AJAE Appendix for

‘Who Pays the Costs of Non-GMO Segregation and Identity Preservation?’

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Proof of Lemma 1. In the absence of hatred and given a GM seed price w, the regular grain price is $p^1(w)= b(a_g+w)/(a_g+b)$ in equilibrium in class (n,g). Then one easily checks that $Q_g^s > 0$ iif $w < v^c$, in which case Q^d and Q_a^s are both positive. A monopolistic innovator cannot profitably sell the GM seed if $v > v^c$, while he sells it profitably by setting a price $w < v^c$ as long as $v < v^c$. If the innovation sector is competitive, the condition $w < v^c$ is equivalent to $v < v^c$.

Proof of Proposition 1. When GMOs are not introduced, the market-clearing condition is $p_r/a =1 - p_r/b$, and therefore the equilibrium regular price is $p^0 = ab/(a+b)$. One easily checks that the condition $Q_a^s > 0$ is then fulfilled. With GMO technology introduction, and whether the innovation sector is monopolistic or competitive, we have that $w^1 < v^c$. One can check that this condition implies that $p^1(w^1) < p^0$ and $p^0/a < (p^1(w^1)\text{-}w^1)/a_g$. It follows that $w^1/(a\text{-}a_g) < (w^1+p^0\text{-}p^1(w^1))/(a\text{-}a_g) < p^0/a < p^1(w^1)\text{-}w^1)/a_g$. From (5), GMO technology introduction increases the indirect utility of any consumer who initially consumed the regular good or who starts consuming it after the introduction of GMOs. The effect on non-adopters is given by $\pi_n(p(w^1),\alpha)–\pi_n(p^0,\alpha) = p^1(w^1)–p^0 < 0$. Adopters initially producing the non-GM good are characterized by $\pi_n(p^0,\alpha) > 0$, $\pi_g(p^1(w^1),\alpha) > 0$, and $\pi_g(p^1(w^1),\alpha) > \pi_n(p^1(w^1),\alpha)$. That is, $w^1/(a–a_g) < \alpha < p^0/a$. Among adopters, those who gain are characterized by $\pi^g(p(w^1),\alpha) > \pi^n(p^0,\alpha)$, i.e. $\alpha > (w+p^0–p(w))/(a–a_g)$. Adopters initially producing the alternative good are characterized by $\pi^n(p^0,\alpha) < 0$, $\pi^g(p(w^1),\alpha) > \pi^n(p(w^1),\alpha)$ and $\pi_g(p^1(w^1),\alpha) > 0$, i.e. $p^0/a < \alpha < (p^1(w^1) –w^1)/a_g$. These producers necessarily gain (otherwise they would not choose to produce the GM good).

Proof of Proposition 2. To characterize equilibrium classes, we solve the market-clearing conditions given in table 1 to obtain equilibrium prices, and then use them to derive equilibrium conditions. Combining equilibrium prices with equations (3) and (4) in the text, we check that the production of the alternative good is always positive in equilibrium. We use below the properties $b > h(1-h)\,(e_r + e_i)$, $b^2 > h(1-h)\,e_r\,e_i$ and $b > (1-h)e_i$, which follows from $\text{Max}(e_r, e_i) < b$ in conditions A and from $h \in [0, 1]$.

Equilibrium class (n, g). Necessarily we have that $Q_n^s > 0$. We must have that: (1) $Q_g^s > 0$. The equilibrium price is $p_r^e = b(a_g(1-h)+w)/(a_g(1-h)+b)$. Introducing this into the expression of Q_g^s, $(p_r - w)/a_g - w\,/(a - a_g)$, we find that $Q_g^s > 0 \Leftrightarrow w < f_1(h)$.

(2) $Q_i = 0$. We have that $Q_i = 0 \Leftrightarrow b < p_i$. Since $p_i^- < p_r^-$, we have that $p_i < p_r+k_i+e_iQ_r$. Therefore, we must have that $b < p_r+k_i+e_iQ_r$ for Q_i to be zero. Using the equilibrium regular price and quantity, and from conditions A, this condition reduces to $w > f_2(h)$.

In addition, $Q_g^s > 0$ implies that in equilibrium $p_r^e\,/a < (p_r^e - w)/a_g$. We check that in equilibrium $p_r < w+a_g$. These two properties combined with (3) and (4) ensure that $Q_a^s > 0$ (the equilibrium quantity of the alternative good is positive).

