The Self-Regulating Profession

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Despite a long standing interest by policy makers, and the recent but rapid development of an informal literature on the subject (for example the several contributions included in Slayton and Treblico (1978)), the formal analysis of the economics of the self-regulating profession has received little attention from theorists. If a profession is "self-regulating", in the sense that its current members, being the sole suppliers of a certain type of service, are free to determine, in one way or another, whether or not to admit a potential recruit, then it might seem prima facie that such a profession could simply be regarded as a monopolistic seller of the service in question, so that the effects of self-regulation would appear to involve an unambiguous welfare loss. The whole rationale for self-regulation, however, rests on the notion that it provides a vehicle through which the quality of the service may be maintained in markets where the consumer cannot readily measure this quality himself. It is the analysis of the interplay of these two elements, the enhanced price of such services associated with the monopolistic power of the profession, and the improved quality of the service which may accompany a reduction in supply, which forms the focus of the present paper.

It is tempting to begin the analysis of such a profession by first positing some particular objective function which the profession might try to optimize. For example, we might consider the profession as attempting "selfishly" to maximize their per capita income, or, "altruistically", to maximize, through their effect on the quality of entrants, some measure of social welfare, or again, as Leland (1980) suggests, to maximize producer surplus.

Such an approach, of its essence, involves from the outset some loss of generality; for there can be little hope of our reaching a consensus as to the objective function which, for example, the legal, medical, or accounting, professions, might reasonably be assumed to employ. Fortunately, the kind of questions which we pose here, and which, arguably, are the only kind of relevance to the policy-maker, may for the most part be posed, and answered, in a more general setting. Specifically, we shall (except in the last section of the paper) focus attention not on the question of what size of profession will be chosen, but rather on the logically prior question of what range of sizes of profession will be viable, in the sense of providing their members with at least an income equal to the opportunity cost represented by their transfer earnings.

The policy-maker's problem, we shall argue, reduces in practice to the question of whether the profession should, or should not, be allowed to retain monopolistic powers. Without such a legal constraint it may or may not be the case that an alternative "para-profession" may enter the market, and successfully supply a possibly inferior service at a lower price.

The most dramatic instance of such a phenomenon in the recent past has been the growth, in the British economy, of alternative suppliers of house conveyancing (escrow) services, whose activities have led to the placing of full page newspaper advertisements by the legal profession which argue that their quality of service in this field warrants the higher fees which their members charge. Whether such conveyancing agencies should be declared illegal is a matter of current debate among policy-makers.
In the present paper we will be concerned with exploring two types of question. Firstly, we discuss the single profession, in the absence of any (potential or actual) threat from a para-profession. Here, we are concerned with investigating how the welfare of consumers, and the income of the profession’s members, vary as the size, and quality of the profession alters. Our central concern here is to investigate whether any conflict arises between a policy-maker’s desire to optimize consumer welfare, and a desire by the self-regulating profession to protect, *inter alia*, its members’ incomes.

Our second theme concerns the effect of allowing a para-profession to enter. Here, we are concerned with whether the entry of the para-profession reduces the incomes of members of the original profession; for insofar as this occurs, the para-profession constitutes a threat to the interests of the original profession which may cause the profession to modify its entry standards and its size, with important consequences for consumer welfare. Furthermore, we are concerned with the effect of actual entry by a para-profession on consumer welfare, in the case where the size and quality of the original profession is given.

These two types of question, taken together, allow us to sum up the likely implications for consumer welfare of allowing self-regulating groups to retain a monopoly of certain professional services.

Finally, a word is in order concerning the familiar problems involved in analysing consumer preferences over quality. One approach to the problem is to define preferences directly over an arbitrary “index of quality” (Leland (1980)); another is to treat a “high quality” unit as equivalent to a certain number of units of “lower quality”—this latter approach of treating “quality as quantity” being quite appropriate where “high quality” units are ones with a longer expected life, for example (Levhari and Peles (1973)). Here, however, we shall define preferences over quality in what seems, in the present context, to be the least restrictive manner possible: essentially, we parameterize the utility function by the list of members of the profession whose services are consumed.

It may be helpful to note at the outset the differences between the model used here and the approach taken in the recent paper by Leland (1980). Though the two papers are directed towards quite different issues, they both begin by considering the supply and demand conditions facing sellers of a professional service. The main differences in approach lie firstly in the generality of our present treatment of quality; secondly, in the fact that we here consider a fully specified labour market involving non-professionals as well as professionals, so that the transfer earning of professionals are determined endogenously; and thirdly, in that we here provide a complete characterisation of the relationship between consumer welfare and the size of the profession, without first imposing a necessarily rather arbitrary objective function for the profession.

1. SOME PRELIMINARY REMARKS

We aim, from the outset, to simplify matters by abstracting from two factors, which, though empirically important, do not appear to play any essential role in the problems discussed here. Firstly, it is the case in practice that some small part of the demand for a professional service derives from the members of the profession itself; and such clients might reasonably be expected to enjoy a superior knowledge of the varying quality of their fellow members. Secondly, potential consumers of professional services will in practice differ in their tastes, and in their incomes, and so in their preferred “consumption bundle”, both in terms of the quantities and in terms of the quality of services purchased; this effect may indeed be of considerable practical importance.

In order to abstract from both these considerations, we take the slightly artificial step of imagining a group of “workers” to supply labour services to some quite separate group of “consumers”. The consumers are assumed to be identical in their preferences, to derive utility only from workers’ services and to enjoy equal endowments of “wealth” or
"money".\textsuperscript{2} It is implicit in our discussion that workers derive utility—via some indirect utility function—from the money incomes they earn through the provision of labour services.

We divide the "workers" into two groups, "lawyers" and "labourers", who provide two different types of labour service. Workers are assumed to differ in their ability as potential lawyers, in a manner to be defined precisely below. Consumers have no way of distinguishing the quality of any particular lawyer from any other (in that, \textit{inter alia}, they use the services of lawyers very infrequently); nonetheless, we assume that once a legal profession is in existence, consumers do know through "hearsay" and "general knowledge", what degree of confidence they may typically place in the reliability of the services offered by a typical practitioner. Thus in defining consumer preferences over the services of lawyers and labourers, we will parameterize the preference map by a suitable description of the membership of the legal profession. Workers, \textit{qua} labourers, however, will be taken as offering a homogeneous service which may simply be measured in quantity units.

