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531

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Berlin, August 2005

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IMPRESSUM

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ISSN print edition 1433-0210
ISSN electronic edition 1619-4535

Can Minimum Prices Assure the Quality of Professional Services?

by
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August 2005

This papers studies the effects on service quality and consumer surplus of a minimum price which is fixed by a bureaucratic non-monopolistic professional association. It shows that the price floor set by a Niskanen-type professional assocation will maximize consumer surplus only if consumers demand the highest possible average quality. If consumers demand services of lesser quality, the association's price floor will be too high if measured by consumer surplus. Moreover we show that a de-regulated market will always reproduce the favorable result of a uniformly high price in the case of top quality demand while delivering superior results in the case of a mixed demand for high and low quality services. The general picture that emerges from this discussion is that the current EU Commission's initiative to abolish fixed price schemes for professional services will not lead to a decrease in quality that would be undesirable from a standpoint of consumer protection. This holds even if we acknowledge the opponent's claim that there is a chance of deprivation of professional ethics due to price competition.

Key words: Liberal professions, price regulation, quality, professional association, self-regulation, EU competition policy, intrinsic motivation

JEL-classification: L15, J44, K21

1 Introduction

Liberal professions such as lawyers, notaries, accountants, architects, engineers and pharamcists are highly regulated throughout Europe. A recent EU report highlights anti-competitive

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practices, such as restrictions on entry, fixed or recommanded prices, and limits on advertisement, for "a large number of the EU professions" (Paterson et al. 2003)[1]. The European Commission is undertaking aggressive efforts to limit such practices as part of its Lisbon strategy of becoming the most competitive and dynamic knowledge-based economy in the world by 2010. In its recent Internal Market Strategy for Services, the Commission sets up a programme to screen each member state's regulations on professional services with the stated aim "to abolish any rules that produce anti-competitive effects without being objectively necessary and the least restrictive means to guarantee the proper practice of the profession"[2]. It also considers to take legal action against member state's regulations of professional services at the European Court of Justice in Luxembourg. [3] A key target of the EU-Commission is "the abolition of minimum, maximum or suggested fee scales" for professional services [4].

Professional associations challenge this initiative by pointing to the inherent dangers of lifting price regulations. They argue that fixed prices are necessary to allow professionals "to make a reasonable profit and to exercise their functions in honour and dignity", suggesting that price competition would force professionals to reduce the quality of their services [5]. The Commission openly disregards any such fears. Following the viewpoint of Advocate General Léger of the European Court of Justice, expressed in his Opinion in the famous Arduino case, the Commission "fails to see how a system of mandatory prices would prevent members of the profession from offering inadequate services if, in any event, they lacked qualifications, competence or moral conscience"[6].

This papers tries to shed some light on this essentially economic debate. Departing from the concept of "reasonable profit" as a precondition for professional ethics, we study the effects on service quality and consumer surplus of a minimum price which is fixed by a bureaucratic, i.e. non-monopolistic professional association. Our main results are that the price floor set by a Niskanen-type professional association will maximize consumer surplus only if consumers demand the highest possible average quality. If consumers demand services of lesser quality, the association's price floor will be too high if measured by consumer surplus. Moreover we show that a de-regulated market will always reproduce the favorable result of a uniformly high price in the case of top quality demand, while delivering superior results in the case of a mixed demand for high and low quality services. Surprisingly the average quality is even higher in a de-regulated market than in a self-regulated market. The general picture that emerges from this discussion is that the

[1]For a comparative analysis in the OECD countries see OECD (2000).

[2]The Internal Market Strategy for Services is documented on the DG competition website at: (europa.eu.int/comm/internal_market/en/services/services/com888en.pdf. The Quotation is taken from the former Commissioner Montis speech at the Conference on Professional Regulation (europa.eu.int/comm/competition/speeches/text/sp2003_028_en.pdf)

[3]Specifically in the case of Belgian architects' honorary system: europa.eu.int/comm/ internal_market/en/qualifications/99-593.htm.

[4]europa.eu.int/comm/competition/speeches/text/sp2003_028_en.pdf.

[5]For an overview of different viewpoints of this sort: europa.eu.int/comm/competition/ liberalization/conference/summary_of _consultation_responses.pdf.

[6]Court of Justice of Arduino case, as quoted by Commissioner Montis (europa.eu.int/comm/competition/speeches/text/sp2003_028_en.pdf)

abolition of fixed price schemes for professional services will never essentially lead to a decrease in quality that would be undesirable from a standpoint of consumer protection - even if we assume that there is a chance of deprivation of professional ethics due to price competition.

Our paper is mainly institutional. It re-constructs and discusses existing regulations on professionals and their proclaimed rationale in a rigorous economic model. It ties to different strands of economic literature.

The most closely related literature addresses the issue of occupational licensing (see e.g. Rottenberg (1980), Faure et al. (1993), Kleiner (2000) for a brief overview). The licensing literature can be broadly split into two groups - the "private interest view" on licensing and its counterpart, the "public interest view". The private interest view follows Stigler's generalized private interest theory of regulation (Stigler 1971). It views entry restrictions as a rent-seeking device of a cartel-like acting regulatory entity, in our case the professional association. Not surprisingly, this theory recommends the abolition of occupational licensing or at least some lifting of access barriers (e.g. Friedman and Friedman 1963, Rometsch and Wolfstetter 1993[7]). The public interest view of licensing departs from an Akerlof-type imperfect information problem (Akerlof 1970, Maurizi 1974). It views occupational licensing as means to select provider quality (e.g. Leland 1979) or as an instrument to reward occupation-specific human capital investment (e.g. Shapiro 1983). The latter theories tend towards a more balanced judgement on licensing, weighing the benefits of enhanced quality performance against the regulatory costs. A general finding of the public interest view is that licensing has an important distributional effect: It benefits consumers who value high quality at the expense of consumers who prefer lower quality services at lower prices (Shapiro 1986). Our paper combines both approaches. We assume an imperfect information setting while at the same time allowing a corporatistic entity - the professional association - to fix entry barriers and a minimum price in order to stabilize income (per unit) in the immediate interest of the association's members. However, since a stable income (per unit) is having a positive spill-over effect on service quality in our model, the market control of the association has a potentially beneficial role from a private and public interest point of view.

Another strand of literature pertinent to our discussion analyzes the effect of price regulation on product quality. Departing from the finding that imperfectly competitive markets undersupply product quality (following the seminal work of Spence 1975), it discusses how price floors or more complex fee schedules induce higher choices of quality. An interesting result of this literature is that minimum prices exhibit an U-shaped relationship with average product (or service) quality, i.e. average quality decreases at low price floors (as some firms specialize in low quality-low price products) and it increases at high price floors (as firms symmetrically choose a suboptimal high quality; see Kamien and Vincent 1991). In difference to this literature we study a competitive supply structure that is fully regulated (in quantity and price) by a bureaucratic professional association.

