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Index sets

$$SEC = \{\mathrm{A}, \mathrm{B}, \mathrm{C}\}$$

1 CONSUMER

1.1 Optimisation problem

$$\max_{\left(D^{\langle s\rangle}\right)_{s\in SEC}} U = \left(\sum_{s\in SEC} \alpha^{\langle s\rangle} {D^{\langle s\rangle}}^{\omega^{-1}(-1+\omega)}\right)^{\omega(-1+\omega)^{-1}} \tag{1.1}$$

s.t. :

$$H^{\mathrm{inc}}\left(1-\tau^{\mathrm{h}}\right) = -\sum_{s\in SEC} \pi^{\langle s\rangle} + \sum_{s\in SEC} p^{\langle s\rangle} D^{\langle s\rangle} \quad \left(\lambda^{\mathrm{CONSUMER}^1}\right) \tag{1.2}$$

1.2 Identities

$$H^{\mathrm{inc}} = L + TR + p^{\mathrm{k}} K \tag{1.3}$$

$$K = \bar{rr}^{\mathrm{k}} \tag{1.4}$$

$$L = \bar{rr}^{\mathrm{l}} \tag{1.5}$$

1.3 First order conditions

$$s \in SEC: \quad \lambda^{\mathrm{CONSUMER}^1} p^{\langle s\rangle} + \alpha^{\langle s\rangle} {D^{\langle s\rangle}}^{-1+\omega^{-1}(-1+\omega)} \left(\sum_{s\in SEC} \alpha^{\langle s\rangle} {D^{\langle s\rangle}}^{\omega^{-1}(-1+\omega)}\right)^{-1+\omega(-1+\omega)^{-1}} = 0 \quad \left(D^{\langle s\rangle}\right) \tag{1.6}$$

2 FIRM $s \in SEC$

2.1 Optimisation problem

$$\max_{Y^{\langle s\rangle},K^{\langle s\rangle},L^{\langle s\rangle},\left(X^{\langle si,s\rangle}\right)_{si\in SEC},VA^{\langle s\rangle},CI^{\langle s\rangle},Tpi^{\langle s\rangle}} \pi^{\langle s\rangle} = Tpi^{\langle s\rangle}\left(1-\tau\right) \tag{2.1}$$

s.t. :

$$Y^{\langle s\rangle} = \left(\beta^{\mathrm{va}\langle s\rangle} VA^{\langle s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)} + \beta^{\mathrm{ci}\langle s\rangle} CI^{\langle s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)}\right)^{\gamma^{\langle s\rangle}\left(-1+\gamma^{\langle s\rangle}\right)^{-1}} \quad \left(\lambda^{\mathrm{FIRM}^1\langle s\rangle}\right) \tag{2.2}$$

$$VA^{\langle s\rangle} = \left(\beta^{\mathrm{k}\langle s\rangle} K^{\langle s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)} + \beta^{\mathrm{l}\langle s\rangle} L^{\langle s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)}\right)^{\gamma^{\langle s\rangle}\left(-1+\gamma^{\langle s\rangle}\right)^{-1}} \quad \left(\lambda^{\mathrm{FIRM}^2\langle s\rangle}\right) \tag{2.3}$$

$$CI^{\langle s\rangle} = \left(\sum_{si\in SEC} \chi^{\langle si,s\rangle} X^{\langle si,s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)}\right)^{\gamma^{\langle s\rangle}\left(-1+\gamma^{\langle s\rangle}\right)^{-1}} \quad \left(\lambda^{\mathrm{FIRM}^3\langle s\rangle}\right) \tag{2.4}$$

$$Tpi^{\langle s\rangle} = p^{\langle s\rangle} Y^{\langle s\rangle} - L^{\langle s\rangle}\left(1+t^{\mathrm{l}}\right) - p^{\mathrm{k}} K^{\langle s\rangle}\left(1+t^{\mathrm{k}}\right) - \sum_{si\in SEC} p^{\langle si\rangle} X^{\langle si,s\rangle} \quad \left(\lambda^{\mathrm{FIRM}^4\langle s\rangle}\right) \tag{2.5}$$

2.2 First order conditions

$$-\lambda^{\mathrm{FIRM}^1\langle s\rangle} + \lambda^{\mathrm{FIRM}^4\langle s\rangle} p^{\langle s\rangle} = 0 \quad \left(Y^{\langle s\rangle}\right) \tag{2.6}$$

$$-p^{\mathrm{k}}\lambda^{\mathrm{FIRM}^4\langle s\rangle}\left(1+t^{\mathrm{k}}\right) + \beta^{\mathrm{k}\langle s\rangle}\lambda^{\mathrm{FIRM}^2\langle s\rangle} K^{\langle s\rangle}{}^{-1+\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)}\left(\beta^{\mathrm{k}\langle s\rangle} K^{\langle s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)} + \beta^{\mathrm{l}\langle s\rangle} L^{\langle s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)}\right)^{-1+\gamma^{\langle s\rangle}\left(-1+\gamma^{\langle s\rangle}\right)^{-1}} = 0 \quad \left(K^{\langle s\rangle}\right) \tag{2.7}$$

$$\lambda^{\mathrm{FIRM}^4\langle s\rangle}\left(-1-t^{\mathrm{l}}\right) + \beta^{\mathrm{l}\langle s\rangle}\lambda^{\mathrm{FIRM}^2\langle s\rangle} L^{\langle s\rangle}{}^{-1+\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)}\left(\beta^{\mathrm{k}\langle s\rangle} K^{\langle s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)} + \beta^{\mathrm{l}\langle s\rangle} L^{\langle s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)}\right)^{-1+\gamma^{\langle s\rangle}\left(-1+\gamma^{\langle s\rangle}\right)^{-1}} = 0 \quad \left(L^{\langle s\rangle}\right) \tag{2.8}$$

$$si \in SEC: \quad -\lambda^{\mathrm{FIRM}^4\langle s\rangle} p^{\langle si\rangle} + \chi^{\langle si,s\rangle}\lambda^{\mathrm{FIRM}^3\langle s\rangle} X^{\langle si,s\rangle}{}^{-1+\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)}\left(\sum_{si\in SEC} \chi^{\langle si,s\rangle} X^{\langle si,s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)}\right)^{-1+\gamma^{\langle s\rangle}\left(-1+\gamma^{\langle s\rangle}\right)^{-1}} = 0 \quad \left(X^{\langle si,s\rangle}\right) \tag{2.9}$$

$$-\lambda^{\mathrm{FIRM}^2\langle s\rangle} + \beta^{\mathrm{va}\langle s\rangle}\lambda^{\mathrm{FIRM}^1\langle s\rangle} VA^{\langle s\rangle}{}^{-1+\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)}\left(\beta^{\mathrm{va}\langle s\rangle} VA^{\langle s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)} + \beta^{\mathrm{ci}\langle s\rangle} CI^{\langle s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)}\right)^{-1+\gamma^{\langle s\rangle}\left(-1+\gamma^{\langle s\rangle}\right)^{-1}} = 0 \quad \left(VA^{\langle s\rangle}\right) \tag{2.10}$$

$$-\lambda^{\mathrm{FIRM}^3\langle s\rangle} + \beta^{\mathrm{ci}\langle s\rangle}\lambda^{\mathrm{FIRM}^1\langle s\rangle} CI^{\langle s\rangle}{}^{-1+\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)}\left(\beta^{\mathrm{va}\langle s\rangle} VA^{\langle s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)} + \beta^{\mathrm{ci}\langle s\rangle} CI^{\langle s\rangle}{}^{\gamma^{\langle s\rangle}-1\left(-1+\gamma^{\langle s\rangle}\right)}\right)^{-1+\gamma^{\langle s\rangle}\left(-1+\gamma^{\langle s\rangle}\right)^{-1}} = 0 \quad \left(CI^{\langle s\rangle}\right) \tag{2.11}$$

$$1-\tau-\lambda^{\mathrm{FIRM}^4\langle s\rangle}=0 \quad \left(Tpi^{\langle s\rangle}\right) \tag{2.12}$$

