1 Online Appendix

A-1.1 Proof of Proposition 6

Results in Cases 2 and 3 reflect equilibrium outcomes with short-term wholesale contracts. With long-term wholesale contracts, manufacturers set wholesale prices at the beginning of the first period, and wholesale prices do not change over time. We solve for equilibrium manufacturer profits with long-term contracts and compare them with manufacturer profits with short-term contracts to derive the optimal contracts for manufacturers.

When manufactures cannot use BBP, the short-term contract corresponds to Case 2 in which only retailers use BBP. Manufacturer profits are $\Pi_{wat}^{c2*} = \frac{671}{324}t \approx 2.07t$ (see Table 2), where the superscript $c2$ indicates Case 2. If manufacturers use long-term contract, the analysis is as follows.

The Second Period. The second-period analysis is similar to that in Case 2 except that wholesale prices are not period-specific. Let w_a and w_b denote the fixed wholesale prices of manufacturers A and B. The second-period marginal consumers are located at x_a and x_b. We have $v - tx_a - a_o = v - t(1 - x_a) - b_n$ that gives $x_a = \frac{t+b_n-a_o}{2t}$, and $v - tx_b - a_n = v - t(1 - x_a) - b_o$ that gives $x_b = \frac{t+b_o-a_n}{2t}$. The second-period profit functions for two retailers are

$$\Pi_{ra2} = (a_o - w_a)x_a + (a_n - w_a)(x_b - x_1), \tag{A1}$$

$$\Pi_{rb2} = (b_o - w_b)(1 - x_b) + (b_n - w_b)(x_1 - x_a). \tag{A2}$$

We obtain the second-period equilibrium prices using first-order conditions $a_n^*(x_1, w) = \frac{3t-4tx_1+w_b+2w_a}{3}$, $a_o^*(x_1, w) = \frac{t+2tx_1+2w_a+w_b}{3}$, $b_n^*(x_1, w) = \frac{4tx_1-t+w_a+2w_b}{3}$, and $b_o^*(x_1, w) = \frac{3t-2tx_1+2w_b+w_a}{3}$, where $w \equiv (w_a, w_b)$. Manufacturers' second-period profits are $\Pi_{wa2}^* = w_a(x_a + x_b - x_1)$ and $\Pi_{wb2}^* = w_b(1 - x_b + x_1 - x_a)$.

The First Period. The location of the marginal consumer in the first period is denoted by x_1. Assuming that the marginal consumer switches firms in the second period, we have

$$v - tx_1 - a_1 + [v - t(1 - x_1) - b_n] = v - t(1 - x_1) - b_1 + (v - tx_1 - a_n), \tag{A3}$$

$$x_1 = \frac{1}{2} + \frac{3(b_1 - a_1) + w_a - w_b}{8t}. \tag{A4}$$

Retailers set first-period prices to maximize total profits. The retailers' profit functions are

$$\Pi_{rat} = (a_1 - w_a)x_1 + \Pi_{ra2}^*(x_1), \tag{A5}$$

$$\Pi_{rbt} = (b_1 - w_b)(1 - x_1) + \Pi_{rb2}^*(x_1). \tag{A6}$$

The optimal first-period retail prices are $a_1^* = \frac{4t}{3} + \frac{3w_a+w_b}{4}$ and $b_1^* = \frac{4t}{3} + \frac{w_a+3w_b}{4}$. Manufacturers set the long-term wholesale prices to maximize total profits over two periods. The manufacturers' profit functions are

$$\Pi_{wat} = w_a x_1 + \Pi_{wa2}^*(x_1), \tag{A7}$$

$$\Pi_{wbt} = w_b(1 - x_1) + \Pi_{wb2}^*(x_1). \tag{A8}$$

Using first-order conditions, we obtain the equilibrium long-term wholesale prices $w_a^* = w_b^* = \frac{8t}{3}$. Let superscript $c4$ indicate the case with long-term contracts. Manufacturers' profits are $\Pi_{wat}^{c4*} = \frac{8t}{3} \approx 2.67t > \Pi_{wat}^{c2*} = 2.07t$, the manufacturers' profits under short-term contract when manufacturers cannot use BBP. Therefore, when manufacturers cannot use BBP, manufacturers prefer long-term contracts. However, if manufacturers can use BBP, manufacturers' profits with short-term contracts are those in Case 3: $\Pi^{c3*}_{wat} = \frac{1039t}{162} \approx 6.41t > \Pi^{c4*}_{wat} \approx 2.67t$, the manufacturers' profits under the long-term contracts. Therefore, when manufacturers can use BBP, they prefer short-term contracts. □

A-1.2 Profitability of BBP When Manufacturers Face Difficulties

The motivating examples demonstrate the feasibility of manufacturers' use of BBP in a channel setting. Some of these examples speak to situations when a manufacturer faces a difficulty. Here, we verify the profitability of BBP in these situations to answer the question that whether BBP is more common when a manufacturer is in a weak position. Without loss of generality, we assume manufacturer B faces a difficulty that results in a decrease in consumers' willingness to buy its product in the second period. Let σ denote the magnitude of manufacturer B's difficulty or the decrease in consumers' willingness to buy. We examine whether there is a condition such that BBP is more profitable for manufacturer A in this case than when manufacturer B does not face this difficulty, i.e., $\sigma = 0$. We analyze Case 1 (without BBP) and Case 3 (with Wholesale and Retail BBP) separately below.

Case 1: Without BBP

The second-period marginal consumer is located at x_2. We must have that:

$$v - tx_2 - a_2 = v - \sigma - t(1 - x_2) - b_2, \tag{A9}$$

$$x_2 = \frac{t + \sigma + b_2 - a_2}{2t}. \tag{A10}$$

Retailers' profit functions in the second period are:

$$\Pi_{ra2} = (a_2 - w_{a2})x_2, \tag{A11}$$

$$\Pi_{rb2} = (b_2 - w_{b2})(1 - x_2). \tag{A12}$$

Using first-order conditions, we obtain second-period retail prices: $a_2^* = t + \frac{\sigma + 2w_{a2} + w_{b2}}{3}$, $b_2^* = t + \frac{w_{a2} + 2w_{b2} - \sigma}{3}$. Manufacturers' profit functions are

$$\Pi_{wa2} = w_{a2}x_2, \tag{A13}$$

$$\Pi_{wb2} = w_{b2}(1 - x_2). \tag{A14}$$

Second-period wholesale prices are $w_{a2}^* = 3t + \frac{\sigma}{3}$ and $w_{b2}^* = 3t - \frac{\sigma}{3}$. Manufacturers' second-period profits are $\Pi^*_{wa2} = \frac{(9t+\sigma)^2}{54t}$ and $\Pi^*_{wb2} = \frac{(9t-\sigma)^2}{54t}$.

