

## Index sets

$$HH = \{1, s\}$$

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

### 1 CONSUMER $h \in HH$

#### 1.1 Optimisation problem

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

s.t. :

$$INC^{(h)} = \sum_{s \in SEC} p^{(s)} D^{(s,h)} \left( \lambda^{CONSUMER^1(h)} \right) \quad (1.2)$$

#### 1.2 Identities

$$INC^{(h)} = CAP^{(h)} + p^K K^{(h)} + p^L L^{(h)} \quad (1.3)$$

#### 1.3 First order conditions

$$s \in SEC: \lambda^{CONSUMER^1(h)} p^{(s)} + \alpha^{(s,h)} D^{(s,h)^{-1+\omega^{-1}(-1+\omega)}} \left( \sum_{s \in SEC} \alpha^{(s,h)} D^{(s,h)} \omega^{-1(-1+\omega)} \right)^{-1+\omega(-1+\omega)^{-1}} = 0 \quad (D^{(s,h)}) \quad (1.4)$$

## 2 SECTOR $s \in SEC$

### 2.1 Optimisation problem

$$\max_{Y^{(s)}, K^{(s)}, L^{(s)}, Y^{VA(s)}, Y^{INT(s)}} \pi^{(s)} = -p^{kc} K^{(s)} - p^{lc} L^{(s)} + p^{(s)} Y^{(s)} - Y^{INT(s)} \left( \sum_{\tilde{s} \in SEC} \beta^{x(\tilde{s}, s)^{-1}} p^{(\tilde{s})} \right) \quad (2.1)$$

s.t. :

$$Y^{(s)} = Y^{VA(s)} \left( \lambda^{SECTOR^1(s)} \right) \quad (2.2)$$

$$Y^{(s)} = Y^{INT(s)} \left( \lambda^{SECTOR^2(s)} \right) \quad (2.3)$$

$$Y^{VA(s)} = \gamma^{yva(s)} K^{(s)\beta^k(s)} L^{(s)\beta^l(s)} \left( \lambda^{SECTOR^3(s)} \right) \quad (2.4)$$

### 2.2 Identities

$$\tilde{s} \in SEC: \quad X^{(\tilde{s}, s)} = \beta^{x(\tilde{s}, s)^{-1}} Y^{INT(s)} \quad (2.5)$$

### 2.3 First order conditions

$$-\lambda^{SECTOR^1(s)} - \lambda^{SECTOR^2(s)} + p^{(s)} = 0 \quad (Y^{(s)}) \quad (2.6)$$

$$-p^{kc} + \beta^k(s) \gamma^{yva(s)} \lambda^{SECTOR^3(s)} K^{(s)^{-1+\beta^k(s)}} L^{(s)\beta^l(s)} = 0 \quad (K^{(s)}) \quad (2.7)$$

$$-p^{lc} + \beta^l(s) \gamma^{yva(s)} \lambda^{SECTOR^3(s)} K^{(s)\beta^k(s)} L^{(s)^{-1+\beta^l(s)}} = 0 \quad (L^{(s)}) \quad (2.8)$$

$$\lambda^{SECTOR^1(s)} - \lambda^{SECTOR^3(s)} = 0 \quad (Y^{VA(s)}) \quad (2.9)$$

$$\lambda^{SECTOR^2(s)} - \sum_{\tilde{s} \in SEC} \beta^{x(\tilde{s}, s)^{-1}} p^{(\tilde{s})} = 0 \quad (Y^{INT(s)}) \quad (2.10)$$

## 2.4 First order conditions after reduction

$$-p^{\text{kc}} + \beta^{\text{k}^{(s)}} \gamma^{\text{yva}^{(s)}} \left( p^{(s)} - \sum_{si \in \text{SEC}} \beta^{\text{x}^{(si,s)}} p^{(si)} \right) K^{(s)-1+\beta^{\text{k}^{(s)}}} L^{(s)\beta^{\text{l}^{(s)}}} = 0 \quad \left( K^{(s)} \right) \quad (2.11)$$

$$-p^{\text{lc}} + \beta^{\text{l}^{(s)}} \gamma^{\text{yva}^{(s)}} \left( p^{(s)} - \sum_{si \in \text{SEC}} \beta^{\text{x}^{(si,s)}} p^{(si)} \right) K^{(s)\beta^{\text{k}^{(s)}}} L^{(s)-1+\beta^{\text{l}^{(s)}}} = 0 \quad \left( L^{(s)} \right) \quad (2.12)$$