Equilibrium class $(n, g, i, p_i > p_r)$. We must have that (1) $Q_i^d > 0$; (2) $Q_g^s > 0$; (3) $Q_{ni}^s > Q_i^d$; and (4) $p_i > p_r$. Conditions A imply that $(a_g+b)b > h(1-h)(a_g(e_r+e_i)+e_re_i)$. Using this, one easily shows that the equilibrium conditions reduce to: (1) $w < f_2(h)$; (2) $w < f_3(h)$; (3) $w > f_4(h)$. Condition (4) is never binding: $p_i^- = p_r^-$ and $p_i > p_r$ together imply that $c_i(Q_r) > c_r(Q_i)$. If $h < e_i/(e_r+e_i)$, it would hold if $w < f_7(h)$, but this never happens as long as $w < f_2(h)$. If $h > e_i/(e_r+e_i)$, then it would hold for $w > f_7(h)$, but conditions A

imply that $e_r < (a_g+b)k_i/(b-k_i)$, and therefore that this is never the case. $Q_g^s > 0$ implies that in equilibrium $p_r^-/a < (p_r^- - w)/a_g$. We check that in equilibrium $p_r < w+c_r(Q_i)+a_g$. These two properties combined with (3) and (4) imply that $Q_a^s > 0$.

Equilibrium class $(g, i, p_i > p_r)$. We must have that (1) $Q_n^s = 0$ (or equivalently, $p_i^- > p_r^-$); (2) $p_i > p_r$ and (3) $Q_i > 0$ (or equivalently, $p_i < b$). (Then we necessarily have that $p_r < b$, and therefore $Q_g^s = Q_r^d > 0$). Conditions *A* imply that $b(a_g+b)+(a-a_g)(a_g(1-h)+b)h > h(1-h)(a_g(e_r+e_i)+e_re_i)$. Using this, one easily shows that the equilibrium conditions reduce to: (1) $w < f_4(h)$ and (2) $w < f_6(h)$. The equilibrium condition (3) ($Q_i > 0$) is equivalent to $w > (a_g(1-h)+b)k_i - b(b-e_i)(1-h))/((a_g+e_i)(1-h))$. But $0 < w < f_4(h)$, and from conditions *A* the denominator in $f_4(h)$ is positive, therefore its numerator has to be positive too. Then, the condition above for Q_i^d to be positive is never binding. $Q_g^s > 0$ implies that in equilibrium $p_i^-/a < (p_r^- - w)/a_g$. We check that in equilibrium $p_r < w + c_r(Q_i)+a_g$. These two properties combined with (3) and (4) imply that $Q_a^s > 0$.

Equilibrium class $(n, g, i, p_i = p_r)$. From the equilibrium condition we find that $Q_r > 0 \Leftrightarrow v < ((b-k_i)e_r - (a_g+b)k_i)/e_r$. Conditions *A* imply that this inequality does not hold, and therefore that there is no equilibrium of type $(n, g, i, p_i = p_r)$.

Equilibrium class $(g, i, p_i = p_r)$. Conditions *A* imply that $(a_g+b)(a-a_g-e_r-e_i) > e_re_i$. Using this, the conditions for Q_n^s to be zero and Q_g^s to be positive reduce to:

$Q_n^s > 0 \Leftrightarrow ((a+b)e_i+(a_g+b+e_i)e_r)w>(a-a_g)((a_g+b)k_i+b\, e_i)$,

$Q_g^s > 0 \Leftrightarrow (a-a_g-e_r)b+(a_g+b+e_r)k_i>(a+b)w$.

From conditions *A*, after simplification, these two equilibrium conditions imply: $e_r >$

$(a+b)k_i/(b-k_i)$, which is in contradiction with conditions A. Therefore there is no equilibrium of type $(g, i, p_i = p_r)$.

Proof of Propositions 4 and 5. In order to avoid overly-complicated expressions of equilibrium prices, we solve the market-clearing conditions, without solving explicitly the equilibrium equations $c_r(Q_i(w,h)) = e_r\, Q_i(w,h)$ and $c_i(Q_i(w,h)) = k_i + e_i\, Q_r(w,h)$. To shorten the notation, we denote $c_r(.) = c_r(Q_i(w,h))$ and $c_i(.) = c_i(Q_r(w,h))$. The following can be shown easily:

- In class (n, g), $p_r(w,h) = p_r^-(w,h) = p^1(w) - a_g bh(b-w)/((a_g+b)(a_g(1-h)+b)) < p^1(w) < p^0$, which proves part of Propositions 4b and 4c.

