

Econ 506A (2007)  
Topics in Advanced Theory I  
GAME THEORY

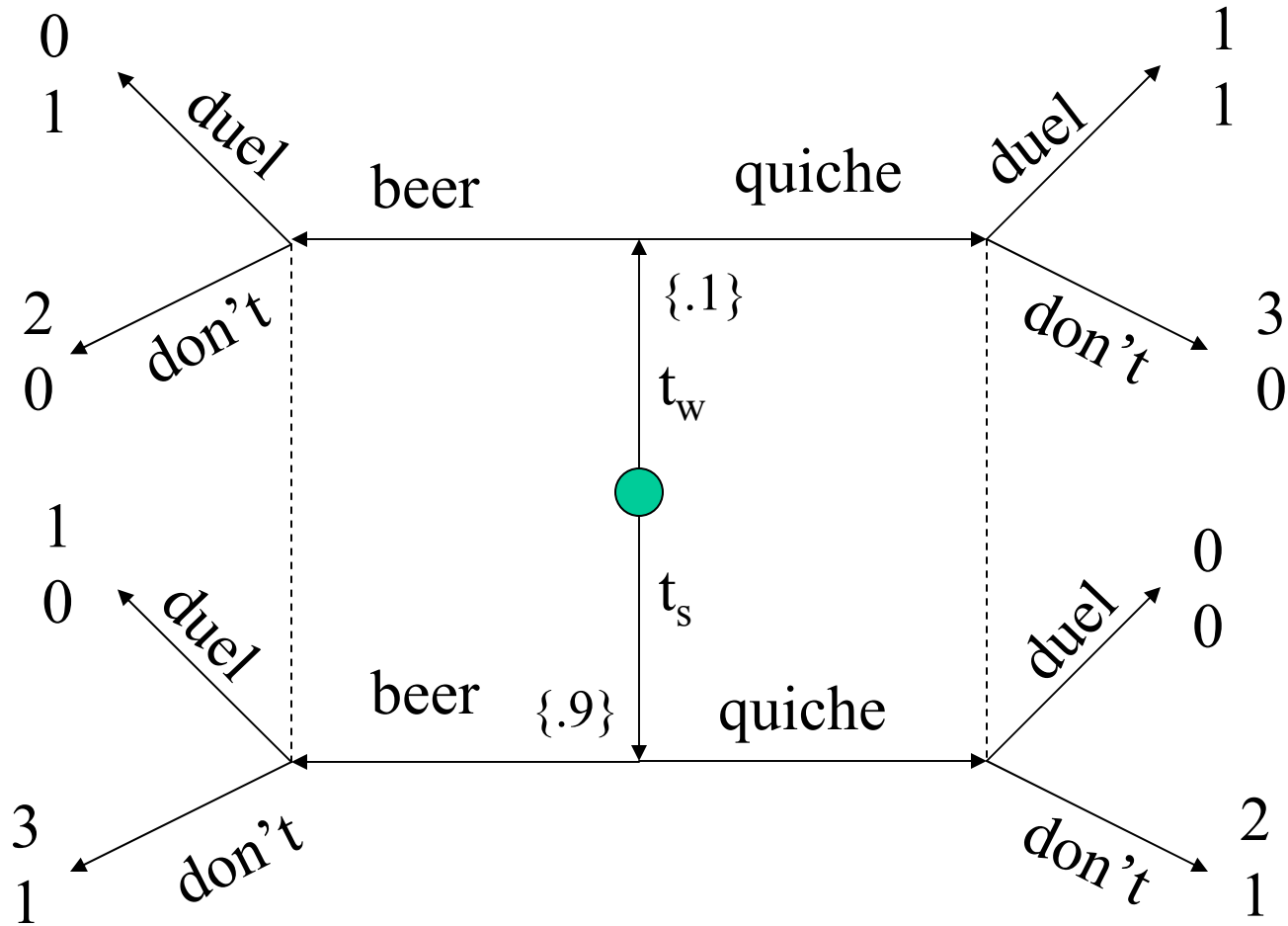
Haluk Ergin & David Levine

**Signaling Games and the Intuitive  
Criterion (Cho & Kreps, 1987)**

# Signaling Game -- Definition

- Two Players: (S)ender, (R)eceiver
  1. Nature selects a type  $t$  from  $T$  with probability  $p(t)$ ;
  2. Sender observes  $t$ , and then chooses a message  $m$  from  $M$ ;
  3. Receiver observes  $m$  (but not  $t$ ), and then chooses an action  $a$  from  $A$ ;
  4. Payoffs are  $U_S(t,m,a)$  and  $U_R(t,m,a)$ .