# 3 EQUILIBRIUM

## 3.1 Identities

$$p^{\text{l}} = 1 \quad (3.1)$$

$$s \in \text{SEC}: \quad p^{(s)} = 1 \quad (3.2)$$

$$KS = \sum_{s \in \text{SEC}} K^{(s)} \quad (3.3)$$

$$KS = ks^{\text{data}} \quad (3.4)$$

$$h \in \text{HH}: \quad K^{(h)} = \alpha w^{(h)} \text{scale}^{(h)-1} KS \quad (3.5)$$

$$LS = ls^{\text{data}} \quad (3.6)$$

$$h \in \text{HH}: \quad L^{(h)} = \alpha w^{(h)} \text{scale}^{(h)-1} LS \quad (3.7)$$

$$p^{\text{kc}} = p^{\text{k}} \quad (3.8)$$

$$p^{\text{lc}} = p^{\text{l}} \quad (3.9)$$

$$\Pi = \sum_{s \in \text{SEC}} \pi^{(s)} \quad (3.10)$$

$$K^{\text{f}} = \Pi + \alpha w^{\text{f}} KS \quad (3.11)$$

$$h \in \text{HH}: \quad \text{CAP}^{(h)} = \alpha w^{\text{f}^{(h)}} \text{scale}^{(h)-1} K^{\text{f}} \quad (3.12)$$

## 4 Equilibrium relationships (before expansion and reduction)

$$1 - p^l = 0 \quad (4.1)$$

$$k^s \text{data} - KS = 0 \quad (4.2)$$

$$l^s \text{data} - LS = 0 \quad (4.3)$$

$$p^k - p^{kc} = 0 \quad (4.4)$$

$$p^l - p^{lc} = 0 \quad (4.5)$$

$$-KS + \sum_{s \in SEC} K^{(s)} = 0 \quad (4.6)$$

$$-\Pi + \sum_{s \in SEC} \pi^{(s)} = 0 \quad (4.7)$$

$$-K^f + \Pi + \alpha w^f KS = 0 \quad (4.8)$$

$$h \in HH: \quad -CAP^{(h)} + \alpha w^f \text{scale}^{(h)-1} K^f = 0 \quad (4.9)$$

$$h \in HH: \quad -INC^{(h)} + \sum_{s \in SEC} p^{(s)} D^{(s,h)} = 0 \quad (4.10)$$

$$h \in HH: \quad -K^{(h)} + \alpha w^{(h)} \text{scale}^{(h)-1} KS = 0 \quad (4.11)$$

$$h \in HH: \quad -L^{(h)} + \alpha w^{(h)} \text{scale}^{(h)-1} LS = 0 \quad (4.12)$$

$$h \in HH: \quad U^{(h)} - \left( \sum_{s \in SEC} \alpha^{(s,h)} D^{(s,h)} \omega^{-1(-1+\omega)} \right)^{\omega(-1+\omega)^{-1}} = 0 \quad (4.13)$$

$$h \in HH: \quad CAP^{(h)} - INC^{(h)} + p^k K^{(h)} + p^l L^{(h)} = 0 \quad (4.14)$$

$$h \in HH: \quad s \in SEC: \quad \lambda^{\text{CONSUMER}^1(h)} p^{(s)} + \alpha^{(s,h)} D^{(s,h)} \omega^{-1(-1+\omega)} \left( \sum_{s \in SEC} \alpha^{(s,h)} D^{(s,h)} \omega^{-1(-1+\omega)} \right)^{-1+\omega(-1+\omega)^{-1}} = 0 \quad (4.15)$$

$$s \in SEC: \quad 1 - p^{(s)} = 0 \quad (4.16)$$

$$s \in SEC: \quad -p^{kc} + \beta^{k(s)} \gamma^{yva(s)} \left( p^{(s)} - \sum_{\dot{s}i \in SEC} \beta^{x(\dot{s}i,s)-1} p^{(\dot{s}i)} \right) K^{(s)-1+\beta^{k(s)}} L^{(s)\beta^{1(s)}} = 0 \quad (4.17)$$