In the first period, manufacturer B does not face difficulties. Thus, the first-period analysis is a special case of the second-period analysis when $\sigma = 0$. We obtain manufacturers' first-period profits $\Pi^*_{wa2} = \Pi^*_{wb2} = \frac{3t}{2}$. Therefore, manufacturers' total profits are $\Pi^*_{wat} = \frac{\sigma^2 + 18\sigma t + 162t^2}{54t}$ and $\Pi^*_{wbt} = \frac{\sigma^2 - 18\sigma t + 162t^2}{54t}$.

Case 3: With Wholesale and Retail BBP

When consumers' willingness to buy manufacturer B's product decreases by σ in the second period, the second-period marginal consumers at x_a and x_b become:

$$v - tx_a - a_o = v - t(1 - x_a) - b_n - \sigma, \tag{A15}$$
$$x_a = \frac{t + b_n - a_o + \sigma}{2t}. \tag{A16}$$

$$v - t(1 - x_b) - b_o - \sigma = v - tx_b - a_n, \tag{A17}$$
$$x_b = \frac{t + b_o - a_n + \sigma}{2t}. \tag{A18}$$

The second-period profit functions take the same form as before. We obtain second-period retail and wholesale prices: $a_n^* = t + \frac{\sigma - 4tx_1 + 2w_{an} + w_{bo}}{3}$, $a_o^* = \frac{2tx_1 + \sigma + t + 2w_{ao} + w_{bn}}{3}$, $b_n^* = \frac{w_{ao} + 2w_{bn} + 4tx_1 - \sigma - t}{3}$, and $b_o^* = t + \frac{w_{an} + 2w_{bo} - \sigma - 2tx_1}{3}$; $w_{an}^* = 3t + \frac{\sigma - 10tx_1}{3}$, $w_{ao}^* = \frac{t + \sigma + 8tx_1}{3}$, $w_{bn}^* = \frac{10tx_1 - \sigma - t}{3}$, and $w_{bo}^* = 3t - \frac{\sigma + 8tx_1}{3}$. The location of the first-period marginal consumer is at x_1. Assuming rational expectations, we have that

$$v - tx_1 - a_1 + v - t(1 - x_1) - b_n - \sigma = v - t(1 - x_1) - b_1 + v - tx_1 - a_n, \tag{A19}$$
$$x_1 = \frac{9(b_1 - a_1) - \sigma + 40t}{80t}. \tag{A20}$$

Manufacturers and retailers set first-period prices to maximize total profits in two periods. We obtain that $a_1^* = \frac{40t}{9} + \frac{139w_{b1} + 319w_{a1} - 11\sigma}{458}$ and $b_1^* = \frac{40t}{9} + \frac{139w_{a1} + 319w_{b1} + 11\sigma}{458}$, $w_{a1}^* = \frac{916t}{81} - \frac{1607\sigma}{91368}$ and $w_{b1}^* = \frac{916t}{81} + \frac{1607\sigma}{91368}$. Manufacturers' total profits are $\Pi_{wat}^* = \frac{31032841\sigma^2 + 215921760\sigma t + 5288027904t^2}{824504832t}$ and $\Pi_{wbt}^* = \frac{31032841\sigma^2 - 215921760\sigma t + 5288027904t^2}{824504832t}$.

Comparing manufacturers' profits in the above two cases, we obtain that when a manufacturer faces a major difficulty (i.e., $\sigma > \bar{\sigma} \approx 1.87$), manufacturers' profits with BBP are higher than when they do not face difficulties. Therefore, we are more likely to observe manufacturers using BBP when they face difficulties.

A-1.3 Myopic Consumers

Case 1 is a repetition of a static game and its analysis does not change with the presence of myopic consumers. We analyze Cases 2 and 3 below to account for myopic consumers.

A-1.3.1 Case 2: With Retail BBP

Myopic consumers make first-period purchase decisions to maximize utilities in the first period. Let x_1' denote the first-period marginal consumer who is myopic. We have that:

$$v - tx_1' - a_1 = v - t(1 - x_1') - b_1, \tag{A21}$$
$$x_1' = \frac{1}{2} + \frac{b_1 - a_1}{2t}. \tag{A22}$$

Let x_1 denote the first-period marginal consumer who is strategic. As in the main model, we have that:

$$
\begin{aligned}
v - tx_1 - a_1 + v - t(1 - x_1) - b_n &= v - t(1 - x_1) - b_1 + v - tx_1 - a_n, && \text{(A23)}\\
x_1 &= \frac{1}{2} + \frac{9(b_1 - a_1)}{26t}. && \text{(A24)}
\end{aligned}
$$

Retailers set first-period prices to maximize total profits generated from both strategic and myopic consumers. Their profit functions are:

$$
\begin{aligned}
\Pi_{rat} &= (a_1 - w_{a1})\left[(1-\alpha)x_1 + \alpha x_1'\right] + \Pi^*_{ra2}(x_1, x_1'), && \text{(A25)}\\
\Pi_{rbt} &= (b_1 - w_{b1})\left[(1-\alpha)(1-x_1) + \alpha(1-x_1')\right] + \Pi^*_{rb2}(x_1, x_1'). && \text{(A26)}
\end{aligned}
$$

Similarly, manufacturers maximize total profits generated from the two types of consumers. Their profit functions become:

$$
\begin{aligned}
\Pi_{wat} &= w_{a1}\left[(1-\alpha)x_1 + \alpha x_1'\right] + \Pi^*_{wa2}(x_1, x_1'), && \text{(A27)}\\
\Pi_{wbt} &= w_{b1}\left[(1-\alpha)(1-x_1) + \alpha(1-x_1')\right] + \Pi^*_{wb2}(x_1, x_1'). && \text{(A28)}
\end{aligned}
$$

We solve for first-period retail and wholesale prices using first-order conditions and obtain the equilibrium results in Table A1.

A-1.3.2 Case 3: With Wholesale and Retail BBP

Similarly, we solve for the locations of the first-period consumers who are myopic and strategic separately and obtain that $x_1' = \frac{1}{2} + \frac{b_1 - a_1}{2t}$ and $x_1 = \frac{1}{2} + \frac{9(b_1 - a_1)}{80t}$. Retailers and manufacturers set first-period prices to maximize total profits generated from both strategic and myopic consumers. Their profit functions take the same forms as in Case 2. We solve for first-period retail and wholesale prices using first-order conditions and obtain the equilibrium results in Table A1.