- In class $(n, g, i, p_i > p_r)$, $p_r^-(w,h) = p_i^-(w,h) = p^1(w) - a_g(c_r(.)(1-h)+ c_i(.)h)/(a_g+b) < p^1(w) < p^0$, which proves part of Proposition 4c; $p_i(w,h) = p^1(w) +(a_g(c_i(.) - c_r(.))(1-h) + b\, c_i(.))/(a_g+b)$, and therefore, given that $c_i(.) > c_r(.)$ in that equilibrium class, we have $p_i(w,h) > p^1(w)$, which proves part of Proposition 4a; and given $e_r = 0$, $p_r(w,h) = p^1(w) - a_g c_i(.)h/(a_g+b) < p^1(w) < p^0$, which proves part of Proposition 4b.

- In class $(n, g, i, p_i = p_r)$, $p_r^-(w,h) = p_i^-(w,h) = p^1(w) - a_g c_r(.)/(a_g+b) < p^1(w) < p^0$, which proves part of Proposition 4c; and $p_r(w,h) = p_i(w,h) = p^1(w) + bc_r(.)/(a_g+b) > p^1(w)$, which proves part of Propositions 4a and 4b.

- In class $(g, i, p_i = p_r)$, $p_r^-(w,h) = p^1(w) - a_g c_r(.)/(a_g+b) < p^1(w) < p^0$, which proves part of Proposition 4c, and $p_r(w,h) = p_i(w,h) = p^1(w) + bc_r(.)/(a_g+b) > p^1(w)$, which proves part of Propositions 4a and 4b.

In order to reach conclusions about other price comparisons, we introduce the following functions, with which we specify equilibrium conditions in the different equilibrium classes:

$$F_1(h) = \frac{(1-h)(a-a_g)b}{a(1-h)+b};\ F_2(w,h) = b(b-c_i(.)) - \frac{(1-h)c_i(.)a_g}{b};$$

$$F_3(w,h) = (a-a_g)\frac{(b-c_i(.)) + (c_i(.)-c_r(.))(1-h)}{a+b};$$

$$F_4(w,h) = \frac{(a-a_g)h}{b}\frac{(b-c_i(.))b - (c_i(.)-c_r(.))a_g(1-h)}{ah+a_g(1-h)+b};$$

$$F_5(w,h) = \frac{((a-a_g)h+b)(b-c_i(.))}{ah+b} + c_i(.) - c_r(.);$$

$$F_6(w,h) = \frac{(a-a_g)h(b-c_i(.))}{ah+a_g(1-h)+b} + c_i(.) - c_r(.).$$

Before turning to price comparisons, we specify the conditions under which some GMO adopters gain from GMO introduction. GMO adopters initially producing the non-GM good gain if $(w+p^0-p_r^-)/(a-a_g) < \alpha$. In equilibrium classes (n, g), $(n, g, i, p_i > p_r)$ and $(n, g, i, p_i = p_r)$, adopters are characterized by $w/(a-a_g) < \alpha < (p_r^- - w)/a_g$. We have seen that in these three equilibrium classes, $p_r^- < p^0$. From the above expression, this implies that at least some adopters lose from GMO introduction. Some adopters gain if and only if $(p_r^- - w)/a_g < (w+p^0-p_r^-)/(a-a_g)$, or equivalently, $p^0/a < (p_r^- - w)/a_g$, which we investigate below. In equilibrium classes $(g, i, p_i > p_r)$ and $(g, i, p_i = p_r)$, adopters are characterized by $(w+p_i^- - p_r^-)/(a-a_g) < \alpha < (p_r^- - w)/a_g$. If $p_i^- > p^0$ then all GMO adopters gain. If $p_i^- < p^0$ then at least some GMO adopters lose. In this case, some GMO adopters gain if $p^0/a < (p_r^- - w)/a_g$. Other welfare effects follow immediately from inspection of the profit and utility functions.

Below, we specify equilibrium conditions and we compare prices.

- In class (n, g), the equilibrium conditions (1) $Q_g^s > 0$ and (2) $Q_i = 0$ reduce to (1) $w < F_1(h)$ and (2) $w > F_2(w,h)$. We find that $[p_r^-(w,h) - w]/a_g - p^0/a$ has the sign of $(a-a_g)(1-h)b-b^2h-(1-h)(a+b)w$, which must be lower than $(a-a_g)(1-h)b-b^2h-(1-h)(a+b)F_2(h)$. We cannot reach a conclusion about the sign of this expression, and therefore cannot conclude whether p^0/a >=< $[p_r^-(w,h) - w]/a_g$. This proves part of Proposition 5d.

