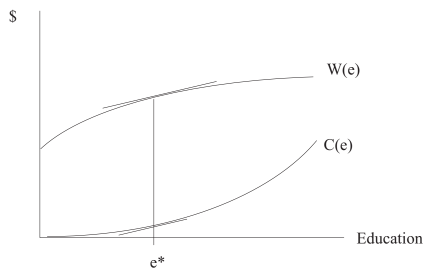
ECO 317 – Economics of Uncertainty – Fall Term 2009
Slides to accompany
17. Job Market Signaling

Notation:
$$\begin{aligned} e &= \text{education} \\ W(e) &= \text{worker's productivity} = \text{wage in competitive market} \\ C(e) &= \text{cost of education (income equivalent units)} \\ u &= W(e) - C(e)\,, \quad \text{utility} \end{aligned}$$

Worker chooses $e = e^*$ to maximize u. FOC $W'(e) = C'(e)$, SOC $W''(e) < C''(e)$.



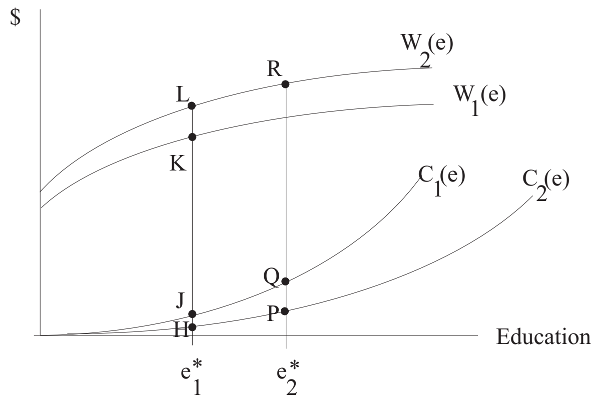
Symmetric Information Benchmark

Worker types 1 and 2; latter superior in all respects: For all e;

$$W_2(e) > W_1(e), \quad W_2'(e) > W_1'(e); \qquad C_2(e) < C_1(e), \quad C_2'(e) < C_1'(e)\,.$$

$$W_2'(e) - C_2'(e) > W_1'(e) - C_1'(e) \quad \text{for all } e \text{ is Mirrlees-Spence condition}$$

Under symmetric information, each type chooses e; here $e_2^* > e_1^*$.



Asymmetric Information

Each applicant's type is private information. Consider wage offer:

$$w = \begin{cases} W_1(e_1^*) & \text{if } e = e_1^* \\ W_2(e_2^*) & \text{if } e = e_2^* \end{cases}$$

Type 1 wants to mimic Type 2 (get education e_2^*) if

$$W_2(e_2^*) - C_1(e_2^*) > W_1(e_1^*) - C_1(e_1^*)\,.$$

In figure, heights QR, JK almost equal, so could easily go either way.
If mimicking, employers make losses; so the contract can't prevail in equilibrium.
Symmetric-information ideal may not be "incentive-compatible."

Note Type 2 does not want to mimic Type 1's choice, because

$$W_2(e_2^*) - C_2(e_2^*) > W_2(e_1^*) - C_2(e_1^*) > W_1(e_1^*) - C_2(e_1^*)\,;$$

In Figure 2, PR $>$ HL (because e_2^* is optimal for Type 2) and HL $>$ HK.

To overcome Type 1's temptation to mimic, and achieve separation of types,
need higher level of education to establish Type 2. Try threshold E, and contract

$$w = \begin{cases} W_1(e_1^*) & \text{if } e \geq E \\ W_2(e_2^*) & \text{if } e < E \end{cases}$$

Condition for Type 1 not to mimic Type 2:

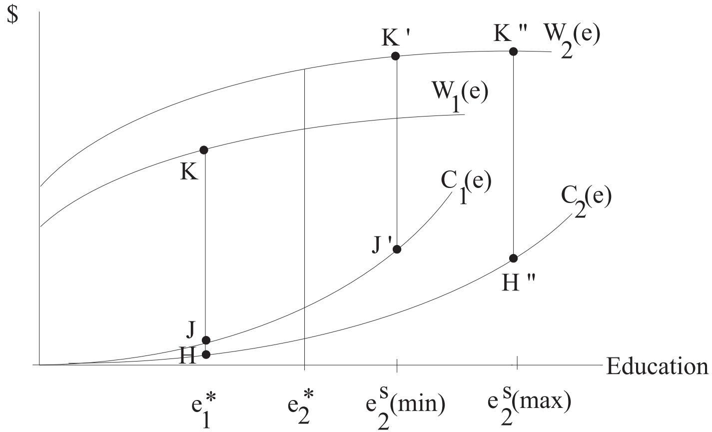
$$W_1(e_1^*) - C_1(e_1^*) \geq W_2(E) - C_1(E)\,, \text{ or } E \geq e_2^s(\min)\,.$$

Condition for Type 2 not to mimic Type 1 (not to give up):

$$W_2(E) - C_2(E) \geq W_1(e_1^*) - C_2(e_1^*)\,, \text{ or } E \leq e_2^s(\max)\,.$$

These bounds are illustrated in the figure on next page.

Requiring $E \geq e_2^s(\min)$ is the minimal unavoidable cost
of achieving separation, but anything higher is inefficient.
May be sustained in equilibrium by self-fulfilling expectations.



But experimentation may change expectations and achieve separation at lowest (informationally constrained efficient) signaling level.

If the proportion of Type 1's in the population is small, pooling at the average wage may be Pareto superior.