

Self-Confirming Racial Stereotypes in

A Simple Investment Hiring Game

(1) Players

- One employer – decides whether to hire
- Many workers – decides whether to invest

(2) Assume employer cannot observe workers investment, but can see “test” which is correlated with worker investment

(3) Investment costly to worker; getting hired always benefits to workers, but only benefits employer if worker has invested.

Thus,

Payoff matrix

		Employer	
		A=0	A=1
Worker	I=0	0,0	1,-2
	I=1	-c,0	1-c,1

c is distributed as uniform [0,1]

Payoff=(worker, employer)

These numbers are chosen for convenience

When will the worker invest?

- Let $q_1 \in (0,1)$ be the probability of getting hired in worker’s mind, if he invests.

q_0 = probability hired if not invest.

- Then :

$q_1 * 1 - c$ = expected net benefit if $I=1$

$q_0 * 1 - 0$ = expected net benefit if $I=0$

$\Rightarrow I=1$ if and only if $(q_1 - q_0) \geq c$

When will the employer hire ?

- Let $s \in (0,1)$ be the probability that worker has invested, in employer's mind.

- Then

0 = benefit to employer if $A=0$

$s * 1 + (1-s) * (-2)$ = expected benefit if $A=1$

so,

$A=1$ if and only if

$s \geq 2/3$

What do workers and employers believe?

- Suppose test has 3 outcomes: Pass, fail, unclear

If worker passes, then employer knows $I=1$

If worker fails, then employer knows $I=0$

- Suppose

Probability [unclear/ $I=0$] = $1/3$

Probability [unclear/ $I=1$] = $2/3$

(numbers chosen for convenience)

- Let the employer think the fraction $\Pi \in (0,1)$ of worker population has invested.

then

$$s = \frac{\Pi*(2/3)}{\Pi*(2/3)+(1-\Pi)*(1/3)}$$

,if test unclear.

$s=0$, if fail

$s=1$, if pass

- For worker, beliefs depend on whether employer gives benefit of the doubt.

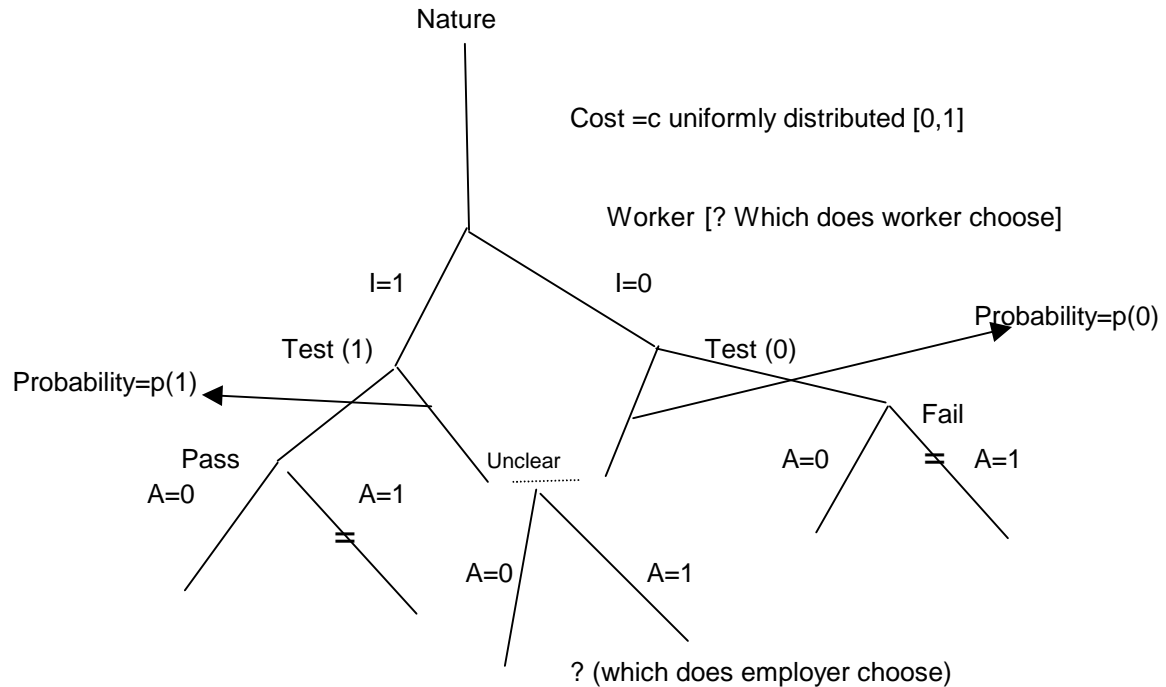
If he does:

$q_1=1$ and $q_0 = 1/3$

If he does not:

$q_1=1/3$ and $q_0 = 0$

Game Tree



(1) $I=1 \Rightarrow$ worker invests

$I=0 \Rightarrow$ worker does not invest.

c = cost to worker of investing

(2) Test has 3 possible outcomes: pass, fail, unclear

No investor can fail; no non-investor can pass.

$p(0)$ = Probability [unclear/ $I=0$] ; $p(1)$ = Probability [unclear/ $I=1$]

(3) $A=1 \Rightarrow$ employer hires

$A=0 \Rightarrow$ employer does not hire

Equilibrium

Seek Π^* a fraction of workers investing such that if employers believe this is the fraction investing, then they will act in such a way that exactly this fraction of the workers find it desirable to invest

Notice that if workers expect benefit of doubt, then

$$q_1 - q_0 = 2/3$$

so $\Pi_H = 2/3$ will invest.

If they do not expect benefit of doubt, then

$$q_1 - q_0 = 1/3$$

so $\Pi_L = 1/3$ will invest.

Notice: Employer gives benefit of doubt if and only if :

$$(2*\Pi)/(1+\Pi) \geq 2/3 \Leftrightarrow \Pi \geq 1/2$$

Thus:

Main Result:

Both: $\Pi^* = \Pi_L = 1/3$, and

$$\Pi^* = \Pi_H = 2/3$$

are self-confirming equilibrium beliefs.

Implications:

(1) This is a theory of stereotypes – or, of rational statistical discrimination

(2) The equilibrium $\Pi^* = \Pi_L$ is less efficient than the equilibrium $\Pi^* = \Pi_H$.

(3) Group identity permits the existence of different stereotypes simultaneously.

(4) In $\Pi^* = \Pi_L$ equilibrium only 1/9 of workers get hired. In $\Pi^* = \Pi_H$ equilibrium, fully 7/9 of workers get hired.