The Handmade Effect: A Model of Conscious Shopping in an Industrialised Economy

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Abstract

Although online marketplaces for handmade products persist, little theoretical research has been undertaken to explain why firms choose a handmade strategy. In this paper, I develop a model that can explain the persistence through a handmade effect on the consumer side. I show that when consumers are willing to pay a sufficiently high handmade premium, the firm chooses production by hand over superior machine production. When the firm is part of a duopoly, the existence of consumers who care about the conditions under which a product is manufactured can explain the firms' specialisation and, thus, the observed co-existence of handmade and machine-made products in the economy. Such specialisation is efficient, and can be robust to collusion. The presence of shoppers who are uncertain about the appropriate behaviour may enable the monopolist to use a handmade strategy to signal a social norm of conscious consumption.

Keywords Conscious shopper · Handmade premium · Norm · Production · Signaling · Specialisation

JEL Classification C70 · D11 · D21 · D42 · D82 · D91

1 Introduction

We believe that human connection is central to buyer engagement. On Etsy, we emphasize that the items listed for sale are brought to life by real people.
-Etsy, Inc., 2018 Annual Report.

The e-commerce website Etsy was founded in 2005 as a marketplace for handmade products. In an era of technological advancement, Etsy's business model is notable: Everything that is listed in the marketplace must be "handmade or unique

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Fig. 1 Business activity on Etsy since 2014 (data source: Etsy, Inc)

and assembled with production partners, vintage or craft supplies” (Etsy, Inc, 2019a, p. 11). In a wide range of categories—including jewelry, clothing, toys and furniture—the sellers’ production processes could readily be automated, which could potentially result in improved quality and fewer defective products. Nevertheless, the number of buyers and sellers on Etsy has been rising with gross merchandise sales (GMS) surpassing 2.5 billion U.S. dollars in the second quarter of 2020 (Fig. 1). It is, therefore, worth understanding why this sector of the economy can persist in the twenty-first century.

In this paper, I offer an explanation for the observed puzzle. I argue that a handmade effect on the consumer side (Fuchs et al., 2015) can explain why some firms—like those selling on Etsy—do not adopt superior production processes and instead choose to produce and advertise their products as handmade. I present a model that features a unit mass of shoppers. They come in two types: quality shoppers, and conscious shoppers. In this setting, product differentiation has two dimensions (e.g., Economides, 1989): All shoppers value product quality equally, but they differ in the weight that they give to the production process. From a firm’s perspective, there are nontrivial interactions: Hand production comes at a higher effort cost, and may be inferior at translating any given effort into quality.

I show that when a fraction of shoppers is sufficiently concerned about the conditions under which the product is manufactured and, therefore, is willing to pay a handmade premium, the firm adopts a handmade strategy. A minimum quality standard, however, can alter the firm’s behaviour and induce switching to machine production. When hand production is associated with increasing marginal cost, I show that a niche handmade product can be perceived to be of higher quality than a mass market machine-made product.

I extend the model to settings in which two ex-ante identical firms decide simultaneously on the production process, pricing strategy, and per-unit effort. I show that the existence of sufficiently conscious shoppers can explain the specialisation of firms

and, thus, the observed co-existence of handmade and machine-made products in the economy. I show that such specialisation is efficient, and robust to collusion if the proportion of conscious shoppers in the market is not too large and their concern about the conditions under which the product is manufactured is not too high.

I then introduce conformist shoppers who behave exactly like conscious or quality shoppers depending on their beliefs. In this setting, a monopolist may be able to use a handmade strategy to signal a social norm of conscious consumption. When credible, this strategy generates a crowding-in effect and explains sales growth even in markets where conscious shoppers are believed to be in the minority. Finally, I show that my model can shape intuitions also on ethical production, and can explain the mainstreaming of Fair Trade in Europe in the late 1990s (Renard, 2003) through such a crowding-in effect.

1.1 Related Literature

My paper relates to the growing economic literature on ethical consumption (e.g., Stiefenhofer, 2019). The empirical literature has focused on estimating consumers' willingness to pay a premium for ethical products (e.g., Galarraga & Markandya, 2004; Loureiro & Lotade, 2005; Arnot et al., 2006). For example, when buying more expensive Fair-Trade products, consumers reveal their preferences for ethical products. They are inferred to obtain additional utility from the product's Fair-Trade label. My model builds on these insights: conscious shoppers gain utility from buying a handmade product whereas quality shoppers care only about product quality.

My extension to two firms relates to how product differentiation can relax price competition. In his classical work on monopolistic competition, Chamberlin (1933) notes that product differentiation leads buyers to pair with sellers according to their preferences. Firms evade price competition by focusing buyers' attention towards a trade-mark, or by competing on the basis of quality. In my model, attention is focused on the production process: A handmade strategy relaxes price competition. Champsaur and Rochet (1989) obtain a similar result by allowing firms to choose non-overlapping qualities followed by prices. Sebald and Vikander (2019) consider a related signaling game in which a monopolist faces a fraction of consumers who care about what other consumers believe.

The rest of the paper is organised as follows: Sect. 2 introduces the model. I discuss my main results when the firm acts as a monopolist in Sect. 3, and when the firm is part of a duopoly in Sect. 4. In Sect. 5, I explain how a monopolist may use a handmade strategy to signal a social norm of conscious consumption. Section 6 concludes with an application to Fair Trade, and avenues for future research.

2 Model

The key mechanism in my model is the *handmade effect*: Some consumers perceive that handmade products symbolically contain the producer's love for the product and its production process (Fuchs et al., 2015). In particular, they may value that

the product is crafted and touched by someone with a passion for the product (Argo et al., 2008). Moreover, the handmade label imbues the product with the producer's personality or "face" (Johnston & Baumann, 2007). The product may be perceived to embody the creator's unique personal expression (Kreuzbauer et al., 2015). Conversely, machine-made products cannot absorb the producer's passion given that the product is often not touched at all during its production (Markoff, 2012).

A second value channel is the "authenticity" of the producer: Some consumers may value that the producer of a handmade product assumes responsibility for the production process; business decisions under machine production do not convey a producer's values but are perceived as marketing strategy (Carroll & Wheaton, 2009; Lehman et al., 2019). I formalise the handmade effect on the consumer side through a fraction C of shoppers being conscious of this handmade effect. These conscious shoppers care about the conditions under which the product is manufactured: They value production by hand h over machine production m . Thus, conscious shoppers base their buying decision on an enlarged set of product attributes compared to the other shoppers (Lancaster, 1966): price, product quality, *and* the production process.

2.1 Timing and Actions

The firm F and a unit mass of shoppers (the market) play a two-stage game: In the first stage, the firm chooses the production process $k \in \{h, m\}$, the product's per-unit price p_k , and the per-unit effort level $x_k \geq 0$. I assume that product quality is jointly determined by the production process and effort, which I will describe in more detail below.

In the second stage, having observed the firm's decision, the shoppers choose whether to buy one unit of the product. They have an outside option that yields a zero payoff. Let C and $Q = 1 - C$ be the fraction of conscious shoppers and quality shoppers in the market, respectively. Let $a_i \in \{0, 1\}$, $i = C, Q$, be their buying decision.

2.2 Firm's Payoffs

For a given k , the firm chooses the per-unit price and the per-unit effort level to solve the profit maximisation problem

$$\max_{(p_k, x_k) \in \mathbb{R}_+^2} \Pi(p_k, x_k; k) = \max_{(p_k, x_k) \in \mathbb{R}_+^2} (a_C C + a_Q Q) \left[p_k - \frac{c_k}{2} x_k^2 \right].$$

The firm's per-unit cost is $c(x_k) = \frac{c_k}{2} x_k^2$. Therefore, the firm's profit depends on the cost parameter $c_k > 0$, where $c_h > c_m$. Intuitively, it is more costly to produce one unit of the product by hand. For example, for a given effort level, it requires more time to knit a pair of socks by hand. The assumption that $c_h > c_m$ then captures the firm's opportunity cost of time in a reduced form. Note that for tractability the per-unit cost increases in effort but remains constant in the level of output produced. I will relax this assumption in Sect. 3.1.

2.3 Quality Shoppers' Payoffs

Quality shoppers choose to buy one unit of the product if it maximises their utility:

$$\max_{a_Q \in \{0,1\}} V_Q(a_Q; k) = \max_{a_Q \in \{0,1\}} a_Q [q(x_k, k) - p_k].$$

Not buying yields a zero payoff. Conversely, buying one unit yields a payoff of $q(x_k, k) - p_k$. The value $q(\cdot)$ represents the benefit from consuming one unit. Following the literature on vertical differentiation (e.g., Mussa & Rosen, 1978), the benefit rises linearly with the product's quality.¹

Assumption 1 (Product Quality) $q(x_k, k) = A_k x_k$ with $A_m \geq A_h \geq 1$.

I assume that the product's per-unit quality is increasing at a constant rate A_k in the firm's effort level. The production process, therefore, scales the shoppers' benefit for a given amount of effort, where $q(0, m) = q(0, h)$ and $q(x, m) \geq q(x, h)$ for all $x > 0$: Production by hand results in weakly lower product quality and, thus, in a weakly lower benefit for quality shoppers.²

This could be due to physical and mechanical variance, or the possibility of human error in the production of h . Compared to the potentially inconsistent quality of handmade products, machine production allows for uniform product quality (Liebl & Roy, 2003), and increased precision (Markoff, 2012). Watches are one example: Machine-made quartz watches are "significantly more precise than the most expensive Swiss mechanical watches made by the hands of a skilled watchmaker in Geneva" (Kreuzbauer et al., 2015, p. 764).