$$s \in SEC: \quad -p^{lc} + \beta^{l(s)} \gamma^{yva(s)} \left( p^{(s)} - \sum_{\dot{s}i \in SEC} \beta^{x(\dot{s}i,s)-1} p^{(\dot{s}i)} \right) K^{(s)\beta^{k(s)}} L^{(s)-1+\beta^{l(s)}} = 0 \quad (4.18)$$

$$s \in SEC: \quad -Y^{(s)} + Y^{VA(s)} = 0 \quad (4.19)$$

$$s \in SEC: \quad -Y^{(s)} + Y^{INT(s)} = 0 \quad (4.20)$$

$$s \in SEC: \quad -Y^{VA(s)} + \gamma^{yva(s)} K^{(s)\beta^{k(s)}} L^{(s)\beta^{1(s)}} = 0 \quad (4.21)$$

$$s \in SEC: \quad \pi^{(s)} + p^{kc} K^{(s)} + p^{lc} L^{(s)} - p^{(s)} Y^{(s)} + Y^{INT(s)} \left( \sum_{\dot{s}i \in SEC} \beta^{x(\dot{s}i,s)-1} p^{(\dot{s}i)} \right) = 0 \quad (4.22)$$

$$s \in SEC: \quad \dot{s}i \in SEC: \quad -X^{(\dot{s}i,s)} + \beta^{x(\dot{s}i,s)-1} Y^{INT(s)} = 0 \quad (4.23)$$

## 5 Equilibrium relationships (after expansion and reduction)

$$1 - p^1 = 0 \quad (5.1)$$

$$1 - p^{(A)} = 0 \quad (5.2)$$

$$1 - p^{(B)} = 0 \quad (5.3)$$

$$1 - p^{(C)} = 0 \quad (5.4)$$

$$k_s^{\text{data}} - KS = 0 \quad (5.5)$$

$$l_s^{\text{data}} - LS = 0 \quad (5.6)$$

$$p^k - p^{kc} = 0 \quad (5.7)$$

$$p^l - p^{lc} = 0 \quad (5.8)$$

$$-p^{kc} + \beta^{k(A)} \gamma^{yva(A)} \left( p^{(A)} - \beta^{x(A,A)} p^{(A)} - \beta^{x(B,A)} p^{(B)} - \beta^{x(C,A)} p^{(C)} \right) K^{(A)-1+\beta^{k(A)}} L^{(A)\beta^{1(A)}} = 0 \quad (5.9)$$

$$-p^{kc} + \beta^{k(B)} \gamma^{yva(B)} \left( p^{(B)} - \beta^{x(A,B)} p^{(A)} - \beta^{x(B,B)} p^{(B)} - \beta^{x(C,B)} p^{(C)} \right) K^{(B)-1+\beta^{k(B)}} L^{(B)\beta^{1(B)}} = 0 \quad (5.10)$$

$$-p^{kc} + \beta^{k(C)} \gamma^{yva(C)} \left( p^{(C)} - \beta^{x(A,C)} p^{(A)} - \beta^{x(B,C)} p^{(B)} - \beta^{x(C,C)} p^{(C)} \right) K^{(C)-1+\beta^{k(C)}} L^{(C)\beta^{1(C)}} = 0 \quad (5.11)$$

$$-p^{lc} + \beta^{l(A)} \gamma^{yva(A)} \left( p^{(A)} - \beta^{x(A,A)} p^{(A)} - \beta^{x(B,A)} p^{(B)} - \beta^{x(C,A)} p^{(C)} \right) K^{(A)\beta^{k(A)}} L^{(A)-1+\beta^{1(A)}} = 0 \quad (5.12)$$

$$-p^{lc} + \beta^{l(B)} \gamma^{yva(B)} \left( p^{(B)} - \beta^{x(A,B)} p^{(A)} - \beta^{x(B,B)} p^{(B)} - \beta^{x(C,B)} p^{(C)} \right) K^{(B)\beta^{k(B)}} L^{(B)-1+\beta^{1(B)}} = 0 \quad (5.13)$$

