

Free-baiting: policy applications for freeness removal and the zero price effect

ETHAN LOWENS*

Harvard Law School, Cambridge, MA, USA

Abstract: This paper explores “free-baiting” as a behavioral policy tool for reducing participation in socially undesirable activities. Empirical evidence establishes that when a good or activity ceases to be free, consumption plummets. A free-baiting policy creates conditions of freeness in order to subsequently take advantage of the discouraging effects of freeness removal. The initial free phase shifts consumers’ reference price for the target activity to zero. Subsequently, prices are returned to market levels – a staggering price increase. Behavioral factors enhance the salience of that price increase. It occurs along the steepest part of the money utility curve. It is especially salient because it is presented as a loss. In addition, it may trigger the endowment effect: forcing people to give something up in order to partake in the target activity once it is no longer free. Moreover, these discouraging effects can enhance the efficiency and effectiveness of other interventions. Free-baiting manufactures a policy window, creating a moment in which many consumers simultaneously confront obstacles to the target activity. The effects of free-baiting are illustrated using several hypothetical interventions, including rush-hour roadway tolls, sugary beverages, gasoline and tobacco.

Introduction

Could free gasoline encourage people to buy fuel-efficient cars? Could free soda reduce people’s intake of sugary beverages? These are implications of “free-baiting,” a policy tool for discouraging socially undesirable behaviors.

Free is powerful. The use of freeness to attract attention and increase consumption is ubiquitous. Tech companies offer free versions of their products to grow a user base. Free trials are used to attract, and then convert, paying customers. Tobacco companies once used free samples to children to attract new smokers (Davis & Jason, 1988).

* Correspondence to: Harvard Law School, Cambridge, MA 02138-2903, USA. Email: elowens@jd21.law.harvard.edu

When a product goes from being not free to being free, demand spikes. Amazon generated many more orders with free shipping than \$0.10 shipping (Shampanier *et al.*, 2007). Hotel rooms with free breakfasts are substantially more popular than those with very low-cost breakfasts (Nicolau & Sellers, 2012). Compared to a scenario in which chocolates were priced at \$0.14 and \$0.01, preference for the lower-priced chocolate increased sharply when prices were \$0.13 and free (Ariely, 2008).

The reverse also appears to be true: when something ceases to be free, consumption plummets. In the summer of 2008, three of the four largest US airlines announced that they would begin to charge checked bag fees on domestic flights (CNN Money, 2008; Maynard, 2008a, 2008b). Checked bags per passenger dropped 13% in 5 months. In 2009, the number of checked bags per passenger was 17% lower than in 2007. By 2012, checked bags per passenger fell to 23% below the 2007 benchmark (United States Department of Transportation, 2019; United States Transportation Security Administration, 2019). Regional US newspapers saw traffic drop by an average of 51% when they erected paywalls (Chiou & Tucker, 2013). There is high attrition among customers attracted by “free trial” offers once those free trials end (Pauwels & Weiss, 2008).

This phenomenon is not unique to US consumers and their discretionary spending. Research in low- and middle-income countries shows that take-up of medical treatments, services and devices drops substantially when they cease to be free (Abdul Latif Jameel Poverty Action Lab, 2011). For example, bed-net take-up in Kenya dropped by 60% when the cost increased from free to a price well below market rate (Cohen & Dupas, 2010). Also in Kenya, take-up of deworming treatments dropped 80% when consumers were charged a fee (Kremer & Miguel, 2007).

Freeness appears to stimulate a powerful behavioral response. This response can be leveraged to achieve social policy goals. This paper focuses on using the discouraging effects of freeness removal to achieve those goals.

Contemporary public policies such as carbon taxes, plastic bag taxes and congestion pricing for driving in crowded cities leverage the discouraging effect of freeness removal. These policies aim to curtail a socially undesirable behavior. Their effectiveness derives at least in part from taking away something that used to be free: increasing the cost of a grocery bag from \$0.00 to \$0.05 is likely more discouraging than an increase from \$0.10 to \$0.15. Notably, in each of these examples, freeness was the status quo before government intervention. The policies take advantage of the discouraging effects of freeness removal by imposing a cost on something that was always free.