Finally our results relate to the literature on intrinsic motivation and reciprocity (e.g., Frey 2000, Fehr and Gächter 2000). This literature looks at the economics and psycho-

[7]These literature has a great overlap with a critical literature on labor unions (see Kleiner (2000)).

mechanics of an observed behaviour of "acting without reward". It is driven by a desire to introduce facts from motivational psychology into a more complex economic theory of individiual behaviour. Our approach differs from this literature in that we model intrinsic motivation as a state-dependent attribute of individuals. It rules the behaviour of individuals if, and only if, a sufficient reward ("decent income") is given. If a service is not fairly honored, or if it does not provide the income for a decent living, suppliers "retaliate" with low quality. In other words, we assume that professional ethics can be deprived.[8]

2 The model setting

The model depicts a market under asymmetric information. Consumer demand services the quality of which cannot be observed at the time the purchases take place. Later, quality can be assessed but is not verifiable[9]. Hence, contracts that comprise quality as an argument are not feasible and consumers resort to estimate the average quality of service that can be inferred from experiences in the past or other sources of information (newspapers, etc.). Suppliers offer their services at two different levels of quality: low quality ($\underline{q}$) and high quality ($\bar{q}$).

The supplier's decisions of how much quality will be offered depends upon the income they earn for every order and upon their attitude towards serving high quality. There are some intrinsically motivated suppliers who care about quality and there are other suppliers who don't care about quality irrespectively of how much they earn. The latter group is the type of economic agent without moral conscience that Advocate General Léger in his opinion on the Arduino case (op. cit. 6) seems to refer to.

Market demand can be derived from the aggregation of consumer's individual demand for services. We assume that each consumer buys only one unit of service. We further assume that consumers differ with respect to their appreciation of service quality. Let $\delta \in [\underline{\delta}, \bar{\delta}]$ be a utility index of consumer type δ reflecting her attitude towards quality. Then, if

$$\delta(E[Q(p)] + a) - p \geq 0 \tag{1}$$

she will buy a service unit. Here, $E[Q(p)]$ is the average service quality observable and p is the price per service unit. a denotes a parameter indicating the valuation of the pure quantitative existence of the product (or service). This implies that there remains a demand for the product even if quality is zero.

Total demand for services can be derived by introducing a density function $f(\delta) \geq 0, \forall \delta \in [\underline{\delta}, \bar{\delta}]$, rearranging (1) and aggregating over all consumer types exhibiting a $\delta \geq \Omega(p) := p/(E[Q] + a)$. This yields

$$D(p) = \int_{\Omega(p)}^{\bar{\delta}} f(\delta) d\delta. \tag{2}$$

[8]This interpretation literally corresponds to the famous "First comes the grub, then the morals" of Bertold Brecht in his Three-Penny Opera.

[9]This type of goods are called experience goods. See e.g. Liebeskind and Rumelt (1989).

In the following we set without loss of generality $\underline{\delta} = 0$.
Suppliers are characterized by their ability as well as their willingness to provide good quality. Both properties independently influence the quality performance of suppliers. To capture the ability of providers to provide quality we introduce a variable $c \in [\underline{c}, \bar{c}]$, where high values of c indicate low professional abilities and vice versa. In other words, high value suppliers have high costs for good service quality, and low value supplier are able to provide good quality at low costs. c is distributed according to the density function $g(c) \geq 0, \forall c \in [\underline{c}, \bar{c}]$, where $\underline{c}$ is set equal to zero. The willingness to provide good quality is taken in to account by the probability $\pi, 0 < \pi \leq 1$, to do so. It can be thought of as function of "moral conscience" or intrinsic motivation, which clearly needs to be separated from the qualification and competence of the individual provider. To keep the model simple we assume a uniform probability[10] π, i.e. the individual probability does not depend on the ability expressed by c. Additionally, we set $\underline{c} = 0$ to simplify.
Suppliers incur production costs[11]

$$C(q, c) = cq, \quad q \in \{\bar{q}, \underline{q}\}, \, c \in [\underline{c}, \bar{c}]. \tag{3}$$

For simplicity we assume that each supplier produces only one good and $\underline{c} = \underline{q} = 0$. A decent price and decent income therefore falls into one.
To derive total supply and average service quality we have to focus on the quality decision of suppliers type $c \in [0, \bar{c}]$. c indicates the costs of producing a certain quality level. Again, we assume that c has a uniform density function $g(c) = 1/(\bar{c}) \geq 0, \forall c$.
It is here, the principle of "reasonable profit"[12] comes to play it's pivotal role in the model. If profits per service unit exceed a threshold value A then a supplier will offer high quality with a probability[13] $\pi, 0 < \pi \leq 1$. Formally:

$$p - c\bar{q} \geq A \Rightarrow q^* = \bar{q}, \tag{4}$$

where q^* indicates his quality decision. Otherwise, he will offer only low quality, i.e. $q^* = \underline{q} = 0$. If profits turn negative then the supplier will decline to offer any services, i.e. leave the market:

$$p - c\underline{q} < 0 \Rightarrow \text{exit}. \tag{5}$$

From the distribution function of c and from (5) we can derive the total supply function which simply is

$$S(p) = \begin{cases} 0 & \text{for } p \leq 0 \\ x & \text{for } p > 0 \end{cases} \tag{6}$$

where x is the overall level of suppliers.

[10] To make the probabilities dependent on c makes the model considerably more complicated.

[11] To keep the model as simple as possible we abstract from non-linear costs and fixed costs.

[12] The notion of "reasonable profit" is often interpreted to include an aspect of entitlement, i.e. the right of a qualified supplier to receive the "fair value" of his effort. Our definition only captures the economic content of it.

[13] To keep the model simple we assume that π does not depend on c, i.e. the supplier's productivity and his inclination to offer high quality are independent.

x is controlled by means of occupational licensing. However, occupational licensing does not serve as a direct control for the quality spectrum of suppliers, e.g. by setting minimum requirements of human capital investments (skills). It rather influences the average quality of services indirectly by its effect on "reasonable profit" and intrinsic motivation.
To derive the average quality $E[Q]$ prevailing in the market the following figure is helpful.