2.3 First order conditions after reduction

$$-p^{\mathrm{k}}\left(1+t^{\mathrm{k}}\right)(1-\tau)+\beta^{\mathrm{k}\langle s\rangle}\beta^{\mathrm{va}\langle s\rangle}p^{\langle s\rangle}(1-\tau)K^{\langle s\rangle^{-1+\gamma^{\langle s\rangle^{-1}}\left(-1+\gamma^{\langle s\rangle}\right)}}VA^{\langle s\rangle^{-1+\gamma^{\langle s\rangle^{-1}}\left(-1+\gamma^{\langle s\rangle}\right)}}\left(\beta^{\mathrm{k}\langle s\rangle}K^{\langle s\rangle^{\gamma^{\langle s\rangle^{-1}}\left(-1+\gamma^{\langle s\rangle}\right)}}+\beta^{\mathrm{l}\langle s\rangle}L^{\langle s\rangle^{\gamma^{\langle s\rangle^{-1}}\left(-1+\gamma^{\langle s\rangle}\right)}}\right)^{-1+\gamma^{\langle s\rangle}\left(-1+\gamma^{\langle s\rangle}\right)^{-1}}\left(\beta^{\mathrm{va}\langle s\rangle}VA^{\langle s\rangle^{\gamma^{\langle s\rangle}}} \tag{2.13}$$

$$\left(-1-t^{\mathrm{l}}\right)(1-\tau)+\beta^{\mathrm{l}\langle s\rangle}\beta^{\mathrm{va}\langle s\rangle}p^{\langle s\rangle}(1-\tau)L^{\langle s\rangle^{-1+\gamma^{\langle s\rangle^{-1}}\left(-1+\gamma^{\langle s\rangle}\right)}}VA^{\langle s\rangle^{-1+\gamma^{\langle s\rangle^{-1}}\left(-1+\gamma^{\langle s\rangle}\right)}}\left(\beta^{\mathrm{k}\langle s\rangle}K^{\langle s\rangle^{\gamma^{\langle s\rangle^{-1}}\left(-1+\gamma^{\langle s\rangle}\right)}}+\beta^{\mathrm{l}\langle s\rangle}L^{\langle s\rangle^{\gamma^{\langle s\rangle^{-1}}\left(-1+\gamma^{\langle s\rangle}\right)}}\right)^{-1+\gamma^{\langle s\rangle}\left(-1+\gamma^{\langle s\rangle}\right)^{-1}}\left(\beta^{\mathrm{va}\langle s\rangle}VA^{\langle s\rangle^{\gamma^{\langle s\rangle^{-1}}(-1} \tag{2.14}$$

$$si\in SEC: \quad -p^{\langle si\rangle}(1-\tau)+\beta^{\mathrm{ci}\langle s\rangle}\chi^{\langle si,s\rangle}p^{\langle s\rangle}(1-\tau)CI^{\langle s\rangle^{-1+\gamma^{\langle s\rangle^{-1}}\left(-1+\gamma^{\langle s\rangle}\right)}}X^{\langle si,s\rangle^{-1+\gamma^{\langle s\rangle^{-1}}\left(-1+\gamma^{\langle s\rangle}\right)}}\left(\beta^{\mathrm{va}\langle s\rangle}VA^{\langle s\rangle^{\gamma^{\langle s\rangle^{-1}}\left(-1+\gamma^{\langle s\rangle}\right)}}+\beta^{\mathrm{ci}\langle s\rangle}CI^{\langle s\rangle^{\gamma^{\langle s\rangle^{-1}}\left(-1+\gamma^{\langle s\rangle}\right)}}\right)^{-1+\gamma^{\langle s\rangle}\left(-1+\gamma^{\langle s\rangle}\right)^{-1}}\left(\sum_{si\in S} \tag{2.15}$$

3

3 GOVERNMENT

3.1 Identities

$$G^{\mathrm{inc}}=TR \tag{3.1}$$

$$G^{\mathrm{inc}}=T^{\mathrm{hh}}+T^{\mathrm{firms}}+T^{\mathrm{lk}} \tag{3.2}$$

$$T^{\mathrm{hh}}=\tau^{\mathrm{h}}H^{\mathrm{inc}} \tag{3.3}$$

$$T^{\mathrm{firms}}=\tau\left(\sum_{s\in SEC}Tpi^{\langle s\rangle}\right) \tag{3.4}$$

$$T^{\mathrm{lk}}=t^{\mathrm{l}}\left(\sum_{si\in SEC}L^{\langle si\rangle}\right)+t^{\mathrm{k}}p^{\mathrm{k}}\left(\sum_{s\in SEC}K^{\langle s\rangle}\right) \tag{3.5}$$

4 EQUILIBRIUM

4.1 Identities

$$s \in SEC: \quad Y^{\langle s \rangle} = D^{\langle s \rangle} + \sum_{si \in SEC} X^{\langle s,si \rangle} \tag{4.1}$$

$$K = \sum_{s \in SEC} K^{\langle s \rangle} \tag{4.2}$$

5 Equilibrium relationships (before expansion and reduction)

$$par^{\mathrm{k}} - K = 0 \tag{5.1}$$

$$par^{\mathrm{l}} - L = 0 \tag{5.2}$$

$$-G^{\mathrm{inc}} + TR = 0 \tag{5.3}$$

$$-K + \sum_{s \in SEC} K^{\langle s \rangle} = 0 \tag{5.4}$$

$$-T^{\mathrm{hh}} + \tau^{\mathrm{h}} H^{\mathrm{inc}} = 0 \tag{5.5}$$

$$-T^{\mathrm{firms}} + \tau \left(\sum_{s \in SEC} Tpi^{\langle s \rangle} \right) = 0 \tag{5.6}$$

$$U - \left(\sum_{s \in SEC} \alpha^{\langle s \rangle} D^{\langle s \rangle^{\omega^{-1}(-1+\omega)}} \right)^{\omega(-1+\omega)^{-1}} = 0 \tag{5.7}$$

$$-T^{\mathrm{lk}} + t^{\mathrm{l}} \left(\sum_{si \in SEC} L^{\langle si \rangle} \right) + t^{\mathrm{k}} p^{\mathrm{k}} \left(\sum_{s \in SEC} K^{\langle s \rangle} \right) = 0 \tag{5.8}$$

$$-H^{\mathrm{inc}} \left(1 - \tau^{\mathrm{h}}\right) - \sum_{s \in SEC} \pi^{\langle s \rangle} + \sum_{s \in SEC} p^{\langle s \rangle} D^{\langle s \rangle} = 0 \tag{5.9}$$

$$-G^{\mathrm{inc}} + T^{\mathrm{hh}} + T^{\mathrm{firms}} + T^{\mathrm{lk}} = 0 \tag{5.10}$$

$$-H^{\mathrm{inc}} + L + TR + p^{\mathrm{k}} K = 0 \tag{5.11}$$

$$s \in SEC: \quad \pi^{\langle s \rangle} - Tpi^{\langle s \rangle} (1-\tau) = 0 \tag{5.12}$$

