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Markets and the NHSME Guidelines

Costs and Prices in the NHS Internal Market

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DISCUSSION PAPER 120

MARKETS *AND* THE NHSME GUIDELINES:

COSTS AND PRICES IN THE NHS INTERNAL MARKET

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ABSTRACT

This paper traces the development of costing and pricing guidance as it relates to the operation of the NHS internal market (Sections 1 & 2). Such guidance has developed at least partly in response to the information deficiencies which undermine the Government's somewhat mechanistic application of the competition-efficiency paradigm to the public sector. The recent paper in this Discussion Paper series [Dawson, 1994] makes a valuable contribution to the debate by pointing out some of the cost classification problems and inherent dangers of average cost pricing rules. This paper endorses such observations, in particular the problems associated with average cost pricing, but develops a different stance with respect to the guidance and, in particular, the issue of openness in pricing (Section 3).

Essentially the general aim of the national guidance on costing and pricing is supported in this paper, while recognising that it is a means to an end, not an end in itself. The guidance is attempting to ensure a degree of consistency in costing methodologies, hence ironing out artificial differences across providers. This paper argues that some degree of consistency is desirable and in particular that openness in pricing information is an essential feature if purchasers are to make more informed decisions. What ***is*** required is supplementary information on qualitative aspects of service in order that price/quality trade-offs can begin to be made by purchasers.

Ex ante openness in pricing may be viewed as a necessary, but not sufficient, condition to facilitate the operation of the NHS internal market. The health care market ***is*** different from other markets and purchasers need a "guiding hand" if they are to make more informed decisions: the national guidance can be interpreted as the guiding hand or a check on market forces.

Underlying the guidance is a real concern that in particular sectors of the market significant degrees of monopoly power will exist. The extent to which market structure may be influencing the price (and quality) of service offered by providers is largely an empirical question, and raises the issue of how markets should be classified. Section 4 discusses two possible methods, one focusing upon indices of concentration and the other describing different types of demand elasticity: specifically, price elasticity of demand, price cross-

elasticity of demand and conjectural price flexibility. The latter method requires further development in the context of the internal market and potential information difficulties. The price cross-elasticity of demand is of particular value in addressing the issue of the degree of substitutability across primary/community and secondary care services. The concept of conjectural price flexibility is essential in identifying the crucial role of expectations in oligopolistic market structures (eg. two or three large teaching hospitals dominating the provision of a range of services).

The paper concludes by supporting the case for openness in pricing but at the same time arguing for less stringent pricing rules. The danger with the current "managed market" is that the system may lumber towards a situation of bilateral monopoly in which price and service specification are influenced primarily by the negotiating skill and bargaining power of purchaser and provider Chief Executives, with the resultant contract prices bearing little relation to efficient resource allocation. Encouraging the development of genuinely seamless primary/community care services, with larger numbers of potential providers, is one means of increasing the degree of competition and exerting a positive influence on patient choice.

SECTION 1: BACKGROUND

The creation of the NHS internal market, by the separation of the purchaser and provider roles, is based on the proposition of economic theory that perfectly competitive markets will produce an efficient allocation of resources. Underlying the theory of perfect competition is the crucial assumption that, for society's well-being to be maximised with the resources available, a number of conditions have to be met. The most crucial assumption is the requirement of the presence of a large number of providers in the market, with ease of entry and exit. If this condition holds then, from Posnett and Culyer (1990), this implies that:

1) providers will maximise net worth;

2) output will be produced at least cost (assuming no externalities);

3) output will be at the optimal rate in the long run (assuming that all other markets are similarly perfect).

Assuming that all providers are aiming to maximise their own net worth and that there are numerous such providers, then a situation arises when each individual provider, being unable to exert any influence over the market, is forced to compete with other providers on the basis of price. Furthermore, if purchasers of health care are assumed to be fully informed regarding the relative prices of services available from competing providers, then this creates an incentive to providers to operate at minimum cost. If a provider fails to operate at minimum cost (and consequently has higher prices), then purchasers will switch their demand away to lower cost providers, offering better value for money. Thus the theory is that any provider acting inefficiently in the market will, in the long run, be forced out of the market by alternative providers operating more efficiently. Those providers remaining in the market will be productively efficient, either maximising the level and quality of service for a given cost or minimising costs for a given level and quality of service.

Additionally, assuming that the objective is to maximise society's net welfare (total social benefit - total social cost), subject to the production function and the availability of resources,

efficiency in the NHS can be stated as the maximisation of:

$$W=SB-TC$$

(where W = net welfare gain, SB = total social benefit and TC = total social cost).

It can be proven (see Appendix 1) that this welfare objective will be maximised when the consumer's marginal valuation of the last unit of production equals the marginal social opportunity cost of the resources used to produce it, so that the price charged for the unit equals the marginal cost of production. One of the basic results of competition under the conditions outlined earlier is to ensure that any profits (surpluses) earned constitute only a competitive rate of return on capital employed. Prices charged for services across the board should therefore reflect the opportunity cost of capital, proxied by the 6% rate of return figure currently in use. One way of perceiving the NHS reforms is an attempt to replicate these desirable outcomes of competition which achieve welfare objectives and secure the optimal use of resources.

