OPI-ESRC Seminar Series on Health Services Productivity

Incentives and healthcare: theory and practice
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Summary

Agency theory emphasises the need for contracts that align provider and patient incentives in failure-prone healthcare markets. However, the incentives governing healthcare provider behaviour are complex and there are substantial practical difficulties in relating healthcare activity with health outcomes. This complicates the design of contracts and adds difficulties to principals' observation of agency behaviour. This seminar reviews the theoretical basis for postulating relationships between doctors' incentives and their productivity and examines these relationships in the case of British surgeons.

Background

Healthcare markets are complicated by uncertainty, information asymmetry, externalities, heterogeneity and barriers to market entry. As a result, health policy is largely concerned with responses to market failures, and in particular to pervasive uncertainty. In such circumstances, information or knowledge becomes a commodity.[1] Within healthcare markets, doctors are regarded as agents, and, as in most agency relationships, the central economic problem is how to design incentive compatible contracts: contracts that align the incentives of patients and doctors and deal with problems of performance measurement. The latter faces a number of difficulties. For example, the assessment of improved health outcomes may be problematic and it may be necessary to attribute such outcomes to the performance of doctors, or to the performance of teams or to other determinants of health status.

There is substantial evidence to suggest that the incentives governing doctors' behaviour are complex. A number of models exist for

Perfect agency relationship?

If the doctor were a perfect agent their relationship would be as follows:

The 'doctor' is there to give the 'patient' all the information the 'patient' needs in order that the 'patient' can make a decision and the 'doctor' should then implement that decision once the 'patient' has made it.

If you find that description …a bit odd, try reversing the respective roles of the doctor and the patient so that it now reads …….

The 'patient' is there to give the 'doctor' all the information the 'doctor' needs in order that the 'doctor' can make a decision and the 'patient' should then implement that decision once the 'doctor' has made it.

Does that sound more like it actually is? The point is that doctors are not perfect agents and, because of that, they have quite a lot of discretion over what they take into account in exercising their so called 'clinical' judgement, so that the distinction between 'strictly clinical' and 'extraneous' factors is a fuzzy one.

Williams 1988

1. Arrow (1963)

relating financial incentives and productivity. However, they appear to provide only a partial explanation. Non-financial incentives such as career concerns and issues of trust, duty and reputation are also likely to play a part.

Financial incentives

Financial incentives may be *explicit*, when payments are made for current services, or *implicit* when there is an expectation that current performance will be rewarded by enhanced payments in the future. There are three main payment methods for healthcare providers: salary (time rates), fee for service (piece rates) and capitation (intermediate method). Most payment systems are a mix of these three methods; for example, HMOs in the US. In the UK, GPs may be paid a basic practice allowance and, in addition, capitation fees and fees for delivering priority services. Each payment method may be related to performance. Salaries and capitation pay may be modified by merit or distinction awards or bonuses; and fee rates may be related to service quality. Blended payment systems are consistent with standard labour economics which argues that firms manipulate the level and structure of wages in order to induce workers to supply a desired quantity and quality of labour.

Fee for service (FFS)

FFS provides incentives to increase activity, as was seen in the case of flu vaccinations with British GPs[2] and, potentially, to induce unwanted demand. This system, while theoretically the most efficient, attracts additional transactions costs in practice from the regulation required to limit inefficient activity.

Capitation fees

Cost containment is the main advantage of capitation fees, together with the incentives to prevent ill-health. However, while providing no incentives to over-treat, they do provide some incentive to shift costs to other sectors such as secondary care.

Salaries

Salaries also provide no incentives to over-treat. Instead, they provide incentives to withhold care or shift costs and do not provide incentives to contain costs. In addition, capitation and salary may require supplementary incentives, financial or otherwise.

The incentive effects of different payment systems are summarised in Table 1. However, a systematic review of hospital physician payment systems found a serious shortage of rigorous studies that would validate these effects or assess their relative importance. Cochrane reviews (repeating the work of Gosden and Giuffrida) in the hospital sector, found that perverse incentives and undesirable outcomes are often introduced by changing payment systems.

Table 1: Doctor payment systems

Type of pay	Incentive effects				
	increase activity	decrease activity	shift costs	target the poor	control cost
fee-for-service	yes	no	no	maybe	no
salary	no	yes	yes	no	yes
capit-ation	no	yes	yes	no	yes

Implicit incentives

Econometric analysis has shown that less than 10 per cent of the observable variation in the hours worked by US doctors can be explained by their pay.[3] The choice of payment method also provides only a partial account of doctor activity. Implicit incentives may serve to add explanation for doctor behaviour. Indeed, as

2. Gosden et al (2002)
3. Reinhardt (1999)

Burgess and Metcalfe observe, `casual empiricism tells us that there is more to incentives than simply more jam today. Many individuals who do not receive any performance related bonus are nevertheless strongly motivated by the possibility of either promotion within the organisation or a better job offer from an outside firm'.[4]

Holmstrom (1982) and Dewatripont (1999) argue that wages depend on expected productivity (a function of observed performance in previous periods), but that an 'implicit contract', which links current performance with future wages, is a more powerful motivator. This is particularly the case in the public sector, where there is a lack of explicit incentives through PRP or bonus payments. It has been argued that the main incentive for performance in the public sector is longer-term career concerns. For this to be true, the efficiency goals of organisations need to be clear and individuals need to trust the organisation to provide future rewards for their contributions. However, there is little empirical evidence to support this hypotheses. In the case of the NHS, doctors reach the top of their careers early so that only merit awards are available to reward outstanding performance. In practice it is not always clear that signals determining merit pay are aligned with employers objectives. In the case of GPs, there is no career structure to which performance can be linked.