In both cases, channel members' profits decrease with α because their first-period prices decrease with α. When both manufacturers and retailers use BBP, their profits are higher than when they do not use BBP (i.e., $\frac{(39401\alpha^2+123318\alpha+28053)t}{54(9+31\alpha)^2} < 3t$ and $\frac{(1271\alpha+3609)t}{162(9+31\alpha)} < t$) for $\alpha < \frac{531}{3751} + \frac{6\sqrt{58017}}{3751} \approx 0.53$. Therefore, as long as the fraction of myopic consumers is less than 53%, our main result in Proposition 3 holds. In addition, $2v - \frac{(752\alpha^2+7200\alpha+9441)t}{18(9+4\alpha)^2} > 2v - 8.50t$ for $\alpha \in (0,1)$ and $2v - \frac{(408425\alpha^2+1040670\alpha+241137)t}{162(9+31\alpha)^2} < 2v - 8.50t$ for $\alpha < 0.53$. Therefore, results in Proposition 4 hold for $\alpha < 0.53$. Social welfare with myopic consumers remain the same as in the main model as the number of switching consumers does not change. Therefore, results in Proposition 5 hold.

A-1.4 Switching Costs

Let s denote the switching costs that consumers incur when they switch firms in the second period. We analyze Cases 2 and 3 in which firms use BBP that induces consumers to switch firms in the second period. We show that the symmetric pure-strategy equilibrium in our models holds as long as the switching cost is not too high. To simplify expressions, we set $t = 1$.

Case 2: Only Retailers use BBP

With switching costs, the second-period marginal consumer located at x_a incurs a switching cost if he or she switches firms. We can write that

$$v - x_a - a_o = v - (1 - x_a) - b_n - s, \tag{A29}$$
$$x_a = \frac{1 + b_n - a_o + s}{2}. \tag{A30}$$

where the right-hand side is the consumer's utility if this consumer switches to product B and incurs the switching cost s. Similarly, the location of the marginal consumer at x_b can be derived as

$$v - x_b - a_n - s = v - (1 - x_b) - b_o, \tag{A31}$$
$$x_b = \frac{1 + b_o - a_n - s}{2}. \tag{A32}$$

The second period can be analyzed in the same way as in the main model.

Lemma A1. *If only retailers use BBP, the second-period equilibrium is as follows:*

a. ***Region I**: If $x_1 \in [0, \frac{1}{5} + \frac{3s}{10}]$, then $w_{a2}^*(x_1) = 3 + \frac{2x_1 - s}{3}$, $w_{b2}^*(x_1) = 3 + \frac{s - 2x_1}{3}$, $a_o^*(x_1) = 4 - \frac{8x_1 - 4s}{3}$, $a_n^*(x_1) = 4 - \frac{4s + 10x_1}{9}$, $b_o^*(x_1) = 4 + \frac{4s - 8x_1}{9}$, and $b_n^*(x_1) = 3 + \frac{s - 2x_1}{3}$. Only retailer A poaches B's customers.*

b. ***Region II**: If $x_1 \in (\frac{1}{5} + \frac{3s}{10}, \frac{4}{5} - \frac{3s}{10})$, then $w_{a2}^*(x_1) = \frac{5 - x_1}{3}$, $w_{b2}^*(x_1) = \frac{4 + x_1}{3}$, $a_o^*(x_1) = \frac{5x_1 + 17}{9} + \frac{s}{3}$, $a_n^*(x_1) = \frac{23 - 13x_1}{9} - \frac{s}{3}$, $b_o^*(x_1) = \frac{22 - 5x_1}{9} + \frac{s}{3}$, and $b_n^*(x_1) = \frac{10 + 13x_1}{9} - \frac{s}{3}$. Both retailers poach each other's customers.*

c. ***Region III**: If $x_1 \in [\frac{4}{5} - \frac{3s}{10}, 1]$, then $w_{a2}^*(x_1) = \frac{7}{3} + \frac{2x_1 + s}{3}$, $w_{b2}^*(x_1) = \frac{11}{3} - \frac{s + 2x}{3}$, $a_o^*(x_1) = \frac{28}{9} + \frac{8x_1 + 4s}{9}$, $a_n^*(x_1) = \frac{7}{3} + \frac{2x_1 + s}{3}$, $b_o^*(x_1) = \frac{4}{3} + \frac{8x_1 + 4s}{3}$, and $b_n^*(x_1) = \frac{26}{9} + \frac{10x_1 - 4s}{9}$. Only retailer B poaches A's customers.*

For Region II to exist, $\frac{1}{5} + \frac{3s}{10} < \frac{4}{5} - \frac{3s}{10}$ which requires that $s < 1$. Moreover, within the range that $s < 1$, we look for conditions under which the symmetric pure-strategy equilibrium exists.

In the first period, the marginal consumer at x_1 anticipates incurring the switching cost in the second period by switching, therefore, we can write

$$v - tx_1 - a_1 + \max\left[v - tx_1 - a_o, v - t(1 - x_1) - b_n - s\right] \tag{A33}$$
$$= v - t(1 - x_1) - b_1 + \max[v - tx_1 - a_n - s, v - t(1 - x_1) - a_o]. \tag{A34}$$

We analyze the first period decisions as in the main model and summarize our findings as follows.

Region II equilibrium. If $x_1 \in (\frac{1}{5} + \frac{3s}{10}, \frac{4}{5} - \frac{3s}{10})$, the second-period equilibrium in Region II applies. The first-period analysis is the same as in the main model without switching costs. We obtain that $x_1 = \frac{1}{2} + \frac{9(b_1 - a_1)}{26}$. Using first-order conditions, we obtain $a_1^* = \frac{11}{9} + \frac{152w_{a1} + 35w_{b1}}{187} - \frac{2s}{3}$, $b_1^* = \frac{11}{9} + \frac{152w_{b1} + 35w_{a1}}{187} - \frac{2s}{3}$, and $w_{a1}^* = w_{b1}^* = \frac{214}{81}$. The first-period retail prices are $a_1^* = b_1^* = \frac{313}{81} - \frac{2s}{3}$. Retailers' profits are $\Pi_{rat}^* = \Pi_{rbt}^* = \frac{8}{9} + \frac{s^2 - 2s}{9}$ and manufacturers' profits are $\Pi_{wat}^* = \Pi_{wbt}^* = \frac{671}{324}$.

