PRICE CAPS IN MULTI-PRICE MARKETS

Oren Bar-Gill*

Abstract

Many consumer markets feature a multi-dimensional price. A policymaker – a legislator, a regulator or a court – concerned about the level of one price dimension may decide to cap this price. How will such a price cap affect other price dimensions? Will the overall effect be good or bad for consumers? For social welfare? Price caps can be beneficial when sellers set prices in response to consumer misperception. The scope for welfare-enhancing regulation depends on the type (and direction) of the underlying misperception, as well as on market structure.

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1. Introduction

The Credit Card Accountability, Responsibility and Disclosure Act of 2009 (the CARD Act), and its implementing regulations, imposed restrictions on certain dimensions of the credit card price. In particular, late fees were subjected to a de facto price cap. Other fees and interest rates were also curtailed. A few years later, the Dodd-Frank Act restricted the permissible magnitude of prepayment penalties in mortgage contracts. Other examples of price caps are easy to find. Usury laws cap interest rates. Courts applying the Penalty Doctrine imposed de facto caps on cellphone early termination fees. The European Union caps roaming fees and international calling rates. The Singapore Telecommunication Act of 2000 caps the price that hotels can charge for international phone calls. Etc.

In these examples, lawmakers, responding to concern about an excessively high price, resolved to cap the suspect price. The lawmakers did not fully account, however, for the possibility of unintended consequences. In particular, credit cards, mortgages, cellular service and hospitality services are all multi-dimensional products with multi-dimensional prices. When the law caps one price dimension, we cannot assume that other price dimensions will remain unchanged. If sellers react to the new law by increasing other prices, then it is no longer clear that the law will achieve its stated purpose.

Will the price cap increase social welfare? Will it make consumers better off? To answer these questions we need to first understand the forces driving the pre-cap pricing structure. If prices were efficient, designed to provide optimal incentives, then a price cap will likely reduce social welfare and hurt consumers. These distortions might be
exacerbated in a multi-price market, where a price cap on one dimension can lead to adjustment away from the efficient level also on other price dimensions. If, on the other hand, pre-cap prices were designed not to maximize efficiency but to exploit consumer biases, then legal intervention may increase welfare and help consumers.

The scope of welfare-enhancing price regulation critically depends on the type and direction of consumer misperception. I consider two general categories of misperception: utility misperception and price misperception. And for each category, I consider both overestimation and underestimation. In the absence of a price cap, profit-maximizing sellers will adjust their pricing in response to consumer misperception, deviating from efficient, cost-based pricing. (Bar-Gill, 2012) I show that the direction of the deviation depends on the direction of the misperception (over- vs. under-estimation), but not on the type of misperception (utility misperception vs. price misperception).

What is perhaps more surprising is that, given the existence of misperception, (second-best) optimal prices also deviate from first-best, cost-based pricing. And, here, the direction of the deviation depends on the type of misperception, but not on the direction of the misperception. The scope of welfare-enhancing price regulation is a function of the difference between these (second-best) optimal prices and the prices that profit-maximizing sellers would set in the absence of a cap. I show that this difference is larger for price underestimation or utility overestimation. Accordingly, well meaning, but imperfectly informed lawmakers can more confidently impose price caps when the underlying (behavioral) market failure results from price underestimation or utility overestimation.
The scope of welfare-enhancing price regulation increases when sellers enjoy market power. In a competitive market, a cap on the underestimated price forces the seller to increase the unregulated (accurately perceived) price, so that the seller covers her overall costs. This unintended consequence – an increase in the unregulated price – is less likely to occur when the seller enjoys market power. Consider a monopolistic seller. In the pre-cap world, the monopolist may have decided to increase the underestimated price, since the increase did not significantly reduce demand for the monopolist’s product. Increasing an accurately perceived price, in response to a cap on the underestimated price, would cost more in terms of reduced demand. Therefore, the monopolist may decide not to increase the unregulated price, or to increase it by a smaller amount. At the normative level, if the regulated price goes down and the unregulated price does not go up (or not by much), demand will increase. In a monopolistic market, higher demand is welfare-enhancing. In essence, the price cap, in addition to correcting the inefficiency caused by the misperception, can also reduce the monopoly deadweight loss.