Figure 1

Within the interval $[(p-A)/\bar{q}, \bar{c}]$ supplier offer only low quality $\underline{q}$. This differs from interval $[\underline{c}, (p-A)/\bar{q}]$ where profit per service unit is "reasonable" (see (4)). Here, the decision to offer high quality depends on the inclination to do so (probability π).
Having derived the behaviour of suppliers we are now ready to calculate the average quality of services offered in the market. We simply have to aggregate the two quality levels weighted by their respective probabilities P.

$$EQ(p) = P(\frac{p-A}{\bar{q}} \leq c \leq \bar{c})\underline{q} + (1-\pi)P(c \leq \frac{p-A}{\bar{q}})\underline{q} + \pi P(c \leq \frac{p-A}{\bar{q}})\bar{q} \qquad (7)$$

where $P(.)$ are the respective probabilities. Recalling our assumption $\underline{q} = \underline{c} = 0$ and the density function $g(c)$ (7) reduces to

$$EQ(p) = \pi\bar{q}\int_0^{(p-A)/\bar{q}} g(c)dc = \pi\bar{q}\frac{(p-A)}{\bar{q}\bar{c}} \qquad (8)$$

Obviously, $EQ(p)$ is a monotonically increasing, almost everywhere differentiable function of p. To derive various results, it s useful to distinguish between three intervals:

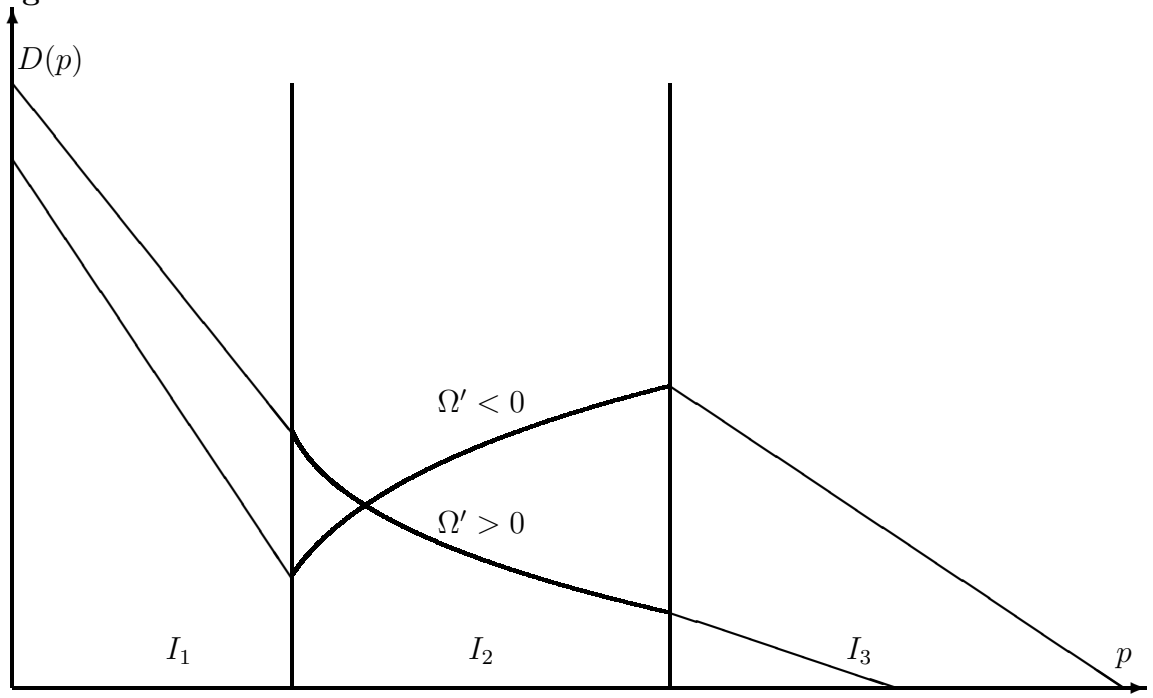
$$EQ(p) = \begin{cases} 0 & \text{for } 0 < p < A \\ \pi\bar{q}\frac{(p-A)/\bar{q}}{\bar{c}} & \text{for } A \leq p \leq \bar{c}\bar{q} + A \\ \pi\bar{q} & \text{for } p > \bar{c}\bar{q} + A \end{cases} \qquad (9)$$

Inserting (9) into the definition of $\Omega(p)$ we have

$$\Omega(p) = p/(EQ(p)+a) = \begin{cases} p/a & \text{for } 0 < p < A \\ \frac{p\bar{c}}{\pi(p-A)+\bar{c}a} & \text{for } A \leq p \leq \bar{c}\bar{q} + A \\ \frac{p}{\pi\bar{q}+a} & \text{for } p > \bar{c}\bar{q} + A \end{cases} \qquad (10)$$

Utilizing (2) and (10) we can distinguish two different types of demand functions depending on the slope of $\Omega(p)$.

Figure 2



The three intervals of (10) $I_1 = \{p : 0 < p < A\}$, $I_2 = \{p : A \leq p \leq \bar{c}\bar{q} + A\}$ and $I_3 = \{p : p > \bar{c}\bar{q} + A\}$ are indicated by the three vertical lines. The slope of the demand curve in I_1 and I_3 are always negative. The slope in I_2 depends on $\Omega'(p)$. It is related to the elasticity of average quality with respect to the price. If the elasticity exceeds 1 then the demand curve increases in p and vice versa. From (2) it easy to show that

$$\text{sign}[D'(p)] = -\text{sign}[\Omega'(p)] = -\text{sign}[\bar{c}(\bar{c}a - \pi A)] \tag{11}$$

where

$$\Omega'(p) == \begin{cases} 1/a & \text{for } 0 < p < A \\ \frac{\bar{c}(\bar{c}a - \pi A)}{(\pi(p-A)+\bar{c}a)^2} & \text{for } A \leq p \leq \bar{c}\bar{q} + A \\ \frac{1}{\pi\bar{q}+a} & \text{for } p > \bar{c}\bar{q} + A \end{cases} \tag{12}$$

The sign of $\Omega'(p)$ depends on the quality elasticity[14] of suppliers to increasing prices $\frac{d(EQ(p)+a)}{dp}\frac{p}{EQ(p)+a}$. If the expected quality in the market rises sharply as a result of higher pay, then $\Omega'(p)$ will be negative and the demand for services will have positive slope. If, on the other hand, the average quality in the market responds inelastically on prices, the marginal benefit will rise less than prices and the demand cure will be downward sloping.

[14]See Wilson (1980).

