

(98) $R_f = CA + \Delta L_{gf} + \sum_{i=5}^{7} (L_{if} - L_{if_{t-1}}) - (O - O_{t-1}) + R_{f_{t-1}}$

(99) $RNNML = L_{gc} + R_{bo} + R_f - CUR - crrD^b$

1.2.7 Credit market balance

(100) $L_{ib}^{v,d} - L_{ib}^{v,s} \leq 0; \qquad L_i^{e,v} = L_{ib}^{v,s} - L_{ib}^{v,d}, \quad i = 1 - 7$

(101) $L_i^{w,d} - L_i^{w,s} \leq 0; \qquad L_i^{e,w} = L_i^{w,s} - L_i^{w,d}, \quad i = 1 - 7$

(102) $L^e = \sum_{i=1}^{7} \left(L_i^{e,v} + L_i^{e,w}\right)$

2 Symbols for the real-financial CGE model

Appendix B lists all symbols of the model given in Appendix A. The table is organised as follows. Subdivisions are made for (I) symbols for the real equations and (II) symbols for the financial equations. Within each of these categories, symbols are classified under five headings: (a) endogenous variables, (b) exogenous variables, (c) lagged variables, (d) policy variables and (e) parameters. Variables without a time index (t) are for the current period, denoting either current-period flows or end-of-period stocks.

2.1 Symbols for the real equations

2.1.1 Endogenous variables

C_i	consumption of good i, i=1–11
C_8^a	consumption of good 8 out of agricultural income
C_8^{na}	consumption of good 8 out of non-agricultural income
C_i^a	consumption of good i out of agricultural income, i=1–7, 9–11
C_i^{na}	consumption of good i out of non-agricultural income, i=1–7 and 9–11
CA	current account balance
CIS_i^o	change in stocks of good i, i=1–11, by sector of origin
cpi	consumer price index
DEP_i	depreciation of capital stock of production sector i, i=1–11
E_i	export of good i, i=1–11
GDP_{nmp}	gross domestic product at market prices (nominal)
GDP_{rmp}	gross domestic product at market prices (real)
I_i	real investment by sector of origin, i=1–11
J_i	sum of private and public investment by sector of destination
J_i^p	real private investment by sector of destination, i=1–7
J_i^{pc}	level of real private investment (by sector of destination) permitted by available bank credit, i=1–7
J_i^{pd}	real private investment demand by sector of destination, i=1–7
K_i	capital stock of production sector i, i=1–11
M_i^{fin}	final import of good i, i=1–11
p_i	producer price of good i (before tax), i=1–7
p_i^c	price of production sector i's inventories, i=1–11
p_i^j	selling price of capital good i (including capital goods tax), i=1–11
p_i^k	price of production sector i's capital stock, i=1–11
p_i^s	selling price of good i (including sales tax), i=1–11
p^{gdp}	GDP deflator
S_g	government savings (gross)
S_h	household savings (gross)
S_i	private corporate savings (gross), i=5–7
U_i	utilisation of capacity in production sector i, i=1–11
V_i	per unit variable production costs in sector i, i=2–11
W_i	wage rate in production sector i, i=2–11
X_i	total demand for the domestic good i, i=1–11
X_i^{sc}	maximum supply-constrained level of output of production sector i, i=1–11
X_i^{sk}	maximum production permitted by end-of-last-period capital stock, i=1–11

X_i^{sl}	maximum production permitted by the availability of working capital credit, i=1–7
X_i^{sz}	maximum production permitted by availability of infrastructural inputs, i=1–7
Y^a	agricultural income
Y^{da}	disposable agricultural income
Y^{dna}	disposable non-agricultural income
Y^{da*}	disposable agricultural income after consumption of infrastructural goods
Y^{dna*}	disposable non-agricultural income after consumption of infrastructural goods
Y^g	government income from production
Y_i^m	non-wage income in sector i, i=2–7
Y^w	wage income
Z_8	maximum amount of infrastructural goods available for intermediate deliveries to sectors 1–7
z_{8i}	maximum supply of infrastructural inputs by sector 8 to sector i, i=1–7
ϕ_i	rate of mark-up in production sector i, i=5–7

2.1.2 Exogenous variables

CIS_i^d	change in stocks held by production sector i, i=1–11
INV_i	inventories of good i, i=1–11
$NFIA_i$	net factor income from abroad earned by income group i, i=1–3 (1= agriculturalists; 2 = wage earners; 3 = non-wage income)
TF_i	transfer payments accruing to income group i, i=1,2
p_i^{we}	world price of exported good i, i=1–11
p_i^{wm}	world price of imported inputs for production sector i, i=1–11
p_i^{wmf}	world price of imported final goods, i=1–11

2.1.3 Lagged variables

All variables with subscript (t–1).