These papers by and large do not consider price caps. The important exceptions are DellaVigna and Malmendier (2004), Heidhues and Koszegi (2010) and Armstrong and Vickers (2012). DellaVigna and Malmendier briefly discuss the potential welfare benefits of price regulation. They study naiveté about time preferences, which is related to the utility misperception studied here. This paper extends the analysis in DellaVigna and Malmendier (2004) by considering different types (and directions) of misperception and by comparing the positive and normative implications of the different types (and directions) of misperception. Heidhues and Koszegi (2010) focus on credit contracts, but their model could be generalized. They demonstrate the potential welfare benefits of price regulation. Like DellaVigna and Malmendier (2004), Heidhues and Koszegi (2010) study naiveté about time preferences. Heidhues and Koszegi study only the perfect competition case and thus do not identify the effects of market structure on the welfare implications of the price cap.

The model in Armstrong and Vickers (2012) appears to cover both utility and price misperception, but in a way that masks the positive and normative differences between the two types of misperception. Also Armstrong and Vickers study only the perfect competition case. On the other hand, the model in Armstrong and Vickers (2012) is more general than the model in this paper, since they allow for heterogeneity in consumer misperception (studying markets where some consumers suffer from misperception, but others do not). Armstrong and Vickers show that a price cap can increase welfare, in large part by limiting the cross-subsidization of sophisticated consumers by less sophisticated consumers.

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1 Gabaix and Laibson (2006) mention price caps in one short paragraph, with no analysis.
This paper builds on and extends the analysis in Bar-Gill and Bubb (2012). Bar-Gill and Bubb study the effects of a price cap in a simple, linear model where each price, in a two-dimensional pricing scheme, is incurred exactly once. The implication is that prices do not have incentive effects, beyond the purchase decision. The current paper relaxes some of the simplifying assumptions in Bar-Gill and Bubb (2012), generalizing and refining the results of that paper and deriving additional results. Also, while Bar-Gill and Bubb (2012) focus on price underestimation, this paper compares the positive and normative implications of different types (and directions) of misperception. Agarwal et al (2013), in addition to its very sophisticated empirical analysis of the CARD Act, includes a short theory section that uses a model similar to the one developed in Bar-Gill and Bubb (2012). Like Bar-Gill and Bubb (2012), Agarwal et al (2013) focus on price underestimation. Their treatment of market structure, or market power, is more general than the treatment in Bar-Gill and Bubb (2012) and in this paper.

Roadmap. The framework of analysis is developed in Section 2. The main results are derived in Sections 3-5. Section 6 offers concluding remarks, discussing several extensions: markets where multiple product and price dimensions are subject to misperception; markets where consumers suffer from multiple types of misperception (on a single dimension); indirect forms of price regulation, beyond price-caps; and quality floors in markets where product quality (rather than price) is multi-dimensional.
2. Framework of Analysis

I study a model with two product, and price, dimensions: The first dimension, labeled Dimension X, represents a binary decision – to purchase, or not to purchase the product. Think of a decision whether or not to book a room for one week in a certain hotel (the duration of your stay is determined exogenously). The consumer enjoys a base utility from the hotel room and pays a base price, $p_x$, for the hotel room. The second dimension, Dimension Y, represents a continuous use decision. Think of a decision to order room service – the consumer could order room service for any number of meals during her stay at the hotel. The consumer enjoys a per-use, or per-meal, utility from in-room dining and pays a per-use, or per-meal, price, $p_y$.