If the discouraging effect of freeness removal were powerful enough, it could justify artificially creating conditions in which an undesirable activity were free

in order to subsequently take advantage of the discouraging effects of freeness removal. This article explores that premise: I propose a behaviorally informed public policy tool called “free-baiting.”

Free-baiting aims to reduce participation in a socially undesirable activity. A free-baiting policy involves two stages: first, accustom people who partake in the undesirable activity to that activity being free; and second, leverage the behavioral response to freeness removal by imposing a cost. The free-baiting policy succeeds if, over the long term, the social harm caused by the undesirable activity is lower than it would have been without the policy (or, alternatively, if the reduction in harm is greater than it would have been with investing similar resources in another policy).

Free-baiting is counterintuitive. The first phase of free-baiting *reduces* the cost of an activity that policymakers intend to curtail. The cost is reduced to zero – and, as discussed earlier, people are especially likely to partake in an activity when it is free. In concrete terms, free-baiting temporarily encourages people to pollute, smoke, drink sugary sodas, dump garbage, use natural resources or drive on crowded roads. The fundamental premise of free-baiting is that the subsequent discouraging effects of freeness removal will prevent more harm over the long term than will be caused by the temporary encouraging effects of freeness.

Even if the policy succeeds, it is disquieting. Policymakers must deliberately cause harm and use public resources to do so. Such taboo trade-offs are a ubiquitous feature of the modern regulatory state. Federal regulations must include a cost–benefit analysis (United States Executive Order No. 12,291, 1981; Sunstein, 2019), which treats all goods as fungible by pricing them in dollars (Chen, [forthcoming](#)). This implies a trade-off between money and, for example, clean air, children’s health or workers’ safety. Federal regulations or proposals have required estimating the impact, in dollars, of a rape in prison, or a year of life added by reduced risk of cancer from smoking (Chen, [forthcoming](#)). While many people will refuse, when surveyed, to put a dollar value on such intangible goods, they do not decry government policymaking that relies on cost–benefit analysis as morally bankrupt (Chen, [forthcoming](#)).

Free-baiting involves two taboo trade-offs. First, there is a temporal trade-off between long-term harm reduction and short-term harm. Moreover, the amount of harm caused in the short term likely tracks with the policy’s long-term benefits. A longer free period would more reliably shift consumers’ reference price to zero. Second, there is a trade-off between some citizens and others: some people harmed by the first phase of a free-baiting policy will not be the ones to benefit over the long term. Even if a free-baiting policy were highly successful, voters and public officials might oppose it because of the taboo trade-offs it requires. The measure of success discussed here – whether free-baiting

results in long-term net harm reduction – is merely a threshold test. Deciding whether a specific free-baiting policy would be advisable *must* engage these difficult ethical and value-laden issues.¹

The rest of this article explores the effects of free-baiting – how and why it would discourage undesirable behavior. The initial free phase repositions the status-quo price of the target activity to zero. With the end of the free phase comes a dramatic cost increase. Behavioral factors enhance the salience of that cost increase. The cost of partaking in the undesirable behavior becomes especially pronounced because it is framed as a loss. The cost increase occurs on the steepest part of people’s money utility curve. In addition, it may trigger the endowment effect by forcing people to give something up in order to partake in the target activity once it is no longer free. Moreover, these discouraging effects of free-baiting make other interventions more efficient and effective. The end of the free phase manufactures a policy window when many people simultaneously confront a barrier to the target activity. Policymakers can utilize that moment to intervene on a large, captive audience.

Empirical support

Research on behavioral pricing lends empirical support to the theoretical intuitions behind free-baiting and helps guide its application to public policy. Empirical studies analyze the influence of freeness on consumer behavior – how it affects engagement, sales and consumption. These findings are illuminating for designing a free-baiting intervention.