2.1.4 Policy variables

e	exchange rate (nominal)
i_i^{bw}	rate of interest on working capital loans to sector i, i=1–11
G_i	real government expenditure on good i, i=1–11
J_i^g	real public investment by sector of destination, i=1 and 8–11
τ_a	rate of tax on agricultural income
τ_i^i	rate of (excise) tax on commodity i, i=1–11
τ_i^j	rate of (sales) tax on capital good i, i=1–11
τ_i^s	rate of (sales) tax on commodity i, i=1–11
τ_i^{ie}	rate of tax on exported good i
τ_i^{im}	rate of tax on imported inputs used by production sector i, i=1–11
τ^m	rate of tax on mark-up income
τ^w	rate of tax on wage income
χ_i^i	rate of ('excise') subsidy on commodity i, i=1–11
χ_i^s	rate of ('sales') subsidy on commodity i, i=1–11

2.1.5 Parameters

c_i^{0a}	fixed quantity of good i consumed out of agricultural income, i=1–11
c_i^{0na}	fixed quantity of good i consumed out of non-agricultural income, i=1–11
c_i^{1a}	marginal budget share of good i for agricultural income, i=1–11
c_i^{1na}	marginal budget share of good i for non-agricultural income, i=1–11
w_i	parameters in wage indexation equations, i=1–4
α_{ij}	input-output coefficient
β_i	rate of depreciation of capital stock in production sector i, i=1–11
γ_i^j	coefficient in private investment function for sector i, i=1–7; j=0–5
ϵ_i^j	parameters in export function for production sector i, i=1–7; j=0,1
ζ_{ij}^c	proportion of inventories of sector j originating in sector i
ζ_{ij}^k	proportion of capital stock of sector j originating in sector i
κ_i	capital-output ratio
λ_i	labour-output ratio in production sector i, i=2–11
μ_i^0	intermediate import coefficient for production sector i, i=1–11
μ_i^j	coefficients in final import function for good i, i=1–11; j=1,2
σ^a	rate of saving out of agricultural income
σ_h^m	rate of saving out of non-wage income in household sector
σ_{pc}^m	rate of saving out of mark-up income earned in private corporate sector
σ^w	rate of saving out of wage income

2.2 Symbols for the financial equations

2.2.1 Endogenous variables

A_h	household sector financial wealth net of liabilities and after subtraction of provident fund deposits and currency
CUR	currency
D^b	bank deposits
D_h^b	bank deposits held by the household sector
D_i^b	bank deposits held by private corporate sector i, i=5–7
D^n	money deposited in non-bank financial institutions
D^o	money deposited in non-bank financial institutions other than provident funds
D^p	money deposited in provident funds
L^e	excess supply of bank credit to the private sector
$L_i^{e,v}$	excess supply of private sector investment credit by banks, i=1–7
$L_i^{e,w}$	excess supply of private sector working capital loans, i=1–7
L_{gb}	government borrowing from banks
L_{gc}	central bank claims on the government
L_{gh}	government debt to household sector
L_{gn}	government debt to non-bank financial institutions
L_{ih}	debt of private corporate sector i to the household sector, i=5–7
L_{in}	sector i's investment loans from non-bank financial institutions, i=1–7
L_b^{s*}	total supply of credit by banks to the private sector

L_b^{s**} total supply of credit by banks to the private sector after subtraction of priority lending to the household sectors
$L_i^{v,d}$ demand for investment credit by production sector i, i=1–4
$L_i^{v,d}$ demand for investment credit by production sector i, i=5–7
$L_{ib}^{v,d}$ demand for investment credit from banks by production sector i, i=1–4
$L_{ib}^{v,d}$ demand for investment credit from banks by production sector i, i=5–7
$L_{ib}^{v,s}$ supply by banks of investment loans to sector i, i=1–7
$L_i^{w,d}$ demand for working capital by production sector i, i=1–4
$L_i^{w,d}$ demand for working capital by production sector i, i=5–7
$L_i^{w,s}$ supply by banks of working capital loans to sector i, i=1–7
NW_h end of period net worth of the household sector
NW_i end of period net worth of sector i, i=5–7
q_b harmonic mean in banks' CES function
q_h harmonic mean in household sector CES function
q_n harmonic mean in non-bank financial institutions' CES function
r_i^{bv} rate of return to banks on their investment loans to sector i, i=1–7
r_i^{bw} rate of return to banks on their working capital loans to sector i, i=1–7
r_g rate of return on public debt
r_i^n rate of return to non-bank financial institutions' loans to sector i, i=1–7
$RNNML$ central bank's net non-monetary liabilities
R_f central bank's stock of foreign reserves
ΔD^p within-period change in provident funds deposits
ΔL_{gb} within-period change in government borrowing from banks
ΔL_{gc} within-period change in central bank claims on the government
ΔL_{gf} within-period change in government foreign debt
ΔL_{gh} within-period change in household claims on the government
ΔL_{gn} within-period change in government debt to non-bank financial institutions
$\Delta L_i^{v,d}$ within-period change in demand for investment credit by production sector i, i=1–4
$\Delta L_i^{v,d}$ within-period change in demand for investment credit by production sector i, i=5–7
θ_g^b share of government debt in the banks' portfolio
θ_i^{bv} share of asset i in total investment credit supplied by banks, i=1–7
θ_i^{bw} share of asset i in total working capital credit supplied by banks, i=1–7
θ_i^h share of asset i in the household sector's portfolio, i=b,g,o,5,6,7
θ_i^n share of asset i in the non-bank financial institutions' portfolio, i=1–7 and g