2. THE MODEL

\textit{Supply of services}

Labour services are supplied by \(N\) workers, each working some fixed number of hours per week, which, for ease of notation, we choose as the unit of labour supply. While workers are identical when employed as "labourers", they differ from one another in the quality of service they offer when employed as "lawyers", and we rank them along the interval \((0,N)\) on this basis, in ascending order of "ability", or "IQ", or whatever criterion is deemed appropriate.

A profession is assumed to regulate itself by imposing a minimum level of "ability" as an entry requirement. The membership of a profession may be described by a subset of \((0,N)\); throughout our present development it will simply take the form of an interval \((a,b)\subset(0,N)\) where \(a\) is the minimum level of ability required, while \(b\) is the minimum required by some profession of higher quality. (That professions should have this form is a consequence of our stipulation, noted earlier, that the incomes of members exceed their transfer earnings).

Thus, if a single profession forms whose entry requirement is \(l\), the profession will be of size \(L = N - l\), in the sense that it supplies \(L\) units of labour services, while "labourers" provide \(l\) units.

\textit{The quality of a profession}

Since a consumer cannot judge the varying qualities of individual practitioners, his preferences are defined over possible professions, the latter being in turn described by intervals of the form \((a,b)\). The consumer's preference ordering may thus be represented as an ordering over the triangle OAB (Figure 1).

The preference ordering is assumed to satisfy the following axioms:

Q.1: The preference order \(\succeq\) is complete, reflexive, transitive and continuous.  
Q.2: If \((a_1,b_1)\preceq(a_2,b_2)\) then \((a_1,b_1)\succeq(a_2,b_2)\).

The second axiom states that if we either remove the least able members, or introduce more able newcomers, or both, the consumer prefers the new profession thus formed to the old. This ensures that the indifference curves in Figure 1 are decreasing.

Let \(Q(a,b)\) be a function representing this ordinal preference ordering. We shall refer to \(Q(a,b)\) as the quality of the profession \((a,b)\).
Utility functions and demand

We wish to introduce the notion that professional services are often purchased in response to some event, such as an illness, or a desire to move house, which may appropriately be regarded as exogenous; so that a consumer will decide to purchase “one unit” of such a service or “one unit” of some substitute service, or none. The services of labourers, on the other hand, we will use as a residual category of expenditure and measure the quantity consumed as a continuous variable.

We might in fact, at the cost of a considerable increase in complexity, extend the model to allow the consumer to buy any quantity of legal services. Our basic reason for using this “zero/one” assumption on such purchases lies in the fact that our main focus of interest is in extending the analysis to deal with the consumer’s choice between using either lawyers or para-lawyers; with this in mind, it is a natural starting point to consider the consumer as deciding either to buy, or not buy, legal services.

The utility level achieved by our consumer may be described by two utility functions, \( V(x) \), giving the utility of the individual purchasing \( x \) units of labourers’ services, and none of lawyers’, and \( U(x, \alpha) \), giving the level achieved where, in addition to \( x \) units of labourers’ services, the consumer enjoys one unit of service from a member of a legal profession of quality \( \alpha \).

We assume that \( V(x) \) and \( U(x, \alpha) \) are increasing in all arguments, that \( U(x, \alpha) > V(x) \) for all \( x > 0 \), and that \( U(0, \alpha) = V(0) = 0 \). (To achieve positive utility a consumer must enjoy some services in the residual “labourers” sector.) The functions \( V(x) \) and \( U(x, \alpha) \) are illustrated in Figure 2.

Given \( x, \alpha \) we define \( M(x, \alpha) \) to be the quantity of labourers’ services the consumer is willing to forego in return for 1 unit of lawyers’ services of quality \( \alpha \). \( M \) is implicitly defined by:

\[
U(x - M(x, \alpha), \alpha) = V(x).
\]

Differentiating w.r.t. \( x \):

\[
U_x \cdot (1 - M_x) = V_x
\]

or:

\[
M_x = 1 - \frac{V_x}{U_x}.
\]
Let $\alpha = Q(a, b)$, and holding $b$ constant, $M_a Q_a$ is the quantity of labourers’ services which an individual consuming legal services is willing to forego per unit increase in $a$, the ability level of the least able lawyers. (By differentiating the defining equation for $M$ with respect to $a$, we have $M_a Q_a = (U_a Q_a / U_x) > 0$).

We make two assumptions on the behaviour of $M$:

M1: For all $x, \alpha$

$$1 > M_x > 0.$$  

M2: For all $x, \alpha, b$:

$$(M_a Q_a)' < 0.$$  

Since $M_x = 1 - V_x / U_x$, where $U_x, V_x > 0$, the first assumption states that $U_x > V_x$, i.e. for two individuals achieving the same level of utility, one of whom consumes the services of $i$ labourers only, while the other enjoys the services of the smaller number $x$ of labourers, along with the services of a lawyer, then the marginal utility of additional services from labourers is greater for the latter individual (reflecting his lesser consumption of such services).

The second assumption deals with the manner in which the marginal utility of an individual derived from the services of labourers, and from improvements in the quality of lawyers’ services, respectively, changes, according as the quality of legal services is enhanced through a raising of the minimal ability requirement $a$, while he simultaneously suffers a compensating reduction in his endowment of the services of labourers.

It seems reasonable to assume that the quantity of labourers’ services he is willing to forego in return for a given improvement in the quality of the legal services he enjoys is less, according as such compensated improvements in the quality of the profession proceed. For he now enjoys a higher quality of legal services, and is at the same time less well endowed with the services of labourers.

On the other hand, what we assume in M2 refers not to the effect of successive constant increments in the quality of the profession per se, but rather to the successive exclusion of a constant number of less able practitioners. Thus, the change in the function specified in M2 reflects the way in which the quality of the profession, as perceived by consumers, changes as successive practitioners are excluded, and so depends inter alia on the nature of the distribution of “ability” across individuals, and will thus for example differ according as the population contains a small number of highly able individuals, or a fairly uniform spread of abilities. Thus our assumption, M2, is rather substantive, in that
we might suggest examples in which it might plausibly be violated. Rather than introduce unnecessarily restrictive conditions on the consumer's measure of the quality of the profession \((a, b)\) in terms of its various members' abilities, we shall here simply impose assumption M2 directly.