Three focuses within the marketing literature are particularly relevant to free-baiting. First, research on bundling, where a product is included for free along with a paid product, suggests that the free add-on increases the attractiveness of the bundle, but may lower the consumer’s reference price for both the main product and the free item (Raghubir, 2004; Kamins *et al.*, 2009; Palmeira, 2013). Second, research on free trials shows that they expand exposure to new customers. However, studies suggest that customers who are converted through a free trial may have a lower reference price than customers who paid from the outset (Pauwels & Weiss, 2008; Foubert & Gijsbrechts, 2016). Third, the literature on products with tiered inferior and premium versions (such as “freemium” or “marketing bait” models) finds that offering a free version of a product often expands the overall user base. However, whether

¹ There is substantial scholarship on the ethics of taboo trade-offs (Kelman, 1981; Fiske & Tetlock; 1997; Carruthers, 2010) and alternatives to cost–benefit analyses that allow comparisons between intangible goods without assigning them a dollar value (Bronsteen *et al.*, 2013).

that converts to more premium-tier customers is debated, with indications that the answer is highly context dependent (Arora *et al.*, 2017; Hüttel *et al.*, 2018).

Additional research explores the drivers of these effects. Freeness seems to generate positive affect (Shampanier *et al.*, 2007; Ma *et al.*, 2018). People are more excited to “buy one get one free” than get “half off when you buy two.” Free is easy to calculate and takes advantage of mathematical naiveté: “50% more for free” may be more attractive than “33% savings” because 50 is greater than 33 (Chen *et al.*, 2012). Finally, inertia drives people’s behavior. Users of a free version of a product become accustomed to not paying and may resist upgrading to a premium version (Arora *et al.*, 2017).

Insights from this research provide cautionary lessons for designers of free-baiting policies. First, the tendency of freeness to increase take-up and engagement through free trials and free samples suggests that the free phase of free-baiting should be open only to those who currently partake in the target activity. For those participants, the attractiveness of freeness suggests that free-baiting should be restricted to contexts where they are unlikely to increase their participation in the target activity in the free phase. For instance, commuters are unlikely to drive over a toll bridge twice during morning rush hour, even if it were free to do so. Alternatively, policymakers could restrict the amount of free product a participant may receive to what they were used to consuming prior to the free-baiting intervention. Second, because “free” is so consistently associated with increased take-up and consumption, ironically, free-baiting interventions may be wise to avoid that all-powerful word.

However, these empirical findings also substantiate the theoretical foundations of free-baiting. The intuition that consumers’ willingness to pay for the target activity will drop after receiving it for free is supported by findings that consumers’ reference prices drop after receiving free trials (Foubert & Gijbrecchts, 2016) or free gifts in bundles (Kamins *et al.*, 2009). The finding that inertia dissuades consumers of the free version of a product from upgrading to a premium version supports the idea that consumers can become accustomed to the target activity being free – so accustomed that they reject a paid alternative (Arora *et al.*, 2017).

Hypothetical free-baiting interventions

This article considers interventions in several policy contexts to illustrate the effects of free-baiting. These hypothetical interventions are not policy proposals, but proofs of concept for free-baiting as a policy tool. Each context has the following features in common: (1) it is an activity that the government currently regulates; (2) there is a societal interest in reducing participation in the activity; and (3) traditionally, there is a monetary cost to consumers associated

with the activity. The contexts discussed in the article are gasoline, cigarettes, roadway tolls during rush hour and sugary beverages. In each context, the broad outline of the free-baiting policy would be the same.

Ordinary Conditions (Phase 0): Participants register the quantity of [X] they are accustomed to consuming.

Free Phase (Phase 1): The quantity of [X] that participants were accustomed to consuming becomes free to the participants.

Free Phase Ends (Phase 2): The subsidy ends and participants must start paying for [X] again.

A diversity of examples is useful to demonstrate that the drawbacks and benefits of a free-baiting policy depend on the context in which it is applied. The rest of this paper focuses on the potential benefits of a free-baiting policy. Each benefit is introduced using an intervention that best illustrates it. However, presenting the hypothetical interventions along with their strongest features should not suggest that they lack disadvantages as applications for free-baiting. For example, a drawback to applications involving tangible items such as gasoline, tobacco and sugary beverages is that they can be stockpiled in the free phase. Additionally, tobacco and, arguably, sugary sodas are chemically addictive. In these applications, chemical compulsion may interfere with participants' calculations about the monetary value of the activity, mitigating the effects of the free-baiting intervention.

