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“A Survey on Drip Pricing and Other False Advertising”

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Abstract: Drip pricing arises when a firm initially advertises a low price, then reveals additional fees as the consumer advances through the purchase process. We give examples of firms that have been pursued for engaging in drip pricing. We summarize theoretical papers on the topic, emphasizing the importance of whether drip prices are optional or mandatory, as well as the degree of consumer sophistication. We also discuss empirical papers which examine how consumers respond to drip pricing, and which examine how the ability to do drip pricing affects firm profitability. False advertising arises when firms make false claims about the “quality” of their product, which in turn cause consumers to pay more than they otherwise might. We give examples of firms that have been pursued for making such false claims. We summarize theoretical papers on the topic, emphasizing that it may not be optimal for consumers or society to impose very large fines for false advertising. For example, we argue this can be true when consumers are sophisticated and the market is relatively healthy. We also discuss empirical evidence which shows that false advertising can affect consumers’ purchase behavior, and that firms are more likely to use it when the returns are higher.

Keywords: Drip pricing, Add-ons, Obfuscation, Deception, False Advertising, Regulation.

1. Drip Pricing

Drip pricing occurs when a firm initially advertises only part of a product’s price, and then gradually reveals extra fees or charges as the consumer gets closer to the point of purchase. Common examples include hotel resort fees, unexpected service charges, as well as hidden fees for shipping or paying with certain types of payment card.² It is often argued that improvements in technology—by making it easier for firms to use more elaborate pricing schemes—have facilitated drip pricing.³

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² The terms drip pricing and partitioned pricing are often used interchangeably, but technically they are different. In both cases the final price consists of several different fees. However with drip pricing these fees are revealed sequentially, whereas with partitioned pricing they are all revealed upfront. Due to space constraints we focus on drip pricing. However we note that partitioned pricing may also increase firms’ market power, by confusing consumers (as in, e.g., Carlin, 2009), or by making it harder for consumers to compare offers (as in, e.g., Wilson, 2010), especially when fees are framed differently (as in, e.g., Piccione and Spiegler, 2012, or Chioveanu and Zhou, 2013). See Bianchi et al (2021) for a review of this literature.

³ For instance, firms can use their online choice architecture to drip prices (see, e.g., CMA, 2022), and can also use increasingly advanced algorithms to set those prices (see, e.g., Assad et al, 2021).

Drip pricing has attracted significant attention from policymakers. For example, the UK and EU responded quickly to so-called 99p flights by requiring airlines to quote all-inclusive prices (Gow, 2008). As another example, in 2012 the FTC warned 22 U.S. hotels that their resort fees were not displayed prominently enough to consumers, and that as a result they might be violating laws that protect consumers from deceptive practices (Sullivan, 2017). Meanwhile, in Canada the CCB has pursued a variety of firms for drip pricing—resulting, for example, in a combined \$3m fine in 2016 for the rental car firms Avis and Budget, and a \$4.5m CAD fine in 2019 for Ticketmaster (Friedman, 2020). In Australia the ACCC has pursued several firms for drip pricing, including Airbnb and eDreams (ACCC, 2015).

We now review the theoretical literature on drip pricing, before turning to empirical evidence.

1.1 Theory

One branch of the theory literature takes a behavioral approach.⁴ An important contribution is by Ellison (2005). To illustrate the main idea, consider the following simple model. There are two firms located at opposite ends of a linear Hotelling line. The firms offer a base good (e.g., a flight) and an add-on good (e.g., checked luggage, or fees for paying by card). Initially firms advertise only their base good prices, and consumers use those to decide which firm to buy from. Later on, consumers also learn the add-on price charged by their chosen firm, and then decide whether or not to complete the transaction. Consumers are either naïve or sophisticated. Naïve consumers do not anticipate needing the add-on, and so do not account for it when choosing a firm. Sophisticated consumers do anticipate needing the add-on good, and form rational expectations about its price when choosing a firm; these consumers can also make a costly (and socially inefficient) investment to avoid needing the add-on in the first place (e.g., they buy a small suitcase to take onboard, or they have a payment card which does not incur fees). Suppose also that sophisticated consumers have a lower transportation cost on the Hotelling line than naïve consumers (i.e., sophisticated consumers view the firms' products as being less differentiated).