$$-p^{lc} + \beta^{l(C)} \gamma^{yva(C)} \left( p^{(C)} - \beta^{x(A,C)} p^{(A)} - \beta^{x(B,C)} p^{(B)} - \beta^{x(C,C)} p^{(C)} \right) K^{(C)\beta^{k(C)}} L^{(C)-1+\beta^{1(C)}} = 0 \quad (5.14)$$

$$-CAP^{(l)} + \alpha wf^{(l)} scale^{(l)-1} K^f = 0 \quad (5.15)$$

$$-CAP^{(s)} + \alpha wf^{(s)} scale^{(s)-1} K^f = 0 \quad (5.16)$$

$$-K^{(l)} + \alpha w^{(l)} scale^{(l)-1} KS = 0 \quad (5.17)$$

$$-K^{(s)} + \alpha w^{(s)} scale^{(s)-1} KS = 0 \quad (5.18)$$

$$-L^{(l)} + \alpha wv^{(l)} scale^{(l)-1} LS = 0 \quad (5.19)$$

$$-L^{(s)} + \alpha wv^{(s)} scale^{(s)-1} LS = 0 \quad (5.20)$$

$$U^{(l)} - \left( \alpha^{(A,l)} D^{(A,l)\omega^{-1}(-1+\omega)} + \alpha^{(B,l)} D^{(B,l)\omega^{-1}(-1+\omega)} + \alpha^{(C,l)} D^{(C,l)\omega^{-1}(-1+\omega)} \right)^{\omega(-1+\omega)^{-1}} = 0 \quad (5.21)$$

$$U^{(s)} - \left( \alpha^{(A,s)} D^{(A,s)} \omega^{-1(-1+\omega)} + \alpha^{(B,s)} D^{(B,s)} \omega^{-1(-1+\omega)} + \alpha^{(C,s)} D^{(C,s)} \omega^{-1(-1+\omega)} \right)^{\omega(-1+\omega)^{-1}} = 0 \quad (5.22)$$

$$-X^{(A,A)} + \beta^{x(A,A)^{-1}} Y^{\text{INT}(A)} = 0 \quad (5.23)$$

$$-X^{(A,B)} + \beta^{x(A,B)^{-1}} Y^{\text{INT}(B)} = 0 \quad (5.24)$$

$$-X^{(A,C)} + \beta^{x(A,C)^{-1}} Y^{\text{INT}(C)} = 0 \quad (5.25)$$

$$-X^{(B,A)} + \beta^{x(B,A)^{-1}} Y^{\text{INT}(A)} = 0 \quad (5.26)$$

$$-X^{(B,B)} + \beta^{x(B,B)^{-1}} Y^{\text{INT}(B)} = 0 \quad (5.27)$$

$$-X^{(B,C)} + \beta^{x(B,C)^{-1}} Y^{\text{INT}(C)} = 0 \quad (5.28)$$

$$-X^{(C,A)} + \beta^{x(C,A)^{-1}} Y^{\text{INT}(A)} = 0 \quad (5.29)$$

$$-X^{(C,B)} + \beta^{x(C,B)^{-1}} Y^{\text{INT}(B)} = 0 \quad (5.30)$$

$$-X^{(C,C)} + \beta^{x(C,C)^{-1}} Y^{\text{INT}(C)} = 0 \quad (5.31)$$

$$-Y^{(A)} + Y^{\text{VA}(A)} = 0 \quad (5.32)$$

$$-Y^{(A)} + Y^{\text{INT}(A)} = 0 \quad (5.33)$$

$$-Y^{(B)} + Y^{\text{VA}(B)} = 0 \quad (5.34)$$

$$-Y^{(B)} + Y^{\text{INT}(B)} = 0 \quad (5.35)$$

$$-Y^{(C)} + Y^{\text{VA}(C)} = 0 \quad (5.36)$$

$$-Y^{(C)} + Y^{\text{INT}(C)} = 0 \quad (5.37)$$

$$-Y^{VA\langle A \rangle} + \gamma^{yva\langle A \rangle} K^{\langle A \rangle \beta^k \langle A \rangle} L^{\langle A \rangle \beta^1 \langle A \rangle} = 0 \quad (5.38)$$

$$-Y^{VA\langle B \rangle} + \gamma^{yva\langle B \rangle} K^{\langle B \rangle \beta^k \langle B \rangle} L^{\langle B \rangle \beta^1 \langle B \rangle} = 0 \quad (5.39)$$

