

## BEHAVIORAL ECONOMICS AND CONSUMER REGULATION<sup>†</sup>

### Helping Consumers Know Themselves

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In standard models with asymmetric information, the parties involved are assumed to have private information about *their own* characteristics. In the health insurance market, for example, customers are typically assumed to know more about their health status than insurers do, and if the customers use this information in deciding whether to buy insurance, we have a classic case of adverse selection. Modern data-gathering technologies, however, can reverse this situation. For example, because cell-phone providers keep and analyze detailed records, they can know more about a consumer's expected usage than the customer herself does. Similarly, a credit card company may know more about a customer's probability of incurring a late fee than the customer herself.

We explore the consequences of this reversal in the information asymmetry.<sup>1</sup> A bare-bones model examines how providing consumers with information about their own usage affects prices and welfare. We first establish the rather obvious result that, taking prices as given, consumers benefit from having better information about their own usage: they can choose the pricing plans that are more suitable for them. Recent

work on Medicare Part D has shown this effect can be sizable (Jeffrey Kling et al. 2010). When seniors were given information about plan prices based on their own prior drug utilization, the rate of plan switching went up by 20 percent and expenditures went down by at least 14 percent per switcher.

The analysis above is predicated, however, on a given set of prices. This is problematic because, as consumers become more informed, prices may change. To illustrate the importance of endogenous price changes, we present a simple model; this model is not intended to provide a complete analysis of the issue but merely to highlight a potential countervailing force. In the model, prices increase with the precision of consumers' information and this effect exactly offsets the benefit of consumers choosing cheaper plans, leaving both consumer and producer welfare unchanged.

In this model, consumers' lack of information about their own usage impacts market outcomes whether firms have better information or not. When firms possess better information than consumers do, however, three major issues arise.

First, such asymmetry can give scope for novel regulation. Firms that are collecting data about their consumers' usage could be required to share those data with their customers. Thaler and Cass R. Sunstein (2008) introduced the idea of a new form of disclosure they dubbed RECAP. The basic concept is that firms would provide two types of machine readable files in a uniform format: (i) they would publicly disclose their pricing scheme, indicating how a customer's usage determines her final bill, and (ii) to each customer, they would provide information about her personal usage data. Consumers could then upload their usage files to third-party websites that would use the now easily available information on pricing schemes to help the customers compare and evaluate plans from service providers. In the United States, policymakers are already considering adopting RECAP-type

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<sup>1</sup>Meglana Jeleva and Bertrand Villeneuve (2004) examine a model where insurance companies are better at predicting risk than consumers, but consumers have residual private information about their risk. Their analysis, however, is quite different from ours: they focus on identifying the properties of a second-best screening contract that could not arise without firms' private information.

disclosure rules in domains such as calling plans and credit cards.

Second, there are important new legal questions raised by such an asymmetry. We suggest that, as a matter of first principles, consumers should have the right to their own purchasing history, as long as providing that history is not very costly to the firm.

Third, when the seller has more information about expected usage than the customer, they may try to exploit this information by targeting specific offers to specific consumers.<sup>2</sup> A credit card company that knows you are absent-minded and occasionally miss your payment deadlines can offer you a “free” credit card knowing that they will make their profits off of your late fees. We call this type of opportunity for firms *adverse targeting*: firms offer prices that are less advantageous than consumers’ naive expectations about their usage would lead them to believe.

Given the space constraints, we do not provide a formal analysis of the three major issues mentioned above. Instead, we discuss some of the theoretical and practical questions that they raise. The remainder of the paper is structured as follows. Next section presents the model. Section II discusses some theoretical issues. Section III considers practical issues in implementing RECAP regulation. The last section concludes.

### I. A Simple Model

There is a unit mass of consumers. Consumer  $i$  uses  $x_i \in \{1, 3\}$  minutes each month. Half of consumers are of each usage type.<sup>3</sup> Consumer  $i$  observes a signal realization  $\theta_i \in \{1, 3\}$  about her usage where  $\Pr(\theta_i = x_i) = \lambda \in [1/2, 1]$ . By Bayes’ rule,  $E[x_i | \theta_i = 1] = 3 - 2\lambda$  and  $E[x_i | \theta_i = 3] = 2\lambda + 1$ . Consumer  $i$ ’s utility from using her cellphone in a given month is  $1 - x - p$ , where  $p$  is the monthly price she pays. Her outside

option is zero. There are two firms, A and B. Firm A charges a fixed monthly price  $P_A$ . Firm B charges a per minute price  $p_B$ . Note that we exogenously impose that the two firms utilize two different pricing schemes. Michele Piccione and Ran Spiegler (2010) develop a model with endogenous comparability of pricing schemes.