$$s \in SEC: \quad -CI^{\langle s \rangle} + \left(\sum_{si \in SEC} \chi^{\langle si,s \rangle} X^{\langle si,s \rangle \gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} \right)^{\gamma^{\langle s \rangle} \left(-1+\gamma^{\langle s \rangle}\right)^{-1}} = 0 \tag{5.13}$$

$$s \in SEC: \quad -VA^{\langle s \rangle} + \left(\beta^{\mathrm{k}\langle s \rangle} K^{\langle s \rangle \gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} + \beta^{\mathrm{l}\langle s \rangle} L^{\langle s \rangle \gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} \right)^{\gamma^{\langle s \rangle} \left(-1+\gamma^{\langle s \rangle}\right)^{-1}} = 0 \tag{5.14}$$

$$s \in SEC: \quad -Y^{\langle s \rangle} + \left(\beta^{\mathrm{va}\langle s \rangle} VA^{\langle s \rangle \gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} + \beta^{\mathrm{ci}\langle s \rangle} CI^{\langle s \rangle \gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} \right)^{\gamma^{\langle s \rangle} \left(-1+\gamma^{\langle s \rangle}\right)^{-1}} = 0 \tag{5.15}$$

$$s \in SEC: \quad \lambda^{\mathrm{CONSUMER}^1} p^{\langle s \rangle} + \alpha^{\langle s \rangle} D^{\langle s \rangle -1+\omega^{-1}(-1+\omega)} \left(\sum_{s \in SEC} \alpha^{\langle s \rangle} D^{\langle s \rangle \omega^{-1}(-1+\omega)} \right)^{-1+\omega(-1+\omega)^{-1}} = 0 \tag{5.16}$$

$$s \in SEC: \quad \left(-1-t^{\mathrm{l}}\right)(1-\tau) + \beta^{\mathrm{l}\langle s \rangle} \beta^{\mathrm{va}\langle s \rangle} p^{\langle s \rangle} (1-\tau) L^{\langle s \rangle -1+\gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} VA^{\langle s \rangle -1+\gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} \left(\beta^{\mathrm{k}\langle s \rangle} K^{\langle s \rangle \gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} + \beta^{\mathrm{l}\langle s \rangle} L^{\langle s \rangle \gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} \right)^{-1+\gamma^{\langle s \rangle} \left(-1+\gamma^{\langle s \rangle}\right)^{-1}} \left(\beta^{\mathrm{va}\langle s \rangle} \right.$$
(5.17)

$$s \in SEC: \quad -p^{\mathrm{k}} \left(1+t^{\mathrm{k}}\right)(1-\tau) + \beta^{\mathrm{k}\langle s \rangle} \beta^{\mathrm{va}\langle s \rangle} p^{\langle s \rangle} (1-\tau) K^{\langle s \rangle -1+\gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} VA^{\langle s \rangle -1+\gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} \left(\beta^{\mathrm{k}\langle s \rangle} K^{\langle s \rangle \gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} + \beta^{\mathrm{l}\langle s \rangle} L^{\langle s \rangle \gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} \right)^{-1+\gamma^{\langle s \rangle} \left(-1+\gamma^{\langle s \rangle}\right)^{-1}} \left(\beta^{\mathrm{v}} \right.$$
(5.18)

$$s \in SEC: \quad D^{\langle s \rangle} - Y^{\langle s \rangle} + \sum_{si \in SEC} X^{\langle s,si \rangle} = 0 \tag{5.19}$$

$$s \in SEC: \quad -Tpi^{\langle s \rangle} + p^{\langle s \rangle} Y^{\langle s \rangle} - L^{\langle s \rangle} \left(1+t^{\mathrm{l}}\right) - p^{\mathrm{k}} K^{\langle s \rangle} \left(1+t^{\mathrm{k}}\right) - \sum_{si \in SEC} p^{\langle si \rangle} X^{\langle si,s \rangle} = 0 \tag{5.20}$$

$$s \in SEC: \quad si \in SEC: \quad -p^{\langle si \rangle} (1-\tau) + \beta^{\mathrm{ci}\langle s \rangle} \chi^{\langle si,s \rangle} p^{\langle s \rangle} (1-\tau) CI^{\langle s \rangle -1+\gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} X^{\langle si,s \rangle -1+\gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} \left(\beta^{\mathrm{va}\langle s \rangle} VA^{\langle s \rangle \gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} + \beta^{\mathrm{ci}\langle s \rangle} CI^{\langle s \rangle \gamma^{\langle s \rangle -1} \left(-1+\gamma^{\langle s \rangle}\right)} \right)^{-1+\gamma^{\langle s \rangle} \left(-1-\right.}$$
(5.21)

6 Equilibrium relationships (after expansion and reduction)

$$pr^{\mathrm{k}} - K = 0 \tag{6.1}$$

$$pr^{\mathrm{l}} - L = 0 \tag{6.2}$$

$$-G^{\mathrm{inc}} + TR = 0 \tag{6.3}$$

$$-T^{\mathrm{hh}} + \tau^{\mathrm{h}} H^{\mathrm{inc}} = 0 \tag{6.4}$$

$$-T^{\mathrm{firms}} + \tau \left(Tpi^{\langle \mathrm{A} \rangle} + Tpi^{\langle \mathrm{B} \rangle} + Tpi^{\langle \mathrm{C} \rangle} \right) = 0 \tag{6.5}$$

$$U - \left(\alpha^{\langle \mathrm{A} \rangle} D^{\langle \mathrm{A} \rangle^{\omega^{-1}(-1+\omega)}} + \alpha^{\langle \mathrm{B} \rangle} D^{\langle \mathrm{B} \rangle^{\omega^{-1}(-1+\omega)}} + \alpha^{\langle \mathrm{C} \rangle} D^{\langle \mathrm{C} \rangle^{\omega^{-1}(-1+\omega)}} \right)^{\omega(-1+\omega)^{-1}} = 0 \tag{6.6}$$

$$\pi^{\langle \mathrm{A} \rangle} - Tpi^{\langle \mathrm{A} \rangle} (1 - \tau) = 0 \tag{6.7}$$

$$\pi^{\langle \mathrm{B} \rangle} - Tpi^{\langle \mathrm{B} \rangle} (1 - \tau) = 0 \tag{6.8}$$

$$\pi^{\langle \mathrm{C} \rangle} - Tpi^{\langle \mathrm{C} \rangle} (1 - \tau) = 0 \tag{6.9}$$

$$-CI^{\langle \mathrm{A} \rangle} + \left(\chi^{\langle \mathrm{A,A} \rangle} X^{\langle \mathrm{A,A} \rangle^{\gamma^{\langle \mathrm{A} \rangle - 1}(-1+\gamma^{\langle \mathrm{A} \rangle})}} + \chi^{\langle \mathrm{B,A} \rangle} X^{\langle \mathrm{B,A} \rangle^{\gamma^{\langle \mathrm{A} \rangle - 1}(-1+\gamma^{\langle \mathrm{A} \rangle})}} + \chi^{\langle \mathrm{C,A} \rangle} X^{\langle \mathrm{C,A} \rangle^{\gamma^{\langle \mathrm{A} \rangle - 1}(-1+\gamma^{\langle \mathrm{A} \rangle})}} \right)^{\gamma^{\langle \mathrm{A} \rangle}(-1+\gamma^{\langle \mathrm{A} \rangle})^{-1}} = 0 \tag{6.10}$$