Intuitively, the quality shoppers choose to buy one unit of product k if the quality is weakly greater than the price set by the firm in the first stage. What is more, quality shoppers only care about the end product: They shop for the highest quality. Thus, for a given price, they weakly prefer the firm to offer a machine-made product.

Arguably, some handmade products are of higher quality than mass-produced products. One example is the high-value niche wine production in France: compared to the machine harvesting in the Australian wine industry, France's handcrafted artisan methods yield a limited quantity of high quality (Aylward & Carey, 2009). A second example is Aston Martin: Its limited number of expensive hand-built cars are recognised as authentic and well designed (Carney, 2016). The extension to convex production cost in Sect. 3.1 will accommodate these settings.

¹ A diminishing marginal benefit, $q(x_k; k)^z$ with $z \in (0, 1)$, will not change the result in Sect. 3 that the firm would sell m to the whole market and h only ever to C as long as z is common to all shoppers. However, it does not always make a handmade strategy relatively more attractive for the firm: A lower z does not necessarily reduce the difference between the optimised profit (or quality) of m and h .

² Given $c_h > c_m$, my results do not hinge on $k = h$ being worse at translating any given effort into quality.

2.4 Conscious Shoppers' Payoffs

Conscious shoppers choose to buy one unit of the product if it maximises their utility:

$$\max_{a_C \in \{0,1\}} V_C(a_C; k) = \max_{a_C \in \{0,1\}} a_C [q(x_k, k) - p_k + \theta v(k)].$$

The exogenous parameter $\theta > 0$ measures their sensitivity to the production process.³ The designation of a product as handmade to trigger θ for segment C is exogenously determined; for example, through the enforcement of a Handmade Policy (Etsy, Inc, 2019b).

Assumption 2 (One-sided Concern) $v(k) = \mathbb{I}(k = h)$.

Let $\mathbb{I}(x = y)$ be an indicator function that is equal to unity if its argument holds true, and zero otherwise. I normalise the conscious shoppers' utility gain from consuming a handmade product to unity. Moreover, I assume that their utility loss from consuming a machine-made product is zero. A one-sided concern of conscious shoppers is a natural assumption given that most firms that use m do not mention the production process explicitly when marketing their product (Fuchs et al., 2015). Consequently, only production by hand is salient when conscious shoppers make the buying decision.

Intuitively, conscious shoppers care about more than product quality: They are also concerned about the conditions under which the product is manufactured. Depending on their sensitivity to the production process, buying one unit of a product that is marketed as handmade may be more important than the product's quality. Carfagna et al. (2014, p. 165) provide empirical support for my choice of utility function: Consumers who are strong supporters of the Do-It-Yourself ethic are "less concerned about quality and outcome and more oriented to the process".

2.5 Solution Method and Preliminary Results

I solve the model by first considering the shoppers' decision problem. The shoppers buy one unit of the product if $V_i(1; k) \geq V_i(0; k)$, $i = C, Q$. Therefore, conscious shoppers' maximum willingness to pay is $p_{C,k} := q(x_k, k) + \theta v(k)$, and quality shoppers are willing to pay $p_{Q,k} := q(x_k, k)$ for $k = h, m$: Quality shoppers are always willing to pay a weakly higher price for the machine-made product. Depending on the conscious shoppers' concern about the conditions under which the product is manufactured, they may be willing to pay a higher price for the handmade product: $q(x, m) \geq q(x, h) + \theta$ for $x > 0$.

³ My results are robust to heterogeneity in θ . When the firm faces a single type of conscious shopper, however, it is able in equilibrium to extract all of the surplus from those who buy. With two or more types, the firm is not able to extract all of the surplus by charging one price as long as the firm does not cater exclusively to the most conscious type.

In the first stage, the firm infers that quality shoppers are willing to pay less for a handmade product than are conscious shoppers. In particular, the firm sets a price of $p_h^* = p_{Q,h}$ to sell one unit of the handmade product to the whole market. Quality shoppers are indifferent between buying and not buying at p_h^* . The firm sets a price of $p_h^{**} = p_{C,h}$ to sell one unit of the handmade product to a fraction of the market. Conscious shoppers are indifferent at p_h^{**} . Conversely, under Assumption 2, quality shoppers' and conscious shoppers' willingness to pay for a machine-made product coincides. Thus, the firm always sells one unit of the machine-made product to the whole market. The optimal price $p_m^* = p_{Q,m} = p_{C,m}$ makes all shoppers indifferent.

3 The Firm's Production Decision

In this section, I analyse the implications of a handmade effect on the firm's optimal production process: Can the presence of conscious shoppers lead to situations in which the firm prefers producing h ? Specifically, how strong does the handmade effect have to be to make h preferable?

Proposition 1 (Equilibrium) *If*

$$C\theta > (1 - C)\Pi(p_m^*, x_m^*; m) + C[\Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h)], \quad (1)$$

the firm sells h to conscious shoppers only and makes profit

$$\Pi(p_h^{**}, x_h^{**}; h) = C[\Pi(p_h^*, x_h^*; h) + \theta] = C\left[\frac{A_h^2}{2c_h} + \theta\right] > 0,$$

where $p_h^{**} = p_h^* + \theta = A_h x_h^{**} + \theta$ and $x_h^{**} = x_h^* = A_h/c_h$. Otherwise, the firm sells m to the whole market and makes profit

$$\Pi(p_m^*, x_m^*; m) = \frac{A_m^2}{2c_m} > 0,$$

where $p_m^ = A_m x_m^*$ and $x_m^* = A_m/c_m$.*

Proof Detailed proofs of all results are in Appendix A. □

If production is by hand, $k = h$, the conscious shoppers' sensitivity to the production process and the comparative size of segment C determines whether the firm: (i) sells to the whole market at p_h^* ; or (ii) sells to conscious shoppers only at a higher price $p_h^* + \theta$. The optimal quality of the handmade product is unaffected by this decision. Moreover, given that profit turns out to be positive for a given production process, the firm always chooses to produce.

Therefore, when conscious shoppers' concern θ is below a certain threshold that decreases in the size of segment C , the firm compares its profit from selling h or m to the whole market. In this case, however, a handmade strategy can never

be optimal: The firm cannot charge a handmade premium but faces increased marginal cost and potentially reduced product quality for a given effort level.

For a concern θ above this threshold, the firm compares its profit from selling h to conscious shoppers only with its profit from selling m to the whole market. In this case, a handmade strategy can be optimal if the market segment of conscious shoppers is sufficiently large and concerned enough about the production conditions. This allows the firm to extract a sufficiently high *handmade premium* from this fraction of the market.

In particular, condition (1) in Proposition 1 says that the total premium needs to outweigh the loss from: (i) not serving market segment $1 - C$; and (ii) selling to segment C under increased marginal cost and reduced product quality for a given effort level. Thus, a handmade product that is sold in equilibrium classifies as a specialised product (Pepall, 1992): It is targeted to those shoppers whose willingness to pay for the special handmade feature is particularly high.

Church and Oakley (2018, p. 894) provide empirical support for the handmade premium on Etsy: “Handmade products sold for an average of 78% more than their traditionally manufactured counterparts, even after controlling for shop size, reputation and social media performance”. Fuchs et al. (2015) provide experimental evidence: Participants were, on average, willing to pay 17 percent more when a bar of soap was presented as handmade rather than machine-made.

Johnson and Myatt (2006) obtain a similar result: Optimal product design relates to whether a firm uses a mass market or a niche production strategy. They show that when valuations are relatively homogeneous, the firm prefers to serve a large fraction of potential consumers through a product design that has universal appeal. Under heterogeneity, in contrast, the firm restricts sales to a relatively small niche through a product design that caters to specialised tastes. In my model, given Assumption 2, a change from machine to hand production is likewise associated with a dispersion in the distribution of shoppers’ willingness to pay, which is profitable for the firm if θ is sufficiently large.

Due to the assumption that $A_m \geq A_h \geq 1$ and $c_h > c_m > 0$, the firm chooses to produce a higher quality product under machine production. If the firm nonetheless finds it optimal to sell a handmade product to conscious shoppers, regulators may be concerned that the firm substitutes a handmade label for quality, which would leave conscious shoppers ill-informed (Leland, 1979).

Therefore, regulators may introduce a minimum quality standard $\bar{q}$ that will be binding for production by hand, $\bar{q} > q(x_h^{**}, h)$, but will not be binding for machine production, $q(x_m^*, m) > \bar{q}$. In other words, regulation affects only the firm that produces by hand, and forces this firm to increase the handmade product’s quality to $\bar{q}$. Under what conditions does such regulation alter the firm’s behaviour? Specifically, when does $\bar{q}$ induce the firm to switch to producing m , reversing the handmade effect? How does $\bar{q}$ impact welfare?

Proposition 2 (Minimum Quality Standard) *Suppose condition (1) holds: If regulation enforces $\bar{q} \in (q(x_h^{**}, h), q(x_m^*, m))$ and the enforced quality standard exceeds $\check{q}$, where*

$$\check{q} := q(x_h^{**}, h) + \sqrt{q(x_h^{**}, h)^2 - \frac{q(x_m^*, m)q(x_h^{**}, h)}{C} + 2q(x_h^{**}, h)\theta} > q(x_h^{**}, h),$$

then the firm switches to producing m .