$$-Y^{VA\langle C \rangle} + \gamma^{yva\langle C \rangle} K^{\langle C \rangle \beta^k \langle C \rangle} L^{\langle C \rangle \beta^1 \langle C \rangle} = 0 \quad (5.40)$$

$$\lambda^{\text{CONSUMER}^1 \langle l \rangle} p^{\langle A \rangle} + \alpha^{\langle A, l \rangle} D^{\langle A, l \rangle -1 + \omega^{-1}(-1 + \omega)} \left( \alpha^{\langle A, l \rangle} D^{\langle A, l \rangle \omega^{-1}(-1 + \omega)} + \alpha^{\langle B, l \rangle} D^{\langle B, l \rangle \omega^{-1}(-1 + \omega)} + \alpha^{\langle C, l \rangle} D^{\langle C, l \rangle \omega^{-1}(-1 + \omega)} \right)^{-1 + \omega(-1 + \omega)^{-1}} = 0 \quad (5.41)$$

$$\lambda^{\text{CONSUMER}^1 \langle l \rangle} p^{\langle B \rangle} + \alpha^{\langle B, l \rangle} D^{\langle B, l \rangle -1 + \omega^{-1}(-1 + \omega)} \left( \alpha^{\langle A, l \rangle} D^{\langle A, l \rangle \omega^{-1}(-1 + \omega)} + \alpha^{\langle B, l \rangle} D^{\langle B, l \rangle \omega^{-1}(-1 + \omega)} + \alpha^{\langle C, l \rangle} D^{\langle C, l \rangle \omega^{-1}(-1 + \omega)} \right)^{-1 + \omega(-1 + \omega)^{-1}} = 0 \quad (5.42)$$

$$\lambda^{\text{CONSUMER}^1 \langle l \rangle} p^{\langle C \rangle} + \alpha^{\langle C, l \rangle} D^{\langle C, l \rangle -1 + \omega^{-1}(-1 + \omega)} \left( \alpha^{\langle A, l \rangle} D^{\langle A, l \rangle \omega^{-1}(-1 + \omega)} + \alpha^{\langle B, l \rangle} D^{\langle B, l \rangle \omega^{-1}(-1 + \omega)} + \alpha^{\langle C, l \rangle} D^{\langle C, l \rangle \omega^{-1}(-1 + \omega)} \right)^{-1 + \omega(-1 + \omega)^{-1}} = 0 \quad (5.43)$$

$$\infty \quad \lambda^{\text{CONSUMER}^1 \langle s \rangle} p^{\langle A \rangle} + \alpha^{\langle A, s \rangle} D^{\langle A, s \rangle -1 + \omega^{-1}(-1 + \omega)} \left( \alpha^{\langle A, s \rangle} D^{\langle A, s \rangle \omega^{-1}(-1 + \omega)} + \alpha^{\langle B, s \rangle} D^{\langle B, s \rangle \omega^{-1}(-1 + \omega)} + \alpha^{\langle C, s \rangle} D^{\langle C, s \rangle \omega^{-1}(-1 + \omega)} \right)^{-1 + \omega(-1 + \omega)^{-1}} = 0 \quad (5.44)$$

$$\lambda^{\text{CONSUMER}^1 \langle s \rangle} p^{\langle B \rangle} + \alpha^{\langle B, s \rangle} D^{\langle B, s \rangle -1 + \omega^{-1}(-1 + \omega)} \left( \alpha^{\langle A, s \rangle} D^{\langle A, s \rangle \omega^{-1}(-1 + \omega)} + \alpha^{\langle B, s \rangle} D^{\langle B, s \rangle \omega^{-1}(-1 + \omega)} + \alpha^{\langle C, s \rangle} D^{\langle C, s \rangle \omega^{-1}(-1 + \omega)} \right)^{-1 + \omega(-1 + \omega)^{-1}} = 0 \quad (5.45)$$

