Crowdsourcing City Government: Using Tournaments to Improve Inspection Accuracy

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Online Appendix – Proof of Proposition 1

The value of $(1-\varphi)^{1-\frac{\overline{w}}{\underline{w}}}-1$ is monotonically increasing in φ and goes from 0 to ∞ as φ goes from 0 to 1. Hence, there must exist a value of φ at which $(1-\varphi)^{1-\frac{\overline{w}}{\underline{w}}}-1$ equals $\frac{V(\overline{q})-V(\underline{q})}{V(q_{\max})-V(\overline{q})}$, a constant. The value of $\frac{V(\overline{q})-V(\underline{q})}{V(q_{\max})-V(\overline{q})}$ is rising with $V(\overline{q})$ and falling with $V(\underline{q})$ and $V(q_{\max})$; hence, φ^* is rising with $V(\overline{q})$ and falling with $V(\underline{q})$ and $V(q_{\max})$. For a given φ, the value of $(1-\varphi)^{1-\frac{\overline{w}}{\underline{w}}}-1$ is rising with $\frac{\overline{w}}{\underline{w}}$; hence, φ^* must be falling with $\frac{\overline{w}}{\underline{w}}$.