Proposition 2 highlights that regulation may have unintended consequences if the enforced quality standard exceeds a certain threshold $\check{q}$, and this threshold falls below $q(x_m^*, m)$. Moreover, a minimum quality standard can alter the firm's behaviour even without productivity differences: The higher effort cost for handmade products induces the firm to choose $q(x_h^{**}, h) < q(x_m^*, m)$ also when $A_h = A_m$. A natural measure of welfare in this setting is the economic surplus from trade: the sum of the firm's profit and the consumer surplus. As the firm increases the price $\bar{p} = \bar{q} + \theta$ one-for-one with increases in the quality standard, the consumer surplus remains constant in $\bar{q}$ and is equal to zero. Therefore, the economic surplus is

$$ES := \begin{cases} C\theta + C(\bar{q} - \frac{c_h}{2A_h^2}\bar{q}^2) & \text{if } q(x_h^{**}, h) < \bar{q} \leq \check{q}, \\ \frac{A_m^2}{2c_m} & \text{if } \check{q} < \bar{q} < q(x_m^*, m). \end{cases}$$

Intuitively, as long as the minimum quality standard does not induce the firm to switch to producing m , a more stringent standard causes the firm's profit, and thus economic surplus, to fall. For a standard that exceeds a certain threshold, the firm switches; and given that the standard is not binding for machine production, economic surplus remains constant. Thus, my result contrasts with the possibility to create welfare-improving standards when there is competition in the dimension of quality (Economides, 1993).

3.1 Convex Production Cost

In my benchmark model, I assumed that the per-unit cost remains constant in the level of output produced. I focus on the effect of the production process on optimal effort and product quality, and provide conditions under which the handmade effect induces the firm to produce by hand.

In some settings, however, the workforce may become exhausted when hand production is scaled up due to the manual handling of materials whereas machine production prevents fatigue through mechanisation (ILO, 2010). Also, managerial coordination may become more complex at higher volumes. Thus, I relax the assumption of constant per-unit cost for h in this section. I show that increasing marginal cost reinforces my result that a handmade strategy is associated with lower sales. Moreover, it allows a niche handmade product to be of higher quality than a mass market machine-made product.

I model the firm's profit maximisation problem in such settings as

Fig. 2 Production cost as a function of output

$$\max_{(p_k, x_k) \in \mathbb{R}_+^2} \Pi(p_k, x_k; k) = \max_{(p_k, x_k) \in \mathbb{R}_+^2} (a_C C + a_Q Q) p_k - (a_C C + a_Q Q)^{\alpha_k} \left[\frac{c_k}{2} x_k^2 \right],$$

where $\alpha_h > \alpha_m = 1$. Unlike the benchmark model, the above specification permits: (i) the firm's marginal production cost for the handmade product to be lower than for the machine-made product whenever sales of the handmade product fall short of $s_1 := \left[\frac{1}{\alpha_h} \frac{c_m}{c_h} \left(\frac{x_m}{x_h} \right)^2 \right]^{\frac{1}{\alpha_h - 1}}$; and (ii) the firm's total production cost for the handmade product to be lower for a given level of output below $s_2 := \alpha_h^{-1} s_1$; see Fig. 2.

If production is by hand, $k = h$, the firm's optimal effort x_h^* and profit $\Pi(p_h^*, x_h^*; h)$ remain unchanged when selling the handmade product to the whole market. When selling to conscious shoppers only, the optimal effort level becomes $x_h^{**} = \frac{C}{C^{\alpha_h}} \frac{A_h}{c_h} > x_h^*$, and the firm makes profit $\Pi(p_h^{**}, x_h^{**}; h) = C \left[\frac{C}{C^{\alpha_h}} \frac{A_h^2}{2c_h} + \theta \right] > 0$, where $p_h^{**} = A_h x_h^{**} + \theta$. Therefore, the firm chooses to sell a handmade product to conscious shoppers only at p_h^{**} over the whole market at p_h^* if

$$\theta \geq \frac{1 - C^{2-\alpha_h}}{C} \Pi(p_h^*, x_h^*; h). \quad (2)$$

Under increasing marginal cost, a niche handmade product has two advantages: First, the firm can charge conscious shoppers a handmade premium. Second, the firm can offer a product of higher quality when selling to conscious shoppers only, rather than to the whole market.

The second effect offsets the decrease in profit from lower sales independent of conscious shoppers' concern: A handmade strategy can be beneficial for the firm even when θ is low. The firm charges a slightly higher price to segment the market, and exclude quality shoppers. This slightly higher price allows the firm to meet demand with a high-quality product. In fact, given $\theta > 0$, the firm will never choose to sell a handmade product to the whole market for $\alpha_h \geq 2$: The

deterioration in quality and, thus, the reduction in shoppers' willingness to pay would be too large.

As before, a handmade strategy cannot be optimal if condition (2) does not hold. If the condition holds, or if $\alpha_h \geq 2$, the firm compares its profit from selling a mass market machine-made product with a niche handmade product. In particular, condition (1) in Proposition 1 modifies to

$$C\theta > (1 - C)\Pi(p_m^*, x_m^*; m) + C \left[\Pi(p_m^*, x_m^*; m) - \frac{C}{C^{\alpha_h}} \Pi(p_h^*, x_h^*; h) \right].$$

The total handmade premium that induces the firm to choose a handmade strategy is lower under increasing than under constant marginal cost. Moreover, the handmade product that is sold in equilibrium is of higher quality than the machine-made product if the fraction of conscious shoppers is sufficiently small: $C < \tilde{C}$, where $\tilde{C} := \left(\frac{A_h c_m}{A_m c_h} \right)^{\frac{1}{\alpha_h - 1}} \in (0, 1)$. Thus, increasing marginal cost can accommodate handmade products that are associated with higher quality and attention to detail (Dickson & Littrell, 1998).

3.2 Multi-product Monopolist

In my benchmark model, I implicitly assume that the firm is limited to one product for the handmade effect to be credible. When conscious shoppers learn that the firm produces both, they are willing to pay as little as quality shoppers for the handmade product as the firm loses its authenticity. Alternatively, the firm has to commit to having divisions m and h behave as independent profit maximisers to generate the handmade effect (Baye et al., 1996). This divisionalisation induces competition within the firm, and will be analysed in Sect. 4.⁴

The restriction that the firm is limited to one product fits, for example, the U.S. craft beer market. U.S. craft breweries are mostly independently owned and are outside larger corporate ownership: "less than 25 percent of the craft brewery is owned or controlled [...] by a beverage alcohol industry member that is not itself a craft brewer" (Brewers Association, 2021). The world's largest tea company—Unilever—provides an example in the application to Fair Trade (Sect. 6.1): The company has switched to sustainable sourcing of its entire tea supply, including the conversion of its leading tea brand Lipton (Poret, 2010).

There exist, however, counterexamples, such as the banana company Dole, which offers shoppers a standard product and an organic option that is Fair-Trade certified. Thus, I relax the restriction in this section: I show that the unrestricted monopolist

⁴ The divisionalisation could also be imposed by a regulator due to antitrust concerns. For example, the U.S. Department of Justice judged Grupo Modelo—the producer of the specialty beer "Corona"—to be a "maverick" that is effective at keeping prices low in an oligopolistic market (Davidson, 2013). Therefore, the merger between Modelo and Anheuser-Busch InBev (ABI) was approved conditional on ABI and Modelo divesting Modelo's entire U.S. business to create an independent competitor to ABI (U.S. Department of Justice, 2013).

always sells to the entire market, and that it adds a second product line h to its standard product line m if the total handmade premium is sufficiently large.

First, note that if the monopolist produces both products and sets prices $p_m^* = q(x_m, m)$ and $p_h^* = q(x_h, h) + \theta$, then conscious and quality shoppers are indifferent between buying and not buying m , but only conscious shoppers are indifferent between buying and not buying h . Quality shoppers would not buy h at a premium: $p_{Q,h} < p_h^*$. Therefore, offering two product lines with pricing schedule (p_m^*, p_h^*) is incentive-compatible for all shoppers as long as I assume that conscious shoppers buy h when indifferent between the two products and not buying.

Moreover, due to the lower marginal cost and the potentially higher product quality under machine production the monopolist always chooses to sell m to quality shoppers to maximise profit. Therefore, the monopolist needs to consider whether it is profit-maximising to add a second product line h in order to sell a handmade instead of a machine-made product to conscious shoppers.

If the firm adds a second product line h , it makes profit $\Pi(p_h^*, x_h^*; h) = C[\Pi(p_h^*, x_h^*; h) + \theta]$ from selling to segment C; if it offers only one standard product line m to the entire market, the firm makes profit $C\Pi(p_m^*, x_m^*; m)$ from selling to segment C. Comparing the profits in the segment of conscious shoppers, the firm adds product line h if

$$C\theta > C[\Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h)]. \quad (3)$$

Compared to condition (1), the total handmade premium now only needs to outweigh the loss from selling to segment C under increased marginal cost and reduced product quality for a given effort level. Therefore, the model with a restricted monopolist and an unrestricted monopolist make identical predictions if the total premium is so low that condition (3) does not hold: All shoppers are served a machine-made product. If the total premium is moderate so that condition (3) but not (1) holds, the unrestricted monopolist sells h rather than m to segment C. If the total premium is high, a niche production strategy is optimal only for the restricted monopolist. The unrestricted monopolist offers two product lines to serve the entire market.