While in theory this could be seen to provide ample justification for introducing provider competition into the NHS, there are, as Posnett and Culyer (1990) point out, "manifest hazards in transferring these results to the hospital sector" (p13). In particular, there may be problems in achieving such an outcome from the type of managed competition that the Government has introduced. Maynard (1993) raises the issue that "some providers, due to inefficiency or just bad luck, will be driven out of business. Governments welcome the former benefits but suffer electorally from the latter" (p198). Questions need to be raised therefore over the extent to which some of the driving forces of the market (such as the possibility of exit) will be allowed to operate. As Posnett and Culyer argue, without any market force promoting profit maximisation, it may be possible for non-profit organisations to adopt alternative objectives which could conflict with the planned objectives of the government.

Additional sources of market failure, which do not guarantee that efficiency in the NHS will be achieved without a certain amount of regulation, are prominent in the health care sector. The most important of these are:

1) lack of competition/contestability in the market for the provision of health care;

2) imperfect information which may leave purchasers unable to make valid comparisons between the price and quality of service across competing providers.

1) Lack of Competition/Contestability

The pursuit of technical efficiency will only arise if relatively high cost providers are faced with incentives to change behaviour. As already noted, the theory of perfect competition is based on the existence of a large number of buyers and sellers in the market, providing the necessary incentives for an efficient outcome. In the NHS, however, local monopolies will exist, at least in the short run. This is only to be expected given the monopolistic nature of the NHS since its inception and given the large capital costs of provision which act as a barrier to potential new entrants. While it has been argued that the actual number of providers is irrelevant if the market is contestable, it is also true that many of the requirements for a contestable market are absent in relation to the health care market. This is a theme which is returned to later in the paper (Section 4).

2) Imperfect Information

The achievement of allocative efficiency will be determined by the extent to which purchasers of health care can make valid comparisons between competing providers' services and hence purchase for health gain. Sufficient information regarding competing providers' price and quality of services therefore needs to be available, not only to ensure that contractual conditions are adhered to, but also so that purchasers of health care can demonstrate value for money in their purchasing decisions.

> However, especially in the early stages of the contractual process, negotiations have been limited by poor quality and price information and crude service specifications; leaving those who represent the demand side in a weak position to make meaningful price and quality comparisons.

Additional concerns have also been raised over the impact which the introduction of GP fund-holders might have. Under the new arrangements, a collective demand is not expressed solely by a single purchasing agent acting on behalf of its resident population. While it is generally the case that most of the custom for hospitals will come from the local DHA, the introduction of GP fund-holders, may, as Posnett and Culyer (1990) point out: "weaken the ability of DHAs to hold prices down and which also brings with it the threat of fragmentation of services and community care" (p34). There is also a potential problem that there is information asymmetry between Health Authority and GP purchasers: if there is evidence of a two-tier system and preferential access to GP fundholder patients, providers would presumably not wish to share qualitative information (eg. on waiting times) with all of its purchasers.

The extent to which this is perceived to be a problem will depend upon the relative power of purchasers in determining what level of quality they deem to be appropriate. With the constraints that regulation of prices in the NHS has imposed on providers, coupled with the (money) price of health care being zero, a situation may result where providers are forced to compete on the basis of non-price factors (quality of care, waiting times, levels of amenity etc). Empirical evidence from the USA (where the existence of large scale third party payments has resulted in non-price competition) shows that, far from reducing costs and enhancing efficiency, non-price competition has resulted in excess capacity, duplication of services and the escalation of costs. For example, Robinson and Luft (1985), using hospital data from 1972, discovered that hospitals in more competitive markets recorded higher costs per day and per case than hospitals in less competitive markets. As Maynard (1993) concludes: "competition by 'quality' can be inflationary" (p197).

As Dawson (1994) points out, in general discussions of the performance of the internal market, "lack of 'good quality' information on prices is seen as a major impediment to the

emergence of a competitive market. Production of generally available 'open' information on prices is considered essential if there is to be movement from the steady state pattern of resource use..... Movement of resources will be produced by competitive behaviour and competitive markets require information on prices." (p1). At national level there has hence been an attempt to provide guidance on the way in which prices should be set, with the aim of improving the quality of market information. The guidance, discussed in detail in Section 2, constitutes a set of instructions on how each provider Unit is to set prices; implicitly purchasers are assumed to be price-takers.

SECTION 2: NATIONAL GUIDANCE

The NHS Management Executive (NHSME) issued initial guidance (EL(90)173) in its document "Costing and Pricing Contracts: Cost Allocation Principles". The underlying objective was to enable provider Units to price their services so that income recovered matched the net costs incurred. With this objective in mind, at least three fundamental rules apply:

a) prices should be based on costs;

b) costs should generally be arrived at on a full cost basis;

c) there should be no planned cross-subsidisation between contracts.

In addition to these fundamental rules, a more detailed examination of the guidance revealed a number of other principles:

d) in practice, at least during the initial phase of contracting, prices should be set on an average cost basis (full absorption - including all unit indirect and overhead costs, capital charges, costs of services received from the DHA etc) in order to ensure that all relevant costs are recovered at the price set;

e) only unplanned excess capacity can be charged at short run marginal cost (SRMC) - the pricing outcome of the ideal economic market assumes that capacity is in long run equilibrium, but in reality there will be short-term fluctuations. However, it is assumed that such situations will be temporary and involve relatively small amounts;

f) surpluses may be used to provide an across-the-board offset over all of a provider's services - it is not acceptable, however, for the surplus to be used to subsidise selective services on the basis that their prices would not be competitive otherwise;

g) charging different prices to purchasers of identical services is only acceptable if

genuine cost differences can be demonstrated (eg. different case-mix).