Misperception afflicts only the use dimension (Dimension Y). I consider two types of consumer misperception: utility misperception and price misperception. With utility misperception, the consumer under- or overestimates the utility from Dimension Y. For example, when booking the hotel room, the consumer might underestimate the utility from in-room dining. With price misperception, the consumer under- or overestimates the per-use price, $p_y$. For example, when booking the hotel room, the consumer might underestimate the room-service prices in the hotel. Misperception is assumed to exist only at the ex ante stage, potentially distorting the purchase decision – the decision whether to book the hotel room. At the ex post stage, when the consumer decides how many times to order room service, there is no misperception – at that time, the consumer knows both the utility from in-room dining and the room service prices.
This framework can be used to study important consumer markets (beyond the hospitality market example described above). In the credit cards market, a consumer makes a Dimension X decision whether to get a credit card and then a Dimension Y decision how intensely to use the card. The base price, $p_x$, would be the annual fee charged by the card issuer. Dimension Y could capture different use dimensions. It could be the amount borrowed, and then the per-use price, $p_y$, would be the interest rate charged by the issuer. It could be the propensity to use the card’s late payment feature, and then the per-use price would be the late fee (which is capped in the U.S.). Or it could be the dollar amount of transactions made outside the U.S. using foreign currency, with the currency conversion fee as the per-use price. It is easy to imagine both utility and price misperception with respect to these possible use dimensions.

In the cell phones market, a consumer makes a Dimension X decision whether to get a new smartphone and a Dimension Y decision how intensely to use the smartphone. The base price, $p_x$, would be the up front cost of the phone or the fixed monthly fee. Dimension Y could, once again, capture different use dimensions: number of minutes talked, messages sent, data used – each with its associated per-use price. Or, to take a use dimension that is actually regulated, Dimension Y could capture the extent of the consumer’s roaming activity, with the associated roaming fees (which are capped in the EU). Again, it is not difficult to imagine both utility and price misperception regarding these use dimensions.

Or consider the mortgage market. Dimension X captures the decision whether to take out a mortgage. The associated base price would be the closing fees and the finance charge. Dimension Y could then measure the likelihood or timing of prepayment, and the
The per-use price would be the prepayment penalty, which is capped in the U.S. The decision to prepay, or refinance, is a complex decision, influenced by the trajectory of market interest rates, real-estate prices, the consumer’s credit rating and more. Misperception about these factors is not uncommon.

3. Second-Best Optimal Prices

When demand is biased by consumer misperception, pre-cap prices will be inefficient. To assess this inefficiency, it is helpful to first characterize the efficient prices in a multi-dimensional pricing scheme: \( p^*_x \) and \( p^*_y \). I refer to these prices as second-best optimal, i.e., optimal given the misperception. (This paper considers different types, directions and levels of misperception, but the misperception is exogenous to the analysis. For a discussion of endogenous misperceptions – see, e.g., Bar-Gill, 2012.) There are two plausible meanings of second-best optimal prices in this context: (i) prices that maximize the consumer surplus, and (ii) prices that maximize social welfare. The two meanings bear different normative implications and different policy prescriptions in certain cases. I first describe second-best prices that maximize the consumer surplus. At the end of this Section, I explain how the results change when we move to social welfare maximization.

In the absence of misperception, cost-based pricing is (first-best) efficient: each price dimension should be set equal to the cost of providing the corresponding product or service dimension. When misperception is introduced, cost-based pricing is no longer optimal. Interestingly, while the second-best optimal prices depend on the type of
misperception – utility misperception vs. price misperception – they do not depend on the direction of the misperception. Optimal prices are the same for both under- and overestimation. And this result holds for both utility misperception and price misperception.