Retailer A does not deviate from Region II to Region I if $s < 0.86$**.** If retailer A deviates to Region I, the price range that results in Region I is $b_1 - a_1 \in [-\frac{13}{9}, -\frac{13}{15} + \frac{13s}{15}]$ such that $x_1 \in [0, \frac{1}{5} + \frac{3s}{10}]$. Given that $b_1^* = \frac{313}{81} - \frac{2s}{3}$, the price range of deviation is $a_1 \in [\frac{1916}{405} - \frac{23s}{15}, \frac{430}{81} - \frac{2s}{3}]$. The best-response price that firm A can deviate to is $\hat{a}_1^I$ such that $\frac{\partial \Pi_{rat}^I}{\partial a_1} = 0$ in Region I, which gives $\hat{a}_1^I = \frac{34013}{7209} - \frac{397s}{267}$. The profit after deviation is $\Pi_{rat}^I(\hat{a}_1^I, b_1^*) = \frac{43s}{1602} + \frac{525}{712} + \frac{7s^2}{267} < \Pi_{rat}^{II}(a_1^*, b_1^*) = \frac{8}{9} + \frac{s^2-2s}{9}$ if and only if $s < \frac{399}{272} - \frac{\sqrt{27145}}{272} \approx 0.86$. Therefore, firm A does not have incentives to deviate to Region I if $s < 0.86$.

Retailer A does not deviate from Region II to Region III if $s < 0.41$. If retailer A deviates to Region III, then the price range that results in Region III is $b_1 - a_1 \in [\frac{13(1-s)}{15}, \frac{13}{9}]$ such that $x_1 \in [\frac{4}{5} - \frac{3s}{10}, 1]$. Given that $b_1^* = \frac{313}{81} - \frac{2s}{3}$, the price range of deviation is $a_1 \in [\frac{196}{81} - \frac{2s}{3}, \frac{1214}{405} + \frac{s}{5}]$. The best-response price that retailer A can deviate to is $\hat{a}_1^{III}$ such that $\frac{\partial \Pi_{rat}^{III}}{\partial a_1} = 0$ in Region I, which gives $\hat{a}_1^{III} = \frac{232}{81} + \frac{2s}{51}$. The profit after deviation is $\Pi_{rat}^{III}(\hat{a}_1^{III}, b_1^*) = \frac{2s}{9} + \frac{13}{18} + \frac{7s^2}{408} < \Pi_{rat}^{II}(a_1^*, b_1^*) = \frac{8}{9} + \frac{s^2-2s}{9}$ if and only if $s < \frac{272}{115} - \frac{2\sqrt{12631}}{115} \approx 0.41$. Therefore, firm A does not have incentives to deviate to Region III if $s < 0.41$.

Manufacturer A does not deviate from Region II to Region I if $s < 0.86$. If manufacturer A deviates to Region I, the price range that results in Region I is $w_{b1} - w_{a1} \in [-\frac{187}{81}, -\frac{187(1-s)}{135}]$ such that $x_1 \in [0, \frac{1}{5} + \frac{3s}{10}]$. Given that $w_{b1}^* = \frac{214}{81}$, the price range of deviation is $w_{a1} \in [\frac{1631}{405} - \frac{187s}{135}, \frac{401}{81}]$. $\frac{\partial \Pi_{wat}^I}{\partial w_{a1}} < 0$ over this region, therefore, he best-response price that manufacturer A can deviate to is $\hat{w}_{a1}^I = \frac{1631}{405} - \frac{187s}{135}$. The profit after deviation is $\Pi_{wat}^I(\hat{w}_{a1}^I, w_{b1}^*) = \frac{29521223}{50808600} + \frac{178042001s}{76212900} - \frac{35951057s^2}{50808600} < \Pi_{wat}^{II}(w_{a1}^*, w_{b1}^*) = \frac{671}{324}$ if and only if $s < \frac{178042001}{107853171} - \frac{485\sqrt{30628572022}}{107853171} \approx 0.86$. Therefore, manufacturer A does not have incentives to deviate to Region I if $s < 0.86$.

Manufacturer A does not deviate from Region II to Region III if $s < 0.38$. If manufacturer A deviates to Region III, then the price range that results in Region III is $w_{b1} - w_{a1} \in [\frac{187(1-s)}{135}, \frac{187}{81}]$ such that $x_1 \in [\frac{4}{5} - \frac{3s}{10}, 1]$. Given that $w_{b1}^* = \frac{214}{81}$, the price range of deviation is $w_{a1} \in [\frac{1}{3}, \frac{509}{405} + \frac{187s}{135}]$. $\frac{\partial \Pi_{wat}^{III}}{\partial w_{a1}} > 0$ over this region. Therefore, the best-response price that manufacturer A can deviate to is $\hat{w}_{a1}^{III} = \frac{509}{405} + \frac{187s}{135}$. The profit after deviation is $\Pi_{wat}^{III}(\hat{w}_{a1}^I, w_{b1}^*) = \frac{478220429}{152425800} + \frac{76799221s}{76212900} - \frac{35951057s^2}{50808600} > \Pi_{wat}^{II}(w_{a1}^*, w_{b1}^*) = \frac{671}{324}$. However, after deviation, $x_1^{III}(\hat{w}_{a1}^I, w_{b1}^*) < 1$ if and only if $s > \frac{381}{991} \approx 0.38$. When $s < 0.38$, manufacturer A cannot deviate to the price in Region III that results in $x_1^{III}(\hat{w}_{a1}^I, w_{b1}^*) > 1$. Therefore, manufacturer A does not have incentives to deviate to Region III when $s < 0.38$.

Overall, the above analysis shows that the symmetric pure-strategy equilibrium exists if switching cost is not too large; that is, $s < 0.38$.

Case 3: Manufacturers and Retailers both use BBP

When manufacturers also use BBP, the analysis is analogous. We incorporate the switching cost s into the model in Case 3 of the main paper. The second-period equilibrium becomes