The NHSME guidance can be seen as an attempt to re-create the outcomes resulting from a perfectly competitive market. Under conditions of perfect information and perfect contestability, then for a given quality of service, the threat of potential new competitors seeking out a profit opportunity will ensure that the price charged by the incumbent provider does not rise above minimum opportunity cost. This price will tend to equal short run marginal cost (SRMC), which in the absence of significant economies of scale will tend to equate to short run average cost (SRAC). Thus the guidance equates to enforcing prices based on average costs.

It has been apparent that the information necessary to classify costs accurately has simply not been available to many providers, forcing them to make what is at best a rough estimate of how costs are likely to be affected by activity changes. However, the impact of this problem has been reduced since the overwhelming bulk of money flowing has related to the use of large block contracts, which have simply reflected historical patterns of service provision. The removal of 'steady state', and the implication that this has on the move to cost and volume and more sophisticated contracts, has focused the NHSME's attention upon standardisation of cost classification and apportionment methods.

The National Steering Group on Costing (NSGC) was set up in 1992 by the NHSME to devise a system to ensure that differences in contract prices between providers were not caused by either different costing approaches or by an inconsistent definition of the service being delivered. Although the initial emphasis has been on the analysis and classification of costs, the concept of 'contract categories' is being developed as a means of providing more sophisticated information below specialty level.

The NSGC has adopted a three phased approach entitled 'Costing for Contracting', a summary of which is provided below:

- Phase 1 - Preliminary guidance for purchasers and providers to assist in the implementation of contracts for 1994/95;

- Phase 2 - Detailed guidance showing an experienced accountant how to produce an analysis and classification of costs for key services;

- Phase 3 - The development of contracting on the basis of contract categories.

The first phase of the project, published in April 1993 (EL(93)26), has been designed to provide preliminary guidance to purchasers and providers in the implementation of the 1994-95 contracts by concentrating on the standardisation of provider approaches to costing. The NSGC focused upon defining a minimum standard for each cost by type (direct, indirect and overhead) and a minimum standard for the method of apportionment. The rationale is that such guidance should be of use to purchasers, by enabling them to make more valid comparisons of providers' cost structures to aid more effective purchasing, and also to providers in explaining the reasons (eg. case mix) why they have apparently higher costs than their competitors. The more accurate classifications of fixed, semi-fixed and variable costs should enable providers to respond more effectively to in-year changes in activity, and to make better use of excess capacity.

The aim of Phases 2 and 3 is to apply the Phase 1 guidance, in respect of the analysis and classification of costs, to key services. For acute services, the NSGC points out that contracts based at specialty level are too aggregated, and that the approach should be to provide minimum standards of service definition at sub-specialty level.

The aim is to divide each specialty into a manageable number of 'condition groupings' which:

1) clinicians regard as sufficiently similar to be treated in the same way;

2) consume similar amounts of resources;

3) represent a high proportion of the total absorption costs of the specialty.

Differences in clinical terminology among providers has led the NSGC to suggest that common terminology could be provided by health care resource groups (HRGs). Analysis

of these at the national acute pilot site (Royal Preston Hospital) has shown that 80% of total costs can be covered by 250 HRGs and that these could be aggregated into approximately 150 contract categories.

However, in order for such a method to be successfully implemented into the NHS, there are four essential links that must be made, and reconciled:

1) annual total expenditure by specialty;

2) direct and indirect costs for the specialty;

3) fixed and variable specialty costs from finance departments and managers;

4) fixed and variable costs by procedure from clinicians and nurses.

At present information systems, even with the latest guidance, are not sophisticated enough to reconcile accurately these four cost dimensions. The costing methodology concentrates on specialties first, then procedures. As an example, while a nurse can now be classified as a direct cost to a specialty, the limited information about the use of the nurse's time will mean that the cost to the HRGs will become indirect.

In order to achieve the required rigour for costing HRGs (and indeed procedures for GPFHs), greater use must be made of what has been termed the 'top-down' and 'bottom-up' approaches to costing. The approach consists of three key elements, which are:

1) a top-down analysis of budget costs by specialty, identifying separately the fixed, semi-fixed and variable components in accordance with EL(93)26;

2) a bottom-up analysis by specialty of the key conditions which represent a high proportion of the total cost by reference to clinicians' and nurse managers' knowledge of:

a) the conditions they treat

b) the frequency with which they are performed

c) the resources used to perform them;

3) a reconciliation of the top-down and bottom-up totals by specialty to ensure that the conditions costed represent a sufficiently high proportion of total costs, and ensuring that the top-down and bottom-up analyses are mutually consistent.

Such analysis should, through the separation of specialty costs into their fixed and variable cost elements and by reconciling the two approaches to costing, provide a more sophisticated and accurate costing mechanism. This approach should also be of great assistance to both purchasers and providers, with regard to both contracting and pricing: for example, by enabling providers to ensure that a change in funding (in particular, for fixed costs) can be coped with in a managed way and does not cause disruptions. It also provides hospital managers with greater information on which to base bids for additional activity.

It appears therefore that the NHSME has acknowledged that the lack of information available to the bargaining parties represents one of the greatest challenges to the NHS. Indeed, the inconsistencies apparent in the initial guidance are now being examined and dealt with. At first glance the NSGC recommendations provide a solution, with more consistency in analysing costs by providers, and a greater emphasis being placed on service definition to enable purchasers to make more informed comparisons across competing providers. Nevertheless, the guidance has been the subject of recent criticism (Dawson, 1994), much of which centres around the debate on openness in pricing. This issue is discussed in Section 3.