It is extremely important to stress, in the light of this comment, that M2 does not play a central part in what follows. Its only role is, rather loosely, to ensure that consumer welfare is concave in the size of the profession. This means that we can identify a unique (local and global) welfare maximum. Most of our results in fact still hold without M2, though their statement becomes more complicated.

3. EQUILIBRIUM WITH ONE PROFESSION

In the one profession case, labour supply consists of \(l\) units of labourers' services, and \(L = N - l\) units of lawyers', while the quality of the profession is \(\alpha = Q(l, N)\).

In equilibrium, a consumer is free to choose whether to purchase the services of lawyers or not; thus consumers may be divided into two groups, those who enjoy \(t\) units of labourers' services only and those who choose to buy the services of lawyers and enjoy \(t - M\) units of labourers' services.

Market equilibrium is now characterised, for given parameters \(L, l, \alpha\) by a vector \((t, M)\) satisfying two conditions. Firstly

\[
U(t-M, \alpha) = V(t)
\]

which is equivalent to the requirement

\[
M = M(t, \alpha).
\]

Moreover, since each consumer purchasing legal services buys exactly one unit of such services, the total number of units supplied coincides with the number of consumers who purchase the bundle \((t-M, \alpha)\). We may therefore equate supply and demand for labour by requiring as our second condition for equilibrium that

\[
L(t-M) + (n-L)t = l
\]

or,

\[
nt = LM + l
\]

(1)

where \(n\) represents the total number of consumers.

Since \(t-M(t, \alpha)\) is strictly increasing in \(t\) by M1 and since \(M = 0\) when \(t = 0\), there exists a unique equilibrium solution for any parameter values \(l, \alpha\).

Viability

If workers are free to choose their occupation, subject only to the minimum level of ability required of lawyers, then the equilibrium conditions just defined need to be supplemented by the requirement that the earnings of labourers, \(q\), do not exceed those of lawyers, \(p\), i.e. that the relative income of lawyers, \(p/q\), should be greater than or equal to unity. An alternative expression for \(p/q\) may be obtained by noting that it represents, at equilibrium, the number of units of labourers' services a consumer is willing to forego in return for one unit of lawyers', i.e. \(M\).

We begin our analysis of the one-profession case by investigating the range of sizes of profession which are associated with viable equilibria, in the sense that they satisfy \(M \geq 1\).

From equation (1), writing \(\alpha\) and \(L\) as functions of \(l\), viz

\[
\alpha = Q(l, N); \quad L = N - l
\]
we obtain on differentiating

\[ nt_i = L M_x t_i + L M \alpha Q_a - M + 1 \]  
(2a)

\[ t_i = \frac{L M \alpha Q_a - (M - 1)}{n - L M_x} \]  
(2b)

\[ M_i = M_x t_i + M \alpha Q_a \]  
(2c)

Note that since \( M_x < 1, L < n \), the denominator in (2b) is positive.

**Proposition 1.** If a single profession of quality \( \beta \) is viable, then any single profession of superior quality \( \alpha > \beta \) is viable.

**Proof.** To establish the proposition, it is sufficient to show that \( M_i \) is positive when \( M = 1 \). This ensures that once \( M \) exceeds unity at some \( l \), it will never fall below unity as \( l \) increases.

From equation (2b), when \( M = 1 \),

\[ t_i = \frac{L M \alpha Q_a}{n - L M_x} > 0. \]

From (2c), moreover \( M_i > 0 \).

**Corollary.** There exists some quality \( \alpha \) such that all single professions with quality \( \alpha \geq \alpha \) are viable, while no single profession of quality \( \alpha, \alpha > \alpha \) is viable.

For the minimal viable level of quality, the associated equilibrium value of \( M \) is unity. We may characterise \( \alpha \) conveniently by noting that when \( M = 1 \) each consumer enjoys the same total number of units of labour services \( t \), and so this number coincides with the total supply of labour per consumer, i.e. \( t = N/n \), and so we have

\[ M \left( \frac{N}{n}, \alpha \right) = 1. \]

Thus, \( \alpha \) is the level of quality represented by the curve \( U(x, \alpha) \) which passes through the point \( (N/n - 1, V(N/n)) \) as indicated in Figure 3.

![Figure 3](image-url)

The largest (g) and smallest (ã) viable single professions (ã is defined in the next section, “Welfare properties”)
Welfare properties

In order to investigate the welfare implications of different sizes of profession, we consider the level of utility \( V(t) \), which at equilibrium represents the level of utility achieved by all consumers, as a function of \( t \). Maximising \( V(t) \) as a function of \( t \) is equivalent to maximizing \( t \) as a function of \( l \), and so we identify welfare with \( t \).

In the preceding section, we showed that the level of welfare achieved with a profession of the maximum size, or minimum quality \( \alpha \), consistent with viability, equals \( N/n \).

We now consider the profession of maximum quality, i.e. a profession of size zero. Here, the allocation of the services of labourers per consumer tends in the limit to \( N/n \); so that the level of welfare associated with this profession of maximum quality \( \alpha \) coincides with the level \( N/n \) attained with a profession of the minimum viable quality \( \alpha \).

To complete our discussion, we demonstrate that any turning point of welfare, i.e. of \( t(l) \), is a maximum. This will establish that \( t(l) \) is a single peaked function, and ensure the existence of some unique optimal quality of profession, \( \alpha \).

Setting \( t_l = 0 \), we first check whether the sufficient condition for a maximum \( t_{ll} < 0 \) is satisfied.

We first note from equation (2b) that when \( t_l = 0 \), we have

\[
\frac{M - 1}{L} = M_aQ_a > 0
\]

so that \( M > 1 \), i.e. the profession in question is viable.