In contrast to Mussa and Rosen (1978) and Deneckere and McAfee (1996), the unrestricted monopolist in my model does not cannibalise some of its high-quality market m when introducing the lower-quality product h because my shoppers have identical valuations for quality. Intuitively, the firm does not face a negative externality that would limit its possibilities for capturing all of the consumer surplus when adding a second product line. Hence, the unrestricted monopolist achieves perfect discrimination instead of imperfect discrimination in my model.

4 Duopoly

In many product categories—such as soap and ceramic tableware—the availability of high-quality machine production does not prevent firms from selling handmade products (Fuchs et al., 2015): Consumers are given the choice of buying a handmade or a machine-made product. What is more, there is specialisation: The products tend

to be sold by different firms. I model this setting with the above framework extended to two firms, F_i and F_j : Each firm can specialise in m or h , and can sell to both segment C and Q . The firms choose the production process, the product's per-unit price, and the per-unit effort level, simultaneously. Shoppers continue to have unit demand.

When is specialisation an equilibrium outcome such that both the handmade product and the machine-made product are offered in the market? Specifically, under which conditions does F_i produce and sell h to conscious shoppers, and F_j produce and sell m to quality shoppers? What are the equilibrium prices and profits under specialisation?

Proposition 3 (Specialised Equilibrium) *There exists an equilibrium in which F_i sells h to conscious shoppers at $p_h^{**} - \bar{\varepsilon}$, and F_j sells m to quality shoppers at p_m^* if*

$$\theta \geq \left(C + \frac{1-C}{C} \right) \Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h) \geq \left(\frac{C}{1-C} + \frac{1-C}{C} \right) \Pi(p_h^*, x_h^*; h). \quad (4)$$

Under specialisation, F_i and F_j make the same profit and the price discount offered on h is

$$\bar{\varepsilon} = \theta - \left[\left(\frac{1-C}{C} \right) \Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h) \right] < \theta.$$

Specialisation is an equilibrium outcome if the conscious shoppers' sensitivity to the production process is sufficiently high. Specifically, condition (4) prevents a profitable deviation for F_j and F_i , respectively.⁵ Only a one-sided price reduction on h but not m can be a specialised equilibrium: F_j charges p_m^* , while F_i charges $p_h^{**} - \bar{\varepsilon}$. Given Assumption 2, conscious shoppers would want to deviate to buying a machine-made product if F_j reduced p_m^* while F_i charged p_h^{**} .⁶ The discount offered on h is strictly positive and bounded above by θ , which prevents a profitable deviation for quality shoppers. The price discount on h leaves conscious shoppers with strictly positive utility, whereas quality shoppers are left with zero utility: They are indifferent at $p_m^* = p_{C,m}$.

Proposition 3 highlights that the presence of conscious shoppers and the choice of production process $k \in \{h, m\}$ can break the usual price competition. Instead of a Bertrand duopoly in which the two firms target overlapping market segments and compete prices down to marginal cost to capture shoppers, F_i and F_j choose to act as monopolists in distinct market segments. The firms can act as monopolists because the segments do not adjust in response to relative price changes.

My result is in line with d'Aspremont et al. (1979, p. 1149), who note that "oligopolists should gain an advantage by dividing the market into submarkets in each

⁵ If condition (4) does not hold, specialisation with a two-sided price reduction can be an equilibrium. The specialised equilibrium in Proposition 3 is robust to k being chosen before p_k and x_k . The results are available in the supplementary appendix to the working paper.

⁶ If instead $v(m) < 0$, a one-sided price reduction $\hat{\varepsilon} \in (0, v(m)\theta]$ on m would be incentive-compatible for C .

of which some degree of monopoly would reappear". A similar result has been obtained by Shaked and Sutton (1982) in a different setting: When consumers are identical in tastes but differ in income, price competition is relaxed through product differentiation. Mohliver et al. (2019) obtain differentiation in a counter-positioning equilibrium. Firms take opposing stances on a social issue that is characterised by: (i) how much people care about the issue; and (ii) what proportion of the population supports the issue.

The intuition behind Proposition 3 is akin to the one of Mussa and Rosen (1978): A sufficiently strong sensitivity allows the two firms to choose a price-quality schedule that allocates the two shopper types to the two different products h and m by a process of self-selection. Furthermore, given that conscious shoppers focus more on production conditions than on quality, tastes have to be sufficiently diverse for the handmade product to co-exist alongside the machine-made product of higher quality (Eaton & Lipsey, 1989).

An important question for policy is whether such specialisation is efficient. I define an outcome as efficient if it maximises the economic surplus from trade between the firms and the shoppers. The surplus is the sum of those shoppers' marginal benefits that buy a product in equilibrium minus the production costs; equivalently, this is the sum of the firms' profits and the consumer surplus. Therefore, the economic surplus in the specialised equilibrium is

$$\begin{aligned} ESS &:= QA_m x_m^* + C(A_h x_h^* + \theta) - Qc(x_m^*) - Cc(x_h^*) \\ &= Q\Pi(p_m^*, x_m^*; m) + C\Pi(p_h^*, x_h^*; h) + C\theta = 2Q\Pi(p_m^*, x_m^*; m) + C\bar{\epsilon}. \end{aligned}$$

Given that conscious shoppers obtain the handmade product and quality shoppers obtain the machine-made product in the specialised equilibrium, a scenario in which the two firms compete in selling h to conscious shoppers only cannot be more efficient. Furthermore, it follows from Proposition 1 that competing in selling h to the whole market cannot be more efficient either. Therefore, I can focus on F_i and F_j competing in selling m to the whole market to establish the specialised equilibrium's efficiency.

Proposition 4 (Efficiency) *The specialised equilibrium is efficient.*

Intuitively, the existence of a specialised equilibrium implies its efficiency: The conscious shoppers' sensitivity to the production process and its associated surplus $C\theta$ is so high in the specialised equilibrium that it trumps the loss $C[\Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h)]$ in surplus from selling a lower-quality product to conscious shoppers.

Some of the gains from efficiency are passed along to conscious shoppers because F_i 's pricing behaviour is disciplined by the presence of a potential competitor (Bain, 1949): The discount $\bar{\epsilon}$ serves as a means to deter the switching of F_j into hand production, and thereby coordinates the firms' behaviour on specialisation. Consequently, the potential competition moderates F_i 's profit but falls short of more vigorous competition (Gilbert, 1989): The discount is smaller than the conscious shoppers' surplus that would be created by perfect competition.

In my analysis so far, I have made the implicit assumption that F_i and F_j play non-cooperatively. I now relax this assumption and allow the two firms to collude in order to study the robustness of the specialised equilibrium in Proposition 3. Under which conditions do the firms not have an incentive to merge to a monopolist, selling a single product k , when sharing the monopolist's profit equally? In particular, either F_i can merge with F_j to sell m to the whole market, or F_j can merge with F_i to sell m to a fraction of the market.

Proposition 5 (Stability) *The specialised equilibrium is stable if $\theta \leq \frac{2(1-C)}{C} \Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h)$ and $C \leq \frac{1}{2}$.*

Corollary 1 (Collusion) *In the specialised equilibrium, there exists $\bar{C} := \frac{\sqrt{5}-1}{2} > \frac{1}{2}$ such that F_i and F_j can profitably collude as (i) h - or m -monopolist for $C > \bar{C}$, and (ii) m -monopolist for $\bar{C} \geq C > \frac{1}{2}$.*

Intuitively, the specialised equilibrium is robust to collusion if the proportion of conscious shoppers in the market is not too large and the conscious shoppers' concern about the conditions under which the product has been manufactured is not too high. Specifically, merging to sell m to the whole market is profitable for F_i and F_j when conscious shoppers are in the majority. Merging to sell h to a fraction of the market requires a larger critical mass $\bar{C}$.

5 Signaling a Social Norm of Conscious Consumption

The baseline model with conscious and quality shoppers explains why a firm chooses production by hand over machine production through a handmade effect on the consumer side. However, the baseline model does not capture the rising demand for and the mainstreaming of costly handmade products (Richards, 2018), the sales growth on dedicated marketplaces like Etsy (Fig. 1), and social movements such as “buyhandmade.org” (Walker, 2007).

In this section, I consider how the firm's handmade strategy can be indicative of a social norm of conscious consumption. As a consequence, shoppers who are not conscious to begin with convert into conscious shoppers and also buy premium-priced handmade products. I develop a signaling model with a single firm in the spirit of Sliwka (2007): quality and conscious shoppers' decision criteria are fixed from the outset, whereas conformist shoppers are influenced by social norms. Under which conditions can the firm credibly signal a social norm of conscious consumption, inducing those conformist shoppers to buy premium-priced handmade products in equilibrium?

5.1 The Extended Model

Shoppers come in three types: As before, quality shoppers care only about product quality whereas conscious shoppers also care about the conditions under which

Fig. 3 The extended market

the product is produced. Following Sliwka (2007), I refer to these two types as the *steadfast* shoppers: Their decision criteria are fixed from the outset. The fraction of conscious shoppers among the steadfast is given by φ , and is drawn from some prior distribution.