#### A. Consumer Expenditure Conditional on Prices

The basic idea behind RECAP regulation is that, taking prices as given, providing consumers with information about their own usage will allow them to identify which firm is cheaper for them. Suppose, for instance, that  $P_A = 2$  and  $p_B = 1$ . In that case, Firm A’s plan is cheaper than Firm B’s plan for consumers with high usage ( $x_i = 3$ ), but Firm B’s plan is cheaper than Firm A’s plan for consumers with low usage ( $x_i = 1$ ). Moreover, consumers who get a high usage signal ( $\theta_i = 3$ ) will buy from Firm A while consumers who get a low usage signal ( $\theta_i = 1$ ) will buy from Firm B. Consumers’ overall expenditure therefore is  $1 + (\frac{3}{2} - \lambda)$ , where 1 is the expenditure from half of the consumers who get the high usage signal, and  $(\frac{3}{2} - \lambda)$  is the expenditure from half of the consumers who get the low usage signal. From this expression it is immediate that any regulation (such as RECAP) that improves consumers’ information about their own usage, i.e., that increases  $\lambda$ , decreases consumer expenditures and thus increases their welfare.

#### B. Endogenous Prices

The analysis above is predicated on a given set of prices. To assess the full impact of RECAP, it is also important to consider what effect an increase in  $\lambda$  might have on the prices.

One rough intuition suggests that the more consumers know about their usage, the more able they are to compare the prices of the two firms. Greater comparability in turn lowers prices (e.g., Piccione and Spiegler 2010). To the extent that a higher  $\lambda$  effectively makes consumers better informed about the effective prices charged by the two firms, this intuition is also closely related to a well-known result that a reduction in consumers’ search costs leads to lower equilibrium prices (e.g., George J. Stigler 1961). Under this view, a regulation like RECAP is likely to

<sup>2</sup> Oren Bar-Gill and Franco Ferrari (2010) also argue that sellers often design their pricing schemes to exploit consumers’ lack of knowledge about their own usage patterns.

<sup>3</sup> We focus on the case with exogenous usage for ease of exposition. If consumers have a stationary usage utility, but choose their usage based on the price they face, providing them with information about their past usage will not always be sufficient for identifying the optimal plan. That said, any plan that would have been cheaper under past usage will necessarily yield higher overall utility under endogenous usage.

provide consumers with a double benefit: lower prices *and* lower expenditure conditional on the prices.

While the intuition above seems compelling at first glance, providing information to consumers does not necessarily lower prices. Suppose the two firms are identical in terms of their cost structure. They incur a cost  $C = 4$  per customer, while the marginal cost of usage is zero. The two firms set their prices simultaneously. We also assume that the firms, apart from the revenue from customers, obtain a fixed payoff  $F = 1$  from being active in the market.<sup>4</sup> Such a payoff can be interpreted as a marketing benefit that helps sales of the firm's other products. The presence of this additional payoff ensures that both firms always have positive profits in the equilibrium with the simple form considered below.

Under the parameter values above, for any  $\lambda$ , there is an equilibrium where Firm A caters to  $\theta_i = 3$  customers while Firm B caters to  $\theta_i = 1$  customers. Specifically, consider prices  $P_A = 2(1 + \lambda)$  and  $p_B = 1 + (1/(3 - 2\lambda))$ . At these prices, customers who receive a high-usage signal buy from Firm A and customers who receive a low-usage signal buy from Firm B. It is easy to check that these prices constitute a Nash equilibrium. At these prices, the firms' profits are  $\pi_A = \lambda$  and  $\pi_B = 1 - \lambda$ . Two key features of this equilibrium are worth noting.

First, both prices are strictly increasing in  $\lambda$ , the amount of information consumers have about their own usage. This result demonstrates the limitations of the intuition that the increased comparability induced by a greater  $\lambda$  would necessarily lead to lower prices.

Second, while Firm A's profits increase and Firm B's profits decrease in  $\lambda$ , the overall producer surplus  $\pi_A + \pi_B$  always equals one; it is independent of the amount of information that consumers have. Since the market is fully covered and the firms have the same cost structure, this in turn implies that consumers' overall expenditure and the consumers' surplus are also independent of  $\lambda$ . In other words, in this simple example, the reduced expenditure conditional on prices is *exactly* offset by the increase in prices, and so firms' aggregate profits and consumer welfare are unaffected. This result

clearly demonstrates the importance of accounting for the potential changes in the firms' prices when assessing the likely impact of RECAP regulation.