*Utility misperception.* With utility misperception, it is second-best optimal to increase the price associated with the misperceived dimension, \( p_y \), above cost and reduce the price associated with the accurately perceived dimension, \( p_x \), below cost. This pricing pattern holds for both under- and overestimation of utility, but for different reasons. When consumers underestimate the utility from in-room dining, demand for hospitality services will be too low (since in-room dining is one dimension in the bundle of services provided by the hotel). Demand can be efficiently increased by shifting pricing towards the underestimated dimension, i.e., by increasing room-service prices and reducing the base-rate charged for the hotel room itself. A consumer who underestimates the utility from in room-dining will also underestimate the number of in-room meals that she will order. Accordingly, the consumer will underestimate the effect of higher room-service prices. While the reduction in \( p_x \) will be fully appreciated, the effect of the corresponding increase in \( p_y \) will be underestimated. Therefore, the perceived total price will go down, and demand will go up.

When consumers overestimate the utility from in-room dining, demand for hospitality services will be too high. But, again, increasing room-service prices and reducing the base-rate improve things – this time by reducing demand. A consumer who overestimates the utility from in room-dining will also overestimate the number of in-room meals that she will order. Accordingly, the consumer will overestimate the effect of
higher room-service prices. The consumer will accurately perceive the reduction in $p_x$, and overestimate the effect of the corresponding increase in $p_y$. Therefore, the perceived total price will go up, and demand will go down.

*Price misperception.* With price misperception, second-best prices will, again, be independent of the direction of the misperception. But these second-best prices will be very different from those obtained for utility misperception: It is optimal to reduce the misperceived price, $p_y$, below cost and to increase the accurately perceived price, $p_x$, above cost. With both under- and overestimation, it is optimal to shift pricing away from the misperceived price dimension and towards the accurately perceived price dimension. Such a shift reduces the difference between the actual total price that the consumer will pay for the product and the price that the consumer thinks she will pay for the product.

How would these results change, when we shift from maximizing consumer surplus to social welfare maximization? When the objective is to maximize consumer surplus, second-best prices always leave sellers with a zero profit (otherwise consumer surplus could be “costlessly” increased by reducing $p_x$). This zero-profit constraint implies that an above-cost base-price must be accompanied by a below-cost per-use price, and vise versa. When the objective is to maximize social welfare, second-best prices can generate positive profits for sellers, and a high price on one dimension does not necessarily imply a low price on the other dimension.

When we maximize social welfare, positive profits are possible but not necessary. Specifically, with utility underestimation and price overestimation, social welfare is maximized when seller profits are zero, and the results derived for consumer surplus maximization continue to hold. The greater flexibility obtained when the zero-profit
constraint is relaxed does change the analysis for price underestimation and utility overestimation. In both of these cases, the first-order effect of the misperception is to artificially inflate demand. The optimal response is to raise the base price, $p_x$, and thus bring down demand. And this can be done while keeping the per-use price at the first-best level, $p_y^* = c_y$, and avoiding any use-level distortion.

4. Competition

To assess the social cost of misperception, and the scope for beneficial price caps, I now compare the second-best prices to the pre-cap, equilibrium prices. I begin with perfect competition and then consider the implications of monopoly and market power.

We saw that the second-best prices depend on the type of misperception, but not on the direction of the misperception (when we maximize consumer surplus). In contrast, the pre-cap, equilibrium prices are very much affected by the direction of the misperception, but not so much by the type of misperception. For both utility underestimation and price underestimation, the equilibrium pre-cap, per-use price, $p_y^c$, exceeds the per-use cost; and the equilibrium base-price, $p_x^c$, is below the base cost. In the hotel example, in-room dining prices are set above the cost to the hotel of providing this service, while the basic room rates are set below cost. Conversely, for both utility overestimation and price overestimation, the pre-cap, per-use price, $p_y^c$, is below the per-use cost; and the base-price, $p_x^c$, exceeds the base cost.

Underestimation. When the utility from in-room dining is underestimated, we saw that the second-best room-service prices are above cost. The pre-cap equilibrium room-
service prices will be even higher. By reducing the basic room rates and increasing room-
service prices, the hotel increases the perceived (net) value of its product and counteracts
the utility underestimation. But, at the same time, the hotel reduces the actual value by
distorting incentives to utilize its in-room dining services – high room-service prices
imply fewer room-service orders. Second-best optimal pricing balances these two effects.
The hotel, however, cares only about perceived value and thus sets room-service prices
inefficiently high.

