1. Assume $\epsilon_i \sim \text{iid}(\theta_i) > 0$, $\forall \theta_i$ in the parameter space and $i \in 1, 2$. Furthmore, denote the income stream to agent i at time 1 as ν_s^i where $s \in \{\text{high}, \text{low}\}$ and

$$\nu_{\text{low}}^i = b_i - \epsilon_i$$
$$\nu_{\text{high}}^i = b_i + \epsilon_i$$

Note that the state space at $t = 1$ for agents 1 and 2 can be given by

$$
\begin{aligned}
S &= \{(\nu_s^1, \nu_s^2)\}_{s \in \{\text{high}, \text{low}\}} \\
&= \{(\nu_{\text{low}}^1, \nu_{\text{low}}^2), (\nu_{\text{high}}^1, \nu_{\text{high}}^2), (\nu_{\text{low}}^1, \nu_{\text{high}}^2), (\nu_{\text{high}}^1, \nu_{\text{low}}^2)\} \\
&= \{\nu_{\text{high}}^1, \nu_{\text{low}}^1\} \times \{\nu_{\text{high}}^2, \nu_{\text{low}}^2\} \\
&= S_1 \times S_2
\end{aligned}
$$

2.