2.2.2 Exogenous variables

$BNNML$ banks' net non-monetary liabilities
$\Delta \bar{L}_{gf}$ within-period change in foreign loans by the government
L_{if} end-of-period stock of foreign loans taken by sector i, i=5–7
O other claims on the rest of the world

2.2.3 Lagged variables

All variables with subscript (t–1)

2.2.4 Policy variables

i_b	average rate of interest offered on bank deposits
i_g	average rate of return offered on government debt
i_i	rate of return on househ. sector claims on private corporate sector i, i=5–7
i_n	rate of return on non-bank financial institutions deposits
i_i^{bw}	bank rate of interest on working capital loans to sector i, i=1–7
i_i^{bv}	bank rate of interest on investment loans to sector i, i=1–7
$\bar{i}_b$	'normal' rate of return on bank deposits
$\bar{i}_g$	'normal' rate of return on government debt
$\bar{i}_i$	'normal' rate of return on household sector claims on private corporate sector i, i=5–7
$\bar{i}_n$	'normal' rate of return on non-bank financial institutions deposits
$\bar{i}_i^{bw}$	'normal' bank rate of interest on working capital loans to sector i, i=1–7
$\bar{i}_i^{bv}$	'normal' bank rate of interest on investment loans to sector i, i=1–7
R_{bo}	borrowed reserves
slr_b	statutory liquidity ratio applicable to banks
slr_n	statutory liquidity ratio applicable to non-bank financial institutions
π_i^w	share in total bank lending to the private sector of priority credit, for working capital purposes, to sector i, i=1–4
π_i^v	share in total bank lending to the private sector of priority credit, for investment purposes, to sector i, i=1–4
crr	cash reserve ratio

2.2.5 Parameters

c_i^{bv}	constant marginal cost to the banks of monitoring loans (including provision for expected defaults) per rupee of investment credit issued to sector i, i=1–7
c_i^{bw}	constant marginal cost to the banks of monitoring loans (including provision for expected defaults) per rupee of working capital credit issued to sector i, i=1–7
c_i^c	constant marginal cost to non-bank financial institutions of monitoring loans (including provision for expected defaults) per rupee lent to sector i, i=1–7
$\bar{c}_i^{bv}$	'normal' constant marginal cost to the banks of monitoring loans (including provision for expected defaults) per rupee of investment credit issued to sector i, i=1–7
$\bar{c}_i^{bw}$	'normal' constant marginal cost to the banks of monitoring loans (including provision for expected defaults) per rupee of working capital credit issued to sector i, i=1–7
$\bar{c}_i^n$	'normal' constant marginal cost to non-bank financial institutions of monitoring loans (including provision for expected defaults) per rupee lent to sector i, i=1–7
γ	currency to GDP ratio
δ_g^b	CES distribution parameter in the banks' portfolio
δ_i^{bv}	CES distribution parameters (i=1–7) in the banks' portfolio
δ_i^{bw}	CES distribution parameters (i=1–7) in the banks' portfolio
δ_i^h	CES distribution parameters in the household sector's portfolio, i=b,g,o,5,6,7
δ_i^n	CES distribution parameters in the non-bank financial institutions' portfolio, i=1–7
δ_g^n	CES distribution parameter for government debt in the non-bank financial institutions' portfolio
η	parameter in equation determining provident fund deposits
ι_i	share of sector i in interest payments on government debt received, i=1–7

ν_i	parameter in investment credit demand equations, i=1–7
ψ_b	elasticity of substitution in the bank portfolio functions
ψ_h	elasticity of substitution in household sector portfolio functions
ψ_n	elasticity of substitution in the non-bank financial institions' portfolio
ω_i	stock-flow coefficient relating the stock of working capital credit demand to the flow of input costs of sector i, i=1–7.