When room-service prices themselves are underestimated, the pre-cap equilibrium
room-service prices will again be above cost. As with utility underestimation, the hotel
increases the perceived (net) value of its product by shifting prices towards the
underestimated dimension. Note, however, that the difference between the equilibrium
price and the second-best price, and correspondingly the space for a welfare-enhancing
price cap, is significantly larger with price underestimation. While the equilibrium price
is above-cost for both types of misperception, the second-best price is significantly lower
with price misperception (- below cost when consumer surplus is maximized and at cost
when social welfare is maximized).

Overestimation. When the utility from in-room dining is overestimated, the
consumer overestimates the number of room-service orders and thus overestimates the
importance of room-service prices. To minimize the perceived total price of its product,
the hotel responds to the misperception by reducing room-service prices below cost, and
increasing the basic room rate above cost. Similarly, when room-service prices
themselves are overestimated, the hotel shifts prices away from the overestimated, room-
service dimension and to the accurately perceived basic room rate.
When utility from in-room dining or the price of in-room dining is overestimated, room-service prices are too low and there is no point in capping them. But, since pricing will shift to the accurately perceived basic room rate, this price will be too high and both welfare and consumer surplus can potentially be enhanced by capping it. The pre-cap equilibrium room rate is similarly above cost for both utility and price overestimation. When consumer surplus is being maximized, second-best prices critically depend on the type of misperception. Specifically, the second-best room rate is significantly lower with utility overestimation and, accordingly, there is more room for a beneficial price cap when the object of misperception is utility rather than price. When social welfare is being maximized, the second-best base price is above-cost for both price and utility overestimation, leaving less room for a welfare-enhancing price cap.

**Summary.** To facilitate a comparison between the welfare and policy implications of different types (and directions) of misperception, I collect the results pertaining to the relative magnitudes of second-best prices and the pre-cap equilibrium prices in the following Table. (When the results for social welfare maximization differ from the results for consumer surplus maximization, they are presented in parentheses.)
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Table 1: Price Distortions for Different Types (and Directions) of Misperception

These comparisons are depicted graphically in Figure 1 below. Figure 1a depicts the comparisons for consumer surplus maximization, and Figure 1b depicts the comparisons for social welfare maximization.
Figure 1a: Scope of Consumer-Surplus-Enhancing Price Caps for Different Types (and Directions) of Misperception
Figure 1b: Scope of Welfare-Enhancing Price Caps for Different Types (and Directions) of Misperception
Market outcomes are often sensitive to the type of misperception that consumers suffer from. Here, however, we find that two types of plausible misperceptions – utility misperception and price misperception – have very similar effects on equilibrium prices. Nevertheless, since second-best optimal pricing depends on the type of misperception, welfare and policy implications also depend on the type of misperception.

The nature and scope of beneficial regulation depends on both the type and direction of misperception. With underestimation – of both utility and price – it is the misperceived price (or the price associated with the misperceived dimension), $p_y$, that needs to be capped. With overestimation it is the accurately perceived price (or the price associated with the accurately perceived dimension), $p_x$, that needs to be capped.

The question of scope is of particular importance when imperfectly informed lawmakers might set the price cap too low and reduce welfare (and hurt consumers). When the problem is underestimation, price misperception gives the imperfectly informed lawmaker a larger target to aim at. In particular, with price underestimation, the lawmaker can set the cap at cost, when information about cost is more readily available (since the pre-cap equilibrium price is above cost and the second-best price is either below cost for consumer surplus maximization or at cost for social welfare maximization). With utility underestimation, a price cap equal to cost is too low (since both the pre-cap equilibrium price and the second-best price are above cost). Conversely, when the problem is overestimation, utility misperception gives the lawmaker a bigger target, if we are maximizing consumer surplus. In particular, with utility overestimation the lawmaker can set the cap at cost, whereas such a cap might reduce welfare with price
overestimation. If we are maximizing social welfare, then the scope for a welfare-enhancing price cap is small with both utility and price overestimation.