Ellison (2005) shows that, compared to a situation where all prices are announced upfront, drip pricing benefits firms and harms consumers (in aggregate). Intuitively, firms have ex post monopoly power on their add-on good, and so charge as much as they can (subject to not losing the sale). Sophisticated consumers rationally anticipate this and take actions to avoid needing the add-on good altogether. Firms have an incentive to compete more fiercely on the base good, so as to attract naïve consumers who can be ripped-off later on for the add-on good. However, crucially, firms do not compete away all the rents from the add-on good, i.e., there is incomplete passthrough. This is due to what Ellison calls a “cheapskate externality.” Specifically, because sophisticated consumers view the firms as less differentiated, they are more responsive to price cuts compared with naïve consumers. Consequently, when a firm slightly undercuts its rival on the base good, it attracts

⁴ The literature primarily focuses on negative aspects of drip pricing. We note, however, that when products are complex with many optional add-ons, it would be impractical to advertise all of them upfront or offer one all-inclusive price. Hotel resort fees have also been argued to enable hotels to pay lower commissions to online travel agencies (see, e.g., Sullivan, 2017).

disproportionately many sophisticated consumers. However sophisticated consumers do not buy the add-on and so are less profitable—which limits how aggressively firms compete on their base good.⁵ As a result, drip pricing benefits firms and lowers aggregate consumer surplus; it also reduces total welfare, because sophisticated consumers make socially inefficient investments to avoid the add-ons.

The above discussion is predicated on the assumption that both firms use drip pricing. It is natural, however, to wonder whether firms might have incentives to “unshroud” their add-on price and inform consumers upfront of both their base and add-on prices. A common intuition is that each firm could gain by unilaterally unshrouding: a firm could thereby commit to a low add-on price, raise total surplus (by eliminating the inefficiency described in the previous paragraph), and capture some of that extra surplus through higher profit (see, e.g., Shapiro, 1995). Nevertheless, Gabaix and Laibson (2006) show that this logic is incomplete. To illustrate why, continue with the earlier Hotelling set-up, but now suppose that when one or more firms unshroud, naïve consumers become sophisticated—meaning that they too account for add-on prices, and can avoid them by making costly investments. A firm that considers unshrouding now faces a trade-off. On the one hand, it can price add-ons low enough to induce sophisticated consumers to buy them. On the other hand, it now loses the high add-on revenues it could previously earn from naïves. Gabaix and Laibson call this latter effect the “curse of debiasing.” When it is relatively easy for even the “educated” naïve consumers to avoid add-ons, the curse of debiasing dominates, such that there is an equilibrium where neither firm unshrouds.⁶

Other papers have sought to explain drip pricing when consumers are fully rational but must incur search costs. Ellison and Wolitzky (2012) consider a model where a consumer’s total search cost is strictly convex in the amount of time spent searching. They show that a firm optimally increases how long it takes a consumer to learn about its offering (e.g., by slowly dripping prices) to deter consumers from searching other firms. Similarly, in a model where consumers have limited time and can either study an existing firm’s offering (e.g., to learn about its drip prices) or browse other firms’ offerings, Heidhues et al (2021) show that drip pricing limits how many firms a consumer can search, again relaxing competition. Meanwhile Baye and Morgan (2019) argue that when consumers expect all firms to drip price, this raises consumers’ search costs and gives all firms greater market power—including those that, for whatever reason, choose not to use drip pricing.

Finally, drip pricing is also related to the pricing strategy of a multiproduct retailer that advertises only some of its prices (e.g., because advertising is costly). Along these lines, in

⁵ In contrast, if all consumers buy the add-on good (e.g., because it is too costly for sophisticated consumers to avoid), it is well-known from Lal and Matutes (1994) that firms fully compete away the rents that they earn from add-ons. In this case drip pricing is neutral for consumers and firms. As a result, Ellison and Ellison (2018) argue that “mandatory” add-ons, which are incurred by all consumers, are less harmful than “optional” ones.

⁶ This framework has been very influential, and several authors have built on it. For example, Johnen and Somogyi (2022) show that a platform which hosts sellers, has more incentive to shroud sellers’ add-on prices than do the sellers themselves. This is because the platform internalises the negative externality that one seller imposes on the others when it unshrouds. As another example, Inderst and Obradovits (2022) consider a model where consumers are relative thinkers, and show that fierce competition on the base good makes quality less salient, inducing sellers to produce inefficiently low-quality products.

