I have a game of timing with perfect information in continuous time. The game involves two players: a Workers Union (U) and an Employer (E). Once the old collective agreement contract expires the players have to find a new agreement about the way to split the quasi-rent (R). Under the old

contract the employer earns $a_E^0 R$ and the worker $a_U^0 R$. The two players have two different discount factors $\delta_U = e^{-g_U t}$ (fot the union) and $\delta_E = e^{-g_E t}$ (for the employer). When the union carries out his threat (going to strike) the payoffs are exogenuous and given by $C = (C_U, C_E)$. If the employer decide to avoid the strike with a new agreement, the employer earns $a_E^N R < a_E^0 R$ and the worker $a_U^N R > a_U^0 R$. Then, if a player stops the game at time t (the

worker (U) with the strike and the employer with an agreement (E)), the payoffs are the following:

NEW AGREEMENT ($\alpha(t)$):

$$\int_0^t a^0 Re^{-gs} ds + \int_t^1 a^N Re^{-gs} ds$$

CONFLICT ($\beta(t)$):

$$\int_0^t a^0 Re^{-gs} ds + \int_t^1 Ce^{-gs} ds$$

STATUS QUO ($\gamma(\infty)$):

$$\int_0^1 a^0 Re^{-gs} ds$$

Allowing the mixed strategies, it's necessary to introduce a probability distribution G_i (with $i = \{E, U\}$) on $[0, 1]$.

I have three problems (maybe they're stupids):

- I can imagine that if the players decides to stop at the same time t there is a situation of conflict that leads to a payoff of $C = (C_U, C_E)$???
- Are the expected utility as follow (it lacks a part for the possibility that the players choose the same time t):

$$P_U(G_U(t), G_E(t)) =$$

$$= \int_0^1 [a_U^0 Re^{-gs}(1 - G_U(s))(1 - G_E(s)) + C_U e^{-gs}(1 - G_E(s))dG_U(s) + a_U^N Re^{-gs}(1 - G_U(s))dG_E(s)]$$

$$P_E(G_U(t), G_E(t)) =$$

$$= \int_0^1 [a_E^0 Re^{-gs}(1 - G_U(s))(1 - G_E(s)) + C_E e^{-gs}(1 - G_U(s))dG_E(s) + a_E^N Re^{-gs}(1 - G_E(s))dG_U(s)]$$

- What's the utility of the worker if he decides to stop at time t and the employer utilizes the distribution G_E ???