Conformist shoppers constitute the third type. Because these shoppers are uncertain about the appropriate consumption behaviour, they are influenced by social norms. For example, if the firm is selling a handmade product, conformist shoppers will take the production conditions positively into account only if they believe that many other shoppers also do. I model this as follows: The production process is payoff-relevant for a conformist shopper if and only if she believes that sufficiently many other steadfast shoppers are also conscious about the production process. In particular, the utility of a conformist shopper is equal to $V_C(a_C; k)$ if she believes that the median steadfast shopper is conscious, and equal to $V_Q(a_Q; k)$ otherwise.⁷

As an established firm, it will typically have learned from previous shoppers' behaviour or will have undertaken market research. Therefore, I assume that the firm knows the fraction of conscious shoppers among the steadfast to be either high or low, $\varphi \in \{\varphi_H, \varphi_L\}$. Moreover, I assume that the firm's private information about the fraction of conscious shoppers is pivotal: $\varphi_H > 1/2 > \varphi_L$.

Consequently, when conformist shoppers are able to infer the firm's private information from its production process, they revise their preferences. Conversely, when conformist shoppers cannot infer the firm's private information, then $\mathbb{E}(\varphi) = \gamma\varphi_H + (1-\gamma)\varphi_L \leq 1/2$ with commonly known prior $\gamma := \Pr(\varphi = \varphi_H) \in (0, 1)$ determines whether conformist shoppers behave like conscious or quality shoppers. The fraction of conformist shoppers in the market has mean η according to the common prior expectation; see Fig. 3.

The timing is as follows. In the first stage, the firm privately observes $\varphi \in \{\varphi_H, \varphi_L\}$. As before, the firm chooses the production process $k \in \{h, m\}$, the product's per-unit price p_k , and the per-unit effort level $x_k \geq 0$. In the second stage,

⁷ Conformist shoppers may pay attention only to steadfast shoppers if the latter segment consists of public persona. These steadfast shoppers are visible through the news (e.g., celebrities) or social media (e.g., bloggers, influencers). In an alternative version, a conformist shopper notices anyone *behaving* like a conscious shopper. If I assume that the firm's private information is important to coordinate conformist shoppers to convert, $\varphi_H > (1-2\eta)/(2-2\eta) > \varphi_L$, where $\eta < 1/2$, Proposition 6 still applies. However, for $\varphi_H < 1/(2-2\eta)$, the separating equilibrium is "less stable", since a conformist shopper is only indifferent between buying and not buying h at a premium if her segment buys h , too.

the shoppers choose whether to buy one unit of the product. All shoppers have unit demand irrespective of the production process.

Given that the firm's choice of the production process may reveal its private information, the extended model is a signaling game. Moreover, depending on a conformist shopper's belief about φ , her action will always correspond exactly to either that of a steadfastly quality shopper or a steadfastly conscious shopper. Hence, the firm's profit in the extended model depends on its production process k and whether conformist shoppers act like conscious or quality shoppers.

Assumption 3 $\Pi(p_h^*, x_h^*; h) + \theta > \Pi(p_m^*, x_m^*; m)$.

Before deriving the key result, I make the assumption that the firm would be better off using a handmade strategy if the market consisted entirely of steadfastly conscious shoppers.

5.2 Separating Equilibrium

The key idea is that it may be attractive for the firm to choose a handmade strategy to signal its private information that most shoppers are conscious. However, even a credible handmade strategy comes with a trade-off: While the firm is better off when conformist shoppers convert into conscious shoppers, quality shoppers do not buy a premium-priced handmade product.

The handmade strategy will be a credible signal when there is separation in equilibrium: A firm that privately observes φ_H produces by hand, and a firm that privately observes φ_L uses machine production. Specifically, when the conformist shoppers believe that the handmade strategy is indeed a credible signal, neither firm can have an incentive to deviate from this strategy. If φ is the firm's private information about the fraction of conscious shoppers among the steadfast, its expected profit under machine production is given by

$$\Pi(p_m^*, x_m^*; m) = [\varphi(1 - \eta) + (1 - \varphi)(1 - \eta) + \eta] \frac{A_m^2}{2c_m} = \frac{A_m^2}{2c_m}. \quad (5)$$

Given Assumption 2, the firm sells to the whole market at price $p_m^* = A_m x_m^*$. Intuitively, under a one-sided concern of conscious shoppers, the market composition is irrelevant for the firm's pricing decision under machine production.

When the firm produces by hand, it must prefer losing out on the fraction of quality shoppers. This follows from Proposition 1: A handmade strategy can never be optimal for a firm that sells to the whole market of shoppers. The firm would have an incentive to deviate. Hence, I assume that $\eta \geq \tilde{\eta}(\varphi_H)$ in the separating equilibrium, where

$$\tilde{\eta}(\varphi_H) := \frac{1}{1 - \varphi_H} \left[\frac{\Pi(p_h^*, x_h^*; h)}{\Pi(p_h^*, x_h^*; h) + \theta} - \varphi_H \right],$$

which implies that $p_h^{**} = A_h x_h^* + \theta$ and $x_h^{**} = x_h^* = A_h / c_h$ are optimal. As quality shoppers' maximum willingness to pay is $p_h^* = A_h x_h^*$, this type will not buy the handmade product.

Simultaneously, the firm benefits from an *amplified handmade effect*: Because conformist shoppers become conscious, they are willing to pay the handmade premium. Hence, there is greater demand for the premium-priced handmade product. The firm's expected profit under hand production is given by

$$\Pi(p_h^{**}, x_h^{**}; h) = [\varphi(1 - \eta) + \eta] \left[\frac{A_h^2}{2c_h} + \theta \right]. \quad (6)$$

Comparing Eqs. (5) and (6), and solving for η highlights that the firm will use a handmade strategy when the fraction of conformist shoppers is larger than the threshold

$$\hat{\eta}(\varphi) := \frac{1}{1 - \varphi} \left[\frac{\Pi(p_m^*, x_m^*; m)}{\Pi(p_h^*, x_h^*; h) + \theta} - \varphi \right].$$

This threshold is decreasing in φ , since higher values imply a lower fraction of steadfastly quality shoppers who do not buy the premium-priced handmade product. As a result, a handmade strategy becomes more attractive. I use the threshold to derive the separating equilibrium.⁸

Proposition 6 (Separating Equilibrium) *If $\theta < \Pi(p_m^*, x_m^*; m)/\varphi_L - \Pi(p_h^*, x_h^*; h)$, a separating equilibrium exists in which the firm sells a premium-priced handmade product to steadfastly conscious and conformist shoppers after observing φ_H , and sells a machine-made product to the whole market after observing φ_L if and only if*

$$\eta \in [\max\{0, \hat{\eta}(\varphi_H)\}, \hat{\eta}(\varphi_L)],$$

where $\hat{\eta}(\varphi_H) < \hat{\eta}(\varphi_L) < 1$ and $\hat{\eta}(\varphi_L) > 0$.

The conscious shoppers' sensitivity to the production process and the fraction of conformist shoppers jointly determine whether the separating equilibrium in Proposition 6 exists. The greater is the fraction of conformists, the smaller is the range of concerns θ for which separation is possible: A handmade strategy becomes more appealing because the firm's expanded market for a premium-priced handmade product grows faster than its base market shrinks.

⁸ There can be other pure-strategy equilibria where the φ_L - and φ_H -firm pool on selling h or m , and a hybrid equilibrium where the φ_H -firm sells h with certainty and the φ_L -firm sells h with probability $x \in (0, 1)$. However, separation is the unique pure-strategy equilibrium in the parameter space of Proposition 6. Moreover, the φ_L -firm pools more often with the φ_H -firm on h in this game of private information relative to when φ is observable. My analysis extends to a situation in which conformists' willingness to pay is increasing smoothly in $\mathbb{E}(\varphi|k)$. The results are available in the supplementary appendix to the working paper.

Moreover, if θ is small, a separating equilibrium exists when there are neither too few or too many conformists. Specifically, when $\theta < \Pi(p_m^*, x_m^*; m) / \varphi_H - \Pi(p_h^*, x_h^*; h)$, the lower bound is given by $\hat{\eta}(\varphi_H)$. When there are few conformist shoppers, even a firm that privately observes φ_H prefers to sell a machine-made product. The higher is the fraction of conformist shoppers, the more attractive it is to signal optimism about the social norm of conscious consumption. But when there are too many conformist shoppers, even a firm that privately observes φ_L would want to imitate this signal, and it would no longer be credible.

If the conscious shoppers' sensitivity is above this value, the total handmade premium from selling to steadfastly conscious and conformist shoppers is so high that a firm that observes φ_H would never want to deviate to machine production. In this case, the separating equilibrium exists when there are not too many conformists and $\theta < \Pi(p_m^*, x_m^*; m) / \varphi_L - \Pi(p_h^*, x_h^*; h)$.

Intuitively, the fewer are the number of steadfastly conscious shoppers, the higher is the cost of using a handmade strategy in the absence of conformists: The firm cannot offset the loss in sales to quality shoppers through higher prices that are charged to conformists. Hence, a firm that knows that the fraction of conscious shoppers among the steadfast is low may want to avoid a handmade strategy even if such a strategy could increase the conformists' willingness to pay. In other words, separation is possible when this firm does not find it profitable to convert conformists as there are too few.⁹

The key result in Proposition 6 is that the firm can use a handmade strategy to create a credible social norm of conscious consumption: The firm that observes φ_H is able to expand its market and mainstream costly handmade products. In essence, a credible signal generates sales growth through a *crowding-in effect*: Conformist shoppers convert into conscious shoppers when observing the firm's handmade strategy. Importantly, this crowding-in effect can operate in a market in which the firm that observes φ_H believes that steadfastly conscious shoppers are in the minority. Specifically, even when the fraction of steadfastly conscious shoppers is arbitrarily small (i.e. $\eta \rightarrow 1$), a handmade strategy may credibly signal a social norm of conscious consumption.

