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The demand for free goods: An experimental investigation☆

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ABSTRACT

In this paper we consider the determinants of the demand function for free goods. A good is free if the pecuniary cost of consumption is zero. Examples include the number of cookies consumed at a picnic, free in-store samples in supermarkets, free coffee and soft drinks in the office and paid sick days and vacations up to the contractual allowance. Standard economic theory suggests that consumers consume the good until their marginal utility equals zero or until the quantity restriction (if one exists) is reached, however, it has been demonstrated that when the price of the good is zero, other, non-economic, social considerations come into play and affect consumption decisions. In this paper we construct a simple demand model for zero-priced goods, with specific consideration given to the exogenous non-market variables discussed by Levitt and List (2007). We focus on the normative and social costs of consumption highlighting the effects on consumer choice of quantity restrictions, of scrutiny and of the size of the externality imposed on others, and we test the model in a field experiment. The results show that allowing unlimited consumption leads to *less* consumption, however, such behavior all but disappears when the subjects' choices are unobserved, including by the experimenter. The results suggest that the recent trend by some large firms to adopt unlimited vacation and sick-day policies may be beneficial for workers and employers as one.

1. Introduction

The law of demand, whereby the quantity demanded of a good increases monotonically with a decrease in its price, is one of the most basic tenets of economics. Yet, as has been demonstrated in numerous different contexts, when price falls to zero something fundamental changes, and this tenet turns tenuous. More specifically, as demonstrated in Gneezy and Rustichini (2000a,b), moving from a positive price to a zero price can often lead to a decrease in consumption rather than to the expected increase from consuming until the marginal utility equals zero.[1] Fiske's Relational Theory (1992) explains

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[1] At the same time, people prefer free goods – Shampan'er and Ariely (2006) show that when offered a choice of goods at different prices, consumers tend to prefer a free good over a good with a minimal but positive price, even when the latter yields greater consumer surplus. The main explanation for

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this behavioral oddity by positing that when money is involved in a transaction, the norms and rules that people invoke relate directly to market norms of exchange and to cost-benefit analyses, but in the absence of monetary considerations transactions are treated as social, and people apply societal norms to the exchange. In other words, consumer demand for free goods tends to be based largely on non-market considerations, centering on self-image, reputation, and norm concerns that might reduce consumption. In this paper we construct a simple demand model for zero-priced goods, and consider specifically the exogenous non-market variables discussed by Levitt and List (2007). The predictions of the model are then tested in a field experiment. Unlike Gneezy and Rustichini (2000a,b), we do not compare behavior with positive prices with that when price is zero. Rather, we are concerned solely with the determinants of demand for goods with zero prices.

A good is free if the pecuniary cost of consumption is zero even though the good has a positive market price. In most cases, the good is supplied as part of a wider relationship between the parties. This can arise between a supplier and a customer, such as when banks fill bowls with free candies for their clients or supermarkets offer free in-store samples or when an internet company offers a free service. It can also emerge in a non-commercial environment, such as when a friend brings a plate of cookies to a picnic or to work[2] or when a family decides how far to spread out on a public beach. Most often, however, it arises in the workplace, such as when companies offer workers perks such as free meals in the company cafeteria, free coffee and free soft drinks. Far more financially substantial are rights that are offered as part of an employment contract such as vacation days and sick days. These are free goods in the sense that there is no cost to the worker to take sick leave or vacation (assuming these cannot be transferred from one year to another), as long as she does not surpass the contractual limit.

In all the above examples, although the market price of consumption is zero, the "social cost" might be positive. As Ariely et al. (2008) explain, a zero price gives rise to social courtesies a consumer must consider in the process of deciding how much to consume. Based on this line of thought, a consumer's utility function should include social-regarding arguments in her utility function in addition to the more usual self-concerned arguments. When a good is a free good, the weight placed on the social considerations is likely to be large.