5. Monopoly

I have thus far assumed that sellers operate in a perfectly competitive market. I now replace competition with monopoly and examine how market power alters the positive and normative implications of price regulation. The analysis in this paper assumes that the X and Y dimensions are separable. Therefore, the price associated with the misperceived dimension, $p_y$, does not depend on market structure, and many of the results derived in the perfect competition case apply in the monopoly case as well. The main difference is that the monopolist will set a higher price on the accurately perceived dimension. The higher $p_y$ affects welfare in a subtle way: With utility underestimation and price overestimation, monopoly pricing reduces welfare – the misperception results in inadequately low demand and the high $p_y$ reduces demand even further. With utility overestimation and price underestimation, demand is excessively high in a competitive market. The high $p_x$ set by the monopolist counteracts the inflated demand. But, while the high $p_x$ avoids purchases that generate a social loss, it might also deter purchases that generate a social gain. Accordingly, with utility overestimation and price underestimation the net welfare effect of monopoly pricing is indeterminate.

Now turn to the price-cap itself. At the descriptive level, market power moderates the effect of a price cap on the unregulated price. Consider underestimation – of either utility or price – which could justify a cap on $p_y$. In a competitive market, a cap that
reduces $p_y$ forces the seller to increase $p_x$, so that the seller covers her overall costs. This unintended consequence – an increase in the unregulated price – is less likely to occur in a monopolistic market. In the pre-cap world, the monopolist may have decided to increase the underestimated price, since the increase did not significantly reduce demand for the monopolist’s product. Increasing an accurately perceived price, in response to a cap on the underestimated price, would cost more in terms of reduced demand. Therefore, the monopolist may decide not to increase the unregulated price, or to increase it by a smaller amount. At the normative level, if the regulated price goes down and the unregulated price does not go up (or not by much), demand will increase. At least when the cap responds to utility underestimation, the higher demand increases both consumer surplus and social welfare. In essence, the price cap, in addition to correcting the inefficiency caused by the misperception, can also reduce the monopoly deadweight loss.

6. Concluding Remarks

A. Misperception on Multiple Dimensions

The analysis in this paper allowed for misperception with respect to one product dimension (the Y dimension) – either misperception about the utility derived from this dimension or about the price associated with this dimension. The other product dimension (the X dimension) was assumed to be free of misperception. What happens when both dimensions are subject to misperception?

While the analysis assumed one misperceived dimension and one accurately perceived dimension, it could be extended to the case where both dimensions are subject
to misperception. The dimension where misperception is more severe would be the Y dimension and the dimension where misperception is less severe would be the X dimension.

The analysis, and results, would need to be reconsidered, when the number of dimensions, and specifically the number of dimensions subject to misperception, is greater than two. Consider underestimation – of utility or of price – where a price cap on the misperceived dimension was shown to benefit consumers and increase social welfare. The benefit from imposing a price cap would be reduced, if the seller can easily find a third dimension, where the misperception is of nearly equal magnitude.

B. Multiple Misperceptions on a Single Dimension

The analysis in this paper studied the effects of each misperception – utility misperception (under- and over-estimation) and price misperception (under- and over-estimation) – separately. What happens if consumers suffer from multiple misperceptions simultaneously? A full analysis of this richer model is beyond the scope of this paper. But even without a full analysis it is clear that simultaneous misperceptions can either reinforce one another or offset one another in non-trivial ways.