Effects of free-baiting

Increasing the price

The most straightforward effect of free-baiting is to substantially increase the monetary cost of the target activity. In an anti-tobacco free-baiting intervention, after becoming accustomed to free tobacco in Phase 1, participants must pay for tobacco in Phase 2 – a price increase from \$0 to \$X, where X is the new price. (As a benchmark, the average price of a pack of cigarettes in the USA in January 2020 was \$6.64.) The magnitude of this instantaneous price increase would be unprecedented. Incremental increases in cigarette prices are typically small – in most states, \$0.10–0.30 annually since 2000 (Centers for Disease Control and Prevention, 2020).²

² Larger increases are driven primarily by state tax increases, typically from \$0.25 to \$1.00 in a given year. In no state, between 2000 and 2018, has the average price of cigarettes ever increased more than \$2.05 in any one year (Campaign for Tobacco-Free Kids, 2020; Centers for Disease Control and Prevention, 2020).

Research shows that increasing the monetary cost of tobacco reliably reduces consumption. Studies on the price elasticity of demand for tobacco in the USA estimate that for each 10% increase in price, consumption drops 2–6% (International Agency for Research on Cancer, 2011; Jha & Peto, 2014). Importantly, the negative impact on demand appears to accelerate with the absolute size of the price increase (Tauras *et al.*, 2016); that is, a \$2.00 increase would have *more than* double the effect of a \$1.00 increase.

Moreover, independent of its other benefits, free-baiting may be more effective than a traditional tax because of the decreasing marginal utility of money (Kahneman & Tversky, 1979; Ruggeri *et al.*, 2020). For a smoker who has become accustomed to tobacco being free, the Phase 2 increase in cost occurs along the steepest part of their utility curve – closest to zero. Because of the decreasing marginal utility of money, if government imposed an excise tax on tobacco of \$X without free-baiting, it would be perceived as less consequential: an increase from \$Y (the status-quo price without free-baiting) to \$Y + \$X occurs along a “flatter” part of the utility curve (see Figure 1).

Finally, paying for an item involves both monetary and nonmonetary costs, which include the time and effort to complete a transaction. In certain contexts, this nonmonetary cost can be substantial, even exceeding the salience of the monetary cost. For example, for a driver in a hurry, slowing down to pay a toll may come at a greater cost than the toll itself. Free-baiting can take advantage of these nonmonetary costs, leveraging the influence of “sludge” that has a real but often underappreciated effect on public policy initiatives (Sunstein, 2020). Phase 1 of a free-baiting initiative could remove both monetary and nonmonetary costs – both the toll and the toll booth. Phase 2 would add both back. Policymakers may even consider *adding* sludge that increases the nonmonetary costs (e.g., cash-only tolls or slow-pumping gasoline dispensers).

Behavioral effects

Free-baiting leverages insights from behavioral science research in order to make decreasing consumption more attractive.

Loss aversion is the tendency for people to perceive the displeasure of a loss as more unpleasant than they perceive the benefit of an equivalent gain (Kahneman & Tversky, 1979; Kahneman, 2011; Ruggeri *et al.*, 2020). In Phase 0 of the rush-hour toll road intervention, a driver is positioned to view the monetary implications of carpooling or public transit as a gain: if they stopped driving alone, they would have more money. Free-baiting leverages loss aversion by repositioning the status quo. In Phase 2, having become accustomed to roads and bridges being free, a driver would view *not* paying as the

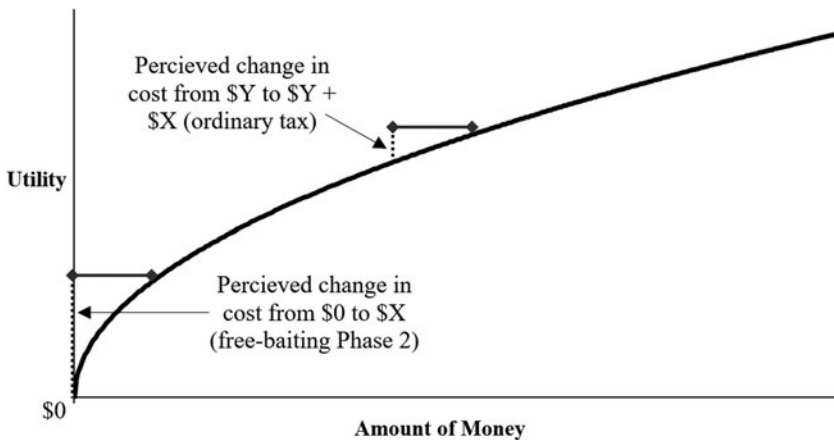


Figure 1. Money utility curve.

norm and tolls as a monetary *loss*. Due to loss aversion, a commuter in Phase 2 would subjectively overvalue the monetary benefits of changing their commute relative to the same commuter making that calculation in Phase 0. Avoiding a monetary loss is a greater motivation than a potential monetary gain.

The endowment effect is the tendency for people to value things more when they possess them than when they do not. The endowment effect manifests with respect to material objects as well as abstract concepts such as rights and freedoms (Kahneman *et al.*, 1991; Huck *et al.*, 2005; Varol, 2017). The sugary soda free-baiting policy is designed so that, during Phase 1, consumers become accustomed to having the extra money (and the objects and experiences they buy with it) that they had previously spent on sugary drinks. In Phase 2, the endowment effect will add additional salience to what consumers must give up if they were to continue buying sugary drinks.

Importantly, there is reason to believe that, for many consumers of sugary beverages, that extra cash would meaningfully affect their lives. Low-income Americans consume more sugary beverages than their higher-income counterparts (Rehm *et al.*, 2008; Leung *et al.*, 2012; Han & Powell, 2013), yet calories from these beverages contain little nutrition and are not filling (Kuczmarski *et al.*, 2010). Meanwhile, poor Americans have very little disposable income or accumulated savings – a recent Federal Reserve study indicates that half of those in the bottom income quintile do not have access to \$400 in liquid savings (Bhutta & Dettling, 2018). For low-income consumers of sugary beverages to continue consuming at the same rate in Phase 2, they would likely need to give up something of value that they had become accustomed to in Phase 1, such as a reduction in debt, access to higher-quality food or an

increase in savings. The endowment effect would further amplify the subjective value of what these consumers must give up to continue drinking sugary beverages at the same rate.

Free-baiting policies also capitalize on participants' awareness that the price of the target activity will increase on a specific future date. For rush-hour commuters subject to a toll road free-baiting policy, awareness of the beginning of Phase 2 may encourage them to make a plan to change their commute on or before that date. When people make plans for how they will achieve their goals, they are less forgetful, procrastinate less and are more resilient when they encounter difficulty (Rogers *et al.*, 2015). Interventions that promote making simple plans have substantially increased subjects' goal completion rates in many domains (Hagger & Luszczynska, 2014). These include voting (Nickerson & Rogers, 2010), preventative medical screenings (Milkman *et al.*, 2013), applying for jobs (Abel *et al.*, 2019) and smoking (Armitage & Arden, 2008; Conner & Higgins, 2010). Policymakers could encourage commuters to make a plan for achieving their goals and provide tools to help them, such as providing an app that helps facilitate carpooling, discounted public transit fairs or expanded public transit service.

The impending start of Phase 2 may also encourage consumers to think more critically and deliberately about their relationship with the target activity. Consider a gasoline free-baiting intervention. Much of the time, driving and burning gasoline is not much of a decision at all. Behavioral science researchers label this type of autopilot thinking "System 1" cognitive processing. System 1 is fast, simple and intuitive. Deciding to reduce gasoline consumption on the basis of a probabilistic determination about environmental impacts and decades' worth of expenses is not the domain of System 1. System 2 – the slower and more deliberative processing system – is better suited for such complex and abstract thinking (Evans, 2008; Bubb, 2015). Drivers of gasoline-fueled cars subject to a free-baiting policy have all of Phase 1 to think about the advantages of reducing consumption in Phase 2. Using System 2 processing, they are more likely to consider the long-term, abstract and intangible effects of reducing gasoline use and put in place the structure to help them follow through on it.

Effects from coordination

The effects of free-baiting discussed above operate on individuals. Other effects of free-baiting are social. These benefits would materialize only if many consumers in a given area or social network were subject to free-baiting.