Taking the second derivative in (2b) and setting \( t_l = 0 \) we have,

\[
t_{ll} \big|_{t_l=0} = \frac{L(M_aQ_a)'_a - M_aQ_a - M_aL_l - M_aQ_a}{n - LM_x} = \frac{l(M_aQ_a)'_a - 2M_aQ_a}{n - LM_x}
\]

\[
(M_aQ_a)'_a = (M_a(t, Q(a, N))Q_a(a, N))'_a
\]

The first term in the numerator is negative by \( M2 \), while the second is clearly negative and so \( t_{ll} < 0 \) at this point. Hence welfare takes a maximum at this point.

Relative incomes

We next turn to the question of investigating how shrinking the size of the profession affects the income \( p \) of its members, relative to the income \( q \) of labourers, postponing until the next section the question of how \( p \) is affected.

We first note that their relative income is measured by \( M = p/q \), given our assumption that the number of units of labour services which each worker provides is fixed. At the maximum viable size of profession, we have that \( M = 1 \), so that the incomes of both groups coincide. We may further deduce, by inspection of equation (2b), that, at the welfare maximum, being the point at which \( t_l = 0 \), that \( M > 1 \), so that lawyers enjoy a higher income than labourers.

What concerns us here is the question of how the relative income of lawyers is affected by a shrinking of the profession below the optimal size.

We show, in fact, that such a shrinkage can raise the relative incomes of the professional group.

Proposition 2. The relative income of lawyers attains its maximum at a size of profession smaller than the (welfare) optimal size.

Proof. We first note that, as the profession begins to shrink below the maximal viable size, for which \( M = 1 \), the relative income of lawyers increases, for, from equation (2c) when \( t_l \geq 0 \), \( M_l \geq M_aQ_a > 0 \). Hence \( M \) increases with \( l \), i.e. with a shrinkage in the size of
the profession, at least up to the first turning point at which \( M_t = 0 \). We establish our proposition by demonstrating that this point lies to the right of the welfare maximum.

We have shown, in our discussion of welfare properties, that welfare is a single peaked function of \( l \), so that \( t_1 \) is positive up to the welfare maximum, and so is \( M_t \). Hence the maximum point of \( M \) lies to the right of the welfare maximum.

The income of the professional group

The income level achieved by lawyers is measured by the price \( p \) of one unit of their services. This may conveniently be expressed as \( MY/t \), where \( M = p/q \), by noting that a consumer who does not purchase legal services spends his entire income \( Y \) on \( t \) units of labourers’ services, so that \( Y = qt \).

The implication of our preceding result for the effect on lawyers’ incomes of a shrinkage in the size of the profession below the social optimum may now be deduced; for, since \( M \) increases, at least initially, to the right of the welfare optimum, while \( t \), (our measure of welfare) declines, it follows that the income of lawyers \( p = MY/t \) increases.

Thus, we may conclude that the self-regulating profession, if it attempts to maximize either the relative, or the absolute incomes of its members, will shrink to a size which is socially sub-optimal; while an altruistic profession which expands to the socially desirable size, does so at the expense of a reduction in its members’ incomes.

A supplementary assumption

The above results leave open a question which is of some interest; does the income \( p \) of the professional group always increase as it contracts in size, or is a maximum attained at some finite, but socially sub-optimal, size of profession? Given our present assumptions, either outcome is possible. For, as the number of lawyers falls below the socially optimal level, it follows, by definition of the latter, that \( t \), our measure of the “real income” of consumers, falls. Thus, two effects operate in opposite directions on \( M \), and so on \( p \): the higher quality of lawyers tends to raise \( M \), while it is natural to assume that a fall in \( t \) will tend to lower it.

This latter effect, which may be thought of rather loosely as an “income effect”, might reasonably be assumed to be small. We prefer, here, however to introduce instead a supplementary assumption, to the effect that as consumers’ real incomes, measured by \( t \), increase, they spend a smaller fraction of their incomes on lawyers’ services (the quality of such services being fixed, and assuming that they do purchase exactly one unit of such services). This, though certainly restrictive, is not implausible, in that, at least above some minimal income level, the expenditure a consumer is willing to devote to acquiring a certain professional service will be greater, but will not, plausibly, constitute a greater fraction of his income.

The effect of this supplementary assumption is to ensure that the “income effect” on \( M \), referred to above, is not sufficiently strong to reverse the tendency for \( p = MY/t \) to increase with falling \( t \) as the profession shrinks below the socially optimal size (consumers now spending at least the same fraction of a diminished income on lawyers’ services).

This of course raises a query concerning the reasonableness of \( p \) as an objective function, as it would appear to lead to “very small” professions. We have shown in Shaked and Sutton (1980) however, that under conditions of imperfect (quality) information, the profession will not shrink indefinitely. Otherwise we might posit a modified objective function: for example, the profession might aim to maximise \( p \) subject to avoiding the appearance of a rival paraprofession. (See Proposition 5 below).

We assume,

P1: For a given quality \( \alpha \), \((t-M)/t \) is an increasing function of \( t \). This may be restated explicitly (by differentiating with respect to \( t \)).

\[
tM_x - M < 0.
\]
Proposition 3. The absolute income of lawyers, \( p \), increases as the size of the profession falls.

Proof. We demonstrate that \((M/t)_1 > 0\). The sign of \((M/t)_1\) coincides with the sign of:
\[
t_M t + t_M a Q_a - M t = t_M (n - M) + t_M a Q_a.
\]
Substituting for \( t \) from (2b), the sign of \((M/t)_1\) coincides with the sign of:
\[
(M - 1)(M x + M) + (n - LM) M a Q_a.
\]
The first term is positive by assumption \( P_1 \), for \( M' > 1 \); the second term is positive since \( nt - LM = l > 0 \), by (1). Hence \( p_i = (M/t)_1 > 0 \).

EQUILIBRIUM WITH TWO PROFESSIONS

We now proceed to investigate the effect of allowing a competing profession to form, which sets a lower threshold of ability as its entry requirement, so that equilibrium now involves a “profession” of “lawyers” offering \( L \) units of service, of quality \( \beta \), and a “para-profession” whose members we label “para-lawyers”, who provide \( P \) units of service of quality \( \gamma < \beta \), where total labour supply \( N = L + P + l \). We have, explicitly, that the qualities of the professions are then
\[
\beta = Q(l + P, N),
\gamma = Q(l, l + P).
\]
A consumer now purchases one unit of lawyers’ services, or one unit of para-lawyers, or none. The equilibrium condition analogous to (1) above becomes,
\[
(n - L - P)t + L(t - M^\beta) + P(t - M^\gamma) = l \quad \text{or} \quad nt = LM^\beta + PM^\gamma + l \quad (3)
\]
where \( M^\beta = M(t, \beta), M^\gamma = M(t, \gamma) \).