SECTION 3: OPENNESS IN PRICING

Given recent debates around the need for openness in pricing, it can become difficult to "see the wood for the trees". Perhaps the most simple and powerful justification for openness can be found in Reeves' Health Service Journal article (3 March 1994) in discussing ***why*** the NSGC was established. Quite simply: "Purchasers were (also) unable to compare what providers were offering".

In developing the arguments for and against openness, it is important not to lose sight of this statement. The British NHS is characterised by lousy information no matter where you look: there must be an inherent flaw in a line of argument which opposes improving that information base.

Ferguson and Posnett (1991) argued that:

> "One of the characteristics of competition is the availability of ***information*** on the prices and product characteristics of competing suppliers. If competition in the new NHS provider market is to be successful, this would appear to be a minimal requirement ..... The benefit of ***enforced*** openness in contracts is that it provides market information to buyers facing a monopoly supplier about the terms of contracts struck elsewhere, in more competitive markets, and this information can then be used to identify the potential abuse of local monopoly power" (p49).

This argument should be supplemented by at least two caveats: firstly, for the range of services under consideration, there exists competition in at least some sectors of the market; secondly, information is also required on ***qualitative*** aspects of service alongside price and volume information. The fundamental thrust of the argument remains, however: ***openness in pricing is a good thing per se***. [The argument is further developed that, for enforced openness to be effective, providers must believe that actual or potential sanctions exist for those who do not abide by the rules of the game: see Ferguson and Posnett, 1991, pp50-51.]

On the other hand, Dawson (1994) argues that *ex ante* openness in pricing (defined as "the posting of prices that can be observed by potential buyers and other suppliers and where transactions take place at the posted prices") is unnecessary and indeed is "***not*** the norm in the economy and is not observed in what would be considered highly competitive markets". The distinction made by Dawson between ***negotiated*** and ***posted*** prices is a valuable one and is the key to the openness discussion. It is worth dwelling upon the above definition of openness. The first part ("the posting of prices that can be observed by potential buyers and other suppliers") is not contentious. The second part ("and where transactions take place at the posted prices") is, however, open to question. The NHSME guidance does leave open the possibility of negotiation, since purchasers can be charged different prices for ostensibly the same service if "genuine cost differences can be demonstrated". It is not difficult for one purchaser to argue that his case-mix is different from another purchaser's: as soon as the question is raised, negotiation begins. Evidence is inevitably patchy, but it would be amazing if this was ***not*** how the NHS contractual process was working (regardless of whether it was the NHSME's intention).

Breaking down the openness definition is valuable because it begins to question Dawson's statement that *ex ante* openness is not observed in highly competitive markets. One such highly competitive market is the second-hand car market in which posted prices are advertised to potential buyers. The price at which the transaction takes place may or may not be the posted price, the outcome depending more than anything else upon: a) how skilful the buyer is; and b) whether the car dealer really has got any scope for manoeuvre in lowering the price. Even when examining a less competitive area of the same market - for example, the fleet car market where a company is able to contract with (say) three main car dealers (Ford, Vauxhall, Peugeot), there is *ex ante* openness in pricing and the final contract price may be either the negotiated or the posted price. A further example is provided by University Computing Services who may contract only with three "preferred suppliers" - the market in computing hardware is highly competitive, such suppliers will post their educational prices to Universities, and here there is in fact every likelihood that the final contract price ***will*** be the posted, rather than the negotiated, price.

In all of these cases, regardless of whether the final contract price is the negotiated or posted price, *ex ante* openness of price information is observed. Consulting the price information is not, as Dawson argues, "simply a means of selecting a supplier". In the NHS case, the added value to the purchaser of having such information is first and foremost to ensure that he is not being "ripped off"! Whether the purchaser then places a contract with that provider is primarily a function of the existence of potential alternative providers (which in turn will influence the provider's posted price - see Section 4). There may also be scope to negotiate prices if the purchaser can reasonably demonstrate case-mix or other differences in his client group. There is sufficient scope to segment the market for a specialty and negotiate separate prices - elective/emergency cases, cases from geographically different localities, etc, even before entering into sophisticated case-mix discussions. Ask a GP how to get a 70 year old patient admitted for hospital treatment when it is not a genuine emergency situation!

What this is arguing is that NHS openness in pricing is a classic case of the public good nature of knowledge/information: that is, any restriction on access is inefficient, hence implying some form of welfare loss. It would surely be undesirable and inefficient for every purchaser to attempt to obtain price information from every provider. The authors would agree with Dawson (1994) that "there is no welfare loss implied by the failure of market determined relative prices to correspond to those derived from the cost/price guidelines". In our view this does not negate the guidelines nor the need for *ex ante* published prices: it does leave open the ***empirical*** question, however, of whether the contract prices are negotiated or posted. Obtaining access to contract prices between purchasers and providers is the only means of addressing this empirical question.

To summarise this section, we would argue that *ex ante* openness in pricing is a necessary, but not sufficient, condition to facilitate the operation of the NHS internal market. This market ***is*** different from other markets, largely due to the paucity of all aspects of information, and purchasers need a "guiding hand" if they are to make informed decisions. The market itself is inherently different from other markets since it is a "managed market" (Reeves, 1994), reflecting the fact that the services in question are "public" in nature and hence laissez-faire would not be desirable. The existence of the NSGC guidance can be interpreted as the "guiding hand" or a check on market forces: the need to ensure some

degree of consistency or standardisation across providers. With this there is a chance that the market will begin to function according to purchaser price/quality trade-offs; without it purchasers would continue to be "unable to compare what providers were offering".