Rhodes (2015) there is a multiproduct monopolist that sells independent products but advertises the prices of only some of them. Consumers must pay a search cost to travel to the store and purchase, whereupon they learn the prices of unadvertised products as well. In equilibrium the firm sets a low price on its advertised products, and consumers pay high dripped prices on the unadvertised products. However, as the firm lowers its advertised prices, this attracts more low-valuation consumers to the store, which makes it optimal for the firm to lower its unadvertised prices as well. Hence low-price advertising helps credibly signal relatively low drip prices.⁷

1.2 Empirics

There is considerable empirical evidence that consumers are less sensitive to add-on prices compared to the price of the base good i.e., that some consumers are “naïve” as in the earlier theory papers. Chetty et al (2009) find that beer sales are more sensitive to taxes that are included in the shelf price, compared to taxes that are added at the till. The authors also surveyed consumers and found them to be generally well-informed about the magnitude of the latter tax, suggesting their results were not driven by a lack of consumer information. Meanwhile several studies have shown that consumers tend to underweight shipping fees on eBay and other internet platforms, especially when fees are shrouded (see, e.g., Hossain and Morgan, 2006, and Brown et al, 2010). For instance, Einav et al (2015) found that a \$1 increase in the shipping fee on eBay had little effect on the probability of an item selling, and only reduced the auction sales price by around \$0.8.⁸

Other studies have sought to explain why consumers are less sensitive to add-on prices. Seim et al (2017) look at the Portuguese market for driving lessons. Learner drivers must buy an initial block of lessons, and then if they fail a written or practical test they must buy an additional set of lessons (usually from the same driving school). The authors find evidence of add-on pricing: mark-ups on the additional lessons are insensitive to competition and are also two to three times higher than mark-ups on the initial lessons. Survey evidence suggests that this is driven by the fact that a significant fraction of consumers is either unaware of add-on prices or underestimates the likelihood of failing the first test and hence needing to buy the add-ons. Meanwhile Santana et al (2020) run lab experiments where consumers must choose between two airlines—one with a high all-inclusive price, and another which has a lower base price but a higher total price once various dripped add-on fees are accounted for. The authors find that consumers tend to pick the second option even though ex post they are unhappy at having made this choice. The authors attribute this firstly to consumers forming (incorrect) beliefs that the other option will also have drip pricing, secondly to consumers not wanting to spend time to go and check this, and thirdly to

⁷ This set-up resembles drip pricing with optional add-on fees, since consumers are not obliged to buy every product in the store. When instead add-on fees are mandatory, Gomes and Tirole (2018) show that a high price for the base good signals a low add-on price; the intuition is that a high margin on the base good makes it attractive for the firm to complete the transaction, which tempers its incentive to overprice add-ons.

⁸ Huck and Wallace (2015) use lab experiments to see how different forms of price framing affect consumer behavior, and find that drip pricing leads to the largest drops in consumer surplus. See also Ahmetoglu et al (2014) for a review of earlier studies on the impact of drip pricing and related practices.

consumers developing an attachment to the product they initially choose (as in the endowment effect of Kahneman et al, 1991).

Another strand of the literature looks at the impact of drip pricing on firm performance. Ellison and Ellison (2009) looked at pricing by sellers of computer parts on a comparison site. The authors note that sellers tend to compete very fiercely on low-quality items, then try to upgrade consumers to higher quality (and more expensive) items once they have clicked through to the seller's site—which can loosely be interpreted as a form of drip pricing. Consistent with the cheapskate externality discussed earlier, as a seller reduces the price of its low-quality product, it makes more sales overall, but a smaller fraction comes from the (more-profitable) upgrade products. The authors argue that this explains why sellers earn reasonable mark-ups despite having very similar products. Meanwhile Blake et al (2021) exploit a natural experiment in which StubHub randomly decided to present a given consumer with a dripped or an all-inclusive price. They find that obfuscating a 15% fee leads to a 21% increase in revenue, part of which is driven by the fact that consumers in the drip pricing group opt for more expensive (higher quality) tickets. This happens even though these “dripped consumers” are more likely to quit the platform just before the payment stage (when they learn about the fee). Dertwinkel-Kalt et al (2020) look at purchases at an online cinema store, and also find that dripped consumers are more likely to add a product to their basket, but also more likely to drop out later on. However they find that these two effects cancel out and so drip pricing does not increase revenues.⁹

We now turn to false advertising in the form of deceptive claims.

