附錄四

由(4.17)式以及(4.18)式可知r_2^{NE}、r_1^{NE}為：

$$r_2^{NE}=\frac{1}{3}\left\{\frac{A+B+2E+2F}{[(x_2-x_1)(1-\gamma hp-(1-\gamma)p)-z_2+z_1]}\right\}+\frac{1}{3}b_1z_1+\frac{2}{3}b_2z_2+\frac{1}{3}c_1+\frac{2}{3}c_2 \quad \text{-----------(4.17)}$$

$$r_1^{NE}=-\frac{1}{3}\left\{\frac{A+B+2E+2F}{[(x_2-x_1)(1-\gamma hp-(1-\gamma)p)-z_2+z_1]}\right\}+\frac{A+B+E+F}{[(x_2-x_1)(1-\gamma hp-(1-\gamma)p)-z_2+z_1]}+\frac{2}{3}b_1z_1$$

$$+\frac{1}{3}b_2z_2+\frac{2}{3}c_1+\frac{1}{3}c_2 \quad \text{--(4.18)}$$

其中：

A＝

$$(x_2-x_1)\left\{(a_1x_1+K_1)\left[(1-\gamma)(1-hp)^2+(1-p)\right]-(K_2-K_1)\left[(1-p)-hp(1-hp)\right]\right\}$$

B＝

$$(-z_2+z_1)\{a_1x_1[(1-hp)-\gamma p(1-h)]+(K_2-K_1)[-(1-hp)+\gamma p(1+h)]\}$$

E＝

$$(x_2-x_1)\{[(1-p)(1+\gamma-hp)][(a_2x_2+K_2)+(K_2-K_1)]+\gamma(x_2-x_1)[-\bar{y}p+\bar{y}hp]$$
$$+[(x_2-x_1)((\bar{y}-\bar{y}p)-z_2+z_1][1-\gamma hp]\}$$

F＝

$$(-z_2+z_1)\{[-\gamma p+\gamma hp+1-hp][(a_2x_2+K_2)+(K_2-K_1)]+\gamma(x_2-x_1)[-\bar{y}p+\bar{y}hp]$$
$$+[(x_2-x_1)((\bar{y}-\bar{y}hp)-z_2+z_1]\}$$

$$\therefore\frac{\partial r_2}{\partial z_1}=$$

$$(18K_2+12hpK_2+6\gamma pK_2-24\gamma hpK_2+3K_1+12\gamma hpK_1-9\gamma h^2p^2K_2$$

$$-24\gamma^2hp^2K_2+15\gamma^2h^2p^2K_2-6\gamma h^2p^2K_1+12\gamma^2hp^2K_1-9\gamma^2h^2p^2K_1-18pK_2$$

$$-9hp^2K_2-9\gamma p^2K_2+24\gamma hp^2K_2-3hp^2K_1-6\gamma hp^2K_1+9\gamma^2p^2K_2+6(hp)^2K_1$$

$$-9\gamma K_1-3(hp)^2K_2+12\gamma K_2+6\gamma pK_1+2hp^2K_2-6hp^2K_1)\,x_1$$

$$+(-18K_2-6\gamma pK_2+24\gamma hpK_2-3K_1-12\gamma hpK_1+9\gamma h^2p^2K_2+24\gamma^2hp^2K_2$$

$$-15\gamma^2h^2p^2K_2+6\gamma h^2p^2K_1-12\gamma^2hp^2K_1+9\gamma^2h^2p^2K_1+18pK_2+9p^2K_2$$

$$+9\gamma p^2K_2-24\gamma hp^2K_2+3hp^2K_1-3\gamma p^2K_1+6\gamma hp^2K_1-9\gamma^2p^2K_2+3\gamma^2p^2K_1$$

$$-6(hp)^2K_1+9\gamma K_1+3(hp)^2K_2-6\gamma pK_1-12hp^2K_2+6hp^2K_1-12\gamma K_2)\,x_2$$

$$
\begin{aligned}
&+\left(-18K_2-6hpK_1\right)z_1 \\
&+\left(18K_2+6hpK_1\right)z_2 \\
&+\left(-3hpa_1+6-12\gamma hp-6\bar{y}hp-6\gamma^2hp^2a_1+3\gamma^2h^2p^2a_1+6\gamma^2h^2p^2+12\gamma^2\bar{y}hp^2\right. \\
&-6\gamma^2\bar{y}h^2p^2+6\bar{y}\gamma h^2p^2+3pa_1-3hp^2a_1-3\gamma p^2a_1+6\gamma hp^2a_1-6p+6\gamma hp^2 \\
&+6\gamma\bar{y}p^2-12\gamma\bar{y}hp^2+6\bar{y}hp^2+3\gamma^2p^2a_1+6\gamma p-6\gamma^2hp^2-6\gamma^2\bar{y}p^2-6\gamma hp^2\bar{y} \\
&\left.+3(hp)^2a_1-3\gamma a_1+6\gamma hpa_1+6\gamma\bar{y}p\right)x_1^2 \\
&+\left(-6a_2-6\gamma a_2+6hpa_2+6pa_2+6\gamma pa_2-6hp^2a_2+6\gamma\bar{y}p-6\gamma\bar{y}hp-6\bar{y}+6\bar{y}p\right. \\
&\left.+6\gamma hp\bar{y}-6\gamma hp^2\bar{y}\right)x_2^2 \\
&+6z_1^2 \\
&+6z_2^2 \\
&+\left(3hpa_1-6+12\gamma hp+6\bar{y}+6\bar{y}hp+6\gamma h^2p^2a_1+6\gamma^2hp^2a_1-3\gamma^2h^2p^2a_1-6\gamma^2h^2p^2\right. \\
&-12\gamma^2\bar{y}hp^2+6\gamma^2\bar{y}h^2p^2-6\bar{y}\gamma h^2p^2-3pa_1+3hp^2a_1+3\gamma p^2a_1-6\gamma hp^2a_1+6p \\
&-6\gamma hp^2-6\gamma\bar{y}p^2+24\gamma\bar{y}hp^2-6\bar{y}p-6\bar{y}hp^2-3\gamma^2p^2a_1-6\gamma p+6\gamma^2hp^2+6\gamma^2\bar{y}p^2 \\
&-3(hp)^2a_1+3\gamma a_1-6\gamma hpa_1-12\gamma\bar{y}p+6a_2+6\gamma a_2-6hpa_2-6pa_2-6\gamma pa_2 \\
&\left.-6hp^2a_2\right)x_1x_2 \\
&+\left(-12+12\gamma hp+12p-12\gamma p\right)x_1z_1 \\
&+\left(12-12\gamma hp-12p+12\gamma p\right)x_1z_2 \\
&+\left(6-6\gamma hp-12p+12\gamma p+6\gamma pa_2-6\gamma hpa_2-6a_2+6hpa_2+6\gamma\bar{y}p-6\gamma\bar{y}hp-6\bar{y}\right. \\
&\left.+6\bar{y}hp\right)x_2z_1 \\
&+\left(-6+6\gamma hp+12p-12\gamma p-6\gamma pa_2+6\gamma hpa_2+6a_2-6hpa_2-6\gamma\bar{y}p+6\gamma\bar{y}hp\right. \\
&\left.+6\bar{y}-6\bar{y}hp\right)x_2z_2 \\
&-12z_1z_2=0 \qquad \text{-----------------------------------}(4.24)
\end{aligned}
$$