Underlying all of this is a concern that some providers will have significant degrees of monopoly power in the markets for at least a proportion of their services. It is not clear, however, how monopoly - or other non-competitive forms of market structure - can be detected. This issue is addressed in Section 4.

SECTION 4: MARKET STRUCTURE

The presence of market failure through inadequate information and the potential for monopoly abuse have meant that a laissez-faire approach to the market, particularly in the short-run, is likely to contradict the aim of the reforms. However when attempting to assess what type of regulation in the market is required, it is important to bear in mind the distinction made by Ferguson and Posnett (1991) between policies "designed to constrain the operation of the market and those designed to facilitate and encourage the competitive process" (p47). In the short term, policies need to be aimed at eliminating the effects of monopoly power, while at the same time encouraging a greater degree of competition in the longer run.

Basic economic theory shows how in a monopolistic market the price charged for a service will exceed the cost of producing it, the difference being taken as excess profit by the provider. In a competitive market such abnormal profits would entice new providers to enter the market until a point is reached where only normal profits are being made. Thus as the supply of a service rises in relation to demand (and hence price falls), a point is reached where there is no incentive for new entrants to enter the market; at this new point price now equals average cost. Thus in a competitive market the role of prices is to act as a signalling device for resource allocation, with excess profits (p>ac) providing the signal of demand exceeding supply and price acting as a rationing device. However, in the new health care market this role of prices has been removed by the imposition of the requirement that prices should be set to equal average cost (where average cost for Trusts includes a 6% rate of return on assets), so that prices no longer act as a guide for resource allocation.

Nevertheless, to the extent that prices do reflect costs, openness in pricing information may point to inefficient resource use - for instance, low bed occupancy rates and low throughput indicating that activity levels are low relative to costs. Comparatively high prices may also indicate potential monopoly abuse; at the very least the presence of comparative information allows purchasers to have a debate with providers about ***why*** their prices appear to be higher, leading to contract negotiations on a more informed basis.

A priori it seems reasonable to assume that providers facing different degrees of competition

in the market will have different incentives to alter their behaviour. Dawson (1994) points to situations where average cost pricing (based on "standard" costing procedures) can be used as a deliberate policy to limit competition. Conversely, it is equally probable that low degrees of competition will lead to potential monopolistic abuse which manifests itself in the form of higher prices. This must at least in part explain the NHSME's desire to understand in more detail the cost base underlying prices charged by provider Units. The problem is that a rule which equates to average cost pricing is merely an accounting rule; when applied it simply results in a situation where costs become whatever providers say they are depending on the degree of actual (or potential) competition in the market.

Within this framework, providers compete on the basis of costs rather than prices. The result is that while such a pricing rule prevents providers from making 'excess profits', it does nothing to hinder a monopolist from internalising this surplus by taking it in the form of X-inefficiency[1]. Through such a process a provider with substantial market power can produce at greater than least cost "by converting it into types of costs that enhance the utility of influential managers (including doctors)" (Friedman, 1984). This may be considered a waste of society's resources, where costs of each unit of output no longer represent opportunity costs. Indeed, as Friedman states: "X-inefficiency is one of the most seriously under-estimated harms from monopoly power" (p323). Clearly then, the presence of such a pricing rule will not of itself prevent X-inefficiency.

Indeed, a monopolist will seek to exploit its position by increasing average cost to the maximum consistent with the budget of the purchaser. The provider will behave in such a manner in order to attract patients and high calibre staff (made easier by the labour market freedoms given to NHS Trusts in the reforms), increasing expenditure on the physical environment of the hospital, maintaining excess capacity to reduce waiting time and investing

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[1] X-inefficiency is frequently cited as the result of a lack of competitive pressure on a management team. The objective function of that team is not then strictly confined to minimising the cost of producing a given output or maximising the output from a given set of inputs, but instead is influenced by other objectives of managers (eg. to increase status, maintain excess capacity) which amount to non-profit maximising behaviour. In effect, X-inefficiency is the difference between maximum and ***actual*** performance.

in high technology diagnostic and therapeutic facilities. The overall anticipated effect of this relative to a more competitive situation would be for costs (and hence prices) to be higher and the volume of service to be lower.

Ultimately, the extent to which market structure may be influencing the price of services offered by providers is an ***empirical*** question. Some measure of competition between providers within market areas and for particular services is necessary. To date there has been little empirical work to shed light on this question.

An exception has been some recent work by the National Association of Health Authorities and Trusts (NAHAT), which has attempted to measure the degree of competition between hospitals in one NHS region. The study (see Robinson, 1991, pp20-22) focused on the degree of competition in general surgery facing each of the 39 NHS hospitals in the West Midlands Regional Health Authority offering this service. The data used were all finished consultant episodes for inpatients and day cases for 1988-89 and early results suggest that the market is more competitive than had been expected. However, such results should be approached with some caution as they are likely to be affected by such factors as the size of the market area adopted and the breadth of the service definitions used.

Drawing on work from the US Department of Justice used in its anti-trust work, the process of measuring competition involved three main stages:

1) identifying each hospital's market area;

2) identifying the competitors within each of these areas;

3) producing an overall index of competition for each hospital based upon the number of competitors in its market area and their market shares.