Norm-based interventions and marketing campaigns (e.g., Cialdini et al., 2006) provide empirical support for my result. The credibility problem that limits a campaign's effectiveness is highlighted by Benabou and Tirole (2011). The interaction between conscious shoppers' concern and credibility is also observed by Melloni et al. (2019): In a cheap-talk model, CEO activism is more likely to be a credible and, thus, profitable strategy when shoppers care greatly about the type of firm that they buy from.

⁹ I thank an anonymous referee for inspiring this intuition.

6 Discussion

In this paper, I developed a model that explains a handmade strategy of firms in an era of technological advancement through a handmade effect on the consumer side.

6.1 Further Applications: Fair Trade

My model generates insights whenever a firm chooses between a conventional production process and an alternative production process. The latter includes Fair Trade, organic produce, and local produce. To demonstrate, I relate my assumptions to Fair-Trade production and underline my predictions with empirical evidence in Fair Trade.

My assumptions capture several key characteristics of Fair Trade: First, Fair-Trade products and conventional products—such as coffee and chocolate—are functional substitutes for shoppers: “Fair Trade and traditionally marketed products show at most very little divergence and hardly differ with respect to their functional utility” (Mohan, 2010, p. 34). Second, Fair Trade may be less productive in the short-run. While higher environmental standards ensure sustainability, land may not be farmed as extensively. Farmers are also encouraged to reduce their use of pesticides (Nicholson, 2018). Fair Trade is more costly for the same per-unit effort level: Firms pay a licence fee for the Fair-Trade label, and pay a living wage to workers, which may exceed the legal minimum.¹⁰ Moreover, providing a safe working environment may increase costs.

Conscious shoppers obtain utility from buying a product with a Fair-Trade label.¹¹ Importantly, these shoppers “care about the production process not because of its effects on the quality of the product itself but for other attributes of the process, such as environmental impacts, effects on animal welfare, country of origin, and so on” (Antle, 1999, p. 1002). In essence, the Fair-Trade firm sells a bundle: The conventional product, plus a contribution to a social or ecological production process (Steinrücken & Jaenichen, 2007) or a donation to the farmer (Reinstein & Song, 2012). As is argued by Richardson and Stähler (2014), the mechanism may be a warm glow from the knowledge that a Fair-Trade firm pays its growers a wage premium.

In my baseline model, selling a Fair-Trade product is the outcome of a profit maximisation problem: The firm weighs the additional costs against the expected benefits. In particular, the firm faces the trade-off that it can charge a Fair-Trade premium but only caters to a niche market of conscious shoppers. In my model, this Fair-Trade premium is the conscious shoppers’ maximum willingness to pay for the

¹⁰ A study of Fair-Trade workers in the South African wine industry, for example, finds that wages exceed the legal minimum (Granville & Telford, 2013). Moreover, wages in Fair Trade-certified firms in Ghana are about 38 percent higher than wages in non-certified firms (Krumbiegel et al., 2018).

¹¹ Using data from the Understanding Society UK survey, Busic-Sontic et al. (2017) show that *conscientiousness*, which could be one possible motivation for conscious shoppers, positively affects buying locally sourced goods, organic or green products, and products with recyclable packaging.

subjective services of the Fair-Trade label.¹² My model is in line with the observation that Fair-Trade products are more expensive than conventional products but do not deliver any extra physical quality (Mohan, 2010).

When the firm is part of a duopoly, conventional and Fair-Trade products may co-exist, as is observed in the economy. Moreover, the firms' specialisation leads to market segmentation and allows for third-degree price discrimination: The Fair-Trade label prevents conventional products from entering the Fair-Trade market. When the firm faces conformist shoppers, my model predicts a growth in Fair-Trade sales if the firm can use a Fair-Trade strategy to create a credible social norm of conscious consumption. In particular, the conversion of conformist shoppers into conscious shoppers resembles the increased public awareness and understanding of the Fair-Trade rationale, and its mainstreaming in Europe in the late 1990s (Renard, 2003).¹³

The predicted crowding-in effect aligns with the finding that building positive attitudes and removing skepticism positively impacts Fair-Trade buying behaviour (De Pelsmacker & Janssens, 2007). Consequently, my model not only predicts that "consumers of Fair Trade products form a kind of speciality market club, which can be joined voluntarily by those who are willing to pay extra for the Fair Trade product bundle" (Mohan, 2010, p. 43), but also that the sales growth of Fair-Trade products in Europe can be explained through a credible signal that most steadfast shoppers care.

6.2 Concluding Remarks

In my analysis, I made several simplifying assumptions: While a one-sided concern of conscious shoppers kept my model tractable, one could envisage situations in which regulation enforces firms to state their production process on the packaging. As a result, both hand and machine production are salient when conscious shoppers make the buying decision: $v(h) > 0 > v(m)$. A firm that chooses machine production may then not want to serve all shoppers because conscious shoppers' maximum willingness to pay falls short of quality shoppers' maximum willingness to pay: $p_{C,m} < p_{Q,m}$.

I also assumed that conscious shoppers and quality shoppers do not interact. However, when quality shoppers buy a handmade product that is also purchased by conscious shoppers, they may incur positive spillovers. For example, quality shoppers may value being perceived as conforming to a social norm of green consumerism (Carlsson et al., 2010). Future research could adapt the baseline model to a setting in which quality shoppers are willing to pay more than what is warranted by

¹² See Dragusanu et al. (2014) for a literature review on how much consumers are willing to pay for knowing that a product's production complies with Fair-Trade standards. See Bjørner et al. (2004) for environmental labels.

¹³ See Friedrichsen and Engelmann (2018) for experimental evidence that consumers who choose a conventional product in private increase the premium that they are willing to pay for a Fair-Trade product in a public setting.

the handmade product's quality if they are likely to meet a conscious shopper who bought the handmade product in stage 3.¹⁴ Consequently, a handmade strategy may also be optimal for a firm that caters to the whole market.

Finally, future work could endogenise conscious shoppers' sensitivity to the production process through a handmade spectrum (Etsy, Inc, 2019b): At one end would be producers literally making products with their own hands; and producers designing products with partners physically producing them would fall into an intermediate range. Instead of a binary choice k of the production process, a firm would then choose $\theta \in [0, \bar{\theta}]$ to position itself on the spectrum, where $\theta = 0$ corresponds to the machine production of all components and per-unit cost $c(x_\theta)$ increases in θ .

Proofs

Proof of Proposition 1 I first prove the optimal pricing, discussed informally in Sect. 2. $\square$

Lemma 1 (Optimal Pricing) *If the firm sells h to the whole market, then quality shoppers are indifferent between buying and not buying, and $p_h^* = p_{Q,h}$. If the firm sells h to a fraction of the market, then conscious shoppers are indifferent between buying and not buying, and $p_h^{**} = p_{C,h}$. If the firm sells m to the whole market, then all shoppers are indifferent, and $p_m^* = p_{C,m} = p_{Q,m}$.*

Proof of Lemma 1 Suppose to the contrary that Q are not indifferent when they buy product h at price p_h ; that is, $V_Q(1;h) > V_Q(0;h) = 0$. This implies $p_h < p_{Q,h} = q(h, x_h) < q(h, x_h) + \theta v(h) = p_{C,h}$. Therefore, F could increase p_h by some amount ε without losing Q or C as customers, and F would strictly increase its profit. Hence, charging $p_h < p_{Q,h}$ can never be optimal. At $p_h^* = p_{Q,h}$, $V_Q(1;h) = V_Q(0;h) = 0$. The same logic applies in the other two cases.

The remainder of the proof proceeds in two steps: First, I derive the firm's optimal effort and maximised profit for a given choice of production technology. Second, I compare the firm's maximised profit across production technologies for different values of θ . Let $q'(x_k) := \frac{\partial q(x_k, k)}{\partial x_k}$.

First, suppose that $k = m$. Given Assumption 2, I can focus on the case that F sells m to the whole market. From Lemma 1 and Assumption 1, F sets $p_m^* = q(x_m, m) = A_m x_m$. Therefore, F 's profit from choosing the effort level is $\Pi(p_m^*, x_m^*; m) = (C + Q)[q(x_m, m) - \frac{c_m}{2} x_m^2] = [A_m x_m - \frac{c_m}{2} x_m^2]$, which is maximised at $x_m^* = \frac{q'(x_m^*)}{c_m} = \frac{A_m}{c_m}$. Consequently, F 's maximised profit is $\Pi(p_m^*, x_m^*; m) = \frac{A_m^2}{2c_m} > 0$. Therefore, given $k = m$, the firm always chooses (p_m^*, x_m^*) to sell to the whole market.

¹⁴ See Sebald and Vikander (2019) for a model where shoppers are matched pairwise after the buying decision, and where the peer's beliefs about the purchased product's popularity affects a shopper's social image.

