

## Equilibrium Strategy Profiles (For JLEO Revision)

First, need to get timing clear for evolution of state variable. Take state variable to be  $q_{st}$ .

- $q_{s1}$ : beginning of the world (or,  $Q_{s0} - \mu = q_{s1}$ )
- $Q_{s1} = q_{s1} + R_{p1} + R_{c1}$   
–  $q_{s2} = Q_{s1} - \mu$

Strategies

- For patron: function of  $q_{st}$
- For c: function of  $q_{st} + R_{pt}$
- For s: function of  $Q_{st} = q_{st} + R_{pt} + R_{ct}$
- For g: not a function of  $q_{st}$  at all

According to Mailath and Samuelson (2006) p. 177.

- The strategy profile  $\sigma$  is a stationary Markov strategy if for any two ex post histories  $\tilde{h}^t$  and  $\tilde{h}^\tau$  (of equal or different lengths) terminating in the same state,  $\sigma(\tilde{h}^t) = \sigma(\tilde{h}^\tau)$ .
- The strategy profile  $\sigma$  is a stationary Markov equilibrium if  $\sigma$  is a stationary Markov strategy profile and a subgame-perfect equilibrium.

We have six state variables, so  $s = (q_s, q_g, l_s, l_g, w_s, w_g)$ .

- Strategies are a function of all six state variables
  - We can restrict attention to relevant ranges of the state variables. CAN I CHANGE PROP 1 PARTS 1 AND 2 TO BE INITIAL VALUES OF STATE VARIABLES? If so, then these conditions and what is necessary in each period to make the game continue.
- Strategies for the patron and c are also how much to invest in each of the six state variables. Some can be ruled out by preference assumptions:

- $c$  dislikes war, so will never invest in  $w_s$  or  $w_g$ . It would also not want to make the government lose, so won't invest in  $l_g$  either.
- Because the patron's preferences are aligned with the secessionists and against the government, it never invests in  $w_g$  or  $l_s$ .

Note that patron will never invest to augment  $l_s$  or  $w_g$ . This leave four state variables in which the patron may invest:  $q_s$ ,  $q_g$ ,  $l_g$  and  $w_s$ .

- Also, Gov't / Secessionists: Choose unilateral, simultaneous best responses depending on magnitudes of  $Q_{i1}$ ,  $L_{i1}$  and  $\omega_{i1}$ 
  - Game only continues if (SQ,SQ) or (Cede, Cede) was played

Period 1

1. Patron:  $R_{p1} = \frac{\beta}{1-\delta} - (q_{s1} - l_{s1})$  to augment  $q_{s1}$  if this is greater than 0. Else,  $R_{p1} = 0$ . Can write in max language.
  - International community:
    - (a) If  $R_{p1} + q_{s1} - l_{s1} \geq \frac{\beta}{1-\delta}$ ,  $R_{c1} = 0$
    - (b) Otherwise  $R_{c1} = l_{s1} - (q_{s1} + R_{p1}) + \varepsilon$  to augment  $l_{s1}$ 
      - (SQ,Cede) is played and game ends
2. Patron might also want to invest to encourage recognition directly. How much to augment  $l_{g1}$ ?
3. Patron might also want to instigate fighting. If  $\frac{\lambda p_{1s} - \alpha(1-p_{1s}) + \mu + \beta}{1-\delta}$  is positive, invest in  $w_{s1}$  to change  $\omega_{s1}$ . Will not invest in  $w_{s1}$  when the quantity is non-positive.
  - $c$  will counter up to  $\frac{\nu p_{1s} - \beta(1-p_{1s})}{1-\delta}$
4. Patron could also invest in  $q_g$  to counter investment by  $c$  in government's payoffs. But this would only been needed if  $c$  had incentive to invest in  $g$  playing Fight, and we've ruled that out.