Appendix for
“Boundedly Rational Search with Positive Search Costs”
D. Stahl, Economics Letters, forthcoming 2018

**Proposition 1.** There is a unique solution $w^*$ to the Kuhn-Tucker conditions that $g(w^*, V, \overline{p_c}) \leq 0$ and $w^* g(w^*, V, \overline{p_c}) = 0$.

**PROOF:** First note that if $g(w, V, \overline{p_c}) < 0$ for all $w \in [0, 1]$, then $w^* = 0$ is the unique solution. Second, suppose there is some $w \in [0, 1]$ such that $g(w, V, \overline{p_c}) = 0$. It suffices to show that $\partial g(w, V, \overline{p_c})/\partial w < 0$ at such a $w$. Recall

$$g(w, V, \overline{p_c}) \equiv -1/(1-w) + \gamma \{1 - p_a - \beta p_a p_c/N(1-\beta \theta(w, V, \overline{p_c}))\}.$$  \hspace{1cm} (A1)

$$\partial g(w, V, \overline{p_c})/\partial w = -1/(1-w)^2 - \gamma^2 \frac{p_a}{N(1-\beta \theta(w, V, \overline{p_c}))}.$$  \hspace{1cm} (A2)

Observe that since $N \geq 1$, $1 - p_a - \beta p_a p_c/N(1-\beta \theta(w, V, \overline{p_c})) \geq 1 - p_a - \beta p_a p_c/(1-\beta \theta(w, V, \overline{p_c}))$, and since $1 - p_a > p_c$, the last term is greater than or equal to $p_c [1 - \beta p_a/(1-\beta \theta(w, V, \overline{p_c}))] \geq 0$. Hence, both terms in curly brackets $\{\}$ of eq(A2) are non-negative, implying that $\partial g(w, V, \overline{p_c})/\partial w \leq -1/(1-w)^2 \leq -1$. Q.E.D.

**Proposition 2.** There is a unique solution $w^*$ to the Kuhn-Tucker conditions that $G(w^*, V) \leq 0$ and $w^* G(w, V) = 0$.

**PROOF:** $G(w, V) \equiv g[w, V, p_c(w, V)] = -1/(1-w) + \gamma \{1 - p_a - \beta p_a p_c/N(1-\beta \theta(w, V, \overline{p_c}))\}$. It will suffice to show that $\partial G(w, V)/\partial w < 0$ for all $w \in [0, 1]$.

$$\partial G(w, V)/\partial w = -1/(1-w)^2 - \gamma^2 \frac{p_a}{N(1-\beta \theta(w, V, \overline{p_c})) - N(\beta p_a p_c/N(1-\beta \theta(w, V, \overline{p_c}))^2)$$

$$= -1/(1-w)^2 - \gamma^2 p_a \{[1 - p_a - \beta p_a p_c/N(1-\beta \theta(w, V, \overline{p_c}))] \mbox{ + } (\beta p_c/N(1-\beta \theta(w, V, \overline{p_c})))[1 - p_a - \beta p_a p_c/(1-\beta \theta(w, V, \overline{p_c}))]\}.$$  \hspace{1cm} (A3)

Observe that since $N \geq 1$, $1 - p_a - \beta p_a p_c/N(1-\beta \theta(w, V, \overline{p_c})) \geq 1 - p_a - \beta p_a p_c/(1-\beta \theta(w, V, \overline{p_c}))$, and since $1 - p_a > p_c$, the last term is greater than or equal to $p_c [1 - \beta p_a/(1-\beta \theta(w, V, \overline{p_c}))] \geq 0$. Hence, both terms in curly brackets $\{\}$ of eq(A3) are non-negative, implying that $\partial G(w, V)/\partial w \leq -1/(1-w)^2 \leq -1$. Q.E.D.