In the following, it is important to determine how the consumer surplus depends on p. To do so, we have to define the aggregate surplus:

$$CS(p) = \int_{\Omega(p)}^{\bar{\delta}} (\delta(EQ(p) + a) - p) f(\delta) d\delta \tag{13}$$

Dividing by $EQ + a$ yields:

$$CS(p) = (EQ(p) + a) \int_{\Omega(p)}^{\bar{\delta}} (\delta - \Omega(p)) f(\delta) d\delta \tag{14}$$

If we recall that δ is uniformly distributed we can write

$$CS(p) = (EQ(p) + a) \left(\frac{(\bar{\delta} - \Omega(p))^2}{2\bar{\delta}} \right) \tag{15}$$

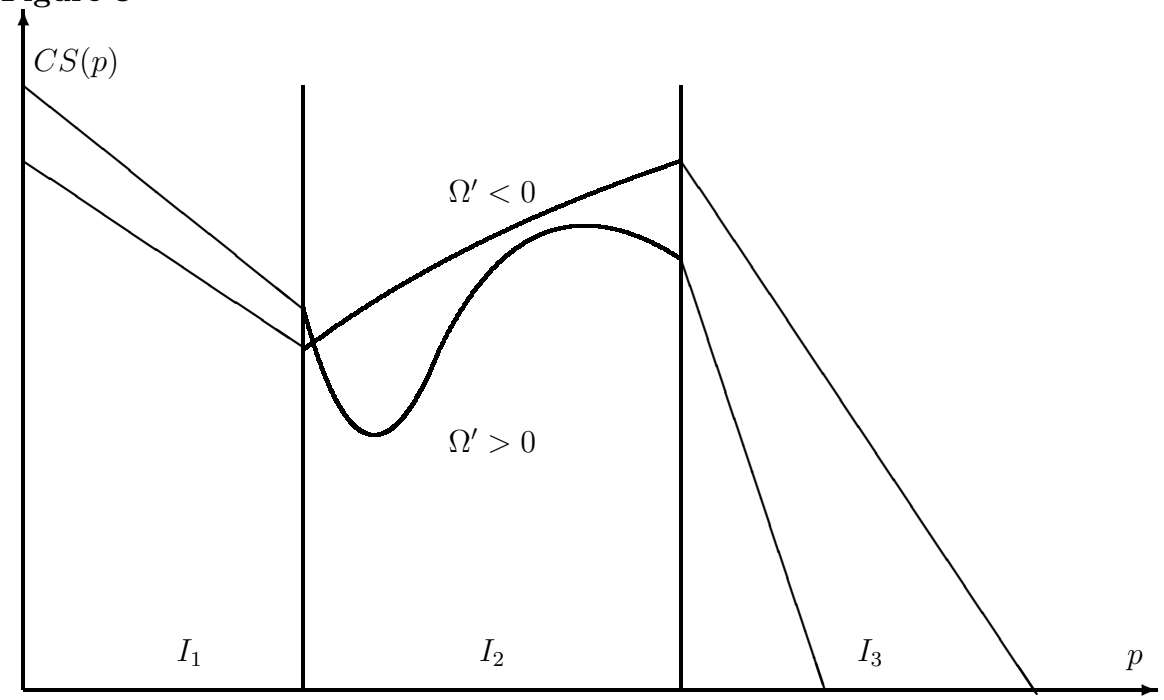
Inserting (9) and (10) yields

$$CS(p) \begin{cases} a \frac{(\bar{\delta} - p/a)^2}{2\bar{\delta}} & \text{for } 0 < p < A \\ (\frac{\pi\bar{q}(p-A)}{\bar{c}} + a) \frac{(\bar{\delta} - \frac{p\bar{c}}{\pi(p-A)+\bar{c}a})^2}{2\bar{\delta}} & \text{for } A \leq p \leq \bar{c}\bar{q} + A \\ (\pi\bar{q} + a) \frac{(\bar{\delta} - \frac{p}{\pi\bar{q}+a})^2}{2\bar{\delta}} & \text{for } p > \bar{c}\bar{q} + A \end{cases} \tag{16}$$

From (16) we can infer some properties of $CS(p)$. It is easy to see that $CS(p)$ is decreasing $\forall p \in \{I_1, I_3\}$ if one inserts the relevant expressions from (9) and (10) into (13). The characteristics in I_2 depend upon those of $\Omega(p)$. If $\Omega'(p) < 0, \forall p \in I_2$, then $CS(p)$ is increasing. If $\Omega'(p) > 0, \forall p \in I_2$ then $CS'(p)$ can have either sign. The following figure depicts a monoton increasing CS- function if $\Omega'(p) < 0$ and one example of $CS(p)$ if $\Omega'(p) > 0$.

]

Figure 3



3 The Self-Regulated Market

The market access and the prices for professional services are in many European countries controlled by professional associations, often in subtle ways such as restrictions on multi-disciplinary cooperation or mandatory memberships. This form of self-regulation has been subject to many criticism. Critics point to the potential abuse of power to exploit consumers in a monopolistic fashion (Friedman and Friedman (1963), Stigler (1971)). A modern day's institutional answer to this critique is a procedural separation of the formal power to legally fix the price and entry rules (done by a state entity) from the informal power to establish the economic rationale behind such settings (done by the associations). Another institution to solve this potential conflict of interest is to tie the (formal or informal) regulatory power of the associations to public interests. Typically, professional associations bind themselves by internal constitution to serve and safeguard market-wide high quality services by, amongst other things [15], securing a "decent earning" for as many members as possible. In this section we assume this optimistic view of self-regulation to evaluate the quality and consumer protection effects it produces (neglecting the more fundamental Stigler-type objections against it).

[15] Other ways of safe-guarding high quality services are codes of conduct, complaint procedures, prohibitions against certain business relationships and professional indemnity insurance (see OECD (2000) for an overview of professional practices).

The self-regulated market in our model is characterized by a professional association (PA) the membership of which is mandatory. PA regulates the access (this is the level x) and the price to maintain a reasonable profit (and hence quality) for as many members as possible. The objective function of this Niskanen-style of PA reads:

$$Z^{pa} = x \int_{\underline{c}}^{(p-A)/\bar{q}} g(c)dc \tag{17}$$

Market equilibrium requires

$$S(p) = x = D(p) = \int_{\Omega(p)}^{\bar{\delta}} f(\delta)d\delta \tag{18}$$

Inserting this into the definiton of Z^{pa} and recalling (10) we arrive at:

$$Z^{pa}(p) = \begin{cases} 0 & \text{for } 0 < p < A \\ \frac{p-A}{\bar{c}\bar{q}\bar{\delta}}(\bar{\delta} - \frac{p\bar{c}}{\pi(p-A)+\bar{c}a}) & \text{for } A \leq p \leq \bar{c}\bar{q} + A \\ (\bar{\delta} - \frac{p}{\pi\bar{q}+a}) & \text{for } p > \bar{c}\bar{q} + A \end{cases} \tag{19}$$

Similar to $CS(p)$, $Z^{pa}(p)$ exhibits some characteristics that depend on $EQ(p)$ and $\Omega(p)$.