$$-CI^{\langle \mathrm{B} \rangle} + \left(\chi^{\langle \mathrm{A,B} \rangle} X^{\langle \mathrm{A,B} \rangle^{\gamma^{\langle \mathrm{B} \rangle - 1}(-1+\gamma^{\langle \mathrm{B} \rangle})}} + \chi^{\langle \mathrm{B,B} \rangle} X^{\langle \mathrm{B,B} \rangle^{\gamma^{\langle \mathrm{B} \rangle - 1}(-1+\gamma^{\langle \mathrm{B} \rangle})}} + \chi^{\langle \mathrm{C,B} \rangle} X^{\langle \mathrm{C,B} \rangle^{\gamma^{\langle \mathrm{B} \rangle - 1}(-1+\gamma^{\langle \mathrm{B} \rangle})}} \right)^{\gamma^{\langle \mathrm{B} \rangle}(-1+\gamma^{\langle \mathrm{B} \rangle})^{-1}} = 0 \tag{6.11}$$

$$-CI^{\langle \mathrm{C} \rangle} + \left(\chi^{\langle \mathrm{A,C} \rangle} X^{\langle \mathrm{A,C} \rangle^{\gamma^{\langle \mathrm{C} \rangle - 1}(-1+\gamma^{\langle \mathrm{C} \rangle})}} + \chi^{\langle \mathrm{B,C} \rangle} X^{\langle \mathrm{B,C} \rangle^{\gamma^{\langle \mathrm{C} \rangle - 1}(-1+\gamma^{\langle \mathrm{C} \rangle})}} + \chi^{\langle \mathrm{C,C} \rangle} X^{\langle \mathrm{C,C} \rangle^{\gamma^{\langle \mathrm{C} \rangle - 1}(-1+\gamma^{\langle \mathrm{C} \rangle})}} \right)^{\gamma^{\langle \mathrm{C} \rangle}(-1+\gamma^{\langle \mathrm{C} \rangle})^{-1}} = 0 \tag{6.12}$$

$$-VA^{\langle \mathrm{A} \rangle} + \left(\beta^{\mathrm{k}\langle \mathrm{A} \rangle} K^{\langle \mathrm{A} \rangle^{\gamma^{\langle \mathrm{A} \rangle - 1}(-1+\gamma^{\langle \mathrm{A} \rangle})}} + \beta^{\mathrm{l}\langle \mathrm{A} \rangle} L^{\langle \mathrm{A} \rangle^{\gamma^{\langle \mathrm{A} \rangle - 1}(-1+\gamma^{\langle \mathrm{A} \rangle})}} \right)^{\gamma^{\langle \mathrm{A} \rangle}(-1+\gamma^{\langle \mathrm{A} \rangle})^{-1}} = 0 \tag{6.13}$$

$$-VA^{\langle \mathrm{B} \rangle} + \left(\beta^{\mathrm{k}\langle \mathrm{B} \rangle} K^{\langle \mathrm{B} \rangle^{\gamma^{\langle \mathrm{B} \rangle - 1}(-1+\gamma^{\langle \mathrm{B} \rangle})}} + \beta^{\mathrm{l}\langle \mathrm{B} \rangle} L^{\langle \mathrm{B} \rangle^{\gamma^{\langle \mathrm{B} \rangle - 1}(-1+\gamma^{\langle \mathrm{B} \rangle})}} \right)^{\gamma^{\langle \mathrm{B} \rangle}(-1+\gamma^{\langle \mathrm{B} \rangle})^{-1}} = 0 \tag{6.14}$$

$$-VA^{\langle \mathrm{C} \rangle} + \left(\beta^{\mathrm{k}\langle \mathrm{C} \rangle} K^{\langle \mathrm{C} \rangle \gamma^{\langle \mathrm{C} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{C} \rangle} \right)} + \beta^{\mathrm{l}\langle \mathrm{C} \rangle} L^{\langle \mathrm{C} \rangle \gamma^{\langle \mathrm{C} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{C} \rangle} \right)} \right)^{\gamma^{\langle \mathrm{C} \rangle} \left(-1 + \gamma^{\langle \mathrm{C} \rangle} \right)^{-1}} = 0 \tag{6.15}$$

$$-Y^{\langle \mathrm{A} \rangle} + \left(\beta^{\mathrm{va}\langle \mathrm{A} \rangle} VA^{\langle \mathrm{A} \rangle \gamma^{\langle \mathrm{A} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{A} \rangle} \right)} + \beta^{\mathrm{ci}\langle \mathrm{A} \rangle} CI^{\langle \mathrm{A} \rangle \gamma^{\langle \mathrm{A} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{A} \rangle} \right)} \right)^{\gamma^{\langle \mathrm{A} \rangle} \left(-1 + \gamma^{\langle \mathrm{A} \rangle} \right)^{-1}} = 0 \tag{6.16}$$

$$-Y^{\langle \mathrm{B} \rangle} + \left(\beta^{\mathrm{va}\langle \mathrm{B} \rangle} VA^{\langle \mathrm{B} \rangle \gamma^{\langle \mathrm{B} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{B} \rangle} \right)} + \beta^{\mathrm{ci}\langle \mathrm{B} \rangle} CI^{\langle \mathrm{B} \rangle \gamma^{\langle \mathrm{B} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{B} \rangle} \right)} \right)^{\gamma^{\langle \mathrm{B} \rangle} \left(-1 + \gamma^{\langle \mathrm{B} \rangle} \right)^{-1}} = 0 \tag{6.17}$$

$$-Y^{\langle \mathrm{C} \rangle} + \left(\beta^{\mathrm{va}\langle \mathrm{C} \rangle} VA^{\langle \mathrm{C} \rangle \gamma^{\langle \mathrm{C} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{C} \rangle} \right)} + \beta^{\mathrm{ci}\langle \mathrm{C} \rangle} CI^{\langle \mathrm{C} \rangle \gamma^{\langle \mathrm{C} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{C} \rangle} \right)} \right)^{\gamma^{\langle \mathrm{C} \rangle} \left(-1 + \gamma^{\langle \mathrm{C} \rangle} \right)^{-1}} = 0 \tag{6.18}$$

$$\lambda^{\mathrm{CONSUMER}^1} p^{\langle \mathrm{A} \rangle} + \alpha^{\langle \mathrm{A} \rangle} D^{\langle \mathrm{A} \rangle - 1 + \omega^{-1} (-1+\omega)} \left(\alpha^{\langle \mathrm{A} \rangle} D^{\langle \mathrm{A} \rangle \omega^{-1} (-1+\omega)} + \alpha^{\langle \mathrm{B} \rangle} D^{\langle \mathrm{B} \rangle \omega^{-1} (-1+\omega)} + \alpha^{\langle \mathrm{C} \rangle} D^{\langle \mathrm{C} \rangle \omega^{-1} (-1+\omega)} \right)^{-1 + \omega (-1+\omega)^{-1}} = 0 \tag{6.19}$$

$$\lambda^{\mathrm{CONSUMER}^1} p^{\langle \mathrm{B} \rangle} + \alpha^{\langle \mathrm{B} \rangle} D^{\langle \mathrm{B} \rangle - 1 + \omega^{-1} (-1+\omega)} \left(\alpha^{\langle \mathrm{A} \rangle} D^{\langle \mathrm{A} \rangle \omega^{-1} (-1+\omega)} + \alpha^{\langle \mathrm{B} \rangle} D^{\langle \mathrm{B} \rangle \omega^{-1} (-1+\omega)} + \alpha^{\langle \mathrm{C} \rangle} D^{\langle \mathrm{C} \rangle \omega^{-1} (-1+\omega)} \right)^{-1 + \omega (-1+\omega)^{-1}} = 0 \tag{6.20}$$