2. False Advertising Claims

Firms sometimes make false claims about their products—common examples would be false claims about where the product was manufactured, its environmental impact, or its health benefits.¹⁰

Such false claims have also attracted significant interest from regulators. In the UK the ASA has banned adverts from several household names, including L'Oréal's use of retouched images of Julia Roberts to advertise skin cream (Reuters, 2011). In the U.S. the FTC has also pursued several well-known companies for false advertising, including Kellogg's for making unsubstantiated claims about how its cereals improve a child's immunity and concentration at school (FTC, 2010). More recently the FTC has also challenged a number of smaller companies, including some that falsely used “Made in USA” claims to market protective

⁹ Other studies use lab experiments. In Kalayci and Potters (2011) sellers compete for buyers by choosing the number of attributes and a price. Buyers are more prone to mistakes when facing products with multiple attributes. In turn, sellers that choose more attributes also set higher prices. In Rasch et al (2020) sellers compete for buyers by setting base prices as well as a dripped add-on price. Sellers typically set their drip prices at or close to the maximum level, and although they adjust their base prices downwards, they still earn positive profits despite being homogeneous; profits fall when sellers are forced to use all-inclusive pricing.

¹⁰ We will focus on “direct” false claims about quality. However Armstrong and Chen (2020) provide evidence that firms also falsely claim to be offering consumers large discounts off previous sales prices, and they show how such claims may “indirectly” induce consumers to overestimate the firm's product quality.

equipment during the Covid pandemic (FTC, 2022). More broadly, in recent years car manufacturers such as Volkswagen paid substantial fines for falsifying emissions tests.

We again start by reviewing theory papers on false advertising, before turning to empirical evidence.

2.1 Theory

A growing theoretical literature demonstrates that it is not always optimal from a consumer (or social welfare) viewpoint to impose large fines on firms that are found to engage in false advertising.

Rhodes and Wilson (2018) consider a model with a monopoly seller and show that the optimal fine can be small (or even zero) when the market is relatively “healthy”. In more detail, the seller in their model is privately informed of whether it has low or high product quality. The firm makes a claim about its product quality and sets a price. Consumers use this information to form a belief about quality. An individual consumer’s utility from buying the product is the sum of its quality and an idiosyncratic match term. After consumers observe the claim and price, and decide whether to buy, a consumer protection authority audits the firm—and imposes a fine if the firm falsely claimed to have high quality.

The degree of consumer sophistication plays an important role. To see this, start with the case where consumers naïvely believe the firm’s claim. The high type always makes a high claim and sets a high price. The low type mimics the high type if the fine that it will incur is sufficiently small, and otherwise truthfully claims to have low quality and sets a low price. False advertising therefore harms consumers in two ways: when the firm has low quality, consumers overpay for the product, and some of them will regret their purchase when they learn *ex post* that quality is low. Consumers are therefore better off when the authority sets a sufficiently high fine that deters false advertising.

Now consider the case where consumers are rational. Rhodes and Wilson focus on an equilibrium where the high type always reports truthfully, but the low type randomizes between lying and telling the truth—and the probability of the low type lying is smoothly decreasing in the authority’s fine. When consumers observe a low claim they believe it, and so the firm sets a low price. When consumers observe a high claim they Bayesian update their belief about quality—and so find the claim more credible when the fine is higher. An increase in the fine reduces the amount of false advertising, which then has countervailing effects on consumer surplus. On the one hand, consumers gain because they are less likely to be fooled into buying a low-quality product at a high price. On the other hand, consumers lose because all firms that claim high quality are now more credible and so can set a higher price. This latter effect is shown to dominate when the market is relatively healthy, *i.e.*, the firm is likely to have high quality, and even low quality is reasonably good.

Piccolo et al (2015) provide a related analysis in a competitive framework. In their model one high-quality and one low-quality firm simultaneously set prices and make quality claims. Consumers are homogeneous and wish to buy one unit of the product; they are rational but uninformed about which firm has which quality. The authors show that a lax policy towards

false advertising causes the firms to pool together—and since this makes the firms appear undifferentiated, they engage in very fierce competition. This increased price competition can outweigh the loss to consumers from buying the low- rather than the high-quality product, and thus a lax policy can be optimal for consumers.¹¹

