Online Appendix
Crime Aggregation, Deterrence, and Witness Credibility

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A Derivation of $\pi_{\min}(\overline{\pi})$

Recall the expression for the fraction of wrongful convictions under DPP, which equals $\overline{\pi}$ under the proposed π^{**}, we have

$$\overline{\pi} = \frac{(1-\pi^{**})^2 R}{(1-\pi^{**})R + \pi^{**}}, \tag{A.1}$$

which solves

$$\pi^{**} = \frac{2R\bar{l} + R + 1 - \sqrt{(R+1)^2 + 4R\bar{l}}}{2R(\bar{l}+1)}. \tag{A.2}$$

where $\bar{l} \equiv \frac{1-\overline{\pi}}{\overline{\pi}}$. The remainder of the proof computes the expected number of crimes, which is

$$\frac{2\pi^{**}}{(1-\pi^{**})R + \pi^{**}} = \frac{(1-\pi^{**})^2 R}{(1-\pi^{**})R + \pi^{**}} \cdot \frac{2\pi^{**}}{(1-\pi^{**})^2 R} = (1-\overline{\pi})\frac{2\pi^{**}}{(1-\pi^{**})^2 R}. \tag{A.3}$$

Plugging in (A.2), we have

$$(1-\pi^{**})^2 R = \frac{\Big(R - 1 + \sqrt{(R+1)^2 + 4R\bar{l}}\Big)^2}{4R(\bar{l}+1)^2} = \frac{\Big(R - 1 + \sqrt{(R+1)^2 + 4R\bar{l}}\Big)^2 \Big(R - 1 - \sqrt{(R+1)^2 + 4R\bar{l}}\Big)^2}{4R(\bar{l}+1)^2 \Big(R - 1 - \sqrt{(R+1)^2 + 4R\bar{l}}\Big)^2}.$$

$$= \frac{\Big((R-1)^2 - (R+1)^2 - 4R\bar{l}\Big)^2}{4R(\bar{l}+1)^2 \Big(R - 1 - \sqrt{(R+1)^2 + 4R\bar{l}}\Big)^2} = \frac{16R^2(\bar{l}+1)^2}{4R(\bar{l}+1)^2 \Big(R - 1 - \sqrt{(R+1)^2 + 4R\bar{l}}\Big)^2}, \tag{A.4}$$

as well as

$$2\pi^{**} = \frac{2R\bar{l} + R + 1 - \sqrt{(R+1)^2 + 4R\bar{l}}}{R(\bar{l}+1)}.$$

Therefore,

$$\frac{2\pi^{**}}{(1-\pi^{**})^2 R} = \frac{1}{4R^2(\bar{l}+1)}\left(2R\bar{l}+R+1-\sqrt{(R+1)^2+4R\bar{l}}\right)\left(R-1-\sqrt{(R+1)^2+4R\bar{l}}\right)^2.$$

$$= \frac{1}{4R^2(\bar{l}+1)}\left(2R\bar{l}+R+1-\sqrt{(R+1)^2+4R\bar{l}}\right)\left((R-1)^2+(R+1)^2+4R\bar{l}-2(R-1)\sqrt{(R+1)^2+4R\bar{l}}\right)$$

$$= \frac{1}{2R^2(\bar{l}+1)}\left(2R\bar{l}+R+1-\sqrt{(R+1)^2+4R\bar{l}}\right)\left(2R\bar{l}+R^2+1-(R-1)\sqrt{(R+1)^2+4R\bar{l}}\right)$$

$$= \frac{1}{2R^2(\bar{l}+1)}\left((2R\bar{l}+R+1)(2R\bar{l}+R^2+1)+(R-1)[(R+1)^2+4R\bar{l}]-[(R-1)(2R\bar{l}+R+1)+2R\bar{l}+R^2+1]\sqrt{(R+1)^2+4R\bar{l}}\right)$$

$$= 2\bar{l}+R+1-\sqrt{(R+1)^2+4R\bar{l}}$$

Since $\overline{\pi} = \frac{1}{1+\bar{l}}$, we have

$$\frac{2\pi^{**}}{(1-\pi^{**})R+\pi^{**}} = \frac{2\bar{l}+R+1-\sqrt{(R+1)^2+4R\bar{l}}}{1+\bar{l}}.$$