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Multipart tariffs and bounded rationality: An experimental analysis of mobile phone plan choices

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ABSTRACT

Multipart tariff structures add to the computational challenges in choosing mobile phone connection services. We study the quality of decision making in a laboratory environment where consumers only face a small set of mobile phone plan options but have to contend with different degrees of tariff complexity as well as uncertain usage. Our main finding is that simply eliminating the multipart tariff structure does not necessarily lead to better decisions. Rather it is multipart tariffs with included values in excess of monthly fees, thus entailing two-tier pricing structures with increasing marginal costs, which lead to the worst decisions. Knowledgeable participants, who understand mobile phone plan pricing, make significantly better choices.

1. Introduction

Businesses have long experience of multipart pricing arrangements in which marginal costs rise discontinuously once usage rates hit a particular level. Such arrangements are common for large customers in sectors such as electricity supply, where peak load spikes impose major costs on suppliers. They are also common with supplies of working capital in automobile retailing, where interest rates rise sharply if vehicles are not sold within a specified time. In both cases, the penalties of shifting from one price regime to another provide significant incentives to avoid crossing the threshold that has been negotiated. By contrast, until recent decades consumers were usually only offered multipart tariffs that included discounts for buying in bulk. Such tariffs were not potentially ruinous, although consumers might experience opportunity losses due to being insufficiently alert or failing to plan far enough ahead to make the most of quantity discounts. However, more recently consumers have started facing multipart tariffs that involve upward shifts in price regime if their usage exceeds specified threshold levels. This paper focuses on the capacity of consumers to deal with the most common of these, namely, connection service contracts for mobile (cell) phones.

Consumers generally find choosing mobile connection services exhausting and distressing (Harrison et al., 2011) and apparently more complex than decisions involving health insurance and retirement choices (Fear, 2008). Increasing levels

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of complaints to consumer watchdogs demonstrate growing dissatisfaction with the telecommunications industry, and the mobile service industry in particular (Telecommunications Industry Ombudsman, 2012; Bright, 2000). If one accepts that consumers suffer from bounded rationality, it is easy to see why this area is so problematic. When choosing a mobile phone service plan, consumers face not just a large array of options, but also difficulties in ranking them.[1] There are different categories of usage (e.g., calls, data, and various messaging services) all generally priced at different rates. Further pricing complications involve call connection fees, different prices for on- and off-network calls and for calls at different times of day (e.g., peak hours), and different billing increments (e.g., 30 s or 1 s). The multiple-part tariffs are such that a fixed fee buys some "included value" (typically a multiple of the fee), which can be used on a whole range of included usage categories. On reaching the limit (or "cap"), overage rates apply. However, the consumer is not presented with an explicit statement about the difference in above- and below-cap prices, which may be tenfold or even more.

In the context of mobile phone contracts, multipart tariffs with increasing usage costs have no beneficial role to play for suppliers and customers alike by smoothing out peak-load spikes and keeping fixed costs down. Instead they appear to be a means of extracting consumer surplus, either at the expense of consumers who under-estimate their usage or by nudging consumers into making inefficiently large monthly commitments for fear of "going over the cap" and ending up with even bigger monthly charges.[2]

Spectacular examples of "bill shock" that provide the basis for stories in the consumer protection media tend to focus on the "fine print" aspect of these contracts. They do not concentrate on the more basic issue of whether consumers have the capacity to cope with these kinds of multipart pricing schemes in everyday contexts in which they have a good idea of their patterns of use and are not being snared by contractual clauses that normally they do not bring into operation. It is this latter issue that we explore in this paper.

Specifically, we use economics experiments to study how multipart tariffs affect the quality of consumer decisions in the context of choosing mobile phone service plans. We study three common types of pricing scheme that differ in the computational challenges they entail. The first is a relatively simple pay-as-you-go pricing scheme where you are charged only when using a service and thus there is no minimum monthly fee. This is akin to either a fully post-paid contract or to a pre-paid option where the unused credit never expires. The second, moderately complex, scheme involves paying an upfront fee each period that purchases a "value" of services equal to the fee paid, with any usage after this value has been exhausted being charged at the same rate as those used before the upfront value is exhausted. Any unused value expires at the end of each period. The third, and most complex, entails an upfront fee each period that purchases a value of services that is some multiple (greater than one) of the fee. As with the previous level of complexity, usage after this value has been exhausted is charged at the same rate as usage before the upfront value is exhausted. The difference, however, is that because the value is some multiple of the fee, overage rates exceed those within the value.[3] Again, any unused value expires at the end of the period.

These three levels of pricing complexity allow us to identify which aspects of multipart pricing (e.g., the use of monthly fees or values that exceed fees) are the most problematic for consumers. The second aspect we vary is uncertainty in usage. By considering the clearly unrealistic case of certain usage, we can isolate the cognitive difficulties that arise with complex pricing regimes. Finally, our design abstracts from the search process by providing participants with only seven plans to choose from. This reduces the likelihood that any suboptimal decisions we observe result from "choice overload" (Agnew and Szykman, 2005; Besedes et al., 2012; Iyengar and Lepper, 2000; Iyengar et al., 2004; Scheibehenne et al., 2010). The task is thus reduced to a computational exercise, and subjects are provided with calculators.

Yet, despite all this stripping back of the choice problem, we find that subjects have difficulty coping with multipart tariffs even after many rounds of feedback. The effects of pricing complexity however are subtle and not monotonic. Indeed our main finding is that simply eliminating the fee and included value structure does not necessarily lead to better decisions. Rather it is multipart tariffs with included values in excess of monthly fees, thus entailing two-tier pricing structures with increasing marginal costs, which are most difficult to handle and lead to the worst decisions.

Our results add significant ammunition to policy debates that center on claims that the telecommunications industry is a confusopoly, i.e., "a group of companies with similar products who intentionally confuse customers instead of competing on price" (Adams, 1998).[4] Such a view is supported by the following statement from Theresa Gattung, former CEO of Telecom New Zealand, who said "[t]hink about pricing. What has every telco in the world done in the past? It's used confusion as its chief marketing tool."[5] What we show in this paper is that multipart tariffs that involve caps and penalty rates are quite sufficient to cause confusion on a large scale, even if consumers do not face information overload or opportunistic contractual ploys, and particularly so when usage rates are subject to variance.

[1] We use the term "plan" loosely to include prepaid options, as well as postpaid (contract) customers.

[2] As such, they are another example of how firms might design their pricing strategies to exploit consumer bounded rationality (DellaVigna and Malmendier, 2004; Gabaix and Laibson, 2006; Ellison and Ellison, 2009). Grubb (2009) shows how multipart tariffs with increasing marginal usage costs are profit maximizing when consumers are overconfident regarding the precision of their usage forecast.

[3] For example, if a fee of $250 buys value of 750, usage beyond what has been paid for upfront is charged at three times the rate of those charged against the 750 value.

[4] Spiegler (2006), Carlin (2009), and Carlin and Manso (2011) develop theoretical models of price obfuscation. Of particular relevance, Piccione and Spiegler (2012) model how firms might choose to frame prices to make comparisons harder for consumers.

[5] Available at http://www.nzherald.co.nz/technology/news/article.cfm?c_id=5&objectid=10380894.