Lemma A2. *If both manufacturers and retailers use BBP, the second-period equilibrium is as follows:*

a. ***Region I**: If $x_1 \in [0, \frac{1+s}{10}]$, then $w_{an}^*(x_1) = 3 - \frac{10x_1}{3} - \frac{s}{3}$, $w_{ao}^*(x_1) = 1 + s - 4x_1$, $w_{bn}^*(x_1) = 0$, and $w_{bo}^*(x_1) = 3 + \frac{s}{3} - \frac{8x_1}{3}$. $a_o^*(x_1) = 1 + s - 2x_1$, $b_n^*(x_1) = 0$, $a_n^*(x_1) = 4 - \frac{4s+40x_1}{9}$, and $b_o^*(x_1) = 4 + \frac{4s-32x_1}{9}$. Only retailer A poaches B's customers.*

b. ***Region II**: If $x_1 \in (\frac{1+s}{10}, \frac{9-s}{10})$, then $w_{an}^*(x_1) = 3 - \frac{10x_1}{3} - \frac{s}{3}$, $w_{ao}^*(x_1) = \frac{1+s}{3} + \frac{8x_1}{3}$, $w_{bn}^*(x_1) = \frac{10x_1}{3} - \frac{s+1}{3}$, and $w_{bo}^*(x_1) = 3 + \frac{s}{3} - \frac{8x_1}{3}$. $a_o^*(x_1) = \frac{4}{9} + \frac{4s+32x_1}{9}$, $b_n^*(x_1) = -\frac{4}{9} - \frac{4s-40x_1}{9}$, $a_n^*(x_1) = 4 - \frac{4s+40x_1}{9}$, and $b_o^*(x_1) = 4 + \frac{4s-32x_1}{9}$. Both retailers poach each other's customers.*

c. ***Region III**: If $x_1 \in [\frac{9-s}{10}, 1]$, then $w_{an}^*(x_1) = 0$, $w_{ao}^*(x_1) = \frac{1+s}{3} + \frac{8x_1}{3}$, $w_{bn}^*(x_1) = \frac{10x_1}{3} - \frac{s+1}{3}$, and $w_{bo}^*(x_1) = 4x_1 + s - 3$. $a_o^*(x_1) = \frac{4}{9} + \frac{4s+32x_1}{9}$, $b_n^*(x_1) = -\frac{4}{9} - \frac{4s-40x_1}{9}$, $a_n^*(x_1) = 0$, and $b_o^*(x_1) = 2x_1 + s - 1$. Only retailer B poaches A's customers.*

For region II to exist, $\frac{1+s}{10} < \frac{9-s}{10}$ which requires $s < 4$. We examine conditions under which the symmetric pure-strategy equilibrium exists.

Region II equilibrium exists when $s < 0.63$. If $x_1 \in (\frac{1+s}{10}, \frac{9-s}{10})$, the second-period equilibrium in Region II applies. The first-period analysis is the same as in the main model without switching costs. We obtain that $x_1 = \frac{1}{2} + \frac{9(b_1-a_1)}{80}$. Using first-order conditions, we obtain the first-period wholesale prices $w_{a1}^* = w_{b1}^* = \frac{916}{81} - \frac{2s}{3}$. First-period retail prices are $a_1^* = b_1^* = \frac{1276}{81} - \frac{8s}{9}$. Retailer profits are $\Pi_{rat}^* = \Pi_{rbt}^* = \frac{401}{162} + \frac{s^2-8s}{81}$. Manufacturer profits are $\Pi_{wat}^* = \Pi_{wbt}^* = \frac{1039}{162} + \frac{s^2-8s}{27}$.

Retailer A does not deviate from Region II to Region I if $s < 4$. If retailer A deviates to Region I, then the price range that results in Region I is $b_1 - a_1 \in [-\frac{40}{9}, -\frac{32}{9} + \frac{8s}{9}]$ such that $x_1 \in [0, \frac{1+s}{10}]$. Given that $b_1^* = \frac{1276}{81} - \frac{8s}{9}$, the price range of deviation is $a_1 \in [\frac{1564}{81} - \frac{16s}{9}, \frac{1636}{81} - \frac{8s}{9}]$. $\frac{\partial \Pi_{rat}^I}{\partial a_1} < 0$ over this price region. Therefore, the best-response price that retailer A can deviate to is $\hat{a}_1^I = \frac{1564}{81} - \frac{16s}{9}$. The profit after deviation is $\Pi_{rat}^I(\hat{a}_1^I, b_1^*) = \frac{1076s}{2025} + \frac{4921-269s^2}{4050} < \Pi_{rat}^{II}(a_1^*, b_1^*) = \frac{401}{162} + \frac{s^2-8s}{81}$. Therefore, retailer A does not have incentives to deviate to Region I when $s < 4$.

Retailer A does not deviate from Region II to Region III if $s < 3.02$. If retailer A deviates to Region III, the price range that results in Region III is $b_1 - a_1 \in [\frac{32-8s}{9}, \frac{40}{9}]$ such that $x_1 \in [\frac{9-s}{10}, 1]$. Given that $b_1^* = \frac{1276}{81} - \frac{8s}{9}$, the price range of deviation is $a_1 \in [\frac{916-72s}{81}, \frac{988}{81}]$. The best-response price that retailer A can deviate to is $\hat{a}_1^{III}$. The profit after deviation is $\Pi_{rat}^{III}(\hat{a}_1^{III}, b_1^*) = \frac{569}{369} + \frac{155s}{738} + \frac{37s^2}{2952} < \Pi_{rat}^{II}(a_1^*, b_1^*)$ if and only if $s < \frac{36\sqrt{13079}}{5} - \frac{4102}{5} \approx 3.02$. Therefore, retailer A does not have incentives to deviate to Region III if $s < 3.02$.

Manufacturer A does not deviate from Region II to Region I if $s < 3.09$. If manufacturer A deviates to Region I, then the price range that results in Region I is $w_{b1} - w_{a1} \in [-\frac{916}{81}, -\frac{3664-916s}{405}]$ such that $x_1 \in [0, \frac{1+s}{10}]$. Given that $w_{b1}^* = \frac{916}{81} - \frac{2s}{3}$, the price range of deviation is $w_{a1} \in [\frac{916}{45} - \frac{1186s}{405}, \frac{1832}{81} - \frac{2s}{3}]$. $\frac{\partial \Pi_{wat}^I}{\partial w_{a1}} < 0$. Therefore, the best-response price that manufacturer A can deviate to is $\hat{w}_{a1}^I = \frac{916}{45} - \frac{1186s}{405}$. The profit after deviation is $\Pi_{wat}^I(\hat{w}_{a1}^I, w_{b1}^*) < \Pi_{wat}^{II}(w_{a1}^*, w_{b1}^*) = \frac{1039}{162} + \frac{s^2-8s}{27}$ as long as $s < \frac{241533613-2220\sqrt{1690639070}}{48580747} \approx 3.09$. Therefore, manufacturer A does not have incentives to deviate to Region I if $s < 3.09$.

