$$E_I(F, q_1, q_2)$$

$$= \int_0^{\varepsilon} [q_1 \cdot (-a_1 - (c_1 - a_1)\beta_1(\varepsilon_1)) + q_2 \cdot (a_2 - (c_2 - a_2)\beta_2(\varepsilon - \varepsilon_1))] dF(\varepsilon_1) \tag{3.4}$$

while the state's expected payoff is

$$E_S(F, q_1, q_2)$$

$$= \int_0^{\varepsilon} [q_1(-b_1 + (b_1 + d_1)\beta_1(\varepsilon_1)) + q_2(-b_2 + (b_2 + d_2)\beta_2(\varepsilon - \varepsilon_1))] dF(\varepsilon_1). \tag{3.5}$$

We assume that the players do not cooperate. Thus, we model Problem 3 as a non-cooperative two-person game $(\{F\}, \{q_1, q_2\}, E_I, E_S)$ with strategies and payoffs as given above. The equilibrium solution (F^*, q_1^*, q_2^*) of this game is determined by the Nash conditions

$$E_I(F^*, q_1^*, q_2^*) \geq E_I(F, q_1^*, q_2^*) \, \forall F \tag{3.6}$$

$$E_S(F^*, q_1^*, q_2^*) \geq E_S(F^*, q_1, q_2) \, \forall q_1, q_2 \text{ satisfying (3.3),} \tag{3.7}$$

where $E_I(F, q_1, q_2)$ and $E_S(F, q_1, q_2)$ are given by (3.4) and (3.5). Two equilibrium solutions are now preented, depending on the analytical forms of the detection probabilities $1 - \beta_i(\cdot)$. The first generalizes results previously obtained in [1] and [2].

Theorem 3.1 (Concentration of inspection effort)

Let $1 - \beta_1(\varepsilon_1)$ and $1 - \beta_2(\varepsilon - \varepsilon_1)$ have the properties

$$1 - \beta_1(0) = 1 - \beta_2(0) = 0 \tag{3.8}$$

$$\frac{d}{d\varepsilon_1}(1 - \beta_1(\varepsilon_1)) > 0, \; \frac{d}{d\varepsilon_1}(1 - \beta_1(\varepsilon - \varepsilon_1)) < 0 \text{ for all } \varepsilon_1 \text{ with } 0 \leq \varepsilon_1 \leq \varepsilon. \tag{3.9}$$

Furthermore, suppose that $1 - \beta_1(\varepsilon_1)$ and $1 - \beta_2(\varepsilon - \varepsilon_1)$ are strictly convex, i.e.,

$$\frac{d^2}{d\varepsilon_1^2}(1 - \beta_1(\varepsilon_1)) > 0, \; \frac{d^2}{d\varepsilon_1^2}(1 - \beta_2(\varepsilon - \varepsilon_1)) > 0 \text{ for all } \varepsilon_1 \text{ with } 0 \leq \varepsilon_1 \leq \varepsilon. \tag{3.10}$$

Define

$$1 - \beta_i(\varepsilon) = 1 - \beta_i \text{ for } i = 1, 2. \tag{3.11}$$

Then the equilibria (F^*, q_1^*, q_2^*) as well as the equilibrium payoffs E_I^* and E_S^* of the game described above are given by

$$F^*(\varepsilon_1) = \begin{cases} 0 & \varepsilon < 0 \\ 1 - p^* \quad \text{for} & 0 \leq \varepsilon_1 < \varepsilon, \\ 1 & \varepsilon_1 \geq \varepsilon \end{cases} \tag{3.12}$$

where p^*, q_1^* and q_2^* are as follows: