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# When Zero is the Price: a Thorough Analysis

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### Abstract

This brief review explores the empirical researches mainly conducted by Dan Ariely concerning consumers' behaviour when faced with a free product, with a focus on the consumers' perception of increased benefits deriving from the free product. Throughout this paper, to better discuss and analyze the zero price effect, I will use the concepts of social norms and market norms suggested by Margaret Clark, Judson Mills and Alan Fiske. I will give insights on the results reported by the literature and suggest other scenarios that can either provide new, potentially relevant data or where the explanations given can be seen under different perspectives. Furthermore, in this article I will shortly explain how the concept of "free" is applied to today's markets and how firms are able to make profits despite the non-positive price, mainly exploring the advertising strategy and the freemium strategy. Finally, I will discuss Facebook advertisers as a practical, current example.

### Introduction

With the introduction of money, the standard protocol of goods exchange (which previously was the barter) between humans took a different, more flexible, and perhaps less arbitrary turn. When money was first introduced, it had its intrinsic value. This allowed traders to trust it as a currency for buying and selling goods. With time money lost most of this intrinsic value, yet maintaining its power to be used in exchanges because people were now used to consider it valuable. Moreover, virtually everyone was willing to accept money as an exchange good, making it “The” exchange good. To strengthen the trust of consumers towards a coin or a piece of paper even further, public institutions decided to guarantee for their value. In other terms, what really made and still makes the value of money is the trust that everyone has in it, not its value as an asset. The scope of this review is to study the apparently paradoxical case in which the money asked in exchange for a good is zero and what trust has to do with it. The explanation lies in psychological underpinnings of human behaviour, as explained in the following paragraph.

Nowadays, we live in a world where not all our actions and reciprocal interactions are perceived by us to be of the same nature. The division employed throughout this review is that of acts belonging to either the realm of social norms or to the realm of market norms. This belongingness, consciously or unconsciously, leads us to apply and comply with the laws relative to the two realms. Whereas in the realm of social norms we behave in a more friendly way and the exchange of reciprocal favours is perhaps more than simply acceptable, in the realm of market norms we compute our efforts in terms of how much money they are worth, and expect others to acknowledge it. We could be gratified by a gift from our parents, siblings or friends, but we would be a lot more surprised if a stranger came to our house offering us a present and expecting nothing in return. Here is where things might get a little confusing: a present is usually linked to social norms as it normally happens within the family or a group of friends, no price is mentioned, and the person receiving the present does not have to pay for it. But why it is a stranger giving us a present?

Who would ever do that, and who would ever expect it? Is it a scam? Is he being “friendly” simply because he/she wants to make my acquaintance?

The purpose of this brief review is to discuss and give insights about consumers’ behaviours when they are faced with free products and how the zero price effect works in different environments. I will first present several empirical researches mainly conducted by Ariely, D., U. Gneezy and E. Haruvy, their main results and their main conclusions. I will then proceed with a personal analysis of the issue.

### **A preliminary evidence**

In this section, I will review experimental evidence on consumer choice when influenced by zero price. There is vast empirical research investigating consumer choice with zero price products. To this aim, I will first briefly examine an experiment by Ariely, D., U. Gneezy and E. Haruvy (2006), then I will complement with a series of studies which shed more light on the issue. In this experiment, authors show how zero as a price causes an overreaction in consumers, leading them to overestimate the utility coming from the free product. Subjects are faced with choices between the same products but different relative prices. First, participants must decide whether to buy one Hershey’s kiss, one Lindt truffle or nothing. In the first case the price was 1 cent for a Hershey’s kiss and 14 cents for a Lindt truffle. From now on we will refer to this condition as the (1,14) condition. Both prices are then reduced by 1 cent each, with the Hershey’s kiss now priced at 0 cents and the Lindt truffle priced at 13 cents ((0,13) condition). The net utilities are apparently left unchanged. However, the data analysis shows that in the second scenario, when faced with a free product, many participants abruptly switched from the Lindt truffle to the Hershey’s kiss. To make sure this change was not due to a particular price elasticity of demand, the scenario was repeated with the prices being 2 cents for a Hershey’s kiss and 15 cents for a Lindt truffle ((2,15) condition). Here the data analysis shows that there is little to no change in the participants’ revealed preferences when compared to the (1,14) scenario, thus excluding the price elasticity of demand explanation.

According to the authors of this study, the possible explanations for their results are primarily attributable to three main mechanisms: social norms, mapping difficulty and affect. I will now briefly discuss these accounts.

### **Social norms**

When assessing the social norms possibility, we must first acknowledge the fact that costly options invoke market exchange norms, whereas free products invoke norms of social exchange (Fiske 1992, McGraw, Tetlock, & Kristel 2003, McGraw & Tetlock 2005). The social norms possibility argues that social norms, when evoked, may attribute a higher value to the product in question. An example of the relationship between social and exchange norms appears in Ariely, Gneezy, and Haruvy's (2006) experiment. The authors examine consumers' behaviour when presented with two choices: the first one is to get candies for free, the second one is to pay for them a nominal price. Results show that more people went for the free candies, but the average amount each person took for free was far smaller than the average amount each person bought when the price was positive. This shows a relation between zero price and social norms. Heyman and Ariely's (2004) experiments suggest that for social norms to be applied, no cost or price shall be mentioned. When gifted a "candy bar", students exerted more effort in performing a task than when gifted a "50 cents candy bar" for the same task. In both cases the students received the candies for free, but in the second scenario their original price was mentioned.

It would have been interesting as well to witness participants' performances in case they were gifted a candy bar while mentioning the fact that the candy was already a gift itself: in other words, indirectly mentioning its cost was zero. As already discussed in the previous lines, the price of zero seems to be of a completely different race when compared to any other positive price. For this reason, I would like to discuss what could happen in the case participants were gifted a recycled gift. According to the experiment, participants performed worse when they went from "performing for a friend" (the gift allegedly placed participants in the realm of social norms) to "performing for an equivalent of 50 cents" (as soon as money was mentioned, participants found themselves in the

realm of market norms). Now, because 50 cents was generally sensed, by participants, as a rather low remuneration, the overall outcome showed better results in the friendly environment (i.e. realm of social norms) than in the formal environment (i.e. realm of market norms). Curiously enough, the difference between the average performance in the friendly environment and the average performance in the formal environment narrowed as the remuneration in the latter increased, to the point of considering a gift, from the social norms, equivalent to a generous remuneration from the market norms, even if the price of the gift was evidently much lower than the remuneration itself. According to the authors of this experiment, all that was needed to summon the mechanisms of market norms was to mention a price. As long as no price is stated, participants will behave accordingly to social norms. But what if we did not declare the price of the gift, and instead we said to the participants that it was a recycled gift? Would participants still behave as if they were in the realm of social norms, thus performing at high levels? Generally speaking, non-recycled gifts are more appreciated than recycled gifts. This is because, on average, the receiver of a recycled gift perceives its value to be lower than if the same gift was not recycled. To the best of my knowledge, there is no empirical evidence available about this. These assumptions stem from the fact that the value of a gift is not only how much it is worth in terms of money, but also how much “effort” the giver has spent on that gift: this effort accounts for the affective value of the gift. Generally, the closer a person is to you, the more you would expect a gift from them (although not necessarily the more expensive) and the more “effort” you would expect them to spend on that gift, for you. This is because it would be seen as a reflection of the reciprocal attachment between the two of you (on your birthday you would never expect a gift from a stranger as there is virtually no connection between the two of you, but if your parents did not make you a gift you would likely think about it). If we define the effort of making a gift as the time spent on thinking to what to buy, the time spent on physically going to get the gift and the money paid for it, we could safely say the effort to make a recycled gift is essentially zero, and this would drastically decrease its affective value. Now, because this effort is in most cases unknown to the receiver (but presumably they know it is never

“zero”) if the receiver knew the gift is recycled (a now “zero-effort” gift) he/she would perceive it as a lower value gift. Going back to the experiment, if we told participants we are giving them recycled gifts, without mentioning their prices, they might not perform as good. This is because we are somehow linking “zero” to the value of their gift (the gift itself could be worth something in terms of money, but the participants might feel the giver is telling them he/she cares “zero” about them).

To test the ability of social norms to account for free products, the following experiment was set up by Shampanier K. and Mazar N. (2007). In this experiment, they replicate the (0,13) conditions of the Hershey’s kisses and Lindt truffles experiment, except for the fact that they now reduce their price again by 1 cent, which originates the negative price for a Hershey’s kiss, namely -1 cent (you get the candy for free, plus a penny; Lindt truffles were priced at 12 cents this time). According to the previously showed Heyman and Ariely’s (2006) experiments, if the negative price of -1 cent for a Hershey’s kiss is mentioned, consumers should not behave accordingly to social norms and thus have a demand similar to the condition where no free product was involved. In this case, we find little to no change in the demand for Lindt truffles. However, the demand for Hershey’s kisses significantly increases again (fewer people this time chose to buy nothing), suggesting other explanations for the change in the cost-benefit analysis (although it should be pointed out that these results could be justified by the mere curiosity of the participants to see if they would actually be given the penny (surely an unusual offer), keeping the social exchange norms explanation valid in the sense that we as consumers are so not used to negative prices that when we see one we might not even perceive it to belong to the realm of market norms).

### **Mapping difficulty**

The second plausible psychological mechanism that might justify the overemphasis on free products comes from the findings of Ariely, Loewenstein, & Prelec (2003, 2006), Hsee et al. (2003), and Nunes & Park (2003). They show, by the means of an experiment, that people have difficulty mapping the utility they expect to receive from a specific consumption. In other terms,

subjects are not able to precisely express their satisfaction in monetary terms. When people are exposed to numbers before proceeding to purchase something, they unconsciously anchor themselves to those numbers and somehow translate this value into the product they intend to purchase. As a result, people exposed to larger numbers tend to spend on average more than people exposed to smaller numbers. This concept may apply to our chocolate candies' setting to the extent that evaluating the utility of a single candy might be extremely difficult and, as a consequence, consumers "feel safer" (meaning they think they will certainly not make a mistake) when buying a product when its cost is zero. However, this option was mainly ruled out by further experiments (Shampanier & Mazar 2007).

### **Affect**

Affect appears to be the most reliable explanation for the zero price effect on perceived utilities. According to this psychological mechanism, people tend to choose a priori a free product over a priced one because, at a first glance, it is a much simpler decision, and this simplicity could be the driver of higher affect (Tversky & Shafir 1992, Luce 1998, Iyengar & Lepper 2000, Benartzi & Thaler 2002, Schwarz 2002, Diederich 2003, Gourville & Soman 2005). In support of this basic affect mechanism, according to which the affect invoked by the free option drives the zero price effect, Shampanier K. and Mazar N. (2007) conducted the experiment that I will now expose. Participants were asked to evaluate, from a scale of five schematic faces, a series of offers that they were presented with. The five faces varied from very unhappy (1) to very happy (5). The four offers consisted of a Hershey's kiss for free (H0), a Hershey's kiss for 1 cent (H1), a Lindt truffle for 13 cents (L13) and a Lindt truffle for 14 cents (L14). If participants' attitude toward the offers reflected the offers' net benefits, the attitudes toward L14 and H1 should be slightly lower than those toward L13 and H0, respectively; and the difference between the attitudes toward L13 and L14 should be similar to the difference between H0 and H1. The affect argument, however, suggests that the attitude toward H0 should be much higher than that toward any other offer. The results indeed show that, in line with the affect hypothesis, attitude toward the H0 offer is significantly higher than



attitude toward any other offer. Furthermore, we find no difference among the attitudes toward the other three offers. In support of the affect idea, the free good elicits more positive affect than standard cost–benefit analysis predicts.

To test whether consumers use this increased affect as a cue for their decisions Shampanier K. and Mazar N. (2007) designed the following experiment. They forced participants to engage in a cognitive and deliberate evaluation of the alternatives before they choose. The aim was to make non-affective, more cognitive evaluations available and accessible to participants. The basic assumption was that in these conditions participants were less influenced by affective evaluations. To create such conditions, they split the participants into two groups. Only in one of the two groups participants were asked, before making their choice concerning what chocolate to pick (a Hershey's kiss for free or a Lindt truffle for 13 cents), two questions which aimed at triggering the cognitive and deliberate evaluation and minimize the affective influence. The questions were "On a scale from 1 (not at all) to 7 (much more) how much more do you like the Lindt truffles in comparison with Hershey's kisses?" and "On a scale from 1 (not at all) to 7 (much more) how much more would you hate paying 14 cents (13 cents) in comparison with paying 1 cent (nothing)?" Results show that in the group of participants who answered the questions the magnitude of the zero price effect was much smaller than in the neutral group (the group where no questions were asked). The conclusion of these experiments is that when participants are "forced", by the addition of other conditions, to behave in a more rational way, the benefit of zero largely dissipates.

### **The positive effect of zero price**

Ariely D., U. Gneezy and E. Haruvy, authors of the first shown Hershey's and Lindt experiments, in order to assess in the most objective and rigorous way the effect of zero price, take into account many variables and possible explanations. For instance, they wanted to test whether participants who preferred the free option did so because of the "extra pain" of paying factor, which is the act of pulling out the wallet from the pocket/purse, take out the money, hand them to the seller, wait for the rest (if there is) and check if it is correct. They dispelled this eventuality with

further experiments. Another insight was given with regard to the price range, and although it was not empirically demonstrated due to the huge costs of the experiments, the general conclusion was that when very high prices are involved, the zero effect is likely “stretched”, meaning that an Audi priced at \$100 could be perceived as free.

Generally speaking, the authors of these experiments seem to treat the value of zero as if, when associated with the price of a product, it always boosts, on average, the perceived utility of the product itself. But can it also decrease it? In the following lines I would like to discuss the influence of price on the perceived quality of products in uncertain environments (i.e., environments with strong information asymmetry).

Even though higher prices rarely reflect better quality of the product (they might reflect higher selling costs, or non-economical packages, or again they might be simply the reflection of an exploitation of strong brand loyalty from the brand itself) (Gerstner 1985) price, when it is the only cue available, is generally agreed to be used by consumers as an indicator of quality (Rao 1971).

Price has also been demonstrated to be the dominant quality cue in a multi-cue setting (Andrews & Valenzi 1971; Stafford & Enis 1969). Paradoxically, zero is the lowest price a tag can display. So why did participants, in the experiments previously described, seem to not question the quality of the free Hershey’s kisses and almost completely ignored the presence of a priced Lindt truffle?

Naturally, participants did not only have price as a clue for quality, they also, and most importantly in this case, knew the brands. The relevance of the brand and its influence on the perceived quality was indeed confirmed in several studies (Gardner 1971). The participants in question therefore trusted the brands, and knew that those chocolates would very unlikely cause them a stomach ache.

As a consequence, they not only ignored the fact that they were eating a free chocolate, but viewed that as an amazing occasion to get a free Hershey’s kiss. After all, they knew the brand so the quality of the candy was not to be questioned. It is also safe to believe that they were familiar too with the product itself, virtually reducing to zero the uncertainty of the odd offer and situation.

Another concept worth mentioning is the “too good to be real” feeling. Briefly, while it is

plausible to be offered a free candy, it is safe to say that it would be much more unexpected to be offered, say, a free car. In the second case, many would not even bother to stop and assess the offer as it would certainly result in a waste of time. An experiment that succeeded in proving this reaction was set up by Dan Ariely. In a shopping center, he placed a small stand with the sign “Free 20\$” on it: after counting the number of people who stopped and asked for the bill (and actually got it), he realized they were only a very small fraction of the total of people who at least confusedly stared at the sign. Furthermore, the ones who stopped were all expecting some sort of counter performance and refused to believe the experimenter when he said there was none, and many of them kept looking back at the stand after they left. Clearly, all the individuals who did not stop at the stand believed the sign could not be true and finding it out was evidently not worth their time.

### **The role of trust**

If we assume consumers’ trust is based on the probability that the trustee is trustworthy, the potential gain, and the potential loss that might occur if the trustee is not trustworthy, there is considerable empirical evidence that trust is a crucial prerequisite for consumers to engage in economic interactions under uncertainty, especially when the obtainment of complete information can only be ascertained at prohibitively high costs (Dierks, L. H. 2007).

In an attempt to show the potential role of trust and trustworthiness relatively to free products, let us imagine to run the same experiment of the (0,13) condition, but this time a more uncertain environment than that displayed in the Ariely D., U. Gneezy and E. Haruvy experiments will be originated. Let the Hershey’s kisses be replaced with equal-looking kisses from a different, unknown brand. Will now the preferences distribution vary compared to the original experiment? Will subjects wonder where do those unknown kisses come from, or what do they taste like? Surely, agents will at least hesitate before taking the free but unknown chocolate. The main explanation would be because an important factor (knowledge of brand) accounting for the overall risk has now been taken out. Hence, uncertainty of the offer should increase, making subjects more suspicious. Decision makers should now have a tougher time trusting the free chocolate. What if the chocolate

was not wrapped as a kiss, but its shape was of a completely different form? What if it resembled a figure that was never seen to be given to chocolate? Would the students start to question the content itself of the now weird looking object, that was said by the seller to be chocolate? Would they simply trust the seller? With regard to this point, I suggest that the nature of these objects, said to be chocolate by the seller, could be somehow confirmed to be true, or at least strongly plausible, by the presence of Lindt truffles (which are sure enough chocolates) placed right next to them. In other terms, the unmistakable presence of a candy (Lindt truffles) could somehow account for the likelihood of the seller saying the truth when claiming the other objects are candies as well. Needless to say, uncertainty of environment can grow further. Indeed, the location itself in which the offer was displayed played a key role in reducing uncertainty. Participants of the Lindt experiments were in fact MIT students, and the experiments took place in the cafeteria of their university, one of the most prestigious in the world. Apparently, MIT students were not bothered enough by the thought that those candies, especially the free ones, were expired. Yet, variables such as expiration date have nothing to do with the brand or the product, but rather with the seller's bad faith (or negligence). A possible explanation to the odd offers could be that the seller was selling the chocolates at very low prices, even for free, because they were already expired and he/she needed to get rid of them. But would they really bother themselves to do such in the cafeteria of MIT? And would MIT, an elite university, actually let someone sell stuff in their facilities without first checking up on them? Probably not: the students, consciously or unconsciously, felt somehow safer because of where they were, almost completely ruling out the possibility of a fraud. In addition to this, the seller likely was elegantly dressed up, or at least had a nice and friendly look.

What would happen if, instead, they were in a completely different place?

### **An innovative approach**

The purpose of this paragraph is to describe new experiment conditions that aim at demonstrating the double effect of zero price on consumers based on the surrounding environment. The experiment is based on the idea that a random consumer will consciously or unconsciously seek

and evaluate certain factors that will attribute a defined grade on uncertainty to the environment. In other words, random consumers will have an approximate grasp of the asymmetry of information that characterizes them. For instance, a man who goes to the same supermarket to buy the same, beloved brand of meat every time will generally feel more confident in his choice than a second man who decides to go in an unknown supermarket and to buy a brand of meat he has never heard of before. To reach a more equal level of confidence, the second consumer will have to evaluate other factors that will tell him the meat is safe and good to eat. He will, for example, observe how many other consumers are buying that same product (if the demand is high, it could be a positive sign), see whether the meat has a palatable look, or compare the product with its “neighbours”: if there are only products of known brands and high quality placed near the uncertain product, chances are it is an assortment of quality products, including the “uncertain” one. Naturally, price itself is used as an important sign of quality when little other cues are available, and a high price is often linked to high quality, as already previously shown in this paper. Seller, location, brand, demand, product appearance and price are perhaps the principal factors that subjectively contribute to balancing the asymmetry of information regarding a certain product, followed by any other hint about the nature of the product, such as the way it is presented “on the shelf” to the consumers and its surroundings. Product typology and external circumstances define the degree to which the consumer requires the product to be safe and reliable (these two concepts will be further examined). When most of the principal factors are ruled out, the remaining ones take on a greater significance.

With this in mind, the hypothetical experiments aimed at demonstrating the dualistic effect of zero price would start from replicating the “Hershey’s kiss” experiment (the (0,13) condition) already discussed in this paper and slowly remove one trust building factor after another. From the perspective of the participants (MIT students), the starting condition is that of a familiar location (MIT itself), a famous researcher (Dan Ariely) as the seller, well known brands and products (Lindt and Hershey, the “kiss” and the truffle) and a clearly positive demand (the

students could witness other students taking the chocolates). The only odd factor is the price for the Hershey's kiss: zero. When the location is altered and becomes less familiar (still from the student's perspective), with all the other factors left unchanged, the new experiment would tell us whether the results on the free chocolate will remain similar to the starting condition or not.

The idea is to proceed and replicate the same experiment once again, however this time the seller too will be different: a random man would replace the famous researcher. Once more, the results would be recorded and compared to the results of both the starting condition and the first modified condition. Ideally, the final step would be to repeat the experiment of the starting condition with all the trust building factors substituted with more ambiguous ones, in a resulting scenario that would still see the MIT student deciding whether to accept the free Hershey's kiss, only in an environment not so unequivocal. Naturally, it is possible to determine different degrees of "suspiciousness" of the factor: one's own home will be more confidential than a friend's home and a lot more confidential than a stranger's home. In an attempt to obtain the most evident deviation from the starting condition, the final modified experiment would need the highest possible degree of asymmetry of information. For instance, the MIT cafeteria would be replaced by a poor suburban area, the seller would need a sinister look, the brand of the two products would be unknown and the nature of the products themselves would be unrecognizable; furthermore, no one would seem to be interested in the two products. A class of MIT students should be tested in this environment so to examine their reactions and their choices, to observe how many would prefer the free choice over the costly option and how many will not pick any option. All the excitement towards the free product displayed in the starting condition would hardly remain unchanged. When price suddenly becomes the only trust building factor, the positive, realistic price functions as the only foothold for the students' asymmetry of information: the students will consider it the only normal condition and, in the end, the costly option will perhaps paradoxically prevail over the free offer, as the entity of the zero price product will not be supported by any trust building factor and will just appear extremely suspicious (the oddity of this offer here is in fact negatively enhanced by

the uncertain conditions). Why would someone, likely extremely poor, sell chocolates for free? Not even in the cafeteria students knew why someone was selling chocolates for free, and unless they asked, they ate their chocolate without finding it out. The huge difference, however, is that the pool of relatively probable answers in the cafeteria scenario included many different possibilities, but none of them allegedly represented a danger in the overall situation. In the poor suburban scenario, instead, explanations of such an odd offer could range from irrelevant ones to others that, if known, would never make someone eat the chocolates.

### **The two-products factor**

Another factor that could have reinforced the positive effect of the zero price is the “two products” factor. The idea is the following: the cafeteria offer consisted of two products and consumers could arbitrarily choose one or the other. As the previous data analysis has shown, participants felt particularly attracted to the free offer, even if the Lindt truffles represented an extremely palatable option as well. However, the free offer could have been enhanced by the fact that it was the “only” free offer. In other words, its uniqueness was underlined by the presence of a non-free offer. What if the seller only had free Hershey’s kisses, and no other options? If the participants from the (0,13) condition experiment were hypothetically replicable, and excluding those who picked the Lindt truffle, it would be interesting to witness how many would still pick the free Hershey’s kiss if it was the only option on the counter (those who picked the Lindt truffle are not taken into account as here the focus is only on those students who have always wanted the free Hershey’s kiss). It is reasonable to think that everyone who did not pick a candy at all in the (0,13) experiment would still not pick a free Hershey’s kiss when it is the only option, but perhaps not everyone who picked a Hershey’s kiss in the (0,13) condition would still take one when it is the only option. According to this logic, fewer students would now pick the candy, due to the fact that in the one-option condition no priced-products can enhance the uniqueness of the free offer, and students might perceive it as “more normal” and thus less attractive..

### **Product typology**

A different theme I would like to discuss in order to shed light on free products is on the type of the products themselves. In the experiments shown so far, authors focused on chocolates, namely food. The reason why it is safe to say quality acquires a particular relevance when it is related to food is because very low quality foods can severely harm our health, and we know this, although some to a larger extent than others. In other words, the more seriously low quality stuff can harm us, the more we will tend not to economize on it. Food is indeed a perfect example of a product whose demanded quality is, on average, higher than that in other categories of products, as it directly concerns our body and our health (it is not a coincidence that food quality control is such a big deal worldwide).

Now, if a different typology of product were to be taken into consideration, would quality (and price) still be such a concern? Referring to this topic, I would like to briefly share an experience of mine of a few years ago as anecdotal evidence to inspire future projects.

Years ago, I suddenly became the owner of a litter of 6 kittens, and because I could not afford to take care of all of them, I decided to give them away, for free, through an online site. After a month or so passed without me being able to give away the kittens, I decided to post the same ad on another online site which, however, did not let me use zero as the price requested. I quickly estimated the average price asked for similar kittens and decided to use it as the price for my kittens: within a couple weeks, I sold all the kittens. Naturally, it could have been a coincidence, but I believe the “higher price – higher quality” argument might as well be an interesting, possible explanation, along with that consumers, when dealing with a rather uncertain environment (such as online sites), tend to believe a priced product looks less suspicious than a free one. The reason why I believe people might seek “quality” in pets as well is because they represent a years-long commitment.

### **External circumstances**

The aim of the following paragraph is to discuss and analyze generic products whose demand might be influenced by external circumstances .



Consider a stand selling free pens, for instance. Regardless of how trustworthy it appears to be, a pen is just a pen after all. No matter its quality and unlike with pets, if it is so bad it does not even work one could simply toss it and go buy another one for a price that is not zero. In this scenario, the cost would be that of having wasted the time spent on getting the free pen, then looking for a bin to toss it: the potential payoff compared to the potential cost would still be worth a try to many. However, if the external circumstances surrounding the odd offer were to be modified, to what extent our decision could be influenced? This time, pretend the following scenario.

You are in a hurry as a very important written exam is about to begin, and in the heat of the moment you forget to bring a pen. Just before entering the class where the other classmates are right about to start, you see two different stands at the opposite sides of the aisle. One is giving out pens for free, the other one is asking for 15 cents each. You know you only have the time to stop either at one or the other, as you cannot attend the exam after its onset. What to do in this situation? On the one hand there is the free option which will make you save 15 cents, on the other hand you have a costly option with no evident benefits. The decision looks straightforward. However, if we suppose the student will perceive the costly pens to be of a better quality (referring to the previous reasoning in this review), the decision might not be as effortless. What would happen if, during the exam, the free pen were to break or its ink was so bad it would mess the entire exam up, and there was no other chance of getting another pen,? The student would then be forced to quit the exam as no other means of writing would be available. In this scenario, the decision of getting the free pen would have a much higher cost than simply zero, namely that of an undone exam (my assumption here is that the pen broke because of the lower quality, relatively to the costly pen, presumably signalled by the difference in price). If the laggard student were able to evaluate this possible outcome in a matter of seconds, he/she might as well opt for the costly pen, thinking that lowering the risk of such disastrous outcome might be worth those 15 cents. In other terms, the student could judge the 15 cents pen more trustworthy and reliable than the zero price pen. Here the zero price effect worked against the sales of the product in question because of other external variables.

### **The double effect of zero price: personal conclusions**

In conclusion, all these variables such as brands, location, look of the seller, the juxtaposition of two different offers, product typology and the right external circumstances allowed the zero price effect to best and positively exert its influence on the attractiveness of the product. The reason to this is because of how much trust the experimenters were able to build around the odd offer. On the other hand, however, if the environment surrounding the odd offer was to be perceived by the subjects as an unreliable one, the zero price tag might entail completely different and opposite effects. My theory is therefore that trust and trustworthiness, determined by the subjective perception of asymmetry of information, can utterly reverse the role of zero price when crucial factors are at risk (such as health with food), creating in certain conditions the “attraction-boost” effect and in others the “attraction-bust” effect.

### **Zero price products on the market**

Products and services priced at zero do not only exist in behavioural experiments. Nowadays, the market is full of goods that are seemingly granted for free. However, why would a firm not use a positive price? Are the reactions from the customers similar to those shown in the experiments previously reported? In the following paragraphs I will discuss and analyze reasons and aims of the implementation of strategies entailing zero-price/free products.

First of all, the concept of “free” must be properly assessed. A product having zero price does not necessarily translates into zero costs for the buyer: what usually happens is the consumer is subject to other subtler requests which often consist of a higher expenditure of time (in case of advertisements, for instance) or an exchange of personal data; in other words, almost nothing is really “free”.

As a matter of fact, many firms that today introduce in the market a free product choose to adopt either an advertising strategy or the so called “freemium” strategy (in the freemium business model, users pay nothing to download the app and are offered either optional in-app purchases for premium features, additional content or digital goods, or the possibility to upgrade the free version

into the premium one). In the next paragraph, I will discuss the reasons that might drive firms towards offering free versions of their app and which strategy (advertising or freemium) they should implement, based on different conditions.

### **Advertising and freemium strategies**

Usually, for every good the lower the price the higher the demand (the previous behavioural experiments not only managed to prove this point, but showed that when the price falls to zero, the change in demand is so excessive that it becomes even difficult to explain). Although offering a product at zero price may sound counter-intuitive, the resulting increase in demand presents several benefits that in some cases allow the firm to earn more money with respect to a positive price. There are the two main strategies behind a free product.

Generally, a platform can adopt a two-sided market business model - an advertising strategy (AS) - which allows consumers to use the platform for free but which generates revenue from advertisers. Alternatively, a firm can also opt for a one-sided market business model - a freemium strategy (FS) - to provide a basic free service for low-level consumers who do not wish to pay for premium services but generate revenue from high level consumers who are willing to pay for premium services. There are three distinct differences between an AS and an FS. First, when taking into account the market structure in the AS, the market involves consumers, platforms, and advertisers. Platforms can be seen as intermediaries and facilitate interactions between consumers and advertisers. However, in the case of FS, the market structure is simpler and consists of consumers and platforms. Second, there are distinct client groups from which platforms can make profit. When a firm uses an AS, it generates revenue from advertisers, whereas it obtains revenue from consumers if it uses an FS. Finally, when assessing the price structure, if a platform uses an AS, the price for advertising service not only affects the advertiser demand for its platform service but it also influences the number of consumers on its platform. The platform should therefore balance the demands of two sides. However, it should ascertain that the consumer demand for free service and that for paid service are balanced out in case it adopts an FS.

When should a firm prefer one strategy over the other? According to Z. Li, G. Nan and M. Li. (2020), there are many factors that should be evaluated in order to make the best decision. First, “the advertising (freemium) strategy is dominant for each platform when the quality of its premium services is too low (high); second, when the quality of each platform’s premium service is intermediate, two equilibria may prevail in two scenarios: 1) simultaneously adopting an AS or an FS, but generating more profits in the former equilibrium; and 2) adopting strategic complements (i.e., one using an AS and the other using an FS); third, if the strengths of the social effects increase, a platform should be cautious to respond to the change” (Z. Li, G. Nan and M. Li. (2020)). The platform can certainly maintain its original business model, but it should improve or devalue its service quality to reach reasonable levels. In case it wanted to keep unchanged its service quality, it must change its original business model. Needless to say, it can also adjust both. Fourth, “in the symmetric platform competition, if the strength of the social effects is medium, the FS is also dominant when the quality of the premium services is too low; finally, a win–win outcome that benefits consumer surplus and platforms may arise under certain conditions under which the basic service quality is too low (high), the premium service quality is too high (low), and the freemium (advertising) strategy is used” (Z. Li, G. Nan and M. Li. (2020)).

Therefore, implementing an AS is the best option for each platform when each premium service quality is too low. The intuition is as follows. In this case, consumers will presumably only use the basic service as no strong incentive to pay for the premium service is provided. Because of this, each platform should really focus on introducing advertisers to generate revenue from them. “Facebook and Snapchat are known to use this strategy combination; their focuses are on providing consumer access for advertisers on their social media platforms, and they have weak incentives to invest in premium services” (Z. Li, G. Nan and M. Li. (2020)). On the other hand, it is better to opt for an FS when each premium service quality is too high. This is reasonable as consumers prefer to pay for the premium service and not deal with any advertisements. As a result, platforms are motivated to drive away advertisers and generate profit from high-end consumers. This finding is

consistent with the empirical observations. “In the online dating service market the competition between Baihe.com and Zhenai.com in China makes up for a good example: Baihe.com, which absorbed Jiayuan.com in a merger in 2015, offers basic services such as registering and reading letters for free, and it charges fees for high-end personality matching services such as matchmaking services and king’s services; the business model is also used by Zhenai.com” (Z. Li, G. Nan and M. Li. (2020)). Interestingly, the dominant strategy of a platform is an FS when it has a sufficient quality advantage with respect to premium service, whereas its rival’s dominant strategy is an AS. Another example given by the authors is the competition between GaGa and Omegle, in the stranger chat services. The former helps users who speak different languages to communicate with one another conveniently by offering a free basic translation service and a paid service with more accurate translation, whereas the latter only offers a basic communication service bundled with advertisements. Again, they highlight as well the competition between YouTube and Netflix as an interesting case in the online video service market: Netflix adopts an FS due to its own more superior content.

### **Freemium in the mobile apps market**

The freemium business model application does slightly vary depending on the specific sector. The following findings are based mainly of the works of Deng Yiting, Lambrecht Anja and Liu Yongdong (2020) and analyze the mobile apps market. Their research was conducted on about 200.000 mobile apps and used the number of ratings accumulated as a proxy for demand and number of stars as a proxy for quality.

The two main reasons firms should consider the adoption of the freemium business model in the mobile apps market are enhanced app visibility and sampling. The main issue firms may encounter through the offer of a free version is the risk of premium demand cannibalization (i.e. the risk consumers will find the free version adequate enough and not upgrade it to the premium one, resulting in a loss of profit for the firm). Deng Yiting, Lambrecht Anja and Liu Yongdong (2020) results are relevant for app developers and, more broadly, digital firms who

offer freemium pricing. First, they confirm that a freemium strategy can indeed increase demand for the paid version of a product. At least on average, this spillover effect outweighs any possible cannibalization in the market studied; this means that the number of consumers deriving from the spillover effect who will buy the premium features is generally greater than the number of consumers who will not buy the app as a direct cause of the release of the free version. However, speaking more broadly (and not just in the market of mobile apps), the researches conducted by Zijun Shi, Kaifu Zhang and Kannan Srinivasan (2018) show that in the absence of word of mouth, “getting more consumers on board” alone cannot justify the freemium strategy. Generally speaking, it is more common that market penetration and expansion can be more effectively achieved through the offer of a conventional product line, wherein the low-end product has a positive price to avoid unnecessary cannibalization. “In the current framework, perpetual freemium is only optimal under network effects asymmetry: the right freemium strategy should include a free product with lower network benefit than the paid product but superior standalone functionalities (compared with the efficient level)” (Zijun Shi, Kaifu Zhang and Kannan Srinivasan (2018)). Freemium could indeed become optimal when there is sufficient asymmetry in network effects between the high- and low-end products. For freemium to be viable, the firm’s product line must grant paid users access to larger network effects compared with their nonpaying peers. This result somewhat echoes the message in Kumar (2014) that to make freemium work, a firm has to offer different sets of features in its free and paid products; but they show that it is the network effects, rather than the “standalone” quality, that are the crucial factors.

Second, their results indicate that a freemium strategy would be more effective for products that prior users evaluated as moderately good: if a product is of low quality, opportunity cost associated with the free version may prevent consumers from sampling (in other words, consumers might give up sampling a product that they presumably will not enjoy) while for high quality products, consumers may forgo sampling and instead directly purchase the paid version (to put it differently, consumers may decide to not waste time sampling a product whose premium features

will presumably meet their expectations, and directly purchase it). Therefore, in either case a free version may not be as effective in driving demand.

Furthermore, their findings suggest that to truly benefit from a freemium strategy, firms need to ensure that the difference in utility for the consumer between the free product and the paid product is sufficiently high to induce upgrades. At least in the market for game apps, this appears to be the case when the user can have a substantially enhanced usage experience by playing more levels or through social interaction. In fact, users appeared to be far more willing to pay for additional levels than for changes in the level's background (whose utility, compared to an additional level, is apparently neglectable).

Lastly, they document that simply the fact that an additional version is available can increase demand of the paid version by making it easier for consumers to discover the app.

### **Beyond Freemium and Advertising: other strategies**

Certain companies decide to give away their products for free even when advertising nor freemium strategies are involved. This could happen when the zero price is applied only for a limited amount of time, as it could result from promotion campaigns. Companies, in fact, may choose to give away free products and samples to increase sales and improve brand awareness.

Likewise, this strategy is intended to let potential customers attest the quality of the product, providing them with a seemingly costless way to do it. However, firms themselves are often not aware of how the product is perceived by the customers. For this reason, companies might agree with customers to give them the product in exchange of just a feedback, so to gather information and determine whether the product will be successful or not. Moreover, firms will consider selling for free when buyers are required to use their personal information, which will be in turn used by the company in many ways. This will allow firms to build database full of relevant data to exploit to increase and sales and order amounts. With regards to the latter point, it is necessary to introduce the concept of "big data". Big data refers to "extremely large data sets that may be analysed computationally to reveal patterns, trends, and associations, especially relating to human behaviour

and interactions” (Oxford Languages). In other words, it is the data generated by consumers’ use which can be translated into business-meaningful information and thus exploited by the company. This means that a firm, even when setting a zero price, is able to make profit through the manipulation of this information by either selling it (this time, not for free) to other companies or using it to improve the quality of its other businesses.

Generally speaking, companies can apply big data mainly in: product development, sales increase, marketing and advertising, risk management and data sale. Companies normally begin the product development process by collecting data on the potential product and its demand in the market. They estimate whether the customers will enjoy this product, the possible competition in the market and whether the product will generate enough revenue. They then use big data analytics to ensure that the product is tailored exactly to customer needs so that they can create a profitable overall strategy. Likewise, companies ensure that the sales department has detailed customer data so that they can identify the customer needs and convert them into sales leads. Using big data analytics, the sales department can pitch the company products better to customers, provide personalized customer service and give more options for products the customers may wish to buy. In this way, the company gains more customers which leads to more profits as a direct result of data analytics. Furthermore, companies can monitor their online activity, their consumer base, and current customer trends before launching a marketing campaign. Collecting all this data and analysing it correctly will ensure a focused marketing campaign that targets current customers and also potential future customers. At the same time, big data has significantly improved the risk management models used by firms as it takes into account all the data generated by the company (production levels, consumer base, finances, etc). This massive amount of data available in the company reduces any guesswork and clearly shows the ramifications of any business decision, which in turn reduces the risk factor. Lastly, as already mentioned, big companies can sell their data to third party companies and earn directly from it.



### **The case of Facebook: the ad preferences**

I decided to rely on the work of Cabañas, J. G., Cuevas, A., and Cuevas, R. (2018) to show a detailed, real and current example of how an apparently free service such as Facebook in reality hides an immense market based on the data generated by its users' activity. In this social network (and almost certainly in every other one) users operate on the platform and, in exchange, Facebook collects huge amounts of personal information which monetizes mainly through advertisers. In this paper I will not enter the legal merits of this diffused phenomenon.

Based on the researches of Cabañas, J. G., Cuevas, A., and Cuevas, R. (2018), Facebook (FB) labels users with so-called ad preferences, which represent potential areas of interests of users. FB assigns different ad preferences based on their online activity within the social network and on third-party websites tracked by FB. Advertisers running ad campaigns are then able to select and target groups of users assigned to a particular ad preference (for instance, users interested in "Nike"). Some of these ad preferences suggest political opinions, sexual orientation, personal health, and other potentially sensitive individual characteristics. Their data suggests that similar assignment of potentially sensitive ad preferences occurs much more broadly. For example, "landing pages associated with ads received by FB users in our study include: [iboesterreich.at](http://iboesterreich.at) (political), [gaydominante.com](http://gaydominante.com) (sexuality), [elpartoestuyo.com](http://elpartoestuyo.com) (health): this illustrates that FB may be actually processing sensitive personal information" (Cabañas, J. G., Cuevas, A., and Cuevas, R. (2018)). These ad preferences may be used to reveal: ethnic or racial origin, political opinions, religious beliefs, health information or sexual orientation. For instance, the ad preferences "Homosexuality" and "Communism" may reveal the sexual orientation and the political preference of a user, respectively.

The Facebook (FB) Ads Manager is the tool utilized by advertisers to configure their ads campaigns. It allows advertisers to identify the audience they want to target with their advertising campaigns. The FB Ads Manager provides advertisers with a wide range

of configuration parameters such as: location (country, region, city, zip code, etc.), demographic parameters (gender, age, language, etc.), behaviors (mobile device, OS and/or web browser used, traveling frequency, etc.), and interests (sports, food, cars, beauty, etc.). The interest parameter is the one their work focused on the most, as it encompasses hundreds of thousands of possibilities capturing users' interest of any kind. "These interests are organized in a hierarchical structure with several levels. The first level is formed by 14 categories. In addition to the interests included in this hierarchy, the FB Ads Manager offers a Detailed Targeting search bar where users can type any free text and it suggests interests linked to such text" (Cabañas, J. G., Cuevas, A., and Cuevas, R. (2018)). Advertisers can make use of any combination of the described parameters in order to configure their target audiences. Finally, the FB Ads Manager provides detailed information about the configured audience. Facebook assigns to each user a set of ad preferences, namely a set of interests, derived from the data and activity of the user on FB and external websites, apps and online services where FB is present. These ad preferences are indeed the interests offered to advertisers in the FB Ads Manager to structure their audiences. For this reason, when a user is assigned "Shoes" within her/his list of ad preferences, she or he will likely become a potential target of any FB advertising campaign configured to reach users interested in shoes. "There are six criteria for the assignment of ad preferences: 1) It is a preference added by the user, 2) The user has this preference because FB thinks it may be relevant to she/he based on what she/he does on Facebook (such as pages liked or ads clicked), 3) The user has this preference because she/he clicked on an ad related to such thing, 4) The user has this preference because she/he installed a related app, 5) the user has this preference because she/he liked a page related to such thing, 6) The user has this preference because of comments, posts, shares or reactions she/he made related to such thing" (Cabañas, J. G., Cuevas, A., and Cuevas, R. (2018)).

Furthermore, Cabañas, J. G., Cuevas, A., and Cuevas, R. (2018) demonstrate that FB allowed ads to be targeted to users assigned to expert-verified sensitive ad preferences. They ran three FB ad campaigns using expert-verified sensitive ad preferences such as: "religious beliefs"

(targeting users interested in Islam, Judaism, Christianity or Buddhism), “political opinions” (targeting users interested in Communism, Anarchism, Radical feminism or Socialism) and “sexual orientation” (targeting users interested in Transsexualism or Homosexuality). The three campaigns focused on four EU countries: Germany, Spain, France and Italy. Overall, with a budget of 35 Euros, they were able to reach 26458 users tagged with some of the previous sensitive ad preferences, with the result that, if generalizable, “unveiling the identity of FB users labeled with potentially sensitive ad preferences may be as cheap as 0.015 Euros per user” (Cabañas, J. G., Cuevas, A., & Cuevas, R. (2018)).

### **Concluding remarks**

The purpose of this paper was to assess the phenomenon of zero price, both under a theoretical (behavioural experiments) and a practical (the marketplace) perspective. As shown, when products gain the characteristic of “being free”, consumers tend to react in a disproportionate way compared to the actual change of their utilities, implying there are other mechanisms in action. However, I suggested the behavioural experiments reported fail to study the phenomenon under complete objective conditions, proposing an innovative approach that could confirm (or reject) the idea that, in certain cases, setting a zero price might entail the opposite effect. Nonetheless, my proposal, if correct, would only work under very specific circumstances. Thus, it can be safely generalized that the most evident consequence of setting a price to zero is the resulting (disproportionate) increase in demand. I then proceeded to summarize the techniques used by firms to exploit such phenomenon, discussing “freemium” and “advertising” as the main ones. Lastly, I concluded with a more detailed analysis of Facebook’s users’ private data management.

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