

Defn In a 2-player symmetric game, a strategy & in ES (in pure strategies) if

- (a) (s,s) is a symmetric NE, AND
- (b) if (ŝ,ŝ) is not strict NE, [eif there is an s' $\pm \hat{s}$ with $u(\hat{s}, \hat{s}) = u(\hat{s}, \hat{s})$] u(s,s') > u(s',s')

a		Ъ	
α	1,1	1,1	
b	1,0	0,0	

Uhat is Nash? >> (a,a) is sym. Nash 15 (a,a) strict NE? No: u(a,a)=u(b,a)=1 So check u(a,6) ? u(b,6) 1 > 0

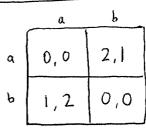
So a is ES

Evolution of social convention driving on Lor R

e What are potential Es? >> (L,L)are both NE (R,R) Strict, so Lis ES Ris ES

Lesson : We can have multiple ES conventions These need not be equally good. « (2,2) "better than" (1.1) »

symmetric B of S



< nature interpretation: a - aggression b - non-aggression

(monomorphic Population

There is no symmetric pure-strategy NE in the gan

« So no pure, stable genemix possible »

There is a symmetric mixed-strategy NE in the gan

Defn change:

\$ ~~ pore ~~ mixed

mixed eq. cannot be strict, since it is mixed need to check $u(\hat{p}, p') \stackrel{?}{>} u(\hat{p}, p')$ for all possible mixed mutations p

Hawk-Dove (strategy names for same species)

-	H	D	
મ	V-C V-C 2 1 2	٧,٥	prize=V >0
D	0, V	× 1/2	Costs = C 70 offignt
	ř	(1-6))

(15 H an ESS? Is (H,H) a NE? Yes if $\frac{V-C}{2} \geqslant 0$

Case (1) V > C then (H_1H) is strict NE (2) $V = C \Rightarrow V = C = 0$ u(H,H)=u(D,H) ...

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Check
$$U(H,D) \stackrel{?}{\neq} u(D,D)$$

$$V > \frac{v}{2}$$

What about
$$\rho$$
.

Step one: find a symmetric mixed NE(p1,1-p)

$$u(H, \hat{\rho}) = \hat{\rho}(\frac{v-c}{2}) + (I-\hat{\rho}) \vee$$

$$u(D, \hat{\rho}) = \hat{\rho}[O] + (I-\hat{\rho})\frac{V}{2}$$

$$(\frac{V}{c}, I-\frac{V}{c})$$

NOT STRICT We need to check

Hueristic argument:

In fact: V

- a) as VI, more Hawks in Ess as CI, more Doves in Ess
- b) payoffs = $(1-\frac{\vee}{c})(\frac{\vee}{2})$
- Most be same as Hawk payoff >>
 what happens as c1? the payoff 1!
- C) Identification we can tell what $\frac{V}{C}$ is from data

	S	В	T		
S	(,1	V,0	0, V	<u>‡</u>	14 1 4 2
В	0, V	1,1	v,0	-3	
Τ	V,0	0, ٧	1,1	$\frac{1}{3}$	
	1/3	1 3	1 3		

The only hope for an ESS is
$$(\frac{1}{3}, \frac{1}{3}, \frac{1}{3})$$

It is NE.

(It is NE.)

It is weak NE

Check
$$u(\hat{\rho}, \rho') \stackrel{?}{>} u(\rho', \rho')$$

Let $\rho' = S$
 $u(\hat{\rho}, s) = \frac{1+v}{3}$
 $u(s, s) = 1 \quad \leftarrow V \text{ bigger}$

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