Threats

We first examine the range of possible sizes of para-profession which can co-exist with a given profession, in the sense that their members earn at least their transfer earnings as labourers (viability).

Keeping \( L \), and so \( P + l \) constant, in (3), we differentiate with respect to \( l \) to obtain,
\[
nt_l = LM^\beta t_l + PM^\gamma t_l + PM^\gamma Q^\gamma_a - M^\gamma + 1
\]
or
\[
t_l = \frac{PM^\gamma Q^\gamma_a - (M^\gamma - 1)}{n - LM^\beta - PM^\gamma}. \quad (4)
\]
We note that the denominator of equation (4) is positive since \( n > L + P \) and \( 1 > M_X^\beta, M_X^\gamma \).

We shall say that a para-profession can threaten a profession if and only if the resulting two profession equilibrium satisfies our viability condition \( M^\gamma \geq 1 \).

Proposition 4. If a para-profession of quality \( \gamma \) can threaten a profession \( \beta \), then every para-profession of quality \( \alpha > \gamma \) can threaten \( \beta \).

Proof. As in Proposition 1, it suffices to show that \( M^\gamma_1 > 0 \) at a point where \( M^\gamma = 1 \). From (4), when \( M^\gamma = 1 \),
\[
t_l = \frac{PM^\gamma Q^\gamma_a}{n - LM^\beta - PM^\gamma} > 0.
\]
Since
\[ M_1^\gamma = M_1^\gamma t_1 + M_2^\gamma Q_2^\gamma, \quad M_1^\gamma > 0 \quad \text{when} \quad M^\gamma = 1. \]

**Corollary.** If a profession \( \beta \) can be threatened by any para-profession, it can certainly be threatened by a profession of quality \( \beta_m = Q(l + P, l + P) \).

Here \( \beta_m \) represents the level of quality of a profession consisting of a single individual whose ability coincides with the minimum level required for membership of the profession.

Our "smallest" para-profession may thus be thought of as consisting of a single individual "just excluded" from the profession \( \beta \).

To identify the full range of para-professions which may threaten the profession, we merely need, by virtue of Proposition 4, to characterise the largest para-profession, i.e. that of lowest quality, which can threaten \( \beta \). We denote the quality of this profession by \( \beta_c \).

We may characterise \( \beta_c \) graphically as in Figure 4. Representing the one profession equilibrium by \( V(t) \) and \( U(x, \beta) \), with an associated utility level \( U_0 \), we note that the viability of a profession requires that its associated \( U \) curve at \( U_0 \), should pass to the left of the curve \( V(x + 1) \). Thus \( \beta_c \) is the level of quality whose associated curve \( U(x, \beta_c) \) cuts \( V(x + 1) \) at \( U_0 \).

![Figure 4](#)

The largest threatening para-profession

We may characterise the condition for a profession of quality \( \beta \) to be threatened by a para-profession, as \( \beta_m > \beta_c(\beta) \).

We now turn to the question of categorising the range of professions which can thus be threatened.

**Proposition 5.** (i) If a profession of quality \( \beta \) can be threatened by a para-profession then so also can any profession of higher quality \( \gamma \), for which the equilibrium welfare level is higher than the equilibrium at \( \beta \).

(ii) If \( \beta \) is such that \( \beta_m > \alpha \) then it can be threatened.

The second part of the proposition characterizes a size of profession which, along with all similar professions, certainly remains open to the threat of competition from a para-profession: it is that profession whose least able member, standing alone, can offer services of quality \( \alpha \), being the quality of the largest viable single profession. (Such a profession is, of course, smaller than the maximal profession of quality \( \alpha \)).

**Proof.** A profession of quality \( \beta \) is threatened if it is threatened by its last member \( \beta_m \), i.e. iff \( M^\beta_m = M(t, \beta_m) \geq 1 \) where \( t \) is the equilibrium value for the single profession \( \beta \).
Let \( t' \) be the equilibrium for \( \gamma, t' > t, \gamma > \beta \), hence \( \gamma_m > \beta_m \) and \( M^{\beta_m} = M(t, \beta_m) < M(t', \gamma_m) = M^{\gamma_m} \). Since \( M^{\beta_m} \geq 1 \) it follows that \( M^{\gamma_m} > 1 \), i.e. \( \gamma \) can be threatened by a para-profession. An immediate result of this is that \( \omega \), the welfare optimum size, can be threatened if there is a larger profession than \( \omega \) that can be threatened.

(ii) If \( \beta_m > \alpha, M^{\beta_m} = M(t, \beta_m) > M(t, \alpha) \). But \( t \), the equilibrium value for the single profession \( \beta \) is never less than \( N/n \), whence,

\[
M^{\beta_m} > M(t, \alpha) \geq M\left(\frac{N}{n}, \alpha\right) = 1. \tag{15}
\]

**Corollary.** If the profession aims to exclude the appearance of a rival para-profession it will not choose to shrink beyond a point where the quality of its least able member exceeds \( \alpha \).

The above proposition ensures that if the profession shrinks to a sufficiently small size, a rival group will appear; it leaves open, however, an interesting question as to the relationship between the critical size characterised by (ii), below which the profession is threatened by a para-profession, and the welfare optimum. It does not seem that anything can be said here without introducing some further, more restrictive assumptions. It is possible that the profession may shrink to some positive size smaller than the optimum before the threat from a para-profession becomes effective.

**Welfare and Income**

We now consider how welfare is affected by allowing a para-profession to enter.

**Proposition 6.** Let \( \beta \) be a profession with \( \beta_m > \beta_c \) (to ensure the viability of a para-profession). Then welfare, as a function of the quality of the para-profession, is a single peaked function, taking an internal maximum at a point \( \omega(\beta), \beta_m > \omega(\beta) > \beta_c \). Moreover, the levels of welfare achieved at the two 'end points' corresponding to the para-profession of the highest quality \( \beta_m \) and of the lowest quality consistent with viability \( \beta_c \), have the common value equal to the level of welfare attained with the single profession of quality \( \beta \).