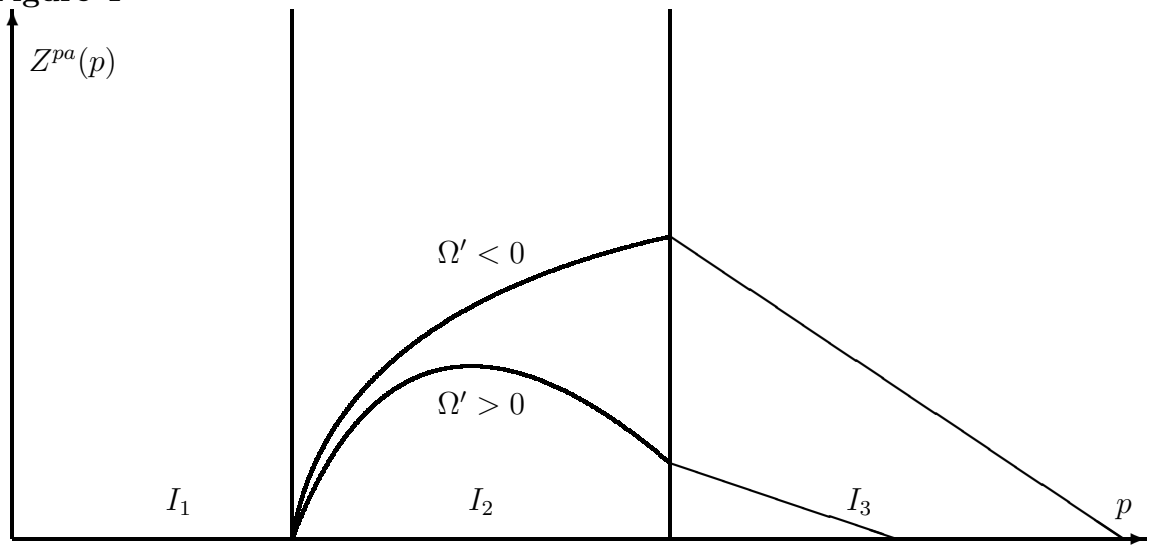
Lemma 1

1. *The number of members earning a sufficiently high income is zero for $p \in I_1$.*
2. *For $p = A$ we have $Z'_{pa}(p) > 0$ which implies that there exists an interval $E \in I_2$ where $Z'_{pa}(p) > 0$.*
3. *$Z^{pa}(p)$ is decreasing $\forall p \in I_3$*
4. *If $\Omega'(p) < 0$, i.e. if the demand curve is upwards sloping for $p \in I_2$, then $Z^{pa}(p)$ is increasing $\forall p \in I_2$.*
5. *If $\Omega'(p) > 0$, i.e. if the demand function is downwards sloping, then $Z^{pa}(p)$ is a strictly concave function and may attain a maximum in I_2.*

Proof in the appendix

The following figure displays Z^{pa} for the various cases. The association has no concern for suppliers in I_1since members would be are serving the market at an unreasonably low profit. Z^{pa} in I_2 reflects the market response to quality services. The association experiences a monotonous increase in decently working members if the market responds elastically to improved quality ($\Omega'(p) < 0$). It has interior maximum membership if the market's response to quality provision is inelastic ($\Omega'(p) > 0$). In I_3 suppliers earn a unreasonably high profit which by definition does not contribute to the professional association's objective function. Its membership decreases because of the market response to higher prices (lesser demand).

Figure 4



The main question to be addressed in this section is whether a professional association contributes to consumer protection or conflicts with it. Define the consumer surplus maximizing price as p^*, i.e. $p^* = \text{argmax}_p[CS(p)]$, and the association's utility maximizing price as p^{pa}, i.e., $p^{pa} = \text{argmax}_p[Z^{pa}(p)]$.

Proposition 1 *Assume, that the consumer surplus maximizing price p^* leads to the highest average quality possible, i.e. $EQ(p^*) = \pi\bar{q}$, then the price set by the association is equal to p^*. Formally:*

$$p^{pa} = p^* \tag{20}$$

If p^* is such that $EQ(p^*) < \pi\bar{q}$, i.e. consumer surplus maximizing average quality is below the highest value attainable then the price set by the association is higher than p^*, i.e.

$$p^{pa} > p^* \tag{21}$$

Notice also by lemma 1.2 that p^{pa} is such that $EQ(p^{pa}) > 0$.
Proof: The proof is rather extensive and, therefore, delegated to the appendix.

The purpose of the association to maximize the number of members with a sufficiently high income would be in accordance with the goal of consumer protection if consumer's surplus is maximized by increasing the price such that the highest quality is induced. This is so because the maximization of quality requires to increase the price to assure that all members earn an income at least as high as A. Both groups of market participants, producers and consumers, are interested in a corner solution where the price induces maximum average quality. Hence, both share the same interest.
Contrary, if p^* implies an average quality below its maximum possible, than the group's interests fall apart and the tendency of the association to put weight on sufficiently high producer's income leads to a price above the price that maximizes consumer surplus.

4 The De-regulated Market

So far, we have analyzed the case of a professional association that acts as a complete market maker, setting one price mandatory for all members and regulating access through its mandatory membership. The latter is similar to and may therefore be called occupational licensing "on the part of the association". In the following we want turn to the case of a de-regulated market the main characteristics of which are free market prices and the absence of mandatory membership. The access to the market, however, shall remain restricted by some form of occupational licensing "on the part of the state". Restriction on market entry will apply in both regimes because certain entry qualifications are needed to deliver professional services which are usually acquired at some institutions of higher education. The throughput-decision of these outside institutions are in reality only loosely related to the market demand for professionals (e.g. controlled by a central governing board for higher education as in Germany). We may therefore take their supply as given. The assumption of a given number of qualified professionals (with different production costs) for both the self-regulated and the de-regulated market serves in our model to discuss the partial equilibrium effect of different pricing regimes ceteris paribus. If we would allow for open access in the course of de-regulation, we would have a perfectly unlimited supply of least cost providers which would drive the market price at this level. This would overstate the efficiency enhancing effect of de-regulation because the opportunity costs of labor would not be considered in such scenario. We would need to apply a general equilibrium model to capture these balancing effects.

In a market with no restrictions on price formation, price discrimination according to service quality may occur which in the literature is called a reputation equilibrium[16]. In our model, a reputation equilibrium is a separating equilibrium with two prices, one price for high quality and one for low quality. High quality is offered by a professional association of voluntary membership and low quality is offered by the remaining suppliers without any kind of self-organization.