## II. Other Theoretical Issues

### A. Efficiency

It is not particularly surprising that prices can increase when consumers are provided with more information. The model above was constructed to mimic the settings where RECAP is most likely to be deployed, but a similar point can be made with a much simpler model. Suppose, for example, that consumers are uniformly distributed on a Hotelling line with one firm at each end. The firms have no fixed costs, have identical constant marginal costs, and set their prices simultaneously. If consumers know nothing at all about their own type, the firms appear identical from the consumers' perspective. The firms are therefore effectively engaged in Bertrand competition and the unique Nash equilibrium is for prices to equal marginal cost. When consumers become informed, however, the firms now (rightly) appear differentiated: consumers learn their location on the Hotelling line and the distance to each firm. Thus, firms can charge above marginal cost and extract some surplus.<sup>5</sup>

This simple extension of the Hotelling model highlights an additional factor to consider in assessing the impact of a RECAP regulation. There are efficiency gains from informing consumers about their types, since with more information consumers can be better matched with an appropriate firm. Hence, the overall impact of making consumers more informed on consumer welfare is not apparent even though consumers' expenditure increases.

### B. Firms' Voluntary Disclosure

In the model in Section I, we did not consider the issue of whether the firms would voluntarily provide consumers with information about their own usage. Since Firm A's profits are increasing in the quality of consumers' information

<sup>4</sup> A firm is active if it has a positive measure of customers.

<sup>5</sup> This simple model is taken from Matthew Gentzkow and Kamenica (2010), who examine the equilibrium information provision by the firms in such a setting.

and Firm B's profits are decreasing, the two firms clearly have a different stance toward disclosure. Firm B will not disclose information unless required to do so. Also, if disclosure is consumer-specific, even Firm A may not want to disclose usage information to all of its consumers.

Xavier Gabaix and David Laibson (2006) present a model in which firms choose to "shroud" the prices of some attributes. In their model, firms choose not to educate consumers because competitive pressures force other firms to subsidize informed consumers, and hence no firm can profitably attract newly informed customers.

A similar force may operate in our setting as well. While a full analysis of firms' voluntary disclosure is beyond the scope of this paper, it is worth noting that, as an empirical matter, many companies actively resist giving consumers access to their own usage information. For example, a major wireless company sent a cease-and-desist letter to Billshrink, a firm that tries to scrape its customers' old bills from the providers' web pages so that it can help the customers evaluate alternative plans.<sup>6</sup>

### C. *Third Parties*

The effectiveness of RECAP would depend crucially on the quality of the third-party websites that organize and analyze the data. Except for the geekiest of consumers, few are likely to take it upon themselves to utilize the data on prices and usage that the regulations will have made available. It is difficult to anticipate what form such third parties might take, but there are some red flags that can be identified.

On the pricing side, the travel websites such as Expedia, Orbitz, and Kayak provide a useful analogy. It seems fair to say that these sites have made shopping for airline tickets and hotel rooms much more efficient, and have nearly driven the traditional travel agents out of business. The "traditional" travel websites such as Expedia and Orbitz have the same business model as the old travel agent. They are paid a commission for every flight or room that they book. This means that if airlines are unwilling to

pay the commission, their flights do not appear on the site. Southwest Airlines, for example, does not cooperate with these websites and insists on selling all its tickets on its own website. Similarly, hotels choose whether they wish to list their rooms on the travel sites.

Although our casual impression is that this travel website industry appears to be working reasonably well, there are several obvious potential dangers. First, since the websites get paid for the tickets they sell, they could have an incentive to push the airlines that offer the largest commissions. Second, if more airlines decide to go the way of Southwest, the websites will lose much of their effectiveness. Third, the websites do not do a complete job of incorporating all the fees that a traveler can face. One of the authors bought a ticket from London to Dublin for £1, only to find out at the airport that the fee for taking the baggage along would be several hundred pounds. Similarly, the rates for hotel rooms rarely include fees such as parking or Internet access. If the hotels are trying to "shroud" these prices (Gabaix and Laibson 2006), they may have an understanding with the websites that such fees are not shown, or at least not prominently.

In the best-case scenario, competition among the sites will lead to full disclosure of information, turning shoppers into rational agents with complete information. However, in the worst-case scenario, the shrouding of prices is simply shifted from the provider to the websites, with the shiftest website winning the biggest market share. One factor that suggests optimism that the realized equilibrium might be closer to the best-case scenario is the existence of price aggregators such as Kayak. Kayak allows shoppers to simultaneously compare the prices from all the websites and to book on the site that has the best price. Kayak does not get paid by commission; instead, it makes money through advertising. And if Kayak does not do a good job of comparing prices, it could lose out to a different price aggregator.<sup>7</sup>

An example of a website that is providing both price and usage data for mobile calling plans is Billshrink. In the absence of RECAP disclosure

<sup>6</sup> Personal communication with Peter Pham, CEO of Billshrink.