Manufacturer A does not deviate from Region II to Region III if $s < 0.63$. If manufacturer A deviates to Region III, then the price range that results in Region III is $w_{b1} - w_{a1} \in [\frac{3664-916s}{405}, \frac{916}{81}]$ such that $x_1 \in [\frac{9-s}{10}, 1]$. Given that $w_{b1}^* = \frac{916}{81} - \frac{2s}{3}$, the price range of deviation is $w_{a1} \in [0, \frac{916+646s}{405}]$. The best-response price that manufacturer A can deviate to is $\hat{w}_{a1}^{III} = \frac{916+646s}{405}$ if $s < \frac{2819}{2136} \approx 1.32$ and $\hat{w}_{a1}^{III} = \frac{11881-694s}{2511}$ otherwise. If $s < 1.32$, the profit after deviation is $\Pi_{wat}^{III}(\hat{w}_{a1}^{III}, w_{b1}^*) = \frac{12719647-4245659s^2}{11088900} + \frac{10473301}{1848150} < \Pi_{wat}^{II}(w_{a1}^*, w_{b1}^*)$ if and only if $s < \frac{16005247}{9312718} - \frac{555\sqrt{330992905}}{9312718} \approx 0.63$. If $s > 1.32$, then $x_1^{III}(\hat{w}_{a1}^{III}, w_{b1}^*) > 1$ so that the equilibrium in Region III does not exist. Therefore, manufacturer A does not have incentives to deviate to Region III when $s < 0.63$.

A-1.5 Partial Market Coverage

We focus our conjectural assessment on the symmetric pure-strategy equilibrium. The market could be partially covered in one of the two periods. We consider two separate settings: First, the market is fully covered in the first period and partially covered in the second period. Second, the market is partially covered in the first period and fully covered in the second period. We find that the symmetric pure-strategy equilibrium in the first scenario does not exist. The intuition is that firms can issue behavior-based prices in the second period. If the market is partially covered, firms issue low new-customer prices to cater to consumers who did not buy in the first period and cover the market in the second period. Below, we analyze the symmetric pure-strategy equilibrium in the second scenario. To simplify exhibition, we standardize $t = 1$. We summarize the equilibrium outcomes in Table A2.

Case 1: Without BBP

With channels, the consumption pattern is the same as in Figure A1. We obtain that $x_{a1} = v - a$ and $x_{b1} = 1 - v - b$. Retailers' profit functions are $\Pi_{ra} = (a - w_a)x_{a1}$ and $\Pi_{rb} = (b - w_b)(1 - x_{b1})$. Retailers' prices are $a^*(w_a, w_b) = \frac{v+w_a}{2}$ and $b^*(w_a, w_b) = \frac{v+w_b}{2}$. Manufacturers' profits are $\Pi_{wa} = w_a x_{a1}$ and $\Pi_{wb} = w_b(1 - x_{b1})$. Equilibrium wholesale prices are $w_a^* = w_b^* = \frac{v}{2}$. Manufacturers' profits over two periods are $\Pi_{wat}^* = \Pi_{wbt}^* = \frac{v^2}{4}$ and retailers' profits over two periods are $\Pi_{rat}^* = \Pi_{rbt}^* = \frac{v^2}{8}$. The marginal consumers are located at $x_{a1}^* = \frac{v}{4}$ and $x_{b1}^* = 1 - \frac{v}{4}$. The market is partially covered if and only if $x_{a1}^* < \frac{1}{2}$; that is, $v < 2$.

Case 2: With Retail BBP

When only retailers use BBP, the consumption pattern that arises in equilibrium is the same as in Figure A2. We obtain the second-period marginal consumers: $x_a = \frac{1+b_n-a_o}{2}$, $x_b = \frac{1+b_o-a_n}{2}$, and $x_2 = \frac{1+b_n-a_n}{2}$. Retailers' profit functions are $\Pi_{ra2} = (a_o - w_{a2})\min(x_a, x_{a1}) + (a_n - w_{a2})(x_2 - x_{a1})$ and $\Pi_{rb2} = (b_o - w_{b2})(1 - \max(x_b, x_{b1})) + (b_n - w_{b2})(x_{b1} - x_2)$. Retailers set new-customer prices to compete for consumers who did not buy in the first period, and set past-customer prices so that the marginal consumers located at x_{a1} and x_{b1} are indifferent between staying and switching; that is, $x_{a1} = x_a$ and $x_{b1} = x_b$. We obtain that $a_n^* = \frac{1+w_{b2}+2x_{b1}-4x_{a1}+2w_{a2}}{3}$ and $a_o^* = \frac{2+2w_{b2}+4x_{b1}-8x_{a1}+w_{a2}}{3}$, $b_n^* = \frac{3w_{b2}-1+4x_{b1}-2x_{a1}+w_{a2}}{3}$, and $b_o^* = \frac{w_{b2}-2+8x_{b1}-4x_{a1}+2w_{a2}}{3}$. Manufacturers' second-period profit functions are $\Pi_{wa2} = w_{a2}x_2$ and $\Pi_{wb2} = w_{b2}(1 - x_2)$. Manufacturers' prices are $w_{a2}^* = \frac{7+2x_{b1}+2x_{a1}}{3}$ and $w_{b1}^* = \frac{11-2x_{b1}-2x_{a1}}{3}$. The first-period marginal consumers make first-period decisions to maximize total utilities in two periods. We can write that $v - x_{a1} - a_1 + (v - x_{a1} - a_o) = v - x_{a1} - a_n$ that gives $x_{a1} = 1 + \frac{2x_{b1}+9a_1-9v}{7}$. Similarly, $v - (1 - x_{b1}) - b_1 + (v - (1 - x_{b1}) - b_o) = v - (1 - x_{b1}) - b_n$ that gives $x_{b1} = v + \frac{2a_1-7b_1}{5}$. Retailers' total profits over two periods are $\Pi_{rat} = (a_1 - w_{a1})x_{a1} + \Pi_{ra2}^*(x_{a1}, x_{b1})$ and $\Pi_{rbt} = (b_1 - w_{b1})(1 - x_{b1}) + \Pi_{rb2}^*(x_{a1}, x_{b1})$. Using first-order conditions, we obtain $a_1^* = \frac{23v-21}{16} - \frac{147w_{b1}+427w_{a1}}{1312}$ and $b_1^* = \frac{23v-21}{16} - \frac{427w_{b1}+147w_{a1}}{1312}$. Manufacturers' total profits are $\Pi_{wat} = w_{a1}x_{a1} + \Pi_{wa2}^*(x_{a1}, x_{b1})$ and $\Pi_{wbt} = w_{b1}(1 - x_{b1}) + \Pi_{wb2}^*(x_{a1}, x_{b1})$. First-order conditions give $w_{a1}^* = w_{b1}^* = \frac{82v}{159} - \frac{746}{1113}$. $x_{a1}^* = \frac{539v-49}{2544} > 0$ if and only if $v > \frac{1}{11} \approx 0.09$. The consumption pattern in Figure A2 holds for $v \in (0.09, 2)$. The equilibrium profits are $\Pi_{rat}^* = \Pi_{rbt}^* = -\frac{76615v}{1078656} + \frac{1091557}{2157312} + \frac{41503v^2}{719104}$ for retailers and $\Pi_{wat}^* = \Pi_{wbt}^* = \frac{22099v^2+305983}{202248} - \frac{15365v}{101124}$ for manufacturers.