For example, utility underestimation and price underestimation both push the pre-cap, per-use price, \( p_y \), up above cost. These same misperceptions, however, exert offsetting forces on the second-best price: utility underestimation pushes the second-best price up above cost, whereas price underestimation pulls the second-best price down below cost (when consumer surplus is being maximized). The policy implications when both misperceptions exist simultaneously are, thus, indeterminate. For example, assume
that consumers are known to underestimate the per-use price in a certain market, and the lawmaker now learns that utility is also underestimated. This discovery could either strengthen the case for imposing a price cap, because the utility underestimation further increases the pre-cap price, or it could weaken the case for imposing a price cap, because the additional misperception increases the second-best price.

A different set of interactions occurs if we consider utility underestimation and price overestimation. These two misperceptions exert offsetting forces on the pre-cap, per-use price: utility underestimation pushes $p_y$ up above cost, whereas price overestimation pulls the pre-cap price down below cost. With opposite effects on $p_x$. They also exert offsetting forces on the second-best price: utility underestimation pushes the second-best per-use price up above cost, whereas price overestimation pulls the second-best per-use price down, below cost. With opposite effects on the second-best base price. Once again, the policy implications are ambiguous.

C. Beyond Price-Caps

The analysis in this paper and the policy implications that follow from it may apply beyond price-caps, to other, indirect forms of price regulation. Policymakers can, and do, restrict prices in other ways. For example, the CARD Act restricts sellers’ ability to reprice credit card debt based on new information regarding the probability that the cardholder will default. Lawmakers reduce prices by changing defaults and demanding that consumers explicitly opt-into the targeted service (as with credit card overlimit fees and overdraft protection). Finally, policymakers can influence pricing by mandating conspicuous disclosure of a specific price dimension (e.g., large font, Bold face terms in
the standardized credit card disclosure, the Schumer Box) or including a certain price
dimension in an influential aggregate disclosure (e.g., specifying what fees are included
in the “finance charge” definition, which underlies the APR disclosure). If these
disclosure strategies succeed in focusing competition on the targeted price dimension, the
result would be downward pressure on the regulated price dimension.

Like price caps, these alternative price-control policies often target one price
dimension within a multi-dimensional pricing structure. While each policy has unique
features and merits further study, the analysis in this paper should be informative.

D. Multi-Dimensional Quality and Quality Floors

This paper focused on multi-dimensional pricing and examined the implications of
capping a single price in such a multi-dimensional pricing scheme. A similar analysis
applies to multi-dimensional quality. For many consumer products and services, quality
is measured on multiple dimensions. Consider the cellphone market. Relevant quality
dimensions include the functionality of the phone itself (the handset), the scope and
duration of the warranty, the reliability of the cellular service (reception, dropped calls),
the accessibility and professionalism of the provider’s customer service department, the
degree of protection afforded to the customer’s personal data, the efficacy and fairness of
the contractually-specified dispute resolution mechanism, etc. The level of transparency
(or disclosure) about any of these features is yet another quality dimension.

And, as with price, lawmakers often target a single quality dimension for regulation.
Rather than capping a certain price dimensions, lawmakers set minimal acceptable levels,
or floors, for certain quality dimensions. Sellers’ ability to disclaim implied warranties is
restricted by law. The Food and Drug Administration (FDA) regulates certain dimensions of pharmaceutical products. The Consumer Product Safety Commission (CPSF) specifies minimum safety requirements for certain dimensions of certain consumer products. The unconscionability doctrine is used by courts to regulate dispute resolution mechanisms. Consumer protection law imposes minimum disclosure requirements, bans certain contractual terms, mandates cancellation or withdrawal rights (in certain cases), and so on.

Like price, quality is subject to consumer misperception. Consumers might overestimate a certain quality dimension. For example, a cellphone user might overestimate the coverage provided by the carrier’s network. Consumers might also misperceive the utility associated with a certain quality dimension. For example, the cellphone user might underestimate the likelihood of traveling to other parts of the country and, therefore, underestimate the utility from broad network coverage. Quality misperception corresponds to price misperception. And utility misperception affects price and quality in a similar way. Accordingly, the positive and normative implications of quality floors, as a function of the underlying misperception, can be studied using a framework similar to the one developed in this paper.
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