$$\lambda^{\mathrm{CONSUMER}^1} p^{\langle \mathrm{C} \rangle} + \alpha^{\langle \mathrm{C} \rangle} D^{\langle \mathrm{C} \rangle - 1 + \omega^{-1} (-1+\omega)} \left(\alpha^{\langle \mathrm{A} \rangle} D^{\langle \mathrm{A} \rangle \omega^{-1} (-1+\omega)} + \alpha^{\langle \mathrm{B} \rangle} D^{\langle \mathrm{B} \rangle \omega^{-1} (-1+\omega)} + \alpha^{\langle \mathrm{C} \rangle} D^{\langle \mathrm{C} \rangle \omega^{-1} (-1+\omega)} \right)^{-1 + \omega (-1+\omega)^{-1}} = 0 \tag{6.21}$$

$$-p^{\langle \mathrm{A} \rangle} (1-\tau) + \beta^{\mathrm{ci}\langle \mathrm{A} \rangle} \chi^{\langle \mathrm{A,A} \rangle} p^{\langle \mathrm{A} \rangle} (1-\tau) CI^{\langle \mathrm{A} \rangle - 1 + \gamma^{\langle \mathrm{A} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{A} \rangle} \right)} X^{\langle \mathrm{A,A} \rangle - 1 + \gamma^{\langle \mathrm{A} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{A} \rangle} \right)} \left(\beta^{\mathrm{va}\langle \mathrm{A} \rangle} VA^{\langle \mathrm{A} \rangle \gamma^{\langle \mathrm{A} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{A} \rangle} \right)} + \beta^{\mathrm{ci}\langle \mathrm{A} \rangle} CI^{\langle \mathrm{A} \rangle \gamma^{\langle \mathrm{A} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{A} \rangle} \right)} \right)^{-1 + \gamma^{\langle \mathrm{A} \rangle} \left(-1 + \gamma^{\langle \mathrm{A} \rangle} \right)^{-1}} \left(\chi^{\langle \mathrm{A,A} \rangle} X \right.$$
(6.22)

$$-p^{\langle \mathrm{A} \rangle} (1-\tau) + \beta^{\mathrm{ci}\langle \mathrm{B} \rangle} \chi^{\langle \mathrm{A,B} \rangle} p^{\langle \mathrm{B} \rangle} (1-\tau) CI^{\langle \mathrm{B} \rangle - 1 + \gamma^{\langle \mathrm{B} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{B} \rangle} \right)} X^{\langle \mathrm{A,B} \rangle - 1 + \gamma^{\langle \mathrm{B} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{B} \rangle} \right)} \left(\beta^{\mathrm{va}\langle \mathrm{B} \rangle} VA^{\langle \mathrm{B} \rangle \gamma^{\langle \mathrm{B} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{B} \rangle} \right)} + \beta^{\mathrm{ci}\langle \mathrm{B} \rangle} CI^{\langle \mathrm{B} \rangle \gamma^{\langle \mathrm{B} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{B} \rangle} \right)} \right)^{-1 + \gamma^{\langle \mathrm{B} \rangle} \left(-1 + \gamma^{\langle \mathrm{B} \rangle} \right)^{-1}} \left(\chi^{\langle \mathrm{A,B} \rangle} X \right.$$
(6.23)

$$-p^{\langle \mathrm{A} \rangle} (1-\tau) + \beta^{\mathrm{ci}\langle \mathrm{C} \rangle} \chi^{\langle \mathrm{A,C} \rangle} p^{\langle \mathrm{C} \rangle} (1-\tau) CI^{\langle \mathrm{C} \rangle - 1 + \gamma^{\langle \mathrm{C} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{C} \rangle} \right)} X^{\langle \mathrm{A,C} \rangle - 1 + \gamma^{\langle \mathrm{C} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{C} \rangle} \right)} \left(\beta^{\mathrm{va}\langle \mathrm{C} \rangle} VA^{\langle \mathrm{C} \rangle \gamma^{\langle \mathrm{C} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{C} \rangle} \right)} + \beta^{\mathrm{ci}\langle \mathrm{C} \rangle} CI^{\langle \mathrm{C} \rangle \gamma^{\langle \mathrm{C} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{C} \rangle} \right)} \right)^{-1 + \gamma^{\langle \mathrm{C} \rangle} \left(-1 + \gamma^{\langle \mathrm{C} \rangle} \right)^{-1}} \left(\chi^{\langle \mathrm{A,C} \rangle} X \right.$$
(6.24)

$$-p^{\langle \mathrm{B} \rangle} (1-\tau) + \beta^{\mathrm{ci}\langle \mathrm{A} \rangle} \chi^{\langle \mathrm{B,A} \rangle} p^{\langle \mathrm{A} \rangle} (1-\tau) CI^{\langle \mathrm{A} \rangle - 1 + \gamma^{\langle \mathrm{A} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{A} \rangle} \right)} X^{\langle \mathrm{B,A} \rangle - 1 + \gamma^{\langle \mathrm{A} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{A} \rangle} \right)} \left(\beta^{\mathrm{va}\langle \mathrm{A} \rangle} VA^{\langle \mathrm{A} \rangle \gamma^{\langle \mathrm{A} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{A} \rangle} \right)} + \beta^{\mathrm{ci}\langle \mathrm{A} \rangle} CI^{\langle \mathrm{A} \rangle \gamma^{\langle \mathrm{A} \rangle} - 1 \left(-1 + \gamma^{\langle \mathrm{A} \rangle} \right)} \right)^{-1 + \gamma^{\langle \mathrm{A} \rangle} \left(-1 + \gamma^{\langle \mathrm{A} \rangle} \right)^{-1}} \left(\chi^{\langle \mathrm{A,A} \rangle} X \right.$$
(6.25)

$$-p^{\langle \mathrm{B} \rangle}\left(1-\tau\right)+\beta^{\mathrm{ci}\langle \mathrm{B} \rangle}\chi^{\langle \mathrm{B,B} \rangle}p^{\langle \mathrm{B} \rangle}\left(1-\tau\right)CI^{\langle \mathrm{B} \rangle^{-1+\gamma^{\langle \mathrm{B} \rangle}}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)}X^{\langle \mathrm{B,B} \rangle^{-1+\gamma^{\langle \mathrm{B} \rangle}}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)}\left(\beta^{\mathrm{va}\langle \mathrm{B} \rangle}VA^{\langle \mathrm{B} \rangle^{\gamma^{\langle \mathrm{B} \rangle}}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)}+\beta^{\mathrm{ci}\langle \mathrm{B} \rangle}CI^{\langle \mathrm{B} \rangle^{\gamma^{\langle \mathrm{B} \rangle}}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)}\right)^{-1+\gamma^{\langle \mathrm{B} \rangle}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)^{-1}}\left(\chi^{\langle \mathrm{A,B} \rangle}X^{\langle \right. \tag{6.26}$$

$$-p^{\langle \mathrm{B} \rangle}\left(1-\tau\right)+\beta^{\mathrm{ci}\langle \mathrm{C} \rangle}\chi^{\langle \mathrm{B,C} \rangle}p^{\langle \mathrm{C} \rangle}\left(1-\tau\right)CI^{\langle \mathrm{C} \rangle^{-1+\gamma^{\langle \mathrm{C} \rangle}}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)}X^{\langle \mathrm{B,C} \rangle^{-1+\gamma^{\langle \mathrm{C} \rangle}}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)}\left(\beta^{\mathrm{va}\langle \mathrm{C} \rangle}VA^{\langle \mathrm{C} \rangle^{\gamma^{\langle \mathrm{C} \rangle}}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)}+\beta^{\mathrm{ci}\langle \mathrm{C} \rangle}CI^{\langle \mathrm{C} \rangle^{\gamma^{\langle \mathrm{C} \rangle}}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)}\right)^{-1+\gamma^{\langle \mathrm{C} \rangle}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)^{-1}}\left(\chi^{\langle \mathrm{A,C} \rangle}X^{\right. \tag{6.27}$$