- In class $(n, g, i, p_i > p_r)$, the equilibrium conditions (1) $Q_i^d > 0$, (2) $Q_g^s > 0$, (3) $Q_{ni}^s > Q_i^d$ and (4) $p_i > p_r$ reduce to (1) $w < F_2(w,h)$, (2) $w < F_3(w,h)$, (3) $w > F_4(w,h)$, and (4) $c_i(.) > c_r(.)$. (Note that these equilibrium conditions are valid whether or not conditions A hold. We derive analogous results in the proof of Proposition 2 above, but those are valid only if conditions A hold.) We have that $p_r(w,h) - p^1(w) = (bc_r(.)-(c_i(.)-c_r(.))a_gh)/(a_g+b)$; $p_r(w,h) - p^0 = (b(c_r(.)+w)-(c_i(.)-c_r(.))a_gh-bv^c)/(a_g+b)$; and $p_i(w,h) - p^0 =((c_i(.)-c_r(.))a_g(1-h)+b(c_i(.)+w-v^c))/(a_g+b)$. We check that as long as $c_r(.) > 0$, none of the four equilibrium conditions above allows us to reach conclusions about the comparisons of $p_r(w,h)$ and $p^1(w)$ or p^0, which proves part of Propositions 4b and 5b. In contrast, these conditions do not allow us to reach conclusions when comparing $p_i(w,h)$ and p^0 , which proves part of Proposition 5a. We find that $[p_r^-(w,h) - w]/a_g - p^0/a$ has the sign of $v^c-w-c_r(.)-(c_i(.)-c_r(.))h$, which is indeterminate. This proves part of proposition 5d.

- In class $(g, i, p_i > p_r)$, the equilibrium conditions (1) $p_i^- > p_r^-$ and (2) $p_i > p_r$ reduce to (1) $w < F_4(w,h)$ and (2) $w < F_6(w,h)$, from which it is easily checked that Q_r and Q_i are both positive. We calculate that:

$$p_i(w,h) = p^1(w) + b\frac{A-Bw}{C} > p^1(w) + b\underbrace{\frac{A-BF_4(w,h)}{C}}_{>0 \text{ after simplification}} > p^1(w),$$

$$p_r^-(w,h) = p^1(w) - a_g\frac{D-Ew}{C} < p^1(w) - a_g\underbrace{\frac{D-EF_4(w,h)}{C}}_{>0 \text{ after simplification}} < p^1(w) < p^0,$$

where $A = (a_g+b)\left(a_g(c_i^e - c_r^e)(1-h) + bc_i^e\right) + b(a-a_g)h\left(b + a_g(1-h)\right)$,

$B = \left(a_g(1-h)+b\right)\left(ah + a_g(1-h) + b\right)$,

$C = \left[b\left(ah + a_g(1-h) + b\right) + h(1-h)a_g(a-a_g)\right](a_g+b)$,

$D = (a_g+b)\left(\left(b + (a-a_g)h\right)c_r(1-h) + bc_ih\right) + (a-a_g)b^2h^2$, $E = bh\left(ah + a_g(1-h) + b\right)$.

This proves part of Propositions 4a and 4d. Given $e_r = 0$, we also have $p_r(w,h) = p_r^-(w,h) < p^1(w) < p^0$, which proves part of Proposition 4b. Next we check that neither of the two equilibrium conditions above allows us to reach conclusions about when comparing $p_r(w,h)$ with $p^1(w)$ or p^0, which proves part of Propositions 4b and 5b. Nor do they allow us to reach conclusions when comparing $p_i(w,h)$ with p^0, which proves part of Proposition 5a. Nor do they allow us to reach conclusions when comparing $p_i^-(w,h)$ with $p^1(w)$ or p^0, which proves part of Propositions 4d and 5e.