In order to define a hospital's market area, the geographical catchment from which it draws its patients needs to be specified. The unit of analysis used in the study was the DHA. A district was included in a hospital's market area if it contributed at least 3% of the hospital's

total episodes (see Melnick and Zwanziger, 1988). Using this figure, the presence of competitors within each district in a hospital's market area was signalled if another hospital also drew at least 3% of a district's total episodes.

Having conducted the first two stages of the process, the Hirschman-Herfindahl Index (see Miller, 1982) was used to obtain the degree of market concentration in each district. The basic definition of the Hirschman-Herfindahl Index (HHI) is stated as the sum of squares of individual hospitals' market shares, ie.

$$HHI=S_1^2+S_2^2+....+S_{N-1}^2+S_N^2=\sum_{i=1}^{N}S_i^2$$

(where S_i is the market share of hospital i and the summation covers all hospitals in the market).

The HHI is therefore calculated by summing the squared values of the market shares of all competitors in each district. The sum of market shares (not squared) over all hospitals in the market is unity, ie.

$$\sum_{i=1}^{N}S_i=1$$

The HHI, for squared market shares, gives a value ranging between 0 and 1, with a value of close to zero indicating a large number of competitors each with a small market share, and a value of 1 signalling the presence of a single monopoly provider.

Finally, the process involved using the HHI obtained for each district to measure the degree of competition facing each hospital. This was calculated using the weighted sum of the HHIs for each district within a particular hospital's market area, with the weights being the proportion of the hospital's patients taken from the district in question.

The table of hospital competition indices (see Appendix 2), shows the initial results from the research team at NAHAT, with each hospital in the West Midlands RHA ranked in order of the degree of competition faced as measured by the weighted HHI. Following the methodology used by the Department of Justice in the US, the scale of 0 to 1 is converted

to a 0 - 10,000 scale, with the US anti-trust guidelines stating that a market with an index in excess of 1800 should be viewed as highly concentrated.

Applying such a standard to the West Midlands, it appears that only one quarter of hospitals can be said to operate in a market when the degree of competition is such that elements of monopoly or oligopoly power may exist. If the number of patients treated is examined, the degree of competition rises to 38% of patients receiving treatment at a hospital with an HHI greater than 1800.

What conclusions can be drawn from such a study? Obviously, the evidence shows that market concentration in most of the West Midlands RHA (75% of hospitals and 60% of general surgery patients) is low enough for competition to take place. However, before attempting to generalise from such a result, several factors need to be examined since they may have led to an over-estimate of the extent of actual competition in the market.

Firstly, using the district as a unit of analysis may be felt to be too high a level of aggregation. As Robinson (1991) concluded: "as the spatial resolution becomes finer, the market area reduces and tends towards monopoly" (p22). Secondly, the index is likely to be affected by the definition of services that is used. This may be potentially serious with such a diverse area as general surgery, where procedures can range from anything such as hernia repairs to mastectomy. It may therefore be useful to disaggregate the episodes below the general surgery level, where a higher degree of concentration is almost certain to be discovered.

It would also be of use to potential purchasers to extend such a study from analysing general surgery which is universally provided and for which the extent of competition may be expected to be reasonably high; to include a specialty such as ophthalmology, which is widely but not universally provided; or even a multi-district service (such as end stage renal failure) for which the degree of potential competition at a local level is relatively low.

Nevertheless, in an area where empirical evidence has been noticeably absent, the NAHAT study offers some important insights. Those concerned with market analysis should be attempting to develop a more sensitive index and ensure that it is used widely as an instrument to monitor the internal market as it develops. Extending investigation to cover a number of regions (cross-section analysis) and over a period of time (time-series analysis) would gauge the extent to which the internal market is becoming more or less competitive. Indeed, such an analysis should also be widened to indicate the extent to which unit costs, quality and other dimensions of hospital performance are related to the degree of competition which it faces. If such information is not perceived to be available by providers, then there is little incentive for high-cost hospitals to improve efficiency.

A note of caution, however, is that simple measures of market concentration may lead to false conclusions about the incentives facing providers to enhance efficiency. This is because such indices only include the number of incumbent providers: where competitive pressure derives from the threat of ***potential entry***, the number of incumbent providers is irrelevant. Any assessment of market concentration must therefore take into account the degree of "contestability".

Much of the work on the theory of contestability has been derived from work by William Baumol. Baumol (1982) describes a contestable market as "one into which entry is absolutely free, and exit is absolutely costless". Freedom of entry is used to describe a situation in which the entrant suffers no disadvantage in terms of production technique or perceived quality relative to the incumbent, and that potential entrants find it appropriate to evaluate the profitability in terms of the incumbent's pre-entry prices. Ensuring that there is absolute freedom of exit is an additional way to have freedom of entry. Freedom of exit is only achieved when the firm can exit the market without any impediment and can recoup any costs incurred in the entry process. Thus, the risk to new entrants is eliminated by ensuring that the market is contestable.

Thus the theory is that in a contestable market incumbent providers are prevented from operating inefficiently and/or making excess profits by facing a tangible threat from potential new entrants. Applying such a theory to the NHS, then actual competition may not be

necessary to ensure efficiency, and therefore measures of existing competition (only between incumbent firms) may be inadequate. One way to improve such an index would be to incorporate some measure of the contestability of the market by examining the extent of 'potential competition'. As long as there are potential new entrants, even apparently monopolistic markets should encourage efficient provider behaviour.