Now, fix $k = h$. There are two scenarios: (i) selling to the whole market at $p_h^* = q(x_h, h) = A_h x_h$; or (ii) selling to C only at $p_h^{**} = q(x_h, h) + \theta v(h) = A_h x_h + \theta$. Suppose $p_h^* = A_h x_h$. Then F 's profit from choosing the effort level is $\Pi(p_h^*, x_h; h) = (C + Q)[A_h x_h - \frac{c_h}{2} x_h^2]$ which is maximised at $x_h^* = \frac{q'(x_h^*)}{c_h} = \frac{A_h}{c_h}$. Consequently, F 's maximised profit is $\Pi(p_h^*, x_h^*; h) = \frac{A_h^2}{2c_h} > 0$. Suppose $p_h^{**} = A_h x_h + \theta$. Then, $x_h^{**} = x_h^*$ with $\Pi(p_h^{**}, x_h^{**}; h) = C \frac{A_h^2}{2c_h} + C\theta > 0$. Therefore, given $k = h$, the firm chooses to sell to C only at p_h^{**} over the whole market at p_h^* if

$$\begin{aligned} \Pi(p_h^{**}, x_h^{**}; h) &= C\Pi(p_h^*, x_h^*; h) + C\theta \geq \Pi(p_h^*, x_h^*; h), \\ \theta &\geq \frac{1-C}{C}\Pi(p_h^*, x_h^*; h). \end{aligned} \quad (7)$$

Second, suppose (7) does not hold: F sells to the whole market under either production process. Then F prefers to produce product m over h if $\Pi(p_m^*, x_m^*; m) > \Pi(p_h^*, x_h^*; h)$. Given $c_h > c_m > 0$, this rearranges to $\left(\frac{A_m}{A_h}\right)^2 > \frac{c_m}{c_h}$. As $\left(\frac{A_m}{A_h}\right)^2 \geq 1$ and $1 > \frac{c_m}{c_h} > 0$, the inequality always holds. If it is optimal to sell to the whole market, the profit is greater for $k = m$. Now, suppose (7) holds: F sells h to a fraction of the market. Then F prefers to produce product h over m if

$$\begin{aligned} \Pi(p_h^{**}, x_h^{**}; h) &= C\Pi(p_h^*, x_h^*; h) + C\theta > \Pi(p_m^*, x_m^*; m), \\ \theta &> \frac{1}{C}\Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h). \end{aligned} \quad (8)$$

Given that (8) is more stringent than (7), that is, $\Pi(p_m^*, x_m^*; m) > \Pi(p_h^*, x_h^*; h)$, the equilibrium production technology is $k = h$ whenever (8) holds. The condition rearranges to $C\theta > Q\Pi(p_m^*, x_m^*; m) + C[\Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h)]$, as is stated in the proposition. $\square$

Proof of Proposition 2 Define $\bar{p} := \bar{q} + \theta$ and $\bar{x} := \frac{\bar{q}}{h}$. First, note that the firm's profit under a binding standard is $\Pi(\bar{p}, \bar{x}; h) = C\left[\bar{q} + \theta - \frac{c_h}{2}\left(\frac{\bar{q}}{A_h}\right)^2\right] < \Pi(p_h^{**}, x_h^{**}; h)$ when selling h to C . I am interested in the conditions under which the unregulated firm chooses to sell h to C , but the regulated firm chooses to sell m to the whole market:

$$\Pi(p_h^{**}, x_h^{**}; h) > \Pi(p_m^*, x_m^*; m) > \Pi(\bar{p}, \bar{x}; h). \quad (9)$$

The second inequality in (9) rearranges as follows:

$$\begin{aligned} \Pi(p_m^*, x_m^*; m) &= \frac{q(x_m^*, m)}{2} > C\left[\bar{q} + \theta - \frac{\bar{q}^2}{2q(x_h^{**}, h)}\right] = \Pi(\bar{p}, \bar{x}; h), \\ \bar{q}^2 - 2q(x_h^{**}, h)\bar{q} + \frac{q(x_m^*, m)q(x_h^{**}, h)}{C} - 2q(x_h^{**}, h)\theta &> 0. \end{aligned}$$

Given that $\bar{q} > q(x_h^{**}, h)$, the unique solution is

$$\bar{q} > q(x_h^{**}, h) + \sqrt{q(x_h^{**}, h)^2 - \frac{q(x_m^*, m)q(x_h^{**}, h)}{C} + 2q(x_h^{**}, h)\theta} =: \check{q}.$$

Note that the first inequality in (9) implies $q(x_h^{**}, h) > \frac{q(x_m^*, m)}{C} - 2\theta$. Substituting for $q(x_h^{**}, h)$ yields

$$\check{q} > q(x_h^{**}, h) + \sqrt{q(x_h^{**}, h) \left(\frac{q(x_m^*, m)}{C} - 2\theta \right) - \frac{q(x_m^*, m)q(x_h^{**}, h)}{C} + 2q(x_h^{**}, h)\theta} = q(x_h^{**}, h).$$

□

Proof of Proposition 3 First, in any such equilibrium the two firms must make the same profit. Otherwise, a firm would prefer to switch to the other production process, and try capturing the other firm's shoppers. In particular, a firm can reduce the price or increase quality. However, I show that a quality increase is more costly. Hence, the firms compete in prices.

For example, an ε price reduction on h reduces profit by $\Pi(p_h^{**}, x_h^{**}; h) - \Pi(p_h^{**} - \varepsilon, x_h^{**}; h) = C\varepsilon$, and increases C 's utility by ε . An ε quality increase reduces profit by $\Pi(p_h^{**}, x_h^{**}; h) - \Pi(p_h^{**}, x_h^{**} + \varepsilon; h) = CA_h\varepsilon + C\frac{c_h}{2}\varepsilon^2$, and increases C 's utility by $A_h\varepsilon$. The profit reduction from a price discount is, thus, proportional to C 's utility increase. The profit reduction from a quality increase, in contrast, is more than proportional. In other words, a price discount is the more effective means: Profit is increasing linearly in price, whereas the effort to increase quality comes with a convex cost $c(x_k)$.

Second, note that, if the other firm was not taken into account, F_i would set p_h^{**} and F_j would set p_m^* so as to extract all surplus from their respective shoppers. Given that $\Pi(p_h^{**}, x_h^{**}; h) \geq Q\Pi(p_m^*, x_m^*; m)$ and if I assume that price adjustment is one-sided, there are two ways to equate F_i 's and F_j 's profit: (i) F_i lowers p_h^{**} by $\bar{\varepsilon}$ while F_j sets p_m^* ; or (ii) F_j lowers p_m^* by $\hat{\varepsilon}$ while F_i sets p_h^{**} . However, (ii) cannot be an equilibrium: C are indifferent between buying and not buying h at p_h^{**} , but C are left with strictly positive utility from buying m at $p_m^* - \hat{\varepsilon} = p_{C,m} - \hat{\varepsilon}$ with $\hat{\varepsilon}$ implicitly defined by $\Pi(p_h^{**}, x_h^{**}; h) = Q\Pi(p_m^* - \hat{\varepsilon}, x_m^*; m)$. Consequently, C would want to deviate to buying m .

In case (i), both C and Q are indifferent between buying and not buying m at p_m^* , but C are left with strictly positive utility from buying h at $p_h^{**} - \bar{\varepsilon}$. Therefore, I can focus on a deviation of Q . Quality shoppers do not have an incentive to deviate to buying h if $\bar{\varepsilon}$ is sufficiently low:

$$V_Q(p_h^{**} - \bar{\varepsilon}, x_h^{**}) = V_Q(p_h^{**}, x_h^{**}) + \bar{\varepsilon} = A_h x_h^{**} - (A_h x_h^{**} + \theta) + \bar{\varepsilon} \leq 0, \quad (10)$$

$$\bar{\varepsilon} \leq \theta.$$

The price discount that equates profits is given by

$$\begin{aligned}\Pi(p_h^{**} - \bar{\varepsilon}, x_h^{**}; h) &= C\Pi(p_h^*, x_h^*; h) + C\theta - C\bar{\varepsilon} = Q\Pi(p_m^*, x_m^*; m), \\ \bar{\varepsilon} &= \theta - \left[\left(\frac{1-C}{C} \right) \Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h) \right].\end{aligned}\quad (11)$$

In the proposed equilibrium with a one-sided price reduction on h , F_i cannot have an incentive to deviate and reduce the price further to p_h^* such that Q switch to buying h :

$$\begin{aligned}\Pi(p_h^{**} - \bar{\varepsilon}, x_h^{**}; h) &= Q\Pi(p_m^*, x_m^*; m) \geq \Pi(p_h^*, x_h^*; h), \\ \frac{A_m}{A_h} &\geq \left[\frac{1}{1-C} \frac{c_m}{c_h} \right]^{\frac{1}{2}}.\end{aligned}\quad (12)$$

Note that $\frac{A_m}{A_h} \geq 1$ and $\left(\frac{c_m}{c_h}\right)^{\frac{1}{2}} < 1$. However, for $C > 0$, $\left(\frac{1}{1-C}\right)^{\frac{1}{2}} > 1$. Therefore, (12) is not implied by the parameter restrictions but is necessary for equilibrium existence, which ensures that F_i does not have a profitable deviation. I will use (12) later to obtain the second condition in Proposition 3. Moreover, (12) implies that the second term on the right-hand side of (11) is strictly positive:

$$\left[\left(\frac{1-C}{C} \right) \Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h) \right] \geq \frac{1}{C} \Pi(p_h^*, x_h^*; h) - \Pi(p_h^*, x_h^*; h) = \frac{1-C}{C} \Pi(p_h^*, x_h^*; h) > 0.$$

Thus, substituting (12) into (11) implies that $\bar{\varepsilon} < \theta$. Given that this condition is stronger than (10), Q do not have an incentive to deviate. Also F_j cannot have an incentive to deviate and reduce the price to such an extent that C switch to buying m . Under pricing strategy $p_h^{**} - \bar{\varepsilon}$, C are left with strictly positive utility $\bar{\varepsilon}$.