$$\lambda^{\text{CONSUMER}^1 \langle s \rangle} p^{\langle C \rangle} + \alpha^{\langle C, s \rangle} D^{\langle C, s \rangle -1 + \omega^{-1}(-1 + \omega)} \left( \alpha^{\langle A, s \rangle} D^{\langle A, s \rangle \omega^{-1}(-1 + \omega)} + \alpha^{\langle B, s \rangle} D^{\langle B, s \rangle \omega^{-1}(-1 + \omega)} + \alpha^{\langle C, s \rangle} D^{\langle C, s \rangle \omega^{-1}(-1 + \omega)} \right)^{-1 + \omega(-1 + \omega)^{-1}} = 0 \quad (5.46)$$

$$-K^f + \Pi + \alpha \omega^f KS = 0 \quad (5.47)$$

$$-KS + K^{\langle A \rangle} + K^{\langle B \rangle} + K^{\langle C \rangle} = 0 \quad (5.48)$$

$$-\Pi + \pi^{\langle A \rangle} + \pi^{\langle B \rangle} + \pi^{\langle C \rangle} = 0 \quad (5.49)$$

$$CAP^{\langle l \rangle} - INC^{\langle l \rangle} + p^k K^{\langle l \rangle} + p^1 L^{\langle l \rangle} = 0 \quad (5.50)$$

$$CAP^{\langle s \rangle} - INC^{\langle s \rangle} + p^k K^{\langle s \rangle} + p^1 L^{\langle s \rangle} = 0 \quad (5.51)$$



$$-INC^{(l)} + p^{(A)} D^{(A,l)} + p^{(B)} D^{(B,l)} + p^{(C)} D^{(C,l)} = 0 \quad (5.52)$$

$$-INC^{(s)} + p^{(A)} D^{(A,s)} + p^{(B)} D^{(B,s)} + p^{(C)} D^{(C,s)} = 0 \quad (5.53)$$

$$\pi^{(A)} + p^{kc} K^{(A)} + p^{lc} L^{(A)} - p^{(A)} Y^{(A)} + Y^{INT^{(A)}} \left( \beta^{x(A,A)^{-1}} p^{(A)} + \beta^{x(B,A)^{-1}} p^{(B)} + \beta^{x(C,A)^{-1}} p^{(C)} \right) = 0 \quad (5.54)$$

$$\pi^{(B)} + p^{kc} K^{(B)} + p^{lc} L^{(B)} - p^{(B)} Y^{(B)} + Y^{INT^{(B)}} \left( \beta^{x(A,B)^{-1}} p^{(A)} + \beta^{x(B,B)^{-1}} p^{(B)} + \beta^{x(C,B)^{-1}} p^{(C)} \right) = 0 \quad (5.55)$$

$$\pi^{(C)} + p^{kc} K^{(C)} + p^{lc} L^{(C)} - p^{(C)} Y^{(C)} + Y^{INT^{(C)}} \left( \beta^{x(A,C)^{-1}} p^{(A)} + \beta^{x(B,C)^{-1}} p^{(B)} + \beta^{x(C,C)^{-1}} p^{(C)} \right) = 0 \quad (5.56)$$

## 6 Calibrating equations

$$-k^{fdata} + K^f = 0 \quad (6.1)$$

$$-l^{data(A)} + L^{(A)} = 0 \quad (6.2)$$

$$-l^{data(B)} + L^{(B)} = 0 \quad (6.3)$$

$$-l^{data(C)} + L^{(C)} = 0 \quad (6.4)$$

$$-x^{data(A,A)} + X^{(A,A)} = 0 \quad (6.5)$$

$$-x^{data(A,B)} + X^{(A,B)} = 0 \quad (6.6)$$

$$-x^{data(A,C)} + X^{(A,C)} = 0 \quad (6.7)$$

$$-x^{data(B,A)} + X^{(B,A)} = 0 \quad (6.8)$$

$$-x^{data(B,B)} + X^{(B,B)} = 0 \quad (6.9)$$

$$-x^{data(B,C)} + X^{(B,C)} = 0 \quad (6.10)$$

$$-x^{\text{data}\langle C,A \rangle} + X^{\langle C,A \rangle} = 0 \quad (6.11)$$

$$-x^{\text{data}\langle C,B \rangle} + X^{\langle C,B \rangle} = 0 \quad (6.12)$$

$$-x^{\text{data}\langle C,C \rangle} + X^{\langle C,C \rangle} = 0 \quad (6.13)$$