**Proof.** The second part of the proposition follows immediately by noting that the equilibrium conditions (3) coincide with the equilibrium conditions for a single profession of quality \( \beta \) when \( \gamma \) equals \( \beta_m \) or \( \beta_c \). It remains to be shown that, between these points, welfare is a single peaked function. As in the previous section, \( t \) can be taken as a measure of welfare.

We observe from equations (4) that for \( \gamma = \beta_c \) (and so \( M^\gamma = 1 \), \( t_1 > 0 \)), whereas for \( \gamma = \beta_m \) (where \( P = 0 \), \( t_1 < 0 \)).

To complete the proof we show that \( t_{\mu_1} < 0 \) when \( t_1 = 0 \).

\[
t_{\mu_1}|_{t_1=0} = \frac{P(M^{\gamma}_\mu Q^{\gamma}_\mu - M^{\gamma}_a Q^{\gamma}_a - M^{\gamma}_\mu Q^{\gamma}_a)}{n - LM^{\gamma}_x - P M^{\gamma}_x}
\]

which is negative by assumption \( M2 \). Hence \( t_{\mu_1} < 0 \) when \( t_1 = 0 \). \( \tag{16} \)

As the para-profession expands the incomes of all three groups of workers will be affected; what concerns us is the effect on the income of the (original) profession, whose quality \( \beta \) is fixed throughout. This will be investigated presently. We note here, however, that the incomes of the (original) lawyers relative to the labourers' may be deduced as an immediate

**Corollary.** \( M^\beta \) is a single peaked function of the quality of the threatening profession, which takes the same value at \( \beta_m \) and \( \beta_c \), and achieves its maximum at \( \omega(\beta) \).
The proof is immediate by noting that

$$M^\beta_t = M^\beta_{x t}$$

so that $M^\beta$ varies directly with the level of welfare. This implies a rise in the income of the profession relative to that of labourers', as a small para-profession is introduced. That this reflects the fact that the income gains accruing to the new members of the para-profession imply a loss of income to both of the other groups, the labourers' suffering a greater relative loss, follows from

**Proposition 7.** (i) The income $p$ of lawyers, when a para-profession enters, takes the same value when the para-profession is of quality $\beta_m$, and when it is of quality $\beta_c$, and this common value coincides with the income level earned before the entry of a para-profession.

(ii) As the size of the para-profession declines from the maximum viable size (i.e. as its quality increases from $\beta_c$) the income $p$ of lawyers initially declines, reaching its minimum at $\omega(\beta)$, after which point it increases.

*Proof.* (i) As before $p = YM^\beta/t$. But, as noted earlier, the value of $t$ (and hence of $M^\beta(t, \beta)$) obtained when $\gamma = \beta_m$, $\gamma = \beta_c$ and when there is no para-profession, coincide; from which proposition (i) follows immediately.

(ii) By differentiating the above expression for $p$, we have that the sign of $p_t$ coincides with the sign of

$$tM^\beta_{x t} - t_tM^\beta = (tM^\beta_x - M^\beta) t_t$$

The first term in this product is negative by virtue of Assumption P1. Hence $p_t$ has the opposite sign to $t_t$, i.e. the income of lawyers varies in the opposite direction to consumer welfare $t$ as the size of the para-profession varies. Noting Proposition 6, our result follows immediately. ||

We complete our characterisation of the effect of varying the size of the para-profession in

**Proposition 8.** Given a profession of size $L$ which can be threatened by a para-profession, the price attained by the para-profession increases as the size of the para-profession shrinks.

*Proof.* We wish to sign the derivative of $M^\gamma/t$ with respect to $l$. This coincides with the sign of $t_t(tM^\gamma_x - M^\gamma) + tM^\gamma_x Q^\gamma_a$. Substituting $t_t$ from equation (4), this expression has the same sign as:

$$[PM^\gamma_a Q^\gamma_a + (1 - M^\gamma)][tM^\gamma_x - M^\gamma] + tM^\gamma_x Q^\gamma_a(n - LM^\beta - PM^\gamma_x)$$

$$= (M^\gamma - 1)(M^\gamma - tM^\gamma_x) + M^\gamma_x Q^\gamma_a(nt - LtM^\beta_x - PM^\gamma)$$

Bearing in mind that $nt = LM^\beta + PM^\gamma + l$, the second expression can be simplified:

$$= (M^\gamma - 1)(M^\gamma - tM^\gamma_x) + M^\gamma_x Q^\gamma_a[L(M^\beta - tM^\beta_x) + l]$$

which is positive by virtue of P.1 and $M^\gamma \geq 1$. ||

The behaviour of prices as the size of the para-profession varies is illustrated in Figure 5.
5. SIDE-PAYMENTS

So far we have treated the profession, and the para-profession, as independent groups whose members' incomes are simply the price of their services, determined by market forces alone. In practice, this may be unduly restrictive. In the present section we explore to what extent our analysis is affected if interaction/co-operation between professional groups is permitted.

Such an investigation demands, of its nature, that we first specify the legal framework within which the professions operate. We shall in particular distinguish two empirically relevant cases. Firstly, a group of individuals may be free to form an independent para-profession,\(^7\) secondly, the right to form such a group may rest with the original profession itself.\(^8\)

Given the legal framework then, we aim here to explore the possibility of interaction/co-operation between professional groups. Such cooperation will be treated analytically by extending our exploration of equilibria to include "solutions with side-payments".

The empirical counterpart of such side-payments lie in any deviation of members' incomes from the equilibrium market price of their services, as determined in the situation where the professional groups are independent (a familiar, and striking, example being perhaps that of the British legal custom which requires a Queen's Councel to "be accompanied by a junior"). Now such arrangements might in principle emerge subsequent to the appearance of an initially quite independent para-profession. Alternatively, the possibility of such transfers might be explored, and agreed upon, prior to their introduction and as a condition for entry, where the para-profession is formed under the aegis of the existing profession. We will investigate both possibilities in turn.