Therefore, F_j needs to reduce its price by $\varepsilon \geq \bar{\varepsilon}$ to induce C to switch. To make such undercutting unprofitable for F_j , $\bar{\varepsilon}$ must be sufficiently large. In particular, setting $p_m^* - \bar{\varepsilon}$ (or less) to sell to both Q and C must lead to a weakly lower profit for F_j than selling only to Q at p_m^* :

$$\begin{aligned}Q\Pi(p_m^*, x_m^*; m) &\geq \Pi(p_m^* - \bar{\varepsilon}, x_m^*; m) = \Pi(p_m^*, x_m^*; m) - \bar{\varepsilon}, \\ \bar{\varepsilon} &\geq C\Pi(p_m^*, x_m^*; m).\end{aligned}\quad (13)$$

Substituting the price discount, given by (11), into (13) yields the first condition in the proposition:

$$\begin{aligned}\theta - \left[\frac{1-C}{C} \Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h) \right] &\geq C\Pi(p_m^*, x_m^*; m), \\ \theta &\geq \left(C + \frac{1-C}{C} \right) \Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h).\end{aligned}\quad (14)$$

Note that this first condition implies also that the price discount is strictly positive. I can substitute further for $\Pi(p_m^*, x_m^*; m)$ from (12) to obtain the second condition in the proposition:

$$\begin{aligned}\theta &\geq \left(C + \frac{1-C}{C}\right) \Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h) \\ &\geq \left(C + \frac{1-C}{C}\right) \left[\frac{1}{1-C} \Pi(p_h^*, x_h^*; h) \right] - \Pi(p_h^*, x_h^*; h) = \left(\frac{C}{1-C} + \frac{1-C}{C} \right) \Pi(p_h^*, x_h^*; h).\end{aligned}$$

Finally, note that the equal-profit constraint prevents F_i from selling h to C at a marginally higher price: F_i realises that this deviation results in zero profit. Suppose F_i plans to increase its price by $\epsilon \in (0, \bar{\epsilon})$. As C enjoy a strictly positive utility, they will continue to buy h . However, F_j expects F_i to make a higher profit: It would switch the production process, and would plan to offer h to C at a price $p_h^{**} - \bar{\epsilon} + \frac{\epsilon}{2}$. Price competition in h in this static setting implies that $p_h = c(x_h^{**})$ instantaneously. Thus, F_i is better off selling at $p_h^{**} - \bar{\epsilon}$, and making profit $\Pi(p_h^{**} - \bar{\epsilon}, x_h^{**}; h) > 0$. $\square$

Proof of Proposition 4 First, the economic surplus when the two firms compete in selling m to the whole market is $ESM := (C + Q)A_m x_m^* - (C + Q)c(x_m^*) = \Pi(p_m^*, x_m^*; m)$. The specialised equilibrium is efficient if

$$\begin{aligned}ESS &:= Q\Pi(p_m^*, x_m^*; m) + C\Pi(p_h^*, x_h^*; h) + C\theta \geq \Pi(p_m^*, x_m^*; m) =: ESM, \\ \theta &\geq \Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h).\end{aligned}\quad (15)$$

Given that the specialised equilibrium exists, (14) holds and $(C + \frac{1-C}{C})\Pi(p_m^*, x_m^*; m) > \Pi(p_m^*, x_m^*; m)$ for $C \in (0, 1)$. Therefore, the existence of a specialised equilibrium implies (15). $\square$

Proof of Proposition 5 First, F_i and F_j cannot have an incentive to merge to sell m to the whole market. Given that the firms share the monopolist's profit equally, this implies

$$\begin{aligned}\Pi(p_h^{**} - \bar{\epsilon}, x_h^{**}; h) &= Q\Pi(p_m^*, x_m^*; m) \geq \frac{1}{2}(C + Q)\Pi(p_m^*, x_m^*; m), \\ \frac{1}{2} &\geq C.\end{aligned}$$

Second, F_i and F_j cannot have an incentive to merge to sell h to market segment C . This implies

$$\begin{aligned}\Pi(p_h^{**} - \bar{\epsilon}, x_h^{**}; h) &= Q\Pi(p_m^*, x_m^*; m) \geq \frac{1}{2}\Pi(p_h^{**}, x_h^{**}; h), \\ Q\Pi(p_m^*, x_m^*; m) &\geq \frac{1}{2}[C\Pi(p_h^*, x_h^*; h) + C\theta], \\ \frac{2(1-C)}{C}\Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h) &\geq \theta.\end{aligned}\quad (16)$$

Proof of Corollary 1 From Proposition 3, given that a specialised equilibrium exists, (14) holds. Moreover, from Proposition 5, F_i and F_j do not have an incentive to colude as h -monopolist if (16) holds. Combining these inequalities yields

$$\frac{2(1-C)}{C} \Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h) \geq \theta \geq \left(C + \frac{1-C}{C}\right) \Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h).$$

Therefore, if

$$\left(C + \frac{1-C}{C}\right) \Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h) > \frac{2(1-C)}{C} \Pi(p_m^*, x_m^*; m) - \Pi(p_h^*, x_h^*; h),$$

$$C + \frac{1-C}{C} > \frac{2(1-C)}{C},$$

then merging to an h -monopolist in the specialised equilibrium is always profitable. Given that $C \in (0, 1)$, the above inequality is uniquely solved by $C > \frac{\sqrt{5}-1}{2} =: \bar{C}$, where $\bar{C} > \frac{1}{2}$. From the proof of Proposition 5, collusion as m -monopolist is profitable if $C > \frac{1}{2}$. $\square$

Proof of Proposition 6 Because $\varphi_H > \frac{1}{2} > \varphi_L$, conformist shoppers will convert into conscious shoppers if and only if the firm chooses handmade production. Therefore, the conjectured separating equilibrium exists if the firm prefers handmade production only after observing φ_H , which is equivalent to $\eta \in [\max\{0, \hat{\eta}(\varphi_H)\}, \hat{\eta}(\varphi_L)]$. Under Assumption 3,

$$\frac{\Pi(p_m^*, x_m^*; m)}{\Pi(p_h^*, x_h^*; h) + \theta} < 1,$$

$$[(1 - \varphi_L) - (1 - \varphi_H)] \frac{\Pi(p_m^*, x_m^*; m)}{\Pi(p_h^*, x_h^*; h) + \theta} < (1 - \varphi_L)\varphi_H - (1 - \varphi_H)\varphi_L,$$

$$(1 - \varphi_L) \frac{\Pi(p_m^*, x_m^*; m)}{\Pi(p_h^*, x_h^*; h)} - (1 - \varphi_L)\varphi_H < (1 - \varphi_H) \frac{\Pi(p_m^*, x_m^*; m)}{\Pi(p_h^*, x_h^*; h)} - (1 - \varphi_H)\varphi_L,$$

$$\hat{\eta}(\varphi_H) := \frac{1}{1 - \varphi_H} \left[\frac{\Pi(p_m^*, x_m^*; m)}{\Pi(p_h^*, x_h^*; h)} - \varphi_H \right] < \frac{1}{1 - \varphi_L} \left[\frac{\Pi(p_m^*, x_m^*; m)}{\Pi(p_h^*, x_h^*; h)} - \varphi_L \right] =: \hat{\eta}(\varphi_L),$$

and

$$\frac{\Pi(p_m^*, x_m^*; m)}{\Pi(p_h^*, x_h^*; h) + \theta} < 1,$$

$$\hat{\eta}(\varphi_L) := \frac{1}{1 - \varphi_L} \left[\frac{\Pi(p_m^*, x_m^*; m)}{\Pi(p_h^*, x_h^*; h) + \theta} - \varphi_L \right] < 1.$$

Because $\hat{\eta}(\varphi_H) < \hat{\eta}(\varphi_L) < 1$, the set is non-empty if $0 < \hat{\eta}(\varphi_L)$. This latter inequality rearranges to the condition $\theta < \frac{\Pi(p_m^*, x_m^*; m)}{\varphi_L} - \Pi(p_h^*, x_h^*; h)$ in the proposition. It follows immediately that $\theta < \Pi(p_m^*, x_m^*; m)/\varphi_H - \Pi(p_h^*, x_h^*; h)$ whenever $0 < \hat{\eta}(\varphi_H)$.

Finally, I show that my assumption $\eta \geq \hat{\eta}(\varphi_H)$ is implied by $\eta \geq \hat{\eta}(\varphi_H)$ so that the firm that sells a handmade product does not prefer deviating to p_h^* to sell also to quality shoppers:

$$\Pi(p_h^*, x_h^*; h) < \Pi(p_m^*, x_m^*; m),$$

$$\tilde{\eta}(\varphi_H) := \frac{1}{1 - \varphi_H} \left[\frac{\Pi(p_h^*, x_h^*; h)}{\Pi(p_h^*, x_h^*; h) + \theta} - \varphi_H \right] < \frac{1}{1 - \varphi_H} \left[\frac{\Pi(p_m^*, x_m^*; m)}{\Pi(p_h^*, x_h^*; h) + \theta} - \varphi_H \right] =: \hat{\eta}(\varphi_H).$$

□

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