$$-y^{\text{data}\langle A \rangle} + Y^{\text{VA}\langle A \rangle} = 0 \quad (6.14)$$

$$-y^{\text{data}\langle B \rangle} + Y^{\text{VA}\langle B \rangle} = 0 \quad (6.15)$$

$$-y^{\text{data}\langle C \rangle} + Y^{\text{VA}\langle C \rangle} = 0 \quad (6.16)$$

$$CAP^{\langle l \rangle} - cap^{\text{data}\langle l \rangle} scale^{\langle l \rangle -1} = 0 \quad (6.17)$$

$$D^{\langle B,l \rangle} - d^{\text{data}\langle B,l \rangle} scale^{\langle l \rangle -1} = 0 \quad (6.18)$$

$$D^{\langle B,s \rangle} - d^{\text{data}\langle B,s \rangle} scale^{\langle s \rangle -1} = 0 \quad (6.19)$$

$$D^{\langle C,l \rangle} - d^{\text{data}\langle C,l \rangle} scale^{\langle l \rangle -1} = 0 \quad (6.20)$$

$$D^{\langle C,s \rangle} - d^{\text{data}\langle C,s \rangle} scale^{\langle s \rangle -1} = 0 \quad (6.21)$$

$$K^{\langle l \rangle} - k^{\text{data}\langle l \rangle} scale^{\langle l \rangle -1} = 0 \quad (6.22)$$

$$K^{\langle s \rangle} - k^{\text{data}\langle s \rangle} scale^{\langle s \rangle -1} = 0 \quad (6.23)$$

$$L^{\langle l \rangle} - l^{\text{data}\langle l \rangle} scale^{\langle l \rangle -1} = 0 \quad (6.24)$$

$$-1 + \beta^{\text{k}\langle A \rangle} + \beta^{\text{l}\langle A \rangle} = 0 \quad (6.25)$$

$$-1 + \beta^{\text{k}\langle B \rangle} + \beta^{\text{l}\langle B \rangle} = 0 \quad (6.26)$$

$$-1 + \beta^{k\langle C \rangle} + \beta^{l\langle C \rangle} = 0 \quad (6.27)$$

$$-1 + \alpha w^{\langle 1 \rangle} + \alpha w^{\langle s \rangle} = 0 \quad (6.28)$$

$$-1 + \alpha f^{\langle 1 \rangle} + \alpha f^{\langle s \rangle} = 0 \quad (6.29)$$

$$-1 + \alpha^{\langle A, l \rangle \omega} + \alpha^{\langle B, l \rangle \omega} + \alpha^{\langle C, l \rangle \omega} = 0 \quad (6.30)$$

$$-1 + \alpha^{\langle A, s \rangle \omega} + \alpha^{\langle B, s \rangle \omega} + \alpha^{\langle C, s \rangle \omega} = 0 \quad (6.31)$$



## 7 Equilibrium values

	Equilibrium value
$p^k$	1
$p^l$	1
$p^{kc}$	1
$p^{lc}$	1
$K^f$	80.9217
$KS$	163.4388
$LS$	88.233
$\Pi$	0
$\lambda^{\text{CONSUMER}^{(l)}}$	-1
$\lambda^{\text{CONSUMER}^{(s)}}$	-1
$p^{(A)}$	1
$p^{(B)}$	1
$p^{(C)}$	1
$\pi^{(A)}$	0
$\pi^{(B)}$	0
$\pi^{(C)}$	0
$CAP^{(l)}$	5.1044
$CAP^{(s)}$	6.0504
$D^{(A,l)}$	9.9136
$D^{(A,s)}$	4.044
$D^{(B,l)}$	6.6431
$D^{(B,s)}$	3.1495
$D^{(C,l)}$	9.9581
$D^{(C,s)}$	7.3678
$INC^{(l)}$	26.5147
$INC^{(s)}$	14.5613
$K^{(l)}$	10.5158
$K^{(s)}$	4.0454
$K^{(A)}$	38.0989
$K^{(B)}$	57.5316
$K^{(C)}$	67.8083
$L^{(l)}$	10.8945
$L^{(s)}$	4.4655
$L^{(A)}$	9.4287
$L^{(B)}$	39.9867
$L^{(C)}$	38.8177
$U^{(l)}$	26.5147
$U^{(s)}$	14.5613
$X^{(A,A)}$	73.3234
$X^{(A,B)}$	43.0305
$X^{(A,C)}$	31.0471
$X^{(B,A)}$	61.3203
$X^{(B,B)}$	119.9318
$X^{(B,C)}$	105.2489
$X^{(C,A)}$	45.3241
$X^{(C,B)}$	84.0875
$X^{(C,C)}$	228.0633
$Y^{(A)}$	227.4954
$Y^{(B)}$	344.5681
$Y^{(C)}$	470.9853
$Y^{VA(A)}$	227.4954
$Y^{VA(B)}$	344.5681
$Y^{VA(C)}$	470.9853
$Y^{INT(A)}$	227.4954
$Y^{INT(B)}$	344.5681
$Y^{INT(C)}$	470.9853