Case 3: With Wholesale and Retail BBP

When both manufacturers and retailers use BBP, the consumption pattern in Figure A2 still applies. We obtain the second-period marginal consumers and obtain that: $x_a = \frac{1+b_n-a_o}{2}$, $x_b = \frac{1+b_o-a_n}{2}$, and $x_2 = \frac{1+b_n-a_n}{2}$. Retailers' profit functions are $\Pi_{ra2} = (a_o - w_{ao})\min(x_a, x_{a1}) + (a_n - w_{an})(x_2 - x_{a1})$ and $\Pi_{rb2} = (b_o - w_{bo})(1 - \max(x_b, x_{b1})) + (b_n - w_{bn})(x_{b1} - x_2)$. First-order conditions give the second-period retail prices: $a_n^* = \frac{29+2w_{ao}+7w_{bo}+8w_{bn}+28w_{an}}{45} - \frac{4(x_{a1}+x_{b1})}{9}$, $a_o^* = \frac{17+26w_{ao}+w_{bo}+14w_{bn}+4w_{an}}{45} + \frac{2(x_{a1}+x_{b1})}{9}$, $b_n^* = \frac{4(x_{a1}+x_{b1})}{9} + \frac{7w_{ao}+2w_{bo}+28w_{bn}+8w_{an}-11}{45}$, and $b_o^* = \frac{37+w_{ao}+26w_{bo}+4w_{bn}+14w_{an}}{45} - \frac{2(x_{a1}+x_{b1})}{9}$. Manufacturers' second-period profit functions are $\Pi_{wa2} = w_{ao}x_{a1} + w_{an}(x_b - x_{b1} + x_2 - x_{a1})$ and $\Pi_{wb2} = w_{bo}(1 - x_{b1}) + w_{bn}(x_{a1} - x_a + x_{b1} - x_2)$. Wholesale prices for past customers are set so that the consumers at x_{a1} and x_{b1} are indifferent between staying and switching; that is, $x_{a1} = x_a$ and $x_{b1} = x_b$. We obtain $w_{an}^* = \frac{45}{158} + \frac{1395x_{b1}-2160x_{a1}}{1343}$, $w_{ao}^* =$

$\frac{48}{79}+\frac{2976x_{b1}-7294x_{a1}}{1343}$, $w_{bn}^{*}=-\frac{45}{158}+\frac{2160x_{b1}-1395x_{a1}}{1343}$, and $w_{bo}^{*}=-\frac{206}{79}+\frac{7294x_{b1}-2976x_{a1}}{1343}$. The first-period marginal consumers make first-period decisions to maximize total utilities in two periods. We can write that $v-x_{a1}-a_1+(v-x_{a1}-a_o)=v-x_{a1}-a_n$ that gives $x_{a1}=1-\frac{79v}{17}+\frac{62x_{b1}+79a_1}{17}$. Similarly, $v-(1-x_{b1})-b_1+(v-(1-x_{b1})-b_o)=v-(1-x_{b1})-b_n$ that gives $x_{b1}=v-\frac{62a_1-17b_1}{45}$. Retailers' total profits over two periods are $\Pi_{rat}=(a_1-w_{a1})x_{a1}+\Pi_{ra2}^{*}(x_{a1},x_{b1})$ and $\Pi_{rbt}=(b_1-w_{b1})(1-x_{b1})+\Pi_{rb2}^{*}(x_{a1},x_{b1})$. Using first-order conditions, we obtain $a_1^{*}=\frac{527w_{b1}+17w_{a1}}{384}-\frac{5v}{12}-\frac{3}{4}$ and $b_1^{*}=\frac{17w_{b1}+527w_{a1}}{384}-\frac{3}{4}-\frac{5v}{12}$. Manufacturers' total profits are $\Pi_{wat}=w_{a1}x_{a1}+\Pi_{wa2}^{*}(x_{a1},x_{b1})$ and $\Pi_{wbt}=w_{b1}(1-x_{b1})+\Pi_{wb2}^{*}(x_{a1},x_{b1})$. First-order conditions give $w_{a1}^{*}=w_{b1}^{*}=\frac{79v}{73}-\frac{11073}{157607}$. $x_{a1}^{*}=\frac{17v}{146}+\frac{1395}{9271}>0$. The consumption pattern in Figure A2 holds for $v<\frac{6481}{2159}\approx 3.00$ so that $x_{a1}^{*}<\frac{1}{2}$. The equilibrium profits are $\Pi_{rat}^{*}=\Pi_{rbt}^{*}=\frac{(4318v-3691)(60452v-79487)}{5844697988}$ for retailers and $\Pi_{wat}^{*}=\Pi_{wbt}^{*}=\frac{45199665}{80064356}+\frac{17v^2}{292}$ for manufacturers.

Comparing equilibrium profits in Cases 1, 2, and 3 (see Table A2), we find that when $v\in(0.09,2)$ such that the market is partially covered in both periods without BBP and in the first period with BBP. When only retailers use BBP (Case 2), manufacturers' and retailers' profits are higher than those without BBP (Case 1). When both manufacturers and retailers use BBP (Case 2), retailers' profits are higher than those without BBP (Case 1) if $v<0.39$ and manufacturers' profits are higher than those without BBP (Case 1) if $v<1.72$. This finding suggests that when the market is not fully covered, BBP can be beneficial for channel members even when only retailers use BBP, which was not profitable with full market coverage in the main models. This is because when only retailers use BBP, retailers and manufacturers reduce first-period prices to expand the segment of past customers from whom they could charge a higher price in the second period. In the second period, retailers set new-customer prices to serve consumers who did not buy in the first period. The market expansion effects in the second period drive retailers' profits to exceed those without BBP. Manufacturers' first-period prices decline as retailers reduce retail prices and second-period wholesale prices increase due to market expansion. The increase in the manufacturers' second-period profits drives its total profits to exceed those without BBP.