A high quality supplier signals his service attitude by means of a high price while a low price offer signals a low quality service attitude. This signaling solves the problem of adverse selection but it does not solve the moral hazard problem of a free rider passing the required access investments but supplying low quality for a high price, i.e. the Léger problem of lacking "moral conscience" (op. cit.). Hence, the key driver of a reputational equilibrium is the a high price that assures a sufficiently high income to enforce high quality services. Even in this case, quality is not always at its maximum $\bar{q}$. However, consumers know by experience that high price providers sell their services for the highest average quality possible, i.e. $EQ(p^h) = \pi\bar{q}$ where p^h is the price of the high quality market.

To define a separating equilibrium we first look at what kind of consumers choose a low or a high quality of services. Utilizing (1) we have utility for customers buying high quality

$$U^h = \delta(q^h + a) - p^h \geq 0 \tag{22}$$

[16] See Shapiro (1986).

where $q^h = \pi\bar{q}$ and

$$U^l = \delta(q^l + a) - p^l \geq 0 \tag{23}$$

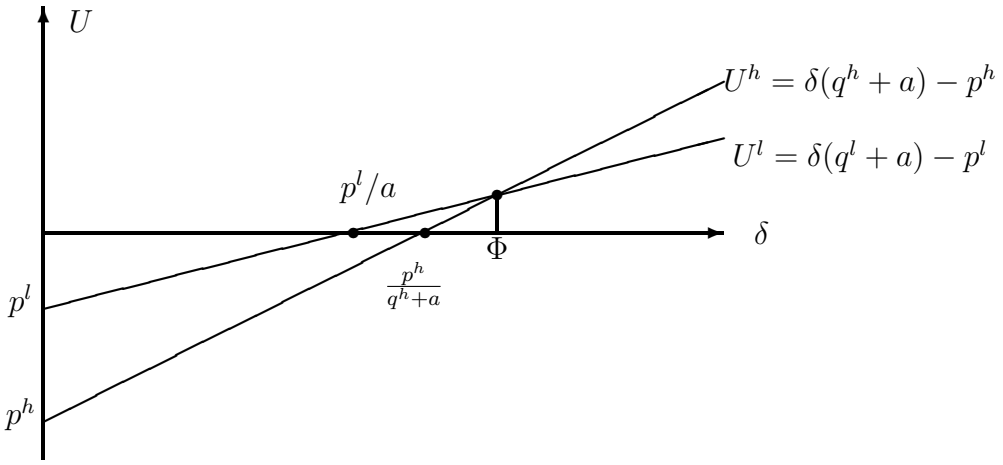
where $q^l = 0$ per assumption (see 3). A necessary condition for a separating equilibrium is that

$$p^h > p^l \quad \text{and} \tag{24}$$

$$\frac{p^h}{\pi\bar{q} + a} > \frac{p^l}{a} \tag{25}$$

as is shown in the following picture.

Figure 5



All consumers with $\delta \in [p^l/a, \Phi]$ buy low quality $q^l = 0$ and consumers with $\delta \in (\Phi, \delta]$ chose high quality $q^h = \pi\bar{q}$, where $\Phi = (p^h - p^l)/\pi\bar{q}$ can be calculated from $U^h = U^l$.
Similar, suppliers are grouped according to their costs. If

$$p^h - c\bar{q} \geq A \tag{26}$$

suppliers choose to voluntarily join the high-quality segment and offer high quality with probability π . Otherwise they offer low quality for $p^l > 0$.
In a separating market equilibrium demand and supply are equalized for both qualities, i.e.

$$S^h(p^h, p^l) = x \int_0^{(p^h - A)/\bar{q}} g(c)dc = D^h(p^h, p^l) = \int_\Phi^{\bar{\delta}} f(\delta)d\delta \tag{27}$$

and

$$S^l(p^h, p^l) = x \int_{(p^h - A)/\bar{q}}^{\bar{c}} g(c)dc = D^l(p^h, p^l) = \int_{p^l/a}^{\Phi} f(\delta)d\delta \tag{28}$$

These two equation determine the equilibrium prices p^h and p^l.
To compare the regulated market with a reputation equilibrium we have to recall that they differ solely by price formation. While the former market is characterized by a uniform price set by a professional association covering all suppliers the latter allows for two prices. The access to the market, denoted by x, shall be the same. We can think of the following scenario. Assume the market is initially fully regulated and the association has maximized the number of its members with sufficient income (Z^{pa}). What would happen, ceteris paribus, if prices were de-regulated and the mandatory membership was abolished? The following proposition resumes the main results.

Proposition 2 *Assume the mandatory association sets the price such that $EQ(p^{pa}) < \pi\bar{q}$, i.e. the average quality falls short of the maximal average quality. Then,*

$$p^l < p^{pa} < p^h \tag{29}$$

and average quality in a de-regulated market is higher than in a regulated market. The effects on consumer surplus are indeterminable.
If the association sets the price p^{pa} such that $EQ(p^{pa}) = \pi\bar{q}$ then a separating equilibrium does not exist, i.e. p^{pa} remains in a de-regulated market.
Proof: see appendix

Figure 6

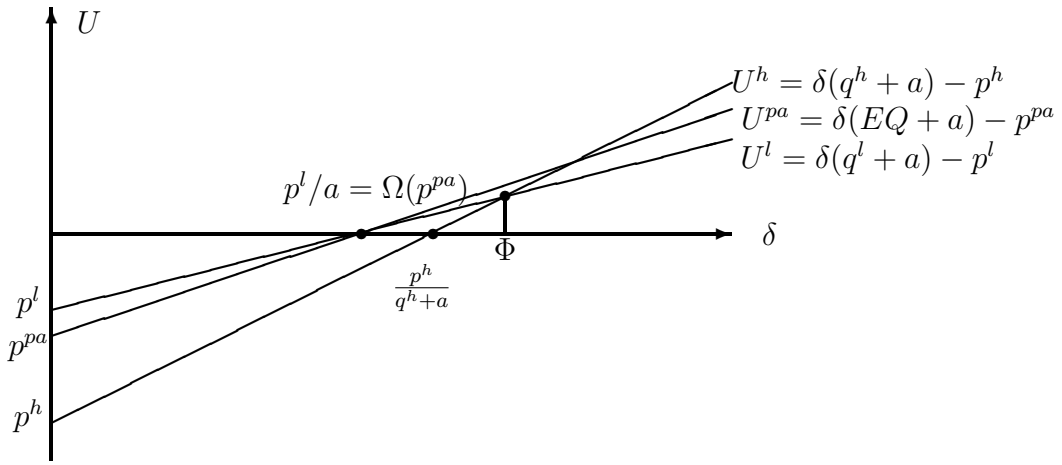


Figure 6 depicts consumer surplus or net utility U of consumers as a function of their preferences for quality δ and the price level p. p^l/a and $p^h/(q^h + a)$ mark the minimal preferences for quality needed to exhibit (positive) demand; Φ depicts the critical level of quality preference for switching from low to high quality services. The critical range of average quality preferences lies between p^l/a and Φ.