## 8 Model parameters

	Value
$k^{\text{data}}$	80.9217
$ks^{\text{data}}$	163.4388
$ls^{\text{data}}$	88.233
$\omega$	2
$aw^{\text{f}}$	0.4951
$\alpha^{\langle A,l \rangle}$	0.6115
$\alpha^{\langle A,s \rangle}$	0.527
$\alpha^{\langle B,l \rangle}$	0.5005
$\alpha^{\langle B,s \rangle}$	0.4651
$\alpha^{\langle C,l \rangle}$	0.6128
$\alpha^{\langle C,s \rangle}$	0.7113
$\beta^{\text{k}\langle A \rangle}$	0.8016
$\beta^{\text{k}\langle B \rangle}$	0.59
$\beta^{\text{k}\langle C \rangle}$	0.6359
$\beta^{\text{l}\langle A \rangle}$	0.1984
$\beta^{\text{l}\langle B \rangle}$	0.41
$\beta^{\text{l}\langle C \rangle}$	0.3641
$\beta^{\text{x}\langle A,A \rangle}$	3.1026
$\beta^{\text{x}\langle A,B \rangle}$	8.0075
$\beta^{\text{x}\langle A,C \rangle}$	15.17
$\beta^{\text{x}\langle B,A \rangle}$	3.7099
$\beta^{\text{x}\langle B,B \rangle}$	2.873
$\beta^{\text{x}\langle B,C \rangle}$	4.475
$\beta^{\text{x}\langle C,A \rangle}$	5.0193
$\beta^{\text{x}\langle C,B \rangle}$	4.0977
$\beta^{\text{x}\langle C,C \rangle}$	2.0652
$ap^{\text{data}\langle l \rangle}$	20.4174
$d^{\text{data}\langle B,l \rangle}$	26.5723
$d^{\text{data}\langle B,s \rangle}$	31.4947
$d^{\text{data}\langle C,l \rangle}$	39.8322
$d^{\text{data}\langle C,s \rangle}$	73.6782
$\gamma^{\text{yva}\langle A \rangle}$	7.8772
$\gamma^{\text{yva}\langle B \rangle}$	6.9527
$\gamma^{\text{yva}\langle C \rangle}$	8.5098
$k^{\text{data}\langle l \rangle}$	42.0633
$k^{\text{data}\langle s \rangle}$	40.4538
$l^{\text{data}\langle l \rangle}$	43.5782
$l^{\text{data}\langle A \rangle}$	9.4287
$l^{\text{data}\langle B \rangle}$	39.9867
$l^{\text{data}\langle C \rangle}$	38.8177
$aw^{\langle l \rangle}$	0.2574
$aw^{\langle s \rangle}$	0.2475
$aww^{\langle l \rangle}$	0.4939
$aww^{\langle s \rangle}$	0.5061
$awf^{\langle l \rangle}$	0.2523
$awf^{\langle s \rangle}$	0.7477
$scale^{\langle l \rangle}$	4
$scale^{\langle s \rangle}$	10
$x^{\text{data}\langle A,A \rangle}$	73.3234
$x^{\text{data}\langle A,B \rangle}$	43.0305
$x^{\text{data}\langle A,C \rangle}$	31.0471
$x^{\text{data}\langle B,A \rangle}$	61.3203
$x^{\text{data}\langle B,B \rangle}$	119.9318
$x^{\text{data}\langle B,C \rangle}$	105.2489