Other papers suggest alternative ways in which softer penalties for false advertising can sometimes be beneficial. For example, Corts (2013, 2014) considers a setting where a firm has a private signal about its product quality, but needs to pay a cost to learn its true quality. Assuming this learning cost is large, Corts shows that welfare is higher when the authority imposes only a mild fine for false advertising. The reason is that this encourages the firm to make unsubstantiated quality claims, which then enables it to convey its (valuable) private information. Janssen and Roy (2022) consider a setting where advertising is costly, and firms with high quality can try to signal either via advertising or via price. They show that welfare is higher with a zero rather than a moderate fine. Intuitively, with a zero fine, claims have no credibility, and so high-quality firms signal their quality through high prices. Moderate fines lend credibility to advertised claims, so high-quality firms use them instead of price signalling. In both cases final consumption choices are the same, but the advertised claims in the latter case are socially wasteful. In other papers firms can choose the degree of false advertising. For example, in Aköz et al (2020) firms engage in an arms race to artificially raise their online reviews; this can enable high-quality firms to stand out to the benefit of consumers. As another example, Wu and Geylani (2020) show that a tougher policy towards false advertising can backfire if it causes firms to make their false claims harder to detect.¹²

2.2 Empirics

There is a growing empirical literature which documents the existence of false advertising and shows that it increases consumers' willingness-to-pay. A classic paper is Jin and Kato (2006) which looks at quality claims made by sellers of baseball cards on eBay. It was standard practice for sellers to make a claim about a card's quality on a scale from 1 to 10. The authors bought a sample of these cards and had them professionally graded—and found little correlation between a card's actual and claimed condition. Nevertheless, high claims did affect consumer behavior: the authors estimate that when a seller increases its claim by one point, the card is 5% more likely to be sold, and conditional on selling, the winning price is over 20% higher. Meanwhile He et al (2022) study the market for fake Amazon reviews. Exploiting a period where the platform quickly deleted a large number of reviews, they find

¹¹ Total welfare is also not necessarily maximized when penalties for false advertising are very high. Intuitively, because firms have market power they restrict output below the socially efficient level—so some degree of false advertising can raise welfare, by inducing consumers to buy more of a product than they otherwise would. See, e.g., Rhodes and Wilson (2018) when consumers are rational, and Glaeser and Ujhelyi (2010) and Hattori and Higashida (2012) when consumers naively believe firms' claims.

¹² Although we have framed the discussion in terms of optimal fines for false advertising, there are several other interesting angles that have been explored. For example, Barigozzi et al (2009) look at how (potentially false) comparative advertising by a new entrant can help it compete with an established incumbent. Meanwhile Drugov and Troya-Martinez (2019) examine how a firm can make its false claims vaguer such that it is harder for an authority to convict it, whilst Baumann and Rasch (2020) study the differing incentives of private and public bodies to pursue firms suspected of engaging in false advertising.

that fake reviews were mainly for low-quality products and were successful in boosting their sales rank.

Turning to offline markets, Cawley et al (2013) document widespread false advertising in the market for over-the-counter weight loss products. For example, around a quarter of the TV ads in their sample contained at least one deceptive claim. Interestingly, they find that consumers respond to false advertising in different ways—with men tending to consume more of the product but women tending to consume less. Continuing with false health claims, Rao and Wang (2017) exploit FTC action against four household brands. Demand for the products (controlling for price) decreased after the false claims were removed, resulting in estimated drops in revenue of roughly 10%-70%. In the same spirit, Kong and Rao (2021) exploit action by the FTC against four companies that were falsely using “Made in USA” claims. Three of the companies experienced a drop in sales after they stopped making the false claim; in one case the drop in sales was estimated to be almost 20%.

Other papers explore firms’ incentives to engage in false advertising. Zinman and Zitzewitz (2016) examine claims made by ski resorts about the amount of fresh snowfall in the preceding twenty-four hours. Comparing these reports with government weather data, they find that ski resorts make exaggerated claims. Moreover, ski resorts exaggerate more when the payoff from doing so is higher. For example, they exaggerate more at weekends—when presumably consumers can travel further to ski and so are more sensitive to snowfall reports—and they exaggerate less after the introduction of an iPhone app which allows skiers to report actual snowfall (and this effect seems to be more pronounced at resorts with better phone reception). Finally, although we have focused on “positive” false claims, firms may also make false negative claims about their rivals. Mayzlin et al (2014) and Luca and Zervas (2016) report suggestive evidence of this for hotel reviews on TripAdvisor and restaurant reviews on Yelp respectively. In both studies, when a firm’s competitors have (arguably) more incentive to post negative reviews about it, the firm does indeed receive more such reviews.

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