However, such measures would almost inevitably highlight the lack of contestability in the new NHS, with many of the above pre-requisites for a market to be contestable being absent in the internal market. In particular, within the NHS there are likely to be barriers to new entrants that would place them at a relative disadvantage with existing providers. A potential barrier is likely to be the existence of heavy sunk-costs and the associated set-up costs (although marginal changes are quite likely, with incumbent firms seeking to enter into new markets in an attempt to consolidate and secure their position), which within the health care market are likely to be quite pronounced. Thus existing providers are unlikely to feel much of a tangible threat from potential new entrants seeking to provide similar care packages.

An interesting alternative method (to measures based on concentration indices and conditions of entry and exit) of market classification can be found in Edwards and Townsend [1980] who argue that:

> "A more precise market classification may be built up in terms of the price cross-elasticity of demand to designate firms within a particular market, the price elasticity of demand to separate pure competition and indicate some possibilities with oligopoly, and conjectural price flexibility to distinguish oligopoly" (p291).

This has some intuitive appeal because the typical NHS situation will be one in which the provider is operating in many markets. The provider may be expected to have varying degrees of monopoly power in different markets, facing purchasers with different elasticities of demand. Edwards and Townsend propose the following market classification on the basis of different types of demand elasticity:

MARKET CLASSIFICATION		PRICE CROSS-ELASTICITY	PRICE ELASTICITY	CONJECTURAL PRICE FLEXIBILITY
1)	PERFECT COMPETITION	infinite	infinite	0
2)	HOMOGENEOUS OLIGOPOLY	infinite	high for **P** increase	high*
3)	HETEROGENEOUS OLIGOPOLY	large	less than in 2)	less than in 2)
4)	MONOPOLY	small	>1	0

Source: Edwards and Townsend, in Townsend (ed.) [1980]

* *Although not explicitly stated in Edwards and Townsend, the assumption must be that the conjectural price flexibility under homogeneous oligopoly will be high for a price **decrease**, signifying that one provider would more than match a price cut, but would not be expected to follow a rival's price increase.*

The example of homogeneous oligopoly is interesting to follow in the case described earlier of a geographical area containing a few large providers and a larger number of smaller providers. Here the price cross-elasticity between the large providers is infinite, reflecting the fact that their respective services will be viewed by the purchaser as perfect substitutes (General Surgery in one teaching hospital is the same as General Surgery in another teaching hospital). This is why it would not be in those providers' interests to compete on the basis of price. As Edwards and Townsend point out, expectations play a crucial role in this form of market structure: "Numbers are few enough for oligopoly when oligopolists think them so" [p291]. Hence the term 'conjectural price flexibility (CPF)' is relevant, where:

$$CPF^{2} = \frac{\text{Expected \% change in price of provider A's service}}{\text{\% change in price of provider B's service}}$$

[2] Clearly with any elasticity measure which is expectations-based, there is a question-mark over whether CPF is measurable in practice. Nevertheless it is worth exploring further, largely because of its intuitive appeal in postulating that oligopolistic providers would follow rivals' price cuts but not price rises. Despite the NHSME guidelines on full cost pricing, it is quite conceivable for providers to be able to change the price of particular services, for example, by varying the skill-mix of labour inputs, and hence signal intentions to other providers operating in similar markets. Clearly any relaxation of the pricing rules would make elasticity measures such as the CPF more relevant, allowing examination of the impact on provider behaviour of varying price-cost margins.

Conversely, the price cross-elasticity between the large providers and the smaller providers (for a defined service or range of services) would be expected to be much lower. It may even be negative, signifying that the purchaser would *a priori* view the services as complementary. This conceptualisation is useful when examining the emergent market in health care, in particular since the typical provider operates as a multi-product firm in several markets which will have different characteristics and should therefore be studied separately.

Significant barriers to entry mean that large health care secondary/tertiary providers are unlikely to feel much of a threat from potential new entrants seeking to provide similar care packages. What may be perceived to be more of a threat is potential new entrants seeking to offer care in a different setting, or alternative care packages in total. This 'product differentiation' will become more pronounced as General Practitioners begin to offer more practice-based services, health centres offer a wider range of services and local 'community facilities' become more imaginative regarding the nature of service provision. Traditional District General Hospitals and larger teaching hospitals may indeed face a significant threat from a larger number of small providers in particular areas of service provision. Theoretically the increased threat from smaller providers would be reflected in a positive price cross-elasticity of demand, signifying that the services offered by the smaller providers begin to be viewed as a ***substitute*** for, rather than complementary to, the services of larger providers. This of course relates to a defined range of services: for example, physiotherapy offered in a local health centre could be viewed as a perfectly acceptable substitute to physiotherapy in a District General Hospital; specialised cancer treatment would not be available in a local health centre.

Empirically it would be possible to track changes in purchaser contracting decisions in response to provider price changes with regard to different services. The demand elasticity measures - in particular price cross-elasticity and price elasticity - offer a means of directly classifying markets which uses observable data[3]. What would be required, however, is

[3] The authors are not suggesting that elasticity measures would be superior to measures based on the degree of market concentration. Indeed, the two types of measure should be viewed as complementary. Elasticity measures do represent, however, an additional means of classifying markets: it is an empirical question as to which type of measure provides more insight or is easier to measure. This question should be the subject of further study, examining elasticity and concentration measures in separate markets for specific services.

complete openness in pricing information, together with an enforcing framework to ensure data were made available by providers to all purchasers (eg. the contract price between provider X and GP Fundholder Y was made available to Health Authority Z). This is information would be required on both *ex ante* published prices and *ex post* transactions prices; it would be anticipated that different monitoring devices would be required to elicit both sets of information.