As is clear from the above examples, in many cases consumption is virtually unrestricted (the worker can drink as many cups of coffee as she wishes), but in others, such as vacation days, quantity restrictions are in place precisely because of the zero marginal cost (and, perhaps, the substantial cost to the supplier of the free good). Companies offering free lunch cafeterias for their workers may issue coupons predetermining the value of the meal subsidized. Others allow workers to consume soft drinks for free, but limit them to some number of cans per day or week. And, of course, the number of vacation and sick days allowed per year is a free good with a quantity restriction in the vast majority of firms.

Interestingly, however, an increasing portion of U.S corporations (some sizable, such as Netflix, Virgin, IBM and BestBuy) have begun offering some of their workers an unlimited number of paid vacation and/or sick-leave days. According to SHRM (2014), in 2013, 1% of US companies offered unlimited time-off vacation and 3% offered unlimited paid sick time (an increase from 0% in 2011, and 2% in 2012).[3,4] Perhaps surprisingly, casual observation suggests that average consumption levels are often *higher* when consumption of a free good is restricted than when it is unrestricted. For instance, it has been observed that workers in Israeli companies that offer unlimited consumption of soft drinks consume less on average than do workers in companies that place a quantity restriction on such consumption. Such seems to be the case also for unlimited vacation policies, a finding that would seem to have some important policy implications.[5,6] To explain this perversity, we posit that placing an exogenously determined restriction on consumption reveals information to the consumer regarding what is

this effect, according to Shampan'er and Ariely, is a psychological mechanism through which agents prefer alternatives with no downside (i.e., cost), while non-free alternatives, even when the cost is minimal, do not invoke such positive affective responses (Slovic et al., 2002). Nicolau et al. (2012) showed that the same effect exists for bundles that include one free product (buy *x* and get *y* free).

[2] Ariely et al. (2008).

[3] Society for Human Resource Management, 2014, "2014 Employee Benefits: An Overview of Employee Benefits Offerings in the U.S." (http://www.shrm.org/Research/SurveyFindings/Documents/14-0301%20Beneftis_Report_TEXT_FNL.pdf).

[4] A 2010 survey found that an increasing number of businesses are shifting toward "unlimited vacation policies," which allows employees the freedom to take as many vacation days as they desire, with no limitations or monitoring, as long as they get the job done (WorldatWork "Paid Time Off Programs and Practices." (http://www.worldatwork.org/waw/adimLink?id=38913)). This policy is especially popular with silicon-valley small and medium companies such as Netflix, Zynga, Evernote and Hotel Tonight (MacMillan, Douglas "To Recruit Techies, Companies Offer Unlimited Vacation." *Bloomberg Businessweek, July 2012* (http://www.businessweek.com/articles/2012-07-19/to-recruit-techies-companies-offer-unlimited-vacation)), but large corporations such as IBM and Best Buy successfully implemented it as well (Belson, Ken "At I.B.M, a Vacation Anytime, or Maybe None." *The New York Times, August 2007* (http://www.nytimes.com/2007/08/31/nyregion/31vacation.html?_r=0)). The concept is that the employee, as a responsible mature individual, is measured according to work output, and not according to time spent by his office desk. This policy is part of a holistic HR management strategy called "Results-Only Work Environment" (ROWE), see Ressler et al. (2008); Blakely, Lindsay "What is a Results-Only Work Environment?" *MoneyWatch, September 2008* (http://www.cbsnews.com/8301-505125_162-51237128/what-is-a-results-only-work-environment).

[5] When asked about the unlimited vacation policy impact on his company, Phil Libbin, CEO of Evernote responded: "The first thing we noticed when we did it was that some people started taking less vacation." (MacMillan, *supra*, fn. 4). In fact, the impact of this policy change on employee's vacations seems to have been substantial, causing Evernote to make a unique offer to their employees; any employee taking a week-long vacation (at least) is given $1000 "spending money" over and above their regular salaries. (http://www.nytimes.com/2012/04/08/business/phil-libin-of-evernote-on-its-unusual-corporate-culture.html?pagewanted=all).

[6] A little introspection may be useful. Researchers in Universities are, by design, allowed an essentially unlimited number of vacation days. We would ask the reader to consider how many vacation days he/she takes on average per year and compare it with the number offered in employment contracts in other types of workplaces.