The picture shows that the impact of deregulation on consumer surplus is indetermined. For low δ, consumer utility is higher under a self-regulated market, whereas for high quality preferences (high δ) utility in a deregulated market is higher than under the uniform price set by an professional association.
More precisely, to compare (14) with the consumer surplus under a reputational equilibrium we first have to define the consumer surplus:

$$CS^{dereg} = \int_{p^l/a}^{\Phi}[\delta(q^l+a)-p^l)f(\delta)]d\delta \tag{30}$$

$$+\int_{\Phi}^{\bar{\delta}}[\delta(q^h+a)-p^h)f(\delta)]d\delta \tag{31}$$

Adding and subtracting $\int_{\Phi}^{\bar{\delta}}[\delta(q^l+a)-p^l]f(\delta)d\delta$ yields:

$$CS^{dereg} = \int_{p^l/a}^{\bar{\delta}}[\delta(q^l+a)-p^l]f(\delta)d\delta + \int_{\Phi}^{\bar{\delta}}[\delta(q^h-q^l)-p^h+p^l]f(\delta)d\delta \tag{32}$$

Recalling $q^l = 0$ and the definition of $\Phi = (p^h - p^l)/q^h$ we arrive after some rearrangements at

$$CS^{dereg} = \int_{p^l/a}^{\bar{\delta}} a(\delta - p^l/a)f(\delta)d\delta + \int_{\Phi}^{\bar{\delta}} q^h(\delta-\Phi)f(\delta)d\delta \tag{33}$$

To determine the impact of the institutional change we subtract (33) from (14) which yields:

$$CS(p^{pa}) - CS^{dereg} = EQ(p^{pa})\int_{p^l/a}^{\bar{\delta}}(\delta - p^l/a)f(\delta)d\delta - \int_{\Phi}^{\bar{\delta}} q^h(\delta-\Phi)f(\delta)d\delta \tag{34}$$

This result can easily be interpreted. Since average quality $EQ(p^{pa})$ does not exceed highest quality $q^h = \pi\bar{q}$ the consumer surplus of the deregulated market tends to be higher in a reputational equilibrium than under the regime of a professional association. On the other hand, the weights attached to the qualities affect the equation in the opposite direction. The weight attached to the average quality is higher than the weight attached to the high quality.

5 Summary

What would happen if the EU Commission would abolish all minimum prices for professional services in Europe? According to opponents from the league of professional associations, we would see prices come down but also a decline of service quality and work dignity. If, for the sake of the argument, we follow this critique and assume that the quality of professional services is conditional upon the intrinsic motivation of service providers, and if we moreover assume that the intrinsic motivation of service providers rests upon a "reasonable profit", we would want to know whether the decline of service quality would indeed accrue and whether it runs in or against the interest of consumers. The answers to these questions are not straightforward because of several countervailing effects, mainly of institutional nature.

First, the assurance of service quality through a uniform pricing scheme leads to a quality of services that can be too high on average, if consumers value quality in a way that the demand quantity decreases with the price.
Second, high quality of services, if it is not the highest possible quality, could be also too low on average in a selfregulatd market if the spectrum of quality demanded is such that a group of consumers desire highest quality. A reputational equilibrium would serve this group at a targeted higher price while other consumers are served at a lower price for lower quality. The uniform pricing schemes of the association can not fix this match.
The goal of the professional association to have a large membership of "honorable man" (with a decent income and a dignitable work morale) may therefore in several ways conflict with the quality goal of consumers.
In this paper we have shown that a minimum price which is fixed by a Niskanen-type professional association will generally not serve the consumers if there is a demand for a variety of low and high quality services. If the price is fixed so that quality is somewhere below the top but beyond the lowest possible quality, it will hurt top quality demand while low quality preferences are better off compared to a reputational equilibrium (see fist term on the r.h.s. of eq. (34)).
Moreover, we have demonstrated that a de-regulation of a pre-existing fixed price scheme will never lead to a decrease in service quality. Even if the professional association prefers top quality, the de-regulated market would produce exactly this average top quality $\pi\bar{q}$.
The EU's initiative for de-regulation of professional tariffs therefore seems in the best interest of consumers - even if we acknowledge the argument of opponents that there is a chance of deprivation of professional ethics due to price competition. We even see a surprising increase of average service quality, if the demand for quality is such that some top quality segment that would not be served under a uniform pricing scheme will be served in market without price regulation.
This papers analysis can be extended in many explorative ways, e.g. by introducing open access or by considering overall welfare effects (including producer surplus). None of this possible extensions would, according to our expectation, change our result in favor of the EU's initiative to de-regulate professional tariffs. The present may therefore be seen as the objectively necessary minimal framework to establish this general result.

6 Appendix

6.1 Proof of Lemma 1

(1) follows immediately by (17). (2) can be derived by recalling the definition of $\Omega(p)$ and differentiating (19) which yields:

$$Z'_{pa}(A) = \frac{1}{\bar{c}\bar{q}\bar{\delta}}((\bar{\delta} - \Omega(p)) > 0 \tag{35}$$

Notice, that $(\bar{\delta} - \Omega(p)) > 0$ since we assume the existence of a market equilibrium with positive demand $D(p)$. (3) follows immediately by inspection of (19). To proof (4) simply observe from (35) that the sign is unambiguously determined.