For example, beginning Phase 2 for all commuters in a given geography at once may create social benefits to changing their commuting pattern. The

impending start of Phase 2 may encourage a group of commuters to jointly consider alternative commutes. They may decide to carpool together or share public transit, providing an opportunity to socialize several times a week. Conversely, a tobacco-related free-baiting initiative could reduce the social costs of quitting. Under ordinary conditions, an individual smoker who quit might pay a social cost: that individual would lose out on joining their peers on a break during work and joining friends outside a bar to smoke. Free-baiting mutes these social costs by simultaneously encouraging all smokers in a social group to quit. If all or a substantial part of a group of smokers quit together, the social costs of quitting to an individual smoker decrease.

Free-baiting also manufactures a policy window – a time and place where traditional, empirically supported interventions are likely to be especially effective and efficient. At the beginning of Phase 2, consumers are primed to reconsider the value of the target activity in their lives. In a gasoline intervention, a greater proportion of drivers who pass a billboard advertising a hybrid car might think about buying one. Or, under ordinary conditions, a commuter who made a plan to reduce gasoline consumption may not have succeeded. But planning combined with the discouraging effects of free-baiting might facilitate success. Finally, the interventions that policymakers deploy alongside a free-baiting policy could be designed to take advantage of the behavioral effects of free-baiting. For instance, an advertising campaign could highlight what consumers would have to give up, in monetary terms, in order to keep drinking sugary beverages in Phase 2.

The politics of free-baiting

Free-baiting presents unique challenges to acceptance among policymakers. First, a free-baiting policy may not just fail to achieve its goal of reducing participation in the target activity, but cause substantial harm. Participants whose consumption had been limited by cost may expand participation in the target activity during Phase 1, effectively using the free product they receive as a cost subsidy. Free-baiting could also contribute to black markets for the target good. These consequences could be mitigated by carefully regulating the amount of free product participants receive. However, accurately determining how actively each participant partakes in the target activity prior to the intervention and regulating their consumption during Phase 1 would be difficult and costly. These logistical complexities may be fatal burdens.

Second, a government-sponsored free-baiting policy would require considerable political capital. This is unintuitive, and to many, the idea of reducing the cost of a socially undesirable activity would be repugnant. It is also likely to be

legally complex, requiring interventions in economically significant and highly regulated industries. The political capital it would take to implement the policy could have been used to launch a more traditional and empirically supported intervention.

Launching the program as a small pilot would ameliorate some of these concerns. If there were adverse effects, these effects would be limited. Running a pilot study would also require less political capital. However, testing the policy in a narrow pilot may also stunt its effectiveness. For example, if the pilot targeted a limited geography, this would enhance the risk of creating a black market for the free goods. Alternatively, if pilot participants were geographically disbursed, the social effects of free-baiting would be muted.

Conclusion

This paper introduces free-baiting as a behavioral insight-informed policy tool to reduce participation in socially undesirable activities. Free-baiting relies on empirical research showing that consumption of goods and participation in activities plummets when they cease to be free. A free-baiting policy accustoms people to a behavior being free and then imposes a cost on it. Policymakers could consider free-baiting for any context where they seek to eliminate or curtail a behavior, especially where those who partake in the behavior fail to adequately consider its financial costs.

The interventions described in this paper illustrate proofs of concept for free-baiting. Free-baiting would adjust participants' perceptions of the risks, costs and benefits of the target activity. It would counteract some of the factors that make behavior change so difficult under ordinary conditions and create a moment in time in which many people are primed to change simultaneously, enhancing the effectiveness of traditional interventions.

However, free-baiting is not without its risks and drawbacks. First, it is unintuitive, and a free-baiting policy would likely require substantial political capital – political capital that could be spent elsewhere, including on an empirically proven policy intervention. Second, there are serious ethical concerns with a policy that, in order to work effectively, must temporarily incentivize participation in a socially undesirable activity.

I do not or cannot suggest that a free-baiting policy, applied in the contexts described above or elsewhere, would succeed or would be worth the political capital needed to implement it. Instead, I encourage policymakers to consider free-baiting as a supplement to the traditional incentive-shifting tools such as sin taxes and criminal charges, as well as the quickly growing list of behavioral economics-inspired tools such as nudges, boosts and decision architectures.

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