<sup>7</sup> Though, one should be cautious even here. For example, in the market for financial advice, despite competition, third-party advisors appear to have settled into a bad equilibrium (Markus Noth, Antoinette Schoar, and Mullainathan 2010).

rules, Billshrink has to obtain its pricing data by scraping price lists from the websites of service providers, and customers have to either input their own usage data or permit Billshrink to access their account by revealing their password. As with the traditional travel websites, Billshrink's business model is based on commissions from service providers who acquire new customers. For now, Billshrink provides an existence proof of the concept of combining price and usage data to consumers, but we are unable to assess how good a job they do at matching customers with suitable plans.

#### D. *Selective Utilization*

For RECAP to directly benefit consumers, they would need to use services such as the third-party websites discussed above. To use the service, consumers would need to have access, notably Internet access. This will obviously be more problematic for users of some products (sub-prime credit cards) than for others (smartphones). Even with access, though, users would have to feel the need for the newly available information. This is particularly problematic since RECAP may be especially needed when consumers have incorrect beliefs. Finally, even if consumers feel the need for the additional information, procrastination might stand in the way of obtaining it. These three factors—access, desire, and follow-through—could impede usage of RECAP and potentially limit its effectiveness.

Limited utilization can be particularly important if it is selective. The direct benefits to consumers of RECAP-based regulation clearly depend in a straightforward way on the utilization of RECAP: only those who use it can benefit from it. The indirect effects—through equilibrium prices—can be more complex. In some models, a small set of consumers searching vigorously can induce price competition and benefit other consumers. In other models, however, the more informed consumers might benefit from lower prices while inducing even higher prices for the uninformed ones. The latter possibility could be particularly problematic if it leads to adverse distributional consequences.

### III. Practical Issues with RECAP

For regulators who are contemplating imposing a RECAP disclosure requirement, there are

some key issues to be considered in designing the regulations.

It is presumably easy for firms to provide usage data on actions that are already priced, but it could be quite costly to collect new data on actions that are currently not being monitored. For example, some mobile calling plans offer free calls to certain numbers such as "friends and family." Those providers will tabulate calls to friends and family separately, while other providers will not. To achieve something close to complete comparability, a regulator would have to choose between two options: either disallow friends and family calling plans, or require other providers to collect or estimate the relevant data. Similar issues would arise if a provider wants to launch a new pricing plan. A guideline might be that new plans that seem only to serve as vehicles for obfuscation or to facilitate adverse targeting could be discouraged unless they impose no disclosure costs on competitors. One possible strategy is to agree that everyone keep track of certain types of information, such as the number called and length of the call, and any pricing strategy that can be computed from this basic list of data would be acceptable.

While the previous point suggests some limits to innovation in pricing, it is important that the disclosure rules do not impede innovation in technology. Consider, for example, the novel ability to purchase music on one's phone. It would certainly be bad if this sort of innovation were prohibited simply because the regulator did not have a category for "songs downloaded" on the list of items to be tracked. Unlike with pure price innovation, the default option in this sort of case should be to allow all innovations by adding new categories to the disclosure list. This would impose no costs on other providers until they also get into the music download business.

Innovations of another sort can cause a different set of problems. For example, with each new generation of smart phones, users have been offered numerous new ways of consuming bandwidth. This can cause past usage data to be badly misleading. For example, when users start watching videos on the phone, their data use jumps. If they begin to watch entire sporting events or movies on their phone, there will be another exponential jump. We are not sure whether this is more of a problem for the third-party websites and the providers than it is for

the regulator, but someone will have to warn consumers that past usage data will not be a reliable indicator of future consumption.

#### IV. Conclusion

Modern information processing technologies are allowing sellers to know increasingly more about their consumers' purchasing behavior. In many cases, this knowledge allows the seller to improve its services by providing suggestions of the form: if you liked this book or movie you might also like X. However, this knowledge can also create an information asymmetry in which the seller knows more about a consumer's habits than the consumer does. In some cases the seller will be able to use this informational advantage to construct special offers that the consumers will overvalue. We call this adverse targeting.

Modern technology can also be used to provide consumers with the ability to become better shoppers. We have discussed the possible advantages of requiring firms to provide machine-readable data on pricing and usage. Such regulation, RECAP, might be able to undo the aforementioned information asymmetry. Consumers would know themselves at least as well as their service provider. RECAP could also help unveil the prices of some attributes that sellers may otherwise choose to shroud.

Additionally, RECAP can offer regulators an alternative method of monitoring and discouraging abusive pricing tactics. Rather than engaging in a continuing game in which some pricing strategy is banned only to be replaced by another one, regulators would use data availability and transparency to help markets become self-policing. This would happen not because firms would

suddenly become socially conscious, but rather because the third-party websites would shine a bright light on sharp practices.

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