Figure A1: Case 1 Partial Market Coverage

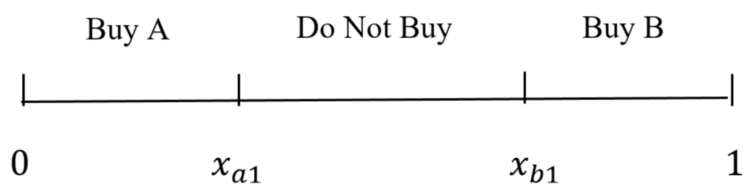

Figure A2: Case 2 Partial Market Coverage

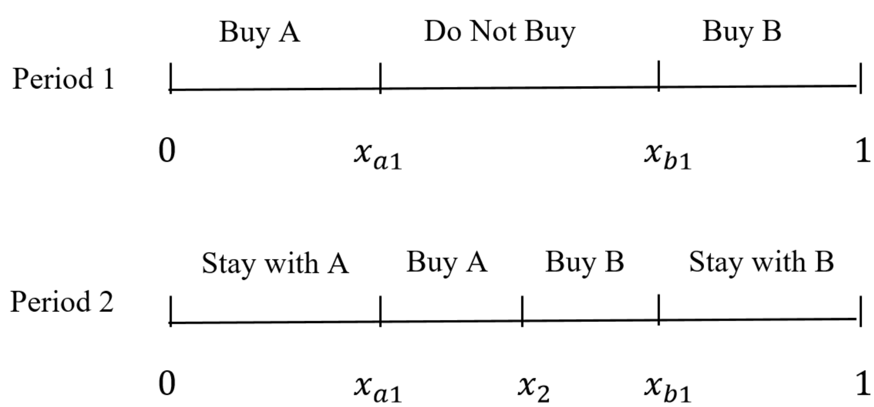

Table A1: Summary of Equilibrium Outcomes with Myopic Consumers

	Case 1	Case 2	Case 3
Retailers use BBP	No	Yes	Yes
Manufacturers use BBP	No	No	Yes
Total Profits			
Channel (Π^*_{at})	$4.00t$	$\frac{(592\alpha^2+6480\alpha+8631)t}{36(9+4\alpha)^2}$	$\frac{2(39401\alpha^2+123318\alpha+29160)t}{81(9+31\alpha)^2}$
Manufacturer (Π^*_{wat})	$3.00t$	$\frac{(48\alpha^2+552\alpha+671)t}{4(9+4\alpha)^2}$	$\frac{(39401\alpha^2+123318\alpha+28053)t}{54(9+31\alpha)^2}$
Retailer (Π^*_{rat})	$1.00t$	$\frac{2(5\alpha+36)t}{9(9+4\alpha)}$	$\frac{(1271\alpha+3609)t}{162(9+31\alpha)}$
First-Period Prices			
Wholesale (w^*_{a1})	$3.00t$	$\frac{2(84\alpha+107)t}{16\alpha^2+72\alpha+81}$	$\frac{4(930\alpha+229)t}{961\alpha^2+558\alpha+81}$
Retail (a^*_1)	$4.00t$	$\frac{(212\alpha+313)t}{(9+4\alpha)^2}$	$\frac{4(1240\alpha+319)t}{(9+31\alpha)^2}$
Second-Period Prices			
Wholesale uniform price (w^*_{a2})		$1.50t$	
Retail uniform price (a^*_2)	$4.00t$		
Wholesale past-customer price (w^*_{ao})			$1.67t$
Wholesale new-customer price (w^*_{an})			$1.33t$
Retail past-customer price (a^*_o)		$2.17t$	$2.22t$
Retail new-customer price (a^*_n)		$1.83t$	$1.78t$
Welfare			
Consumer surplus (CS^*)	$2v - 8.50t$	$2v - \frac{(752\alpha^2+7200\alpha+9441)t}{18(9+4\alpha)^2}$	$2v - \frac{(408425\alpha^2+1040670\alpha+241137)t}{162(9+31\alpha)^2}$
Social welfare (SW^*)	$2v - 0.50t$	$2v - 0.56t$	$2v - 0.60t$

Table A2: Equilibrium Outcomes with Partial Market Coverage

	Case 1	Case 2	Case 3
Manufacturers use BBP	No	No	Yes
Retailers use BBP	No	Yes	Yes
Retailers' Total Profits	$\frac{v^2}{8}$	$\frac{41503v^2}{719104} - \frac{76615v}{1078656} + \frac{1091557}{2157312}$	$\frac{(4318v-3691)(60452v-79487)}{5844697988}$
Manufacturers' Total Profits	$\frac{v^2}{4}$	$\frac{22099v^2+305983}{202248} - \frac{15365v}{101124}$	$\frac{45199665}{80064356} + \frac{17v^2}{292}$
Retailers' Period 1 Profits	$\frac{v^2}{16}$	$\frac{77(11v-1)(1127v-565)}{6471936}$	$\frac{(2159v+2790)(10795v-245638)}{5844697988}$
Manufacturers' Period 1 Profits	$\frac{v^2}{8}$	$\frac{7(11v-1)(287v-373)}{202248}$	$\frac{(2159v+2790)(170561v-11073)}{2922348994}$
Period 1 Retail Price	$\frac{3v}{4}$	$\frac{3083v-2593}{2544}$	$\frac{163v}{146} - \frac{7876}{9271}$
Period 1 Wholesale Price	$\frac{v}{2}$	$\frac{82v}{159} - \frac{746}{1113}$	$\frac{79v}{73} - \frac{11073}{157607}$
Period 1 Demand	$\frac{v}{4}$	$\frac{539v-49}{2544}$	$\frac{17v}{146} + \frac{1395}{9271}$
Retailers' Period 2 Profits	$\frac{v^2}{16}$	$\frac{(539v+1223)(1321-539v)}{32335968}$	$\frac{57571561}{343805764} - \frac{15317v}{1353566} + \frac{867v^2}{21316}$
Manufacturers' Period 2 Profits	$\frac{v^2}{8}$	$\frac{2}{3}$	$\frac{3361362885}{5844697988} - \frac{1445v^2}{21316} - \frac{209337v}{1353566}$
Period 2 Retail Price	$\frac{3v}{4}$	$p_{ao} = \frac{3229-539v}{636}$, $p_{an} = \frac{5137-539v}{1272}$	$a_o = \frac{311088}{157607} - \frac{48v}{73}$, $a_n = \frac{200911}{157607} - \frac{31v}{73}$
Period 2 Wholesale Price	$\frac{v}{2}$	3	$w_{ao} = \frac{263658}{157607} - \frac{65v}{73}$, $w_{an} = \frac{291645}{315214} - \frac{45v}{146}$
Period 2 Demand	$\frac{v}{4}$	$\frac{1}{2}$	$\frac{1}{2}$