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Model name: `pure_exchange_t`

Index sets

$$agents = \{A, B\}$$
$$goods = \{1, 2, 3\}$$

1 AGENTS $a \in agents$

1.1 Optimisation problem

$$\max_{\left(C^{\langle a,g \rangle}\right)_{g \in goods}} U^{\langle a \rangle} = \prod_{g \in goods} C^{\langle a,g \rangle^{\alpha^{\langle a,g \rangle}}} \tag{1.1}$$

s.t. :

$$\sum_{g \in goods} p^{\langle g \rangle} C^{\langle a,g \rangle} = \sum_{g \in goods} e^{\langle a,g \rangle} p^{\langle g \rangle} \quad \left(\lambda^{\mathrm{AGENTS}^{1\,\langle a \rangle}} \right) \tag{1.2}$$

1.2 Identities

$$g \in goods: \quad e_t^{\langle a,g \rangle} = e^{\mathrm{calibr}^{\langle a,g \rangle}} \tag{1.3}$$

1.3 First order conditions

$$g \in goods: \quad -\lambda_t^{\mathrm{AGENTS}^{1\,\langle a \rangle}} p_t^{\langle g \rangle} + \alpha^{\langle a,g \rangle} C_t^{\langle a,g \rangle^{-1}} \left(\prod_{g' \in goods} C_t^{\langle a,g' \rangle^{\alpha^{\langle a,g' \rangle}}} \right) = 0 \quad \left(C_t^{\langle a,g \rangle} \right) \tag{1.4}$$

2 EQUILIBRIUM

2.1 Identities

$$p^{\langle 1 \rangle} = 1 \tag{2.1}$$

$$g \in goods \backslash \{1\}: \quad \sum_{a \in agents} C_t^{\langle a,g \rangle} = \sum_{a \in agents} e_t^{\langle a,g \rangle} \tag{2.2}$$

3 Equilibrium relationships (before expansion and reduction)

$$-1 + p^{\langle 1 \rangle} = 0 \tag{3.1}$$

$$a \in agents: \quad U^{\langle a \rangle} - \prod_{g \in goods} C^{\langle a,g \rangle^{\alpha^{\langle a,g \rangle}}} = 0 \tag{3.2}$$

$$a \in agents: \quad \sum_{g \in goods} e^{\langle a,g \rangle} p^{\langle g \rangle} - \sum_{g \in goods} p^{\langle g \rangle} C^{\langle a,g \rangle} = 0 \tag{3.3}$$

$$a \in agents: \quad g \in goods: \quad -e^{\mathrm{calibr}^{\langle a,g \rangle}} + e^{\langle a,g \rangle} = 0 \tag{3.4}$$

$$a \in agents: \quad g \in goods: \quad -\lambda^{\mathrm{AGENTS}^{1\,\langle a \rangle}} p^{\langle g \rangle} + \alpha^{\langle a,g \rangle} C^{\langle a,g \rangle^{-1}} \left(\prod_{g' \in goods} C^{\langle a,g' \rangle^{\alpha^{\langle a,g' \rangle}}} \right) = 0 \tag{3.5}$$

$$g \in goods \backslash \{1\}: \quad -\sum_{a \in agents} e^{\langle a,g \rangle} + \sum_{a \in agents} C^{\langle a,g \rangle} = 0 \tag{3.6}$$

4 Equilibrium relationships (after expansion and reduction)

$$-1 + p^{\langle 1 \rangle} = 0 \tag{4.1}$$

$$-e^{\text{calibr}\langle \text{A},1 \rangle} + e^{\langle \text{A},1 \rangle} = 0 \tag{4.2}$$

$$-e^{\text{calibr}\langle \text{A},2 \rangle} + e^{\langle \text{A},2 \rangle} = 0 \tag{4.3}$$

$$-e^{\text{calibr}\langle \text{A},3 \rangle} + e^{\langle \text{A},3 \rangle} = 0 \tag{4.4}$$

$$-e^{\text{calibr}\langle \text{B},1 \rangle} + e^{\langle \text{B},1 \rangle} = 0 \tag{4.5}$$

$$-e^{\text{calibr}\langle \text{B},2 \rangle} + e^{\langle \text{B},2 \rangle} = 0 \tag{4.6}$$

$$-e^{\text{calibr}\langle \text{B},3 \rangle} + e^{\langle \text{B},3 \rangle} = 0 \tag{4.7}$$

$$U^{\langle \text{A} \rangle} - C^{\langle \text{A},1 \rangle^{\alpha^{\langle \text{A},1 \rangle}}} C^{\langle \text{A},2 \rangle^{\alpha^{\langle \text{A},2 \rangle}}} C^{\langle \text{A},3 \rangle^{\alpha^{\langle \text{A},3 \rangle}}} = 0 \tag{4.8}$$

$$U^{\langle \text{B} \rangle} - C^{\langle \text{B},1 \rangle^{\alpha^{\langle \text{B},1 \rangle}}} C^{\langle \text{B},2 \rangle^{\alpha^{\langle \text{B},2 \rangle}}} C^{\langle \text{B},3 \rangle^{\alpha^{\langle \text{B},3 \rangle}}} = 0 \tag{4.9}$$