$$-p^{\langle \mathrm{C} \rangle}\left(1-\tau\right)+\beta^{\mathrm{ci}\langle \mathrm{A} \rangle}\chi^{\langle \mathrm{C,A} \rangle}p^{\langle \mathrm{A} \rangle}\left(1-\tau\right)CI^{\langle \mathrm{A} \rangle^{-1+\gamma^{\langle \mathrm{A} \rangle}}\left(-1+\gamma^{\langle \mathrm{A} \rangle}\right)}X^{\langle \mathrm{C,A} \rangle^{-1+\gamma^{\langle \mathrm{A} \rangle}}\left(-1+\gamma^{\langle \mathrm{A} \rangle}\right)}\left(\beta^{\mathrm{va}\langle \mathrm{A} \rangle}VA^{\langle \mathrm{A} \rangle^{\gamma^{\langle \mathrm{A} \rangle}}\left(-1+\gamma^{\langle \mathrm{A} \rangle}\right)}+\beta^{\mathrm{ci}\langle \mathrm{A} \rangle}CI^{\langle \mathrm{A} \rangle^{\gamma^{\langle \mathrm{A} \rangle}}\left(-1+\gamma^{\langle \mathrm{A} \rangle}\right)}\right)^{-1+\gamma^{\langle \mathrm{A} \rangle}\left(-1+\gamma^{\langle \mathrm{A} \rangle}\right)^{-1}}\left(\chi^{\langle \mathrm{A,A} \rangle}X^{\right. \tag{6.28}$$

$$-p^{\langle \mathrm{C} \rangle}\left(1-\tau\right)+\beta^{\mathrm{ci}\langle \mathrm{B} \rangle}\chi^{\langle \mathrm{C,B} \rangle}p^{\langle \mathrm{B} \rangle}\left(1-\tau\right)CI^{\langle \mathrm{B} \rangle^{-1+\gamma^{\langle \mathrm{B} \rangle}}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)}X^{\langle \mathrm{C,B} \rangle^{-1+\gamma^{\langle \mathrm{B} \rangle}}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)}\left(\beta^{\mathrm{va}\langle \mathrm{B} \rangle}VA^{\langle \mathrm{B} \rangle^{\gamma^{\langle \mathrm{B} \rangle}}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)}+\beta^{\mathrm{ci}\langle \mathrm{B} \rangle}CI^{\langle \mathrm{B} \rangle^{\gamma^{\langle \mathrm{B} \rangle}}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)}\right)^{-1+\gamma^{\langle \mathrm{B} \rangle}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)^{-1}}\left(\chi^{\langle \mathrm{A,B} \rangle}X^{\langle \right. \tag{6.29}$$

$$-p^{\langle \mathrm{C} \rangle}\left(1-\tau\right)+\beta^{\mathrm{ci}\langle \mathrm{C} \rangle}\chi^{\langle \mathrm{C,C} \rangle}p^{\langle \mathrm{C} \rangle}\left(1-\tau\right)CI^{\langle \mathrm{C} \rangle^{-1+\gamma^{\langle \mathrm{C} \rangle}}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)}X^{\langle \mathrm{C,C} \rangle^{-1+\gamma^{\langle \mathrm{C} \rangle}}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)}\left(\beta^{\mathrm{va}\langle \mathrm{C} \rangle}VA^{\langle \mathrm{C} \rangle^{\gamma^{\langle \mathrm{C} \rangle}}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)}+\beta^{\mathrm{ci}\langle \mathrm{C} \rangle}CI^{\langle \mathrm{C} \rangle^{\gamma^{\langle \mathrm{C} \rangle}}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)}\right)^{-1+\gamma^{\langle \mathrm{C} \rangle}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)^{-1}}\left(\chi^{\langle \mathrm{A,C} \rangle}X^{\right. \tag{6.30}$$

$$\left(-1-t^{1}\right)\left(1-\tau\right)+\beta^{\mathrm{l}\langle \mathrm{A} \rangle}\beta^{\mathrm{va}\langle \mathrm{A} \rangle}p^{\langle \mathrm{A} \rangle}\left(1-\tau\right)L^{\langle \mathrm{A} \rangle^{-1+\gamma^{\langle \mathrm{A} \rangle}}\left(-1+\gamma^{\langle \mathrm{A} \rangle}\right)}VA^{\langle \mathrm{A} \rangle^{-1+\gamma^{\langle \mathrm{A} \rangle}}\left(-1+\gamma^{\langle \mathrm{A} \rangle}\right)}\left(\beta^{\mathrm{k}\langle \mathrm{A} \rangle}K^{\langle \mathrm{A} \rangle^{\gamma^{\langle \mathrm{A} \rangle}}\left(-1+\gamma^{\langle \mathrm{A} \rangle}\right)}+\beta^{\mathrm{l}\langle \mathrm{A} \rangle}L^{\langle \mathrm{A} \rangle^{\gamma^{\langle \mathrm{A} \rangle}}\left(-1+\gamma^{\langle \mathrm{A} \rangle}\right)}\right)^{-1+\gamma^{\langle \mathrm{A} \rangle}\left(-1+\gamma^{\langle \mathrm{A} \rangle}\right)^{-1}}\left(\beta^{\mathrm{va}\langle \mathrm{A} \rangle}VA^{\langle \right. \tag{6.31}$$

$$\left(-1-t^{1}\right)\left(1-\tau\right)+\beta^{\mathrm{l}\langle \mathrm{B} \rangle}\beta^{\mathrm{va}\langle \mathrm{B} \rangle}p^{\langle \mathrm{B} \rangle}\left(1-\tau\right)L^{\langle \mathrm{B} \rangle^{-1+\gamma^{\langle \mathrm{B} \rangle}}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)}VA^{\langle \mathrm{B} \rangle^{-1+\gamma^{\langle \mathrm{B} \rangle}}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)}\left(\beta^{\mathrm{k}\langle \mathrm{B} \rangle}K^{\langle \mathrm{B} \rangle^{\gamma^{\langle \mathrm{B} \rangle}}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)}+\beta^{\mathrm{l}\langle \mathrm{B} \rangle}L^{\langle \mathrm{B} \rangle^{\gamma^{\langle \mathrm{B} \rangle}}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)}\right)^{-1+\gamma^{\langle \mathrm{B} \rangle}\left(-1+\gamma^{\langle \mathrm{B} \rangle}\right)^{-1}}\left(\beta^{\mathrm{va}\langle \mathrm{B} \rangle}VA^{\langle \mathrm{B} \right. \tag{6.32}$$

$$\left(-1-t^{1}\right)\left(1-\tau\right)+\beta^{\mathrm{l}\langle \mathrm{C} \rangle}\beta^{\mathrm{va}\langle \mathrm{C} \rangle}p^{\langle \mathrm{C} \rangle}\left(1-\tau\right)L^{\langle \mathrm{C} \rangle^{-1+\gamma^{\langle \mathrm{C} \rangle}}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)}VA^{\langle \mathrm{C} \rangle^{-1+\gamma^{\langle \mathrm{C} \rangle}}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)}\left(\beta^{\mathrm{k}\langle \mathrm{C} \rangle}K^{\langle \mathrm{C} \rangle^{\gamma^{\langle \mathrm{C} \rangle}}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)}+\beta^{\mathrm{l}\langle \mathrm{C} \rangle}L^{\langle \mathrm{C} \rangle^{\gamma^{\langle \mathrm{C} \rangle}}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)}\right)^{-1+\gamma^{\langle \mathrm{C} \rangle}\left(-1+\gamma^{\langle \mathrm{C} \rangle}\right)^{-1}}\left(\beta^{\mathrm{va}\langle \mathrm{C} \rangle}VA^{\langle \mathrm{C} \right. \tag{6.33}$$