- In class (g, i, $p_i = p_r$), the equilibrium conditions (1) $p_i^- > p_r^-$, (2) $Q_g^s > 0$, (3) $Q_i^s > h\,Q_i^d$ and (4) $Q_i^d > 0$ reduce to (1) $c_r(.) > c_i(.)$, (2) $w < ((a-a_g)(b-c_r(.))-(a_g+b)(c_r(.)-c_i(.)))/(a+b)$, (3) $w > F_6(w,h)$, and (4) $w < b - c_r(.)$. We find that $p_r(w,h)-p^0$ (equal to $p_i(w,h)-p^0$)) has the sign of $(c_r(.)+w)(a+b) - b(a-a_g)$, which is indeterminate. This proves parts of Propositions 5a and 5b. We find that $p_i^-(w,h) - p^1(w)$ has the sign of

$b(c_r(.)-c_i(.))-a_g\, c_i(.)$, which is indeterminate. This proves part of Proposition 4c. We find that $p_i^{-}(w,h)-p^0 = b(a_g+ c_r(.)+w)/(a_g+b) - c_i(.)-ab/(a+b)$, which is indeterminate in sign. This proves part of Proposition 5e.

- In class (n, g, i, $p_i = p_r$), the equilibrium conditions (1) $p_i^{-} = p_r^{-}$, (2) $Q_g^s > 0$, (3) $Q_{ni}^s > h\, Q_i^d$ and (4) $Q_i^d > 0$ reduce to (1) $c_r(.) = c_i(.)$, (2) $w < (a-a_g)(b-c_r(.))/(a+b)$, (3) $w > (a-a_g)(b-c_r(.))h/(a_g+b+(a-a_g)h)$, and (4) $w < b - c_r(.)$. We find that $p_r(w,h) - p^0$ (equal to $p_i(w,h)-p^0$) has the sign of $(c_r(.)+w)(a+b) - b(a-a_g)$, which is indeterminate. This proves parts of Propositions 5a and 5b. We find that $[p_r^{-}(w,h) - w]/a_g - p^0/a$ has the sign of $(a+b)bw + a_g b(a-a_g) - a_g(a+b)c_r(.)$, which is indeterminate. This proves part of Proposition 5d.

Finally, we compare the monopolistic equilibrium prices with GMOs in the presence and then in the absence of hatred. When there is no hatred, we calculate that the monopolistic equilibrium price $p^1(w^{\text{mon}}(h,v))$ is equal to $b(a/(a+b)+(a_g+v)/(a_g+b))/2$. The comparisons below prove proposition 4e.

- In equilibrium class (n, g):

$$p_r(w^{mon}(h,v),h) = \underbrace{\frac{b}{2}\left(\frac{a(1-h)}{a(1-h)+b}+\frac{a_g(1-h)+v}{a_g(1-h)+b}\right)}_{<p^1(w^{mon}(h,v))} + \underbrace{\frac{c_r(.)b}{2}\left(\frac{1}{a(1-h)+b}+\frac{1}{a_g(1-h)+b}\right)}_{>0},$$

$$p_r^{-}(w^{mon}(h,v),h) = \underbrace{\frac{b}{2}\left(\frac{a(1-h)}{a(1-h)+b}+\frac{a_g(1-h)+v}{a_g(1-h)+b}\right)}_{<p^1(w^{mon}(h,v))} \underbrace{-\frac{c_r(.)(1-h)}{2}\left(\frac{a}{a(1-h)+b}+\frac{a_g}{a_g(1-h)+b}\right)}_{<0}.$$

- In equilibrium class (n, g, i, $p_i > p_r$):

$$p_r(w^{mon}(h,v),h) = p^1(w^{mon}(h,v),h) \underbrace{- \frac{(c_i(.)-c_r(.))h}{2}\left(\frac{a}{a+b}+\frac{a_g}{a_g+b}\right)}_{<0} + \underbrace{\frac{c_r(.)b}{2}\left(\frac{1}{a+b}+\frac{1}{a_g+b}\right)}_{>0},$$

$$p_i(w^{mon}(h,v),h) = \underbrace{p^1(w^{mon}(h,v),h) + \frac{(c_i(.)-c_r(.))(1-h)}{2}\left(\frac{a}{a+b}+\frac{a_g}{a_g+b}\right) + \frac{c_i(.)b}{2}\left(\frac{1}{a+b}+\frac{1}{a_g+b}\right)}_{>0},$$

$$p_i^-(w^{mon}(h,v),h) = p_r^-(w^{mon}(h,v),h)$$

$$= p^1(w^{mon}(h,v),h) \underbrace{- \frac{(c_i(.)-c_r(.))h}{2}\left(\frac{a}{a+b}+\frac{a_g}{a_g+b}\right) - \frac{c_r(.)}{2}\left(\frac{a}{a+b}+\frac{a_g}{a_g+b}\right)}_{<0}.$$