$$-\lambda^{\text{AGENTS}^1 \langle \text{A} \rangle} p^{\langle 1 \rangle} + \alpha^{\langle \text{A},1 \rangle} C^{\langle \text{A},1 \rangle^{-1}} C^{\langle \text{A},1 \rangle^{\alpha^{\langle \text{A},1 \rangle}}} C^{\langle \text{A},2 \rangle^{\alpha^{\langle \text{A},2 \rangle}}} C^{\langle \text{A},3 \rangle^{\alpha^{\langle \text{A},3 \rangle}}} = 0 \tag{4.10}$$

$$-\lambda^{\text{AGENTS}^1 \langle \text{A} \rangle} p^{\langle 2 \rangle} + \alpha^{\langle \text{A},2 \rangle} C^{\langle \text{A},2 \rangle^{-1}} C^{\langle \text{A},1 \rangle^{\alpha^{\langle \text{A},1 \rangle}}} C^{\langle \text{A},2 \rangle^{\alpha^{\langle \text{A},2 \rangle}}} C^{\langle \text{A},3 \rangle^{\alpha^{\langle \text{A},3 \rangle}}} = 0 \tag{4.11}$$

$$-\lambda^{\text{AGENTS}^1 \langle \text{A} \rangle} p^{\langle 3 \rangle} + \alpha^{\langle \text{A},3 \rangle} C^{\langle \text{A},3 \rangle^{-1}} C^{\langle \text{A},1 \rangle^{\alpha^{\langle \text{A},1 \rangle}}} C^{\langle \text{A},2 \rangle^{\alpha^{\langle \text{A},2 \rangle}}} C^{\langle \text{A},3 \rangle^{\alpha^{\langle \text{A},3 \rangle}}} = 0 \tag{4.12}$$

$$-\lambda^{\text{AGENTS}^1 \langle \text{B} \rangle} p^{\langle 1 \rangle} + \alpha^{\langle \text{B},1 \rangle} C^{\langle \text{B},1 \rangle^{-1}} C^{\langle \text{B},1 \rangle^{\alpha^{\langle \text{B},1 \rangle}}} C^{\langle \text{B},2 \rangle^{\alpha^{\langle \text{B},2 \rangle}}} C^{\langle \text{B},3 \rangle^{\alpha^{\langle \text{B},3 \rangle}}} = 0 \tag{4.13}$$

$$-\lambda^{\text{AGENTS}^1 \langle \text{B} \rangle} p^{\langle 2 \rangle} + \alpha^{\langle \text{B},2 \rangle} C^{\langle \text{B},2 \rangle^{-1}} C^{\langle \text{B},1 \rangle^{\alpha^{\langle \text{B},1 \rangle}}} C^{\langle \text{B},2 \rangle^{\alpha^{\langle \text{B},2 \rangle}}} C^{\langle \text{B},3 \rangle^{\alpha^{\langle \text{B},3 \rangle}}} = 0 \tag{4.14}$$

$$-\lambda^{\text{AGENTS}^1 \langle \text{B} \rangle} p^{\langle 3 \rangle} + \alpha^{\langle \text{B},3 \rangle} C^{\langle \text{B},3 \rangle^{-1}} C^{\langle \text{B},1 \rangle^{\alpha^{\langle \text{B},1 \rangle}}} C^{\langle \text{B},2 \rangle^{\alpha^{\langle \text{B},2 \rangle}}} C^{\langle \text{B},3 \rangle^{\alpha^{\langle \text{B},3 \rangle}}} = 0 \tag{4.15}$$

$$-e^{\langle \text{A},2 \rangle} - e^{\langle \text{B},2 \rangle} + C^{\langle \text{A},2 \rangle} + C^{\langle \text{B},2 \rangle} = 0 \tag{4.16}$$

$$-e^{\langle \text{A},3 \rangle} - e^{\langle \text{B},3 \rangle} + C^{\langle \text{A},3 \rangle} + C^{\langle \text{B},3 \rangle} = 0 \tag{4.17}$$

$$e^{\langle \text{A},1 \rangle} p^{\langle 1 \rangle} + e^{\langle \text{A},2 \rangle} p^{\langle 2 \rangle} + e^{\langle \text{A},3 \rangle} p^{\langle 3 \rangle} - p^{\langle 1 \rangle} C^{\langle \text{A},1 \rangle} - p^{\langle 2 \rangle} C^{\langle \text{A},2 \rangle} - p^{\langle 3 \rangle} C^{\langle \text{A},3 \rangle} = 0 \tag{4.18}$$

$$e^{\langle \text{B},1 \rangle} p^{\langle 1 \rangle} + e^{\langle \text{B},2 \rangle} p^{\langle 2 \rangle} + e^{\langle \text{B},3 \rangle} p^{\langle 3 \rangle} - p^{\langle 1 \rangle} C^{\langle \text{B},1 \rangle} - p^{\langle 2 \rangle} C^{\langle \text{B},2 \rangle} - p^{\langle 3 \rangle} C^{\langle \text{B},3 \rangle} = 0 \tag{4.19}$$

5 Equilibrium values

	Equilibrium values
e^{A^1}	3
e^{A^2}	2
e^{A^3}	1
$\lambda^{\text{AGENTS}^{1A}}$	0.2674
C^{A^1}	2.2667
C^{A^2}	1.7
C^{A^3}	2.2667
U^A	2.0203

6 Equilibrium values

	Equilibrium values
e^{B^1}	1
e^{B^2}	1
e^{B^3}	3
$\lambda^{\text{AGENTS}^{1B}}$	0.2674
C^{B^1}	1.7333
C^{B^2}	1.3
C^{B^3}	1.7333
U^B	1.5449