$$-p^{\mathrm{k}}\left(1+t^{\mathrm{k}}\right)(1-\tau)+\beta^{\mathrm{k}\langle\mathrm{A}\rangle}\beta^{\mathrm{va}\langle\mathrm{A}\rangle}p^{\langle\mathrm{A}\rangle}(1-\tau)K^{\langle\mathrm{A}\rangle^{-1+\gamma^{\langle\mathrm{A}\rangle^{-1}}\left(-1+\gamma^{\langle\mathrm{A}\rangle}\right)}}VA^{\langle\mathrm{A}\rangle^{-1+\gamma^{\langle\mathrm{A}\rangle^{-1}}\left(-1+\gamma^{\langle\mathrm{A}\rangle}\right)}}\left(\beta^{\mathrm{k}\langle\mathrm{A}\rangle}K^{\langle\mathrm{A}\rangle^{\gamma^{\langle\mathrm{A}\rangle^{-1}}\left(-1+\gamma^{\langle\mathrm{A}\rangle}\right)}}+\beta^{\mathrm{l}\langle\mathrm{A}\rangle}L^{\langle\mathrm{A}\rangle^{\gamma^{\langle\mathrm{A}\rangle^{-1}}\left(-1+\gamma^{\langle\mathrm{A}\rangle}\right)}}\right)^{-1+\gamma^{\langle\mathrm{A}\rangle}\left(-1+\gamma^{\langle\mathrm{A}\rangle}\right)^{-1}}\left(\beta^{\mathrm{va}\langle\mathrm{A}\rangle}\right.\tag{6.34}$$

$$-p^{\mathrm{k}}\left(1+t^{\mathrm{k}}\right)(1-\tau)+\beta^{\mathrm{k}\langle\mathrm{B}\rangle}\beta^{\mathrm{va}\langle\mathrm{B}\rangle}p^{\langle\mathrm{B}\rangle}(1-\tau)K^{\langle\mathrm{B}\rangle^{-1+\gamma^{\langle\mathrm{B}\rangle^{-1}}\left(-1+\gamma^{\langle\mathrm{B}\rangle}\right)}}VA^{\langle\mathrm{B}\rangle^{-1+\gamma^{\langle\mathrm{B}\rangle^{-1}}\left(-1+\gamma^{\langle\mathrm{B}\rangle}\right)}}\left(\beta^{\mathrm{k}\langle\mathrm{B}\rangle}K^{\langle\mathrm{B}\rangle^{\gamma^{\langle\mathrm{B}\rangle^{-1}}\left(-1+\gamma^{\langle\mathrm{B}\rangle}\right)}}+\beta^{\mathrm{l}\langle\mathrm{B}\rangle}L^{\langle\mathrm{B}\rangle^{\gamma^{\langle\mathrm{B}\rangle^{-1}}\left(-1+\gamma^{\langle\mathrm{B}\rangle}\right)}}\right)^{-1+\gamma^{\langle\mathrm{B}\rangle}\left(-1+\gamma^{\langle\mathrm{B}\rangle}\right)^{-1}}\left(\beta^{\mathrm{va}\langle\mathrm{B}\rangle}V\right.\tag{6.35}$$

$$-p^{\mathrm{k}}\left(1+t^{\mathrm{k}}\right)(1-\tau)+\beta^{\mathrm{k}\langle\mathrm{C}\rangle}\beta^{\mathrm{va}\langle\mathrm{C}\rangle}p^{\langle\mathrm{C}\rangle}(1-\tau)K^{\langle\mathrm{C}\rangle^{-1+\gamma^{\langle\mathrm{C}\rangle^{-1}}\left(-1+\gamma^{\langle\mathrm{C}\rangle}\right)}}VA^{\langle\mathrm{C}\rangle^{-1+\gamma^{\langle\mathrm{C}\rangle^{-1}}\left(-1+\gamma^{\langle\mathrm{C}\rangle}\right)}}\left(\beta^{\mathrm{k}\langle\mathrm{C}\rangle}K^{\langle\mathrm{C}\rangle^{\gamma^{\langle\mathrm{C}\rangle^{-1}}\left(-1+\gamma^{\langle\mathrm{C}\rangle}\right)}}+\beta^{\mathrm{l}\langle\mathrm{C}\rangle}L^{\langle\mathrm{C}\rangle^{\gamma^{\langle\mathrm{C}\rangle^{-1}}\left(-1+\gamma^{\langle\mathrm{C}\rangle}\right)}}\right)^{-1+\gamma^{\langle\mathrm{C}\rangle}\left(-1+\gamma^{\langle\mathrm{C}\rangle}\right)^{-1}}\left(\beta^{\mathrm{va}\langle\mathrm{C}\rangle}\right.\tag{6.36}$$

$$-T^{\mathrm{lk}}+t^{\mathrm{l}}\left(L^{\langle\mathrm{A}\rangle}+L^{\langle\mathrm{B}\rangle}+L^{\langle\mathrm{C}\rangle}\right)+t^{\mathrm{k}}p^{\mathrm{k}}\left(K^{\langle\mathrm{A}\rangle}+K^{\langle\mathrm{B}\rangle}+K^{\langle\mathrm{C}\rangle}\right)=0\tag{6.37}$$

$$-G^{\mathrm{inc}}+T^{\mathrm{hh}}+T^{\mathrm{firms}}+T^{\mathrm{lk}}=0\tag{6.38}$$

$$-H^{\mathrm{inc}}+L+TR+p^{\mathrm{k}}K=0\tag{6.39}$$

$$-K+K^{\langle\mathrm{A}\rangle}+K^{\langle\mathrm{B}\rangle}+K^{\langle\mathrm{C}\rangle}=0\tag{6.40}$$

$$D^{\langle\mathrm{A}\rangle}+X^{\langle\mathrm{A,A}\rangle}+X^{\langle\mathrm{A,B}\rangle}+X^{\langle\mathrm{A,C}\rangle}-Y^{\langle\mathrm{A}\rangle}=0\tag{6.41}$$

$$D^{\langle\mathrm{B}\rangle}+X^{\langle\mathrm{B,A}\rangle}+X^{\langle\mathrm{B,B}\rangle}+X^{\langle\mathrm{B,C}\rangle}-Y^{\langle\mathrm{B}\rangle}=0\tag{6.42}$$

$$D^{\langle\mathrm{C}\rangle}+X^{\langle\mathrm{C,A}\rangle}+X^{\langle\mathrm{C,B}\rangle}+X^{\langle\mathrm{C,C}\rangle}-Y^{\langle\mathrm{C}\rangle}=0\tag{6.43}$$

$$-\pi^{\langle\mathrm{A}\rangle}-\pi^{\langle\mathrm{B}\rangle}-\pi^{\langle\mathrm{C}\rangle}-H^{\mathrm{inc}}\left(1-\tau^{\mathrm{h}}\right)+p^{\langle\mathrm{A}\rangle}D^{\langle\mathrm{A}\rangle}+p^{\langle\mathrm{B}\rangle}D^{\langle\mathrm{B}\rangle}+p^{\langle\mathrm{C}\rangle}D^{\langle\mathrm{C}\rangle}=0\tag{6.44}$$

