Appendix A

The probability that an agent who fails and then succeeds is of high quality is, using Bayes' rule,

$$Pr(H|F,S) = \frac{(1-p_h)p_{h,F}0.5}{(1-p_h)p_{h,F}0.5 + (1-p_l p_{l,F})0.5} = \frac{1}{1+\frac{(1-p_l)p_{l,F}}{(1-p_h)p_{h,F}}},$$

which is a decreasing function of the ratio $(1-p_l)p_{l,F}/((1-p_h)p_{h,F})$. Similarly, the probability that an agent who succeeds and then fails is of high quality is

$$Pr(H|S,F) = \frac{p_h(1-p_{h,S})0.5}{p_h(1-p_{h,S})0.5 + p_l(1-p_{l,S})0.5} = \frac{1}{1+\frac{p_l(1-p_{l,S})}{p_h(1-p_{h,S})}}.$$

$Pr(H|F,S)$ is larger than $Pr(H|S,F)$ whenever

$$\frac{(1-p_l)p_{l,F}}{(1-p_h)p_{h,F}} < \frac{p_l(1-p_{l,S})}{p_h(1-p_{h,S})}, \implies \frac{(1-p_{h,S})p_h}{(1-p_{l,S})p_l} < \frac{p_{h,F}(1-p_h)}{p_{l,F}(1-p_l)}. \tag{EC.1}$$

The probability that an agent who succeeds, and then succeeds again, is of high quality is

$$Pr(H|S,S) = \frac{p_h p_{h,S}0.5}{p_h p_{h,S}0.5 + p_l p_{l,S}0.5} = \frac{1}{1+\frac{p_l p_{l,S}}{p_h p_{h,S}}}.$$

Thus, $Pr(H|F,S)$ is larger than $Pr(H|S,S)$ whenever

$$\frac{(1-p_l)p_{l,F}}{(1-p_h)p_{h,F}} < \frac{p_l p_{l,S}}{p_h p_{h,S}} \implies \frac{p_{h,S}p_h}{p_{l,S}p_l} < \frac{p_{h,F}(1-p_h)}{p_{l,F}(1-p_l)}. \tag{EC.2}$$

By symmetry, we have (using the second inequality in equation EC.2) that $Pr(L|S,F)$ is larger than $Pr(L|F,F)$ whenever

$$\frac{q_{l,F}}{q_{h,F}}\frac{q_l}{q_h} < \frac{q_{l,S}}{q_{h,S}}\frac{1-q_l}{1-q_h}. \tag{EC.3}$$

Appendix B

Suppose that failure decreases resources from r_2 to $r_1 < r_2$, while success increases resources to $r_3 > r_2$. Using the first inequality in equation EC.2, $Pr(H|F,S)$ is larger than $Pr(H|S,S)$ whenever

$$\frac{1-g(l,r_2)}{1-g(h,r_2)}\frac{g(l,r_1)}{g(h,r_1)} < \frac{g(l,r_2)}{g(h,r_2)}\frac{g(l,r_3)}{g(h,r_3)} \implies \frac{g(h,r_2)}{1-g(h,r_2)}\frac{g(l,r_1)}{g(h,r_1)} < \frac{g(l,r_2)}{1-g(l,r_2)}\frac{g(l,r_3)}{g(h,r_3)}. \tag{EC.4}$$

Because $g(h,r_2) > g(l,r_2)$ implies that $g(h,r_2)/(1-g(h,r_2))$ is larger than $g(l,r_2)/(1-g(l,r_2))$, EC.4 is only satisfied if $\frac{g(l,r_3)}{g(h,r_3)} > \frac{g(l,r_1)}{g(h,r_1)}$, i.e., if $\frac{g(l,r_3)}{g(l,r_1)} > \frac{g(h,r_3)}{g(h,r_1)}$, which is thus a necessary condition for $Pr(H|F,S) > Pr(H|S,S)$.