- In equilibrium class (n, g, i, $p_i = p_r$):

$$p_i(w^{mon}(v,h),h) = p_r(w^{mon}(v,h),h) = p^1(w^{mon}(v,h)) + \underbrace{\frac{1}{2}bc_i(.)\left(\frac{1}{a+b}+\frac{1}{a_g+b}\right)}_{>0},$$

$$p_i^-(w^{mon}(v,h),h) = p_r^-(w^{mon}(v,h),h) = p^1(w^{mon}(v,h)) \underbrace{- \frac{1}{2}c_r(.)\left(\frac{a}{a+b}+\frac{a_g}{a_g+b}\right)}_{<0}.$$

- In equilibrium class (g, i, $p_i = p_r$):

$$p_i(w^{mon}(v,h),h) = p_r(w^{mon}(v,h),h) = p^1(w^{mon}(v,h)) + \underbrace{\frac{1}{2}b\left(\frac{c_i(.)}{a+b}+\frac{c_r(.)}{a_g+b}\right)}_{>0},$$

$$p_r^-(w^{mon}(v,h),h) = p^1(w^{mon}(v,h)) \underbrace{- \frac{1}{2}\left(\frac{(c_r(.)-c_i(.))b}{a+b} + c_r\left(\frac{a}{a+b}+\frac{a_g}{a_g+b}\right)\right)}_{<0},$$

$$p_i^-(w^{mon}(v,h),h) = p^1(w^{mon}(v,h)) + \frac{1}{2}\left(\underbrace{\frac{(c_r(.)-c_i(.))b}{a_g+b}}_{>0} \underbrace{- c_i\left(\frac{a}{a+b}+\frac{a_g}{a_g+b}\right)}_{<0}\right).$$

Comparisons of our Price and Welfare Effects to Other Results in the Literature

As in our model, Fulton and Giannakas (2004) (F&G) and Lapan and Moschini (2004) (L&M) assume that the introduction of GMO technology or hatred creates a discontinuous jump in IP costs. That is, IP costs are zero in the absence of GMOs or hatred, and positive given any positive amount of GMOs and hatred. In their comparative statics analysis, F&G study the price effects of marginal variations in the levels of GM consumer aversion and GM cost effectiveness (analogues to our parameters hatred h and GMO fee w). Their marginal analysis cannot be used to compare the discrete change from the pre-hatred (or pre-GMO) regular price to post-hatred (or post-GMO) regular and IP prices, because of the discontinuous jump due to the introduction of positive IP costs. Their marginal analysis can only be used when the per-unit IP cost for regular producers is assumed equal to zero, which enables comparison of changes in regular prices, which are then continuous. F&G find that an increase in the level of GM aversion or in the level of GM cost effectiveness causes the regular price to decrease. When we assume the absence of IP costs for regular producers ($c_r = 0$), our results in Proposition 4b and the Corollary to Proposition 4 that the introduction of hatred or GMOs causes the regular price to decrease are similar to this F&G result. In their welfare analysis, F&G compare pre-GM and post-GM prices, but only for the case in which IP costs are all zero (a situation analogous to $c_i = c_r = 0$ in our model). They find that in the presence of GMOs, IP consumers pay a lower price than they would pay if GMOs had not been introduced ($p_i < p^0$ in our notation). In the absence of IP costs, we derive a similar result in class ($n, g, i, p_i > p_r$) ($p_i^- < p^0$). However, in our model, in class

(g, i, $p_i > p_r$), GMO-haters may end up paying more than they would pay if GMOs had not been introduced, even if IP is costless. This is not recognized in their model.

In terms of our model's terminology, L&M analyze the price effects of GMO technology introduction in equilibrium class (n, g, i, $p_i > p_r$), in the absence of IP costs for regular producers (their Proposition 5). They find that GMO technology introduction decreases the net price. We obtain a similar result in our Proposition 5b. In addition, L&M find that the IP price in the presence of GMO technology is higher than the pre-GMO price ($p_i > p^0$). This result is different from ours in Proposition 5a (p_i may be higher or lower than p^0). L&M do not obtain our result because they assume that total land allocated to GM and non-GM crops is constant. With this assumption, in the absence of hatred, the regular price stays constant as GMO technology is introduced in the absence of hatred. L&M do not consider variations in the level of GM consumer aversion, and therefore they have no results similar to those in our Proposition 4.