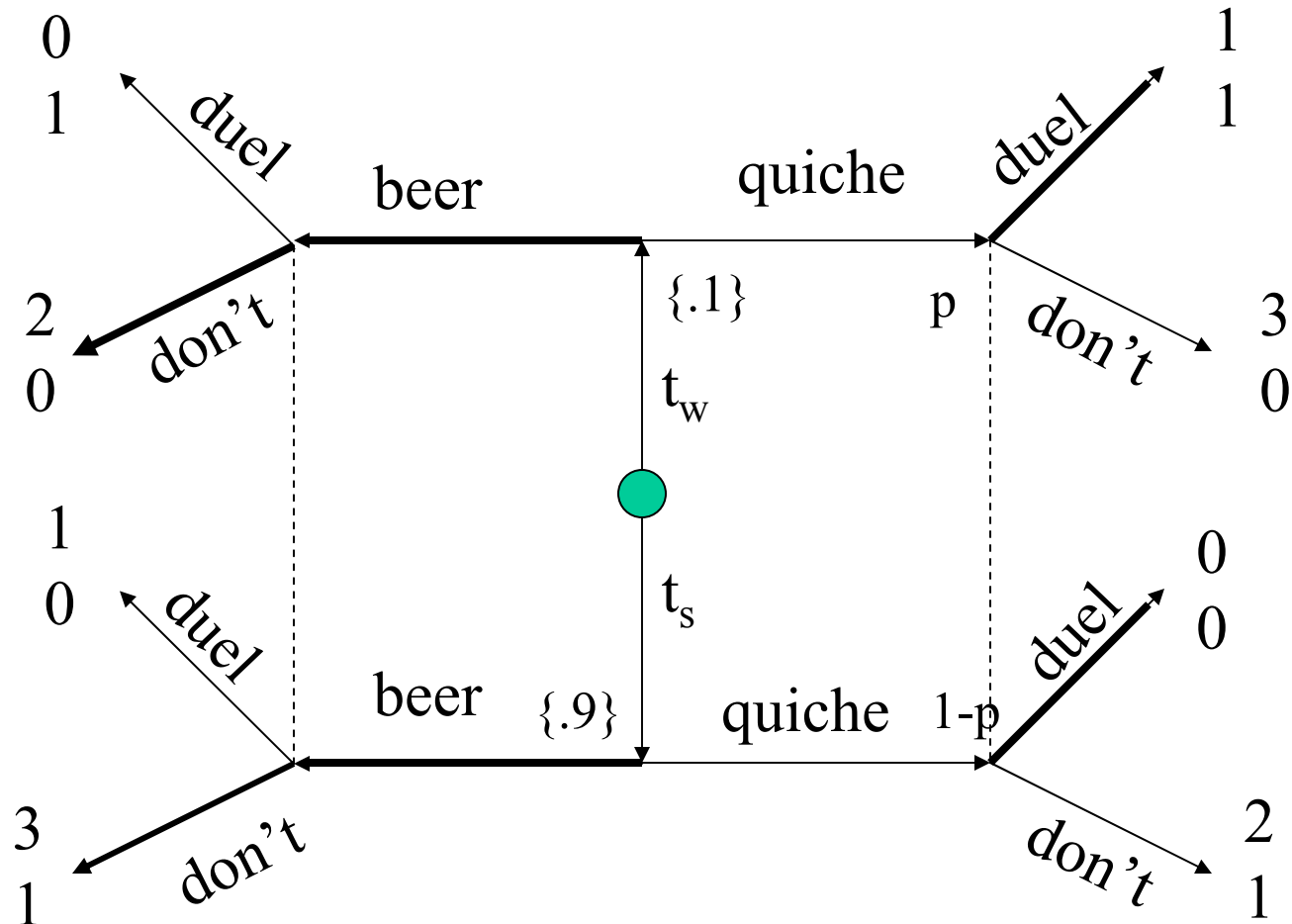
# Beer – Quiche



# Types of Sequential Equilibria (SE)

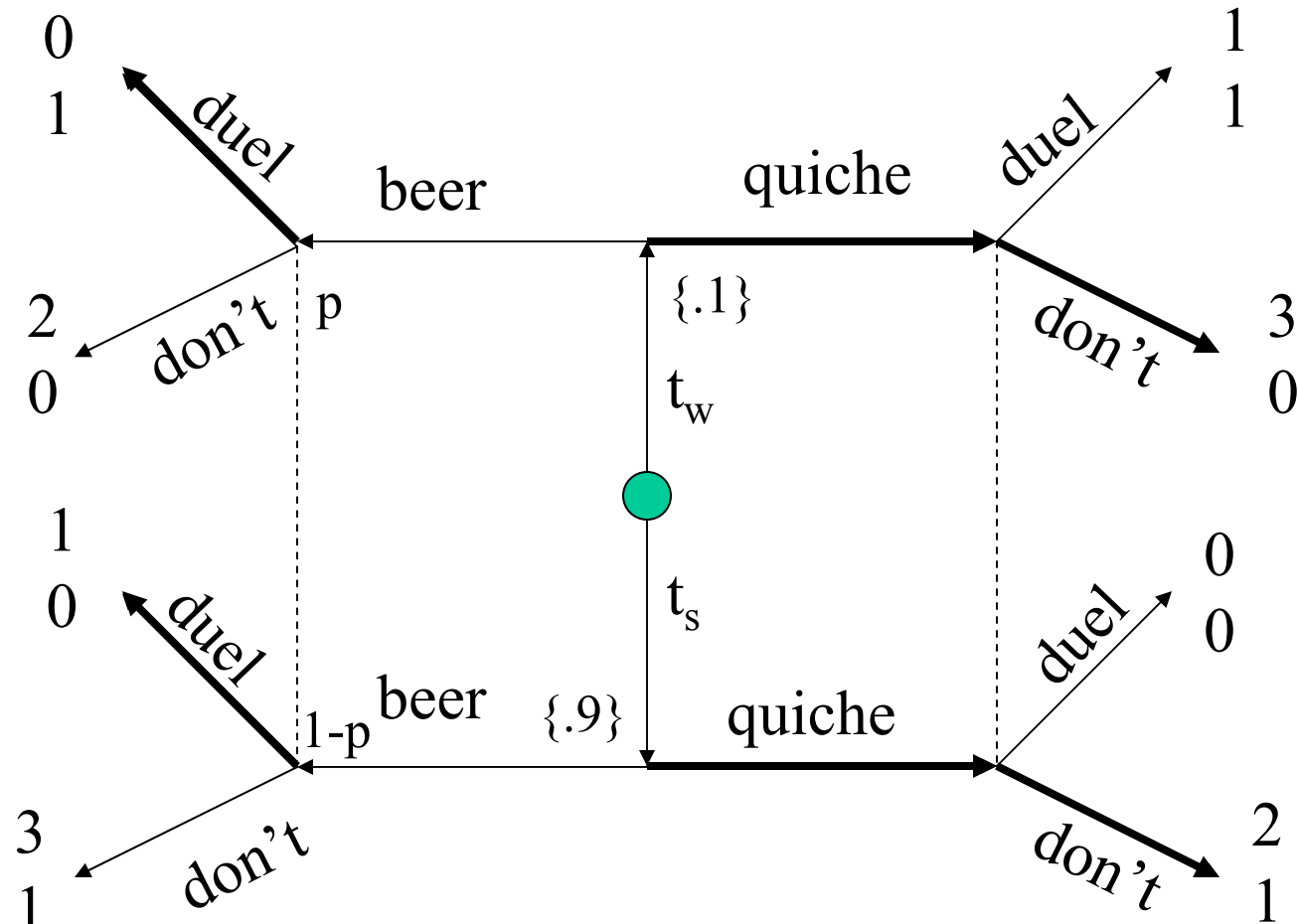
- A **pooling equilibrium** is an equilibrium in which all types of sender send the same message.
- A **separating equilibrium** is an equilibrium in which all types of sender send different messages.
- A **partially separating/pooling equilibrium** is an equilibrium in which some types of sender send the same message, while some others sends some other messages.

# Pooling SE where “Beer” is Played



$p = \mu(t_w | \text{quiche}) > 1/2$ , and  
 $p = 1/2$  &  $\text{Prob}(\text{duel} | \text{quiche}) \geq 1/2$

# Pooling SE where “Quiche” is Played



$p = \mu(t_w | \text{beer}) > 1/2$ , and

$p = 1/2$  &  $\text{Prob}(\text{duel} | \text{beer}) \geq 1/2$

# Intuitive Criterion

Given a SE, if  $t$ 's equilibrium payoff denoted  $U^*(t)$  is greater than  $t$ 's highest possible payoff from  $m$ , i.e:

$$U^*(t) > \max_{a \in A} U_S(t, m, a) \quad (*)$$

then after receiving message  $m_j$ , the Receiver's should place zero probability on Sender being of type  $t$ , i.e.  $\mu(t|m)=0$ .

