

APPENDIX B4

ASSUMPTIONS' CROSS CHECKING FOR THE CASE I.2

Given any value of consumer's location x , the utility from buying the product from new branch of player 1 will always be higher than buying the product from the original branch of player 2 and utility from buying the product from new branch of player 2 will be always higher than buying the product from the original branch of player 1 because of the following.

$$\begin{aligned}
 u_2 &= V - p_1^* - (x - m_1^*)^2 + n_1^* &= V - \frac{13}{8} - (x-1)^2 + 1 \\
 &> V - \frac{13}{8} - (x-1)^2 + \frac{1}{2} \\
 &> V - p_2^* - (x - x_2^*)^2 + y_2^* = u_3
 \end{aligned}$$

$$\begin{aligned}
 u_4 &= V - p_2^* - (x - m_2^*)^2 + n_2^* &= V - \frac{13}{8} - (x-0)^2 + 1 \\
 &> V - \frac{13}{8} - (x-0)^2 + \frac{1}{2} \\
 &> V - p_1^* - (x - x_1^*)^2 + y_1^* = u_1
 \end{aligned}$$

Therefore, in this case, the competition will be between the new branch of player 1 and new branch of player 2 or the only market separating line we need to consider is x_{c_3} . By substitute the optimal location, product's quality level, and pricing of both players into x_{c_3} , π_1 , and π_2 , the results are $x_{c_3} = 1/2$, $\pi_1 = 1/2$, and $\pi_2 = 1/2$. Since there is only one market separating line, x_{c_3} , and both optimal price and market share of both players are positive, we can conclude that the assumptions are correct.