In investigating the role of side-payments we will confine ourselves to the special case in which the professions' objective is simply to maximise its members' income (\textit{per capita}), i.e. the price of its services.

We first consider a para-profession which has already appeared; only its size, therefore, remains to be determined. Since it is in the interests of the para-profession to shrink (Proposition 8) we assume the policy maker dictates that the lower bound to quality required for entry, be \textit{at most} some size (say, the welfare optimal size).

Since \(p^\beta\) and \(p^\gamma\) both increase as the size of the para-profession shrinks below the welfare optimal level, such a contraction is likely if no such constraint is imposed. In the absence of "side-payments", such a constraint is moreover sufficient, in that the para-profession will not wish to expand. Where side-payments are possible, it is no longer
obvious that this is the case: for now it is in the interests of the main profession that the
para-profession should expand. We show however, rather surprisingly, that no side-
payments exist such that the para-profession might expand (Proposition 9 below).

We turn now to the second possibility, which involves the notion that the profession
might choose to introduce a para-profession. In the absence of side-payments, such a
possibility is unlikely, for it leads to a fall in the income of members of the existing
profession.

Where side-payments are permitted, the possibility arises that the profession might
find it worthwhile to sponsor the entry of such a group; for the new para-professionals earn
more than hitherto (as we show in Proposition 10) and so may be recruited even when
making "side-payments". If the original profession aims to maximize its members (per capita) incomes, including side-payments, then we show that the profession will in fact
sponsor the entry of a para-professional group, and that the entry requirement it will set
will be lower than the welfare optimal level (Proposition 11).

We have then, a rather clear cut policy conclusion. Firstly, allowing an independent
para-profession of any size to enter is welfare improving, and fixing the welfare optimum
entry requirement as an upper bound is sufficient to ensure a welfare optimum (even if
institutional arrangements between the professions are allowed subsequently to appear
which involve side-payments). Secondly, the policy of allowing the profession to sponsor
such a para-professional body will, when and only when, institutional arrangements admit
of side-payments, lead to the formation of such a body; and that its quality will be set at
"too low" a level, in welfare terms.

Finally, we state and prove Propositions 9, 10 and 11.

**Proposition 9.** When side-payments are permitted, the profession cannot successfully
induce the para-profession to expand.

**Proof.** Let \( P_1 \) be the minimum size of the para-profession (as decreed by govern-
ment). Let \( P_2 > P_1 \) be the size to which the original profession wishes the para-profession
to expand. Let \( t_i, M_i^\beta, M_i^\gamma \) be the equilibrium values of \( t, M^\beta, M^\gamma \) for the pair of
professions \( L, P_i \), i.e.

\[
nt_i = LM_i^\beta + P_iM_i^\gamma + (N - L - P_i) \quad i = 1, 2.
\]

We assume of course that the profession's price is higher at \( P_2 \) than at \( P_1 \), since otherwise
the main profession would not want the para-professions to expand. This implies that
\( t_2 < t_1 \) because the price of the profession varies inversely with welfare (Proposition 7).
Whatever the institutional arrangements, the main profession will certainly have to make
side-payments to at least the "best" para-professionals i.e. those in the minimal size group
designated by the government.

The maximal total payment which the profession can make is

\[
L \left( \frac{M_2^\beta}{t_2} - \frac{M_1^\beta}{t_1} \right).
\]

The minimal payment which the para-professionals require in order to expand to \( P_2 \) is:

\[
P_1 \left( \frac{M_1^\gamma}{t_1} - \frac{M_2^\gamma}{t_2} \right).
\]

A necessary condition for a successful offer is

\[
L \left( \frac{M_2^\beta}{t_2} - \frac{M_1^\beta}{t_1} \right) \geq P_1 \left( \frac{M_1^\gamma}{t_1} - \frac{M_2^\gamma}{t_2} \right)
\]
i.e.
\[ L\left(\frac{M_2^\alpha}{t_2} - \frac{M_1^\alpha}{t_1}\right) - P_1\left(\frac{M_1^\gamma}{t_1} - \frac{M_2^\gamma}{t_2}\right) \geq 0. \]

However, we demonstrate that this expression is negative, (which establishes the proposition).

\[
L\left(\frac{M_2^\alpha}{t_2} - \frac{M_1^\alpha}{t_1}\right) - P_1\left(\frac{M_1^\gamma}{t_1} - \frac{M_2^\gamma}{t_2}\right) = \frac{LM_2^\alpha + P_1M_2^\gamma}{t_2} - \frac{LM_1^\alpha + P_1M_1^\gamma}{t_1} + (P_1 - P_2)M_2^\gamma
\]

By using the definition of \( t, M_1^\alpha, M_1^\gamma \):

\[
= \frac{N - L - P_1}{t_1} - \frac{N - L - P_2}{t_2} + (P_1 - P_2)M_2^\gamma
\]

\[
= (N - L - P_1)\left(\frac{1}{t_1} - \frac{1}{t_2}\right) - \frac{(P_1 - P_2)}{t_2} + (P_1 - P_2)M_2^\gamma
\]

\[
= (N - L - P_1)\left(\frac{1}{t_1} - \frac{1}{t_2}\right) + \frac{(P_1 - P_2)}{t_2}(M_2^\gamma - 1) < 0.
\]

For \( t_2 < t_1, P_1 < P_2 \) and \( M_2^\gamma \geq 1. \)

We establish our final result in two stages. We establish in Proposition 10 a preliminary result, which ensures that when a para-profession is created or expanded, its (new) members enjoy an increase in income. This is in fact non-trivial: for, while their new earnings \( p' \) certainly exceed the earnings \( q \) of labourers in the new equilibrium, what must be established is that \( p' \) in the new equilibrium exceeds the earnings of labourers in the original equilibrium. Having established this, we proceed to our final result in proposition 11.

**Proposition 10.** When a group of individuals join a para-profession their (per capita) incomes thereby increase.

**Proof.** We demonstrate that the price a para-professional earns always exceeds that earned by a labourer, whatever the size of the combined profession. This follows immediately, for, when the para-profession is of the maximal viable size, then \( p^\gamma = q = 1/t \). As the para-profession shrinks, \( p^\gamma \) increases, while \( q = 1/t \) first falls and subsequently increases, reaching its initial value when the size of the para-profession shrinks to zero. Hence \( p^\gamma \), for any size of para-profession, is not less than the earnings \( q \) of labourers, for any size of para-profession. Thus when a group of labourers join the para-profession (thus changing its size), their incomes thereby rise (see Figure 5).