More important, however, is the requirement that pricing rules would have to be relaxed. Providers would have to be allowed to behave in a way which appeared efficient ***to them***, which would almost inevitably involve, *inter alia*, a degree of cross-subsidisation. Observing price and quantity outcomes in a market which was allowed to operate in a less constrained fashion would be of value. The current 'managed competition' model does not lend itself to meaningful analysis, at best reflecting the rules of the game imposed by Central bodies and, at worst, lumbering towards a situation of bilateral monopoly in which price and service specification are influenced primarily by the negotiating skill and bargaining power of purchaser and provider Chief Executives.

Ensuring openness in pricing information, supplemented with a drive by purchasers to improve the qualitative aspects of service specifications, may encourage a sufficient degree of competition to avoid outcomes being determined solely by bargaining power. This will nevertheless remain difficult to achieve given the growth of large purchasing consortia and the traditional power of large teaching hospitals or local District General Hospitals. Much depends upon the extent to which there are genuine shifts in service provision to a seamless primary/community care sector in which the range of services and the potential number of providers begin to offer real patient choice.

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APPENDIX 1

Welfare Objective and Marginal Cost Pricing

Assume that society's objective is to maximise society's net welfare (total social benefit - total social cost), subject to the production function and the availability of resources. Then, efficiency in the NHS can be stated as the maximisation of:

$$W=SB-TC$$

(where W = net welfare gain, SB = total social benefit and TC = total social cost*).

* For simplicity, assume that all of the factors available to the NHS are in perfectly elastic supply, which means that there will be no intra-marginal rents and total costs can be interpreted as total money costs.

Then, re-defining total social benefit (SB) as:

$$SB=TR+CS$$

(where TR = total revenue and CS = consumers' surplus), the initial objective can be re-stated as the maximisation of:

$$W=TR+CS-TC$$

This function is maximised by differentiating it with respect to output and setting the result equal to zero, ie.

$$\frac{\delta W}{\delta Q}=\frac{d}{dQ}(TR+CS)-\frac{d}{dQ}(TC)=0$$

The third term, $d(TC)/dQ$, is simply the marginal cost. Furthermore, TR + CS is equal to the area under the uncompensated demand curve. So, specifying P(Q) as the demand curve, then:

$$TR+CS=\int_0^Q P(Q)dQ$$

Differentiating this expression with respect to output:

$$\frac{d}{dQ}(TR+CS)=\frac{d}{dQ}\int_0^Q P(Q)dQ$$
$$=P(Q)$$
$$=price.$$

Source: Webb (1976)

The result is that, under perfect competition, the price charged equals marginal cost, which means that the welfare objective is maximised when the consumer's marginal valuation of the last unit equals the marginal social opportunity cost of the resources used to produce that unit.

APPENDIX 2

Table of Hospital Competition Indices

HOSPITAL (HOST DISTRICT)	NO. OF DISTRICTS IN MARKET AREA**	NO. OF COMPETITORS FACING HOSPITAL IN MARKET AREA IN WEST MIDLANDS	DEGREE OF COMPETITION
*St Cross (Rugby)	3	1	6,790
*George Elliot (N.Warks)	2	1	6,570
County (Hereford)	2	1	6,450
*RSH (Shropshire)	2	1	5,980
*WRI Ronkswood (Worcester)	1	1	5,120
*Walsgrave (Coventry)	2	1	4,510
*KGH (Kidderminster)	3	4	4,000
*Warwick (S.Warks)	1	3	2,680
*Alexandra (Broms/Redd)	2	4	2,450
*Sandwell DGH (Sandwell)	2	6	2,100
*Stafford DGH (Mid Staffs)	1	5	1,770
*Selly Oak (S.B'ham)	3	5	1,590
*NSRI (N.Staffs)	2	9	1,510
The Royal (Wolverhampton)	4	8	1,190
City General (N.Staffs)	3	9	1,130
*Russells Hall (Dudley)	3	12	1,090
*New Cross (Wolverhampton)	4	8	1,020
*East B'ham Gen (E.B'ham)	3	5	929
*Good Hope (N.B'ham)	4	9	880
*Manor Hospital (Walsall)	2	5	840
*Dudley Road (W.B'ham)	4	8	820
General (Walsall)	3	10	720
Burton General (S.E.Staffs)	2	4	680
General (C.B'ham)	6	6	570
Wordsley (Dudley)	3	12	560
Warneford (S.Warks)	1	2	540
Queen Elizabeth (C.B'ham)	8	9	520
WRI Castle St (Worcester)	2	2	480
Staff General (Mid Staffs)	1	5	450

HOSPITAL (HOST DISTRICT)	NO. OF DISTRICTS IN MARKET AREA**	NO. OF COMPETITORS FACING HOSPITAL IN MARKET AREA IN WEST MIDLANDS	DEGREE OF COMPETITION
*Solihull (Solihull)	3	5	420
Tenbury (Kidderminster)	3	3	350
*Burton DHC (S.E.Staffs)	3	9	330
Longton (N.Staffs)	2	8	310
Guest (Dudley)	2	6	280
Stratford (S.Warks)	3	5	270
Tamworth Gen (S.E.Staffs)	3	9	230
Corbett (Dudley)	4	14	160
Biddulph Gr (N.Staffs)	3	9	120
Lichfield Vic (S.E.Staffs)	4	9	90

** Flows from other English Regions treated as an additional district
* District general hospitals

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