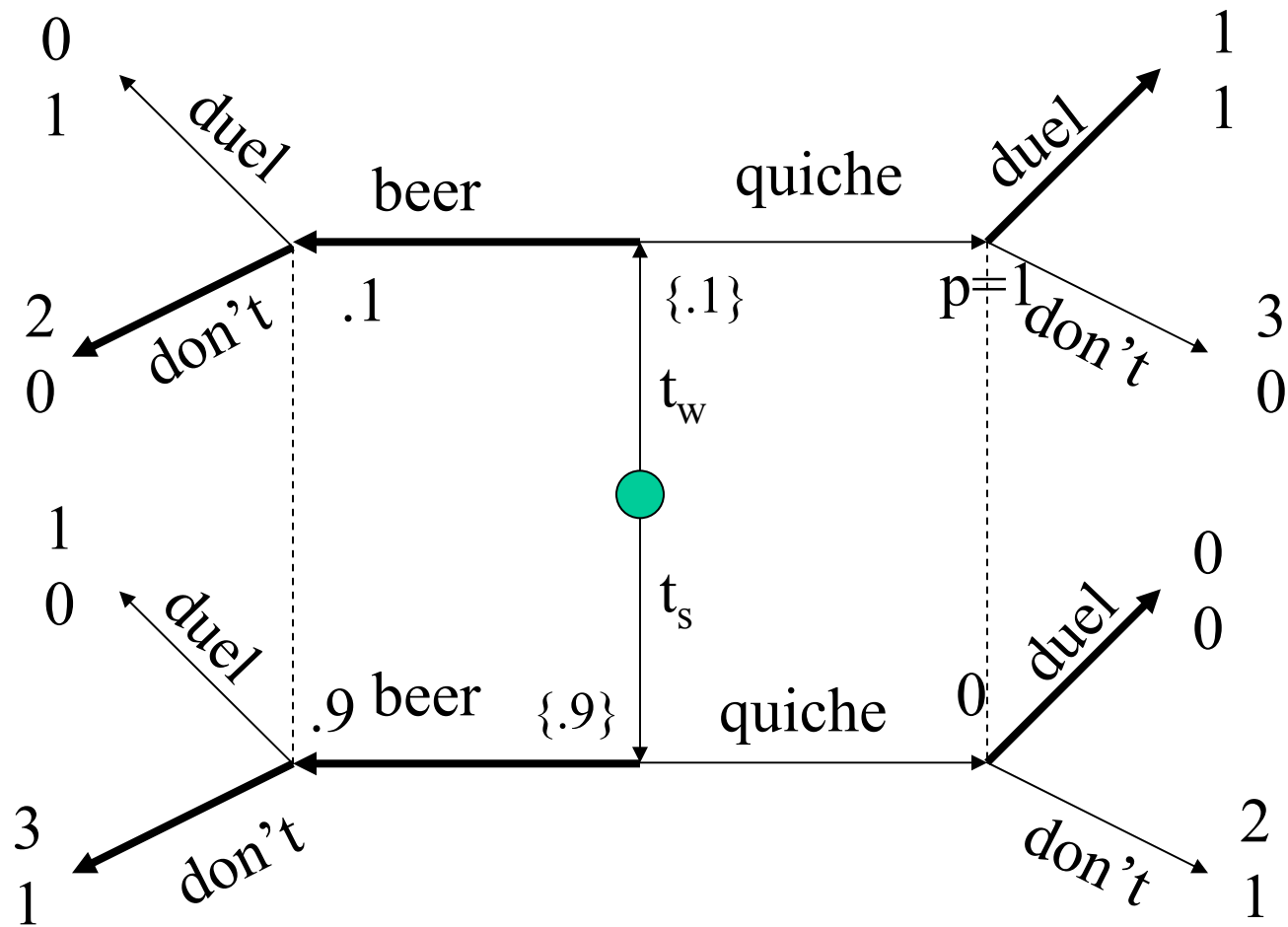
*Note:* This is possible if (\*) does not hold for at least one type in  $T$ .

## Cho & Kreps:

It is as if the sender, if he were of strong type, is (by drinking beer) implicitly making the speech:

*“I am drinking beer, which ought to convince you that I am of the strong type. For (given the Quiche-pooling equilibrium) I would never wish to drink beer if I were of the weak type. While, if I am of the strong type, and if drinking beer convinces you, then as you see it is in my interest to drink beer.”*

# The only pooling SE that survives the Intuitive Criterion



# A Mixed SE