**Proposition 11.** If side-payments are allowed the profession gains by the introduction of a para-profession. If the profession aims to maximize its gross income (price + side-payments) it will introduce a para-profession of a quality lower than the welfare optimal level.

**Proof.** Let \( P_1 \) be the minimum permitted size of para-profession as before. Assume that the profession expands the para-profession to \( P_2 \) and receives side-payments from the new para-professionals, of whom there are \( (P_2 - P_1) \). Using the notation of the proof to Proposition 9, the maximal total payment that these para-professionals are willing to
make is:

\[(P_2 - P_1) \left( \frac{M^2_2}{t_2} - \frac{1}{t_1} \right) \]

(from Proposition 10 this is positive).

The minimal payment the profession will require is:

\[L \left( \frac{M^\theta_1}{t_1} - \frac{M^\theta_2}{t_2} \right).\]

So in order that the profession introduce the para-profession we require

\[(P_2 - P_1) \left( \frac{M^2_2}{t_2} - \frac{1}{t_1} \right) \geq L \left( \frac{M^\theta_1}{t_1} - \frac{M^\theta_2}{t_2} \right).\]

This is trivially satisfied if \( t_2 < t_1 \) because then \( M^\theta_2/t_2 > M^\theta_1/t_1 \) and the left hand side is negative.

This corresponds to the case of \( P_1 \) being small (smaller than the welfare optimal size of para-profession). If the profession expands the para-profession to \( P_1 \), it thereby earns a higher price for its services, and in addition receives side-payments from the para-professionals.

For \( t_2 > t_1 \) we can show that the inequality still holds, using our expressions for \( t_1, t_2 \):

\[(P_2 - P_1) \left( \frac{M^2_2}{t_2} - \frac{1}{t_1} \right) - L \left( \frac{M^\theta_1}{t_1} - \frac{M^\theta_2}{t_2} \right) = (N - L - P_2) \left( \frac{1}{t_1} - \frac{1}{t_2} \right) + \frac{P_1}{t_1} (M^\gamma_1 - 1) > 0.\]

Hence the profession gains by introducing any para-profession and setting an appropriate level of side-payments. If the profession aims to maximise its gross income (price plus side-payments) its objective function is:

\[(P_2 - P_1) \left( \frac{M^2_2}{t_2} - \frac{1}{t_1} \right) + \frac{LM^\theta_2}{t_2} = \frac{P_2M^\gamma_2 + LM^\theta_2}{t_2} + \frac{P_2 - P_1}{t_1} \frac{P_1M^\gamma_2}{t_2} \]

\[= \frac{nt_2 - l + P_2 - P_1}{t_2} - \frac{P_1M^\gamma_2}{t_2} \]

where \( l = N - L - P_2 \).

Differentiating w.r.t. \( l \) (holding \( P_1, t_1 \) constant):

\[-\frac{1}{t_2} - \frac{lt_2}{(t_2)^2} - \frac{1}{t_1} - P_1 (M^\gamma_2/t_2)_l \]

\((t_2l) \) is the derivative of \( t_2 \) with respect to \( l \).

Since \((M^\gamma_2/t_2)_{l>0} > 0 \) (proposition 8) this expression is negative for \( t_2l \leq 0 \). Hence (for any \( P_1 \) not exceeding the optimum size) the profession will choose to introduce a para which is larger than the optimum (in fact, such that \( t_2l = 0 \)).

6. SUMMARY AND CONCLUSION

The present model offers extremely strong support for the argument that the granting of monopolistic powers to the self-regulating professions is likely to be welfare reducing, and that permitting the entry of rival para-professions is certainly welfare improving.

For, as we have shown in the discussion following Proposition 2, the monopolistic profession of optimal size can certainly raise its members' incomes at the cost of a reduction in consumer welfare, by further restricting entry; so that only a "perfectly altruistic" profession which considers only consumer welfare, and places no weight on its members' incomes, will choose to remain at the socially optimal size.
Even if the profession is indeed quite altruistic, then allowing a para-profession to enter can only further improve consumer welfare; for, in Proposition 6 we showed that if a para-profession is viable then it is welfare-improving (strictly, non-reducing).

The entry of the para-profession, so long as Assumption P1 holds, represents a threat to the profession in that its members' incomes fall when the para-profession enters. A surprising result holds, moreover, (Proposition 7), which underlines the conflict of interest involved: the size of para-profession which leads to the greatest improvement in welfare is also that which leads to the greatest loss in income for the members of the original profession.

In the final section of the paper, we examined a more general framework in which incomes might be determined institutionally. This was shown to leave our conclusions unaffected, so long as para-professional bodies are free to form quite independently of the existing profession. Where such bodies are formed only under the aegis of the existing profession, on the other hand, they will be introduced, if at all, at a quality level below that which is welfare optimal.

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NOTES
1. Where only one profession is present, all of its members thus enjoy the same level of transfer earnings irrespective of ability, in contrast to Leland (1980).
2. We consider elsewhere the effect of introducing differences in consumers' incomes (Shaked and Sutton (1981)).
3. Despite the paucity of theoretical results in this area, it is interesting to note that a considerable empirical literature asserts a tendency for a shrinkage in the size of the profession to raise the incomes of its members. See for example Shepard (1978).
4. Of course, we might in principle imagine this competing profession to be itself threatened by a third group, and so on.
5. Being a shift of \( V(x) \) to the left by one unit. Thus we are simply appealing to the notion that the income of professionals at least equals their transfer earnings at equilibrium.
6. It may be worth stressing that the point at which \( M^* \) does not in general coincide with the welfare optimum. The latter point reflects the effect of adding in the marginal worker to the existing profession and so "diluting" its quality.
7. In the case of the U.K., the Royal Commission on the Legal Profession recommended in 1979 that such groups should not have to provide conveyancing services.
8. An example from U.K. experience being dental auxiliaries, who provide many of the services offered by dentists (and work through clinics rather than private practices).

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