$$-Tpi^{\langle\mathrm{A}\rangle}-p^{\langle\mathrm{A}\rangle}X^{\langle\mathrm{A,A}\rangle}+p^{\langle\mathrm{A}\rangle}Y^{\langle\mathrm{A}\rangle}-p^{\langle\mathrm{B}\rangle}X^{\langle\mathrm{B,A}\rangle}-p^{\langle\mathrm{C}\rangle}X^{\langle\mathrm{C,A}\rangle}-L^{\langle\mathrm{A}\rangle}\left(1+t^{\mathrm{l}}\right)-p^{\mathrm{k}}K^{\langle\mathrm{A}\rangle}\left(1+t^{\mathrm{k}}\right)=0\tag{6.45}$$

$$-Tpi^{\langle\mathrm{B}\rangle}-p^{\langle\mathrm{A}\rangle}X^{\langle\mathrm{A,B}\rangle}-p^{\langle\mathrm{B}\rangle}X^{\langle\mathrm{B,B}\rangle}+p^{\langle\mathrm{B}\rangle}Y^{\langle\mathrm{B}\rangle}-p^{\langle\mathrm{C}\rangle}X^{\langle\mathrm{C,B}\rangle}-L^{\langle\mathrm{B}\rangle}\left(1+t^{\mathrm{l}}\right)-p^{\mathrm{k}}K^{\langle\mathrm{B}\rangle}\left(1+t^{\mathrm{k}}\right)=0\tag{6.46}$$

$$-Tpi^{\langle\mathrm{C}\rangle}-p^{\langle\mathrm{A}\rangle}X^{\langle\mathrm{A,C}\rangle}-p^{\langle\mathrm{B}\rangle}X^{\langle\mathrm{B,C}\rangle}-p^{\langle\mathrm{C}\rangle}X^{\langle\mathrm{C,C}\rangle}+p^{\langle\mathrm{C}\rangle}Y^{\langle\mathrm{C}\rangle}-L^{\langle\mathrm{C}\rangle}\left(1+t^{\mathrm{l}}\right)-p^{\mathrm{k}}K^{\langle\mathrm{C}\rangle}\left(1+t^{\mathrm{k}}\right)=0\tag{6.47}$$

7 Parameter settings

$$t^{\mathrm{k}} = 0 \tag{7.1}$$

$$t^{\mathrm{l}} = 0 \tag{7.2}$$

$$\tau^{\mathrm{h}} = 0 \tag{7.3}$$

$$\tau = 0 \tag{7.4}$$

8 Equilibrium values

	Equilibrium value
$\lambda^{\text{CONSUMER}^1}$	-0.9978
p^{k}	1.0001
G^{inc}	0
H^{inc}	80.0057
K	40
L	40
T^{hh}	0
T^{firms}	0
T^{lk}	0
TR	0
U	79.8271
$p^{\langle \text{A} \rangle}$	1.0013
$p^{\langle \text{B} \rangle}$	1.0026
$p^{\langle \text{C} \rangle}$	1.0023
$\pi^{\langle \text{A} \rangle}$	0
$\pi^{\langle \text{B} \rangle}$	0
$\pi^{\langle \text{C} \rangle}$	0
$CI^{\langle \text{A} \rangle}$	39.8256
$CI^{\langle \text{B} \rangle}$	29.8056
$CI^{\langle \text{C} \rangle}$	49.6959
$D^{\langle \text{A} \rangle}$	29.9529
$D^{\langle \text{B} \rangle}$	9.997
$D^{\langle \text{C} \rangle}$	39.9004
$K^{\langle \text{A} \rangle}$	19.9931
$K^{\langle \text{B} \rangle}$	9.9852
$K^{\langle \text{C} \rangle}$	10.0217
$L^{\langle \text{A} \rangle}$	9.9994
$L^{\langle \text{B} \rangle}$	19.9761
$L^{\langle \text{C} \rangle}$	10.0245
$Tpi^{\langle \text{A} \rangle}$	0
$Tpi^{\langle \text{B} \rangle}$	0
$Tpi^{\langle \text{C} \rangle}$	0
$VA^{\langle \text{A} \rangle}$	29.9561
$VA^{\langle \text{B} \rangle}$	29.9249
$VA^{\langle \text{C} \rangle}$	20.0401
$X^{\langle \text{A,A} \rangle}$	9.9763
$X^{\langle \text{A,B} \rangle}$	9.9615
$X^{\langle \text{A,C} \rangle}$	19.9301
$X^{\langle \text{B,A} \rangle}$	19.8974
$X^{\langle \text{B,B} \rangle}$	9.937
$X^{\langle \text{B,C} \rangle}$	19.881
$X^{\langle \text{C,A} \rangle}$	9.958
$X^{\langle \text{C,B} \rangle}$	9.9433
$X^{\langle \text{C,C} \rangle}$	9.9516
$Y^{\langle \text{A} \rangle}$	69.8208
$Y^{\langle \text{B} \rangle}$	59.7124
$Y^{\langle \text{C} \rangle}$	69.7533

9 Equilibrium values

	Equilibrium value
$\lambda^{\mathrm{CONSUMER}^1}$	-0.9978
p^{k}	0.8001
G^{inc}	8.0011
H^{inc}	80.0057
K	40
L	40
T^{hh}	0
T^{firms}	0
T^{lk}	8.0011
TR	8.0011
U	79.8271
$p^{\langle \mathrm{A} \rangle}$	1.0013
$p^{\langle \mathrm{B} \rangle}$	1.0026
$p^{\langle \mathrm{C} \rangle}$	1.0023
$\pi^{\langle \mathrm{A} \rangle}$	0
$\pi^{\langle \mathrm{B} \rangle}$	0
$\pi^{\langle \mathrm{C} \rangle}$	0
$CI^{\langle \mathrm{A} \rangle}$	39.8256
$CI^{\langle \mathrm{B} \rangle}$	29.8056
$CI^{\langle \mathrm{C} \rangle}$	49.6958
$D^{\langle \mathrm{A} \rangle}$	29.9529
$D^{\langle \mathrm{B} \rangle}$	9.997
$D^{\langle \mathrm{C} \rangle}$	39.9004
$K^{\langle \mathrm{A} \rangle}$	19.9931
$K^{\langle \mathrm{B} \rangle}$	9.9852
$K^{\langle \mathrm{C} \rangle}$	10.0217
$L^{\langle \mathrm{A} \rangle}$	9.9994
$L^{\langle \mathrm{B} \rangle}$	19.9761
$L^{\langle \mathrm{C} \rangle}$	10.0245
$Tpi^{\langle \mathrm{A} \rangle}$	0
$Tpi^{\langle \mathrm{B} \rangle}$	0
$Tpi^{\langle \mathrm{C} \rangle}$	0
$VA^{\langle \mathrm{A} \rangle}$	29.9561
$VA^{\langle \mathrm{B} \rangle}$	29.9249
$VA^{\langle \mathrm{C} \rangle}$	20.0401
$X^{\langle \mathrm{A,A} \rangle}$	9.9763
$X^{\langle \mathrm{A,B} \rangle}$	9.9615
$X^{\langle \mathrm{A,C} \rangle}$	19.9301
$X^{\langle \mathrm{B,A} \rangle}$	19.8974
$X^{\langle \mathrm{B,B} \rangle}$	9.937
$X^{\langle \mathrm{B,C} \rangle}$	19.881
$X^{\langle \mathrm{C,A} \rangle}$	9.958
$X^{\langle \mathrm{C,B} \rangle}$	9.9433
$X^{\langle \mathrm{C,C} \rangle}$	9.9516
$Y^{\langle \mathrm{A} \rangle}$	69.8208
$Y^{\langle \mathrm{B} \rangle}$	59.7124
$Y^{\langle \mathrm{C} \rangle}$	69.7533