**AB Opgave 2.C**

Initialbeholdninger

$$\begin{aligned} e^a &= \left(e^a(0), e^a(1), e^a(2)\right) = ((4,2),(1,1),(1,1)) \\ e^b &= \left(e^b(0), e^b(1), e^b(2)\right) = ((1,1),(4,2),(4,2)) \end{aligned}$$

Mængden af mulige indkomstoverførsler

$$\mathbb{M} = \left\{ r \in \mathbb{R}^3 | r = (-1,1,1)\,\theta, \theta \in \mathbb{R} \right\}$$

Første ordens betingelser for indkomstoverførselsproblem

$$\begin{aligned} -\frac{\alpha_1(0)+\alpha_2(0)}{p(0)\,e^a(0)-\theta} + \sum_{t=1}^{2} \frac{\alpha_1(t)+\alpha_2(t)}{p(t)\,e^a(t)+\theta} &= 0 \\ -\frac{\gamma_1(0)+\gamma_2(0)}{p(0)\,e^b(0)-\theta} + \sum_{t=1}^{2} \frac{\gamma_1(t)+\gamma_2(t)}{p(t)\,e^b(t)+\theta} &= 0 \end{aligned}$$

Værdien af initial beholdninger ved $\bar{p} = ((1,1),(1,1),(1,1))$

| | $w^a$ | $w^b$ |
|---|---|---|
| 0 | 6 | 2 |
| 1 | 2 | 6 |
| 2 | 2 | 6 |

Spot-markeds efterspørgsel ved $\bar{p}$, $\bar{r}^a = (-2,2,2)$ og $\bar{r}^b = (2,-2,-2)$

$$\begin{aligned} g^a(p, r^a) &= \left(\left(\frac{1}{2}4, \frac{1}{2}4\right), \left(\frac{1}{2}4, \frac{1}{2}4\right), \left(\frac{3}{4}4, \frac{1}{4}4\right)\right) = ((2,2),(2,2),(3,1)) \\ g^b(p, r^b) &= \left(\left(\frac{3}{4}4, \frac{1}{4}4\right), \left(\frac{3}{4}4, \frac{1}{4}4\right), \left(\frac{1}{2}4, \frac{1}{2}4\right)\right) = ((3,1),(3,1),(2,2)) \end{aligned}$$

Gradienten for de indirekte nyttefunktioner i $\bar{r}^a = (-2,2,2)$ og $\bar{r}^b = (2,-2,-2)$

$$\begin{aligned} D_r v^a(\bar{p}, \bar{r}^a) &= \left(\frac{\frac{1}{2}}{6-2}, \frac{\frac{1}{6}}{2+2}, \frac{\frac{1}{3}}{2+2}\right) = \left(\frac{1}{8}, \frac{1}{24}, \frac{1}{12}\right) \\ D_r v^b(\bar{p}, \bar{r}^b) &= \left(\frac{\frac{1}{2}}{2+2}, \frac{\frac{1}{3}}{6-2}, \frac{\frac{1}{6}}{6-2}\right) = \left(\frac{1}{8}, \frac{1}{12}, \frac{1}{24}\right) \end{aligned}$$

**AB Opgave 2.E**

Mængden af netto indkomstoverførsler dannet af koalitioner

$$\begin{aligned} Z &= \left\{ r \in \mathbb{R}^{T+1} | r = \sum_{i \in \mathbb{I}_1} \bar{r}^i, \mathbb{I}_1 \subset \mathbb{I} \right\} \\ &= \left\{ \begin{array}{c} (-7,6), (-1,2), (6,-7), (2,-1), \\ (-8,8), (8,-8), (-1,-1), (1,1), (-5,5), (-5,5), \\ (1,-2), (-2,1), (-6,7), (7,-6), (0,0) \end{array} \right\} \end{aligned}$$

Illustration af $Z$