To proof (5) one has to differentiate $Z^{pa}(p)$ with respect to p. Utilizing the definitions of $\Omega(p)$ (eq. (10) and Z^{pa} (eq. (19) we have

$$Z^{pa}(p) = \frac{p-A}{\bar{c}\bar{q}}\left(\frac{\bar{\delta}-\Omega(p)}{\bar{\delta}}\right) \tag{36}$$

Differentiating with respect to p yields

$$Z'_{pa}(p) = \frac{1}{\bar{c}\bar{q}}\left(\frac{\bar{\delta}-\Omega(p)}{\bar{\delta}}\right) - \left(\frac{p-A}{\bar{c}\bar{\delta}\bar{q}}\right)\Omega'(p) \tag{37}$$

where from (10)

$$\Omega'(p) = \frac{\bar{c}(\bar{c}a-\pi A)}{(\pi(p-A)+\bar{c}a)^2},\ p \in I_2 \tag{38}$$

Differentiating once more yields

$$\begin{aligned}\Omega''(p) &= -\frac{2\bar{c}(\bar{c}a-\pi A)(\pi(p-A)+\bar{c}a)\pi}{(\pi(p-A)+\bar{c}a)^4} &(39)\\ &= -2\Omega'(p)\frac{\pi}{\pi(p-A)+\bar{c}a},\ p \in I_2 &(40)\end{aligned}$$

To proof concavity of Z^{pa} we have to determine the negative sign of Z''_{pa}. After differentiating (37) and utilizing (39) we arrive at

$$\begin{aligned}Z''_{pa}(p) &= -\frac{2\Omega'(p)}{\bar{c}\bar{q}\bar{\delta}} - \frac{p-A}{\bar{c}\bar{q}\bar{\delta}}\Omega''(p) &(41)\\ &= \frac{-2\Omega'(p)}{\bar{c}\bar{q}\bar{\delta}}\left(\frac{\bar{c}a}{(\pi(p-A)+\bar{c}a)}\right) < 0 &(42)\end{aligned}$$

The sign follows by the assumption that $\Omega'(p) > 0$.

6.2 Proof of Proposition 1

The first assertion of the proposition can be proved by referring to the definition of $CS(p)$ and Z^{pa} (eqs. (16) and (19). The slopes of both objective functions are negative in I_3. Hence, a price p^* maximizing consumer surplus such that $EQ(p^*) = \pi\bar{q}$ requires that $CS'(p^*) \geq 0$ for $p^* \in I_2$ as a necessary condition. To prove that $p^{pa} = p^*$ we firstly have to show, that $Z'_{pa}(p^*) \geq 0$. Secondly, we have to assure that there exists no $\hat{p} \in I_2$ such that $Z'_{pa}(\hat{p}) = 0$ and $Z^{pa}(\hat{p}) > Z^{pa}(p^*)$.
From the proof of lemma 1, eq. (37), we know

$$Z'_{pa}(p) = \frac{1}{\bar{c}\bar{q}}\left(\frac{\bar{\delta}-\Omega(p)}{\bar{\delta}}\right) - \left(\frac{p-A}{\bar{c}\bar{\delta}\bar{q}}\right)\Omega'(p) \tag{43}$$

Similar, from eqs. (10), (37) and from (15) we can calculate for $p \in I_2$

$$\begin{aligned}CS'(p) &= EQ'(p)\left(\frac{(\bar{\delta}-\Omega(p))^2}{2\bar{\delta}}\right) - \frac{(EQ(p)+a)(\bar{\delta}-\Omega(p))\Omega'(p)}{\bar{\delta}} &(44)\\ &= \frac{\pi\bar{q}(\bar{\delta}-\Omega(p))}{\bar{c}\bar{\delta}\bar{q}}\left(\frac{\bar{\delta}-\Omega(p)}{2} - (p-A)\Omega'(p)\right) - \frac{a}{\bar{\delta}}(\bar{\delta}-\Omega(p))\Omega'(p)\end{aligned}$$

To proceed it is helpful to distinguish between the two cases $\Omega'(p) > 0$ and $\Omega'(p) < 0$. If $\Omega'(p) < 0, p \in I_2$, i.e. if the demand curve is upwards sloping, then from (37) and (44) we can infer that $Z'_{pa} > 0$ and $CS'(p) > 0$, $\forall p \in I_2$ which implies that $p^{pa} = p^*$.
If $\Omega'(p) > 0, p \in I_2$, i.e. in the case of a normal demand function, it follows from (44) that $CS'(p) \geq 0$ which implies $Z'_{pa}(p) \geq 0$. By the concavity of $Z^{pa}(p)$ (see lemma 1) it follows immediately that there cannot exist a $\hat{p} \in I_2$ such that $Z'_{pa}(\hat{p}) = 0$. Hence p^* maximizes $Z^{pa}(p)$.

To prove the second assertion, it is again helpful to distinguish the two cases. If $\Omega'(p) < 0, \forall p \in I_2$, then the consumer surplus maximizing price $p*$ must be nil, i.e. $p^* = 0$. This follows immediately from $CS'(p^*) \geq 0, \forall p \in I_2$. If the price inducing highest average quality does not maximize consumer surplus, then only a price inducing lowest average quality will do. This follows from $CS'(p) < 0, \forall p \in I_1$ and the assumption of the second assertion. Since $Z'_{pa} > 0, \forall p \in I_2$ and $Z'_{pa} = 0, \forall p \in I_1$ it follows that Z^{pa} is maximized for a price inducing highest average quality. Hence $p^{pa} > p^* = 0$.
If $\Omega'(p) > 0, \forall p \in I_2$, a necessary condition for $p^* > 0$ is $CS'(p^*) = 0, p^* \in I_2$. From (44) one can infer that the first bracketed term must therefore be positive which implies that $Z'_{pa} > 0$ (see (43)). Hence, by the concavity of $Z^{pa}(p)$ it follows that $p^{pa} > p^*$.

6.3 Proof of Proposition 2

First we proof that $p^l < p^{pa}$. Adding (27) and (28) and recalling (18) yields

$$S^h + S^l = x = \int_{p^l/a}^{\bar{\delta}} f(\delta)d\delta = \int_{\Omega(p^{pa})}^{\bar{\delta}} f(\delta)d\delta \tag{45}$$

Since total supply x is the same in both regimes total demand must also be the same to assure market equilibrium. Hence, from (45) it follows

$$p^l/a = \Omega(p^{pa}) = \frac{p^{pa}}{EQ(p^{pa}) + a} \tag{46}$$

and, since $EQ(p^{pa}) > 0$ by proposition 1,

$$p^l < p^{pa} \tag{47}$$

A reputation equilibrium which separates high and low qualities requires by (28)

$$p^l/a < \Phi = \frac{p^h - p^l}{\pi\bar{q}} \tag{48}$$

Utilizing (46) we end up with

$$p^h > \left(\frac{\pi\bar{q} + a}{EQ(p^{pa}) + a}\right) p^{pa} \tag{49}$$

which implies $p^h > p^{pa}$ since $\frac{\pi\bar{q}+a}{EQ(p^{pa})+a} > 1$.

To show that average quality in a de-regulated market exceeds that of a price-regulated market we first have to determine the average quality of the former market.

$$EQ^{dereg} = 0 \int_{(p^h - A)/\bar{q}}^{\bar{c}} g(c)dc + \pi\bar{q} \int_0^{(p^h - A)/\bar{q}} g(c)dc \tag{50}$$

Since $p^h > p^{pa}$ it follows from (50) and (8) that $EQ^{dereg} > EQ(p^{pa})$.

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