Non-financial incentives

Doctors' behaviour is also influenced by trust, duty and altruism. Reputation is an important driver of quality in healthcare. A doctor's sense of duty is reinforced by codes of ethics and is the basis for self-regulation.

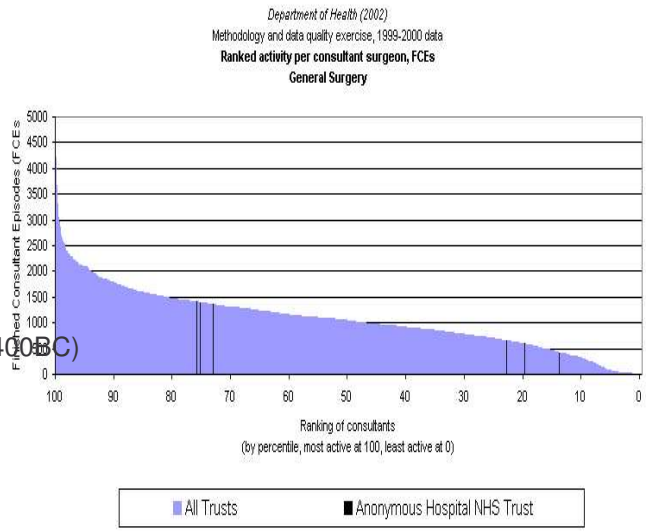
> Extract from the Hippocratic Oath
>
> I will follow that system of regimen which, according to my ability and judgement, I consider for the benefit of my patients, and abstain from whatever is deleterious and mischievous
>
> Hippocrates 400BC

This has been coupled with issues of trust, duty and altruism, and coincides with the notion that medicine is a 'reputation good.' Hence there is often a sense of duty, reinforced strongly by professional codes and self-regulation.[5] However, self-regulation relies on a level of trust between doctors, patients and employers and many would argue that there is a current crisis of trust, citing evidence that suspicion and mistrust have spread across many walks of life.[6]

Applying theoretical perspectives to incentives and healthcare: the case of NHS surgical consultants

The objective of this study is to explore the relative importance of explicit and implicit incentives on the productivity of surgeons as measured by annual finished consultant episodes (FCEs). Routinely collected NHS data (Hospital Episode Statistics) were used to explore variations and

Fig 1: Variation in activity per consultant



4. Burgess and Metcalfe (1999)
5. Coincides with Hippocrates (400BC)
6. O'Neill (2002)
7. Veen & Korver (1998)
8. Maslow (1954)
9. Hull (1943)

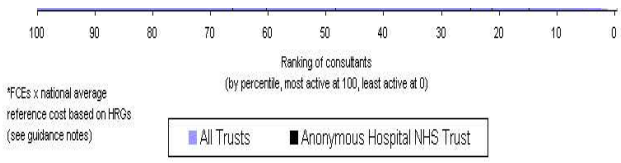
associations between reward structures (explicit incentives) and activity using multi-level techniques. The data was derived from HES data for England in 1998/99 (repeated for 1999/00) in five surgical specialties: general surgery, urology, T&O, ENT and ophthalmology. FCEs were attributed to individual consultants and weighted for case mix severity by HRGs and reference costs (now Tariff Costs). The characteristics of consultants included from other sources were anonymised.

The figures illustrate the extent of the variation in productivity between gernal surgeons as measured by FCEs per annum (Fig 1) and casemix-adjusted activity (Fig 2). The standard descriptive statistics for five surgical specialities is shown in Table 2. They highlight considerable variation between consultants, with and without case mix adjustment. Interquartile variation is between 1.6 and 1.85, indicating that the top 25% of consultants have activity rates 60% to 85% higher than the bottom 25%. Using case mix adjusted data, the range of interquartile variation remains between 1.6 and 1.8.

Fig 2: Variation in casemix-adjusted activity

Table 2: FCEs & casemix-adjusted activity per year by specialty

	Mean FCEs	SD	IQ	Mean (£k)	SD	IQ
Gen surg	1139	548	1.85	1013	435	1.67
Urology	1129	509	1.85	825	371	1.80
T&O	668	268	1.60	974	391	1.60
ENT	824	405	1.69	545	255	1.68
Ophth	643	337	1.82	388	196	1.77



Multi-level modelling, a mixed model with fixed and random effects was also used to explore the pooled dataset.[10] The dependent variable was the total number of FCEs per consultant. The random effects included specialty, NHS Trust, age and the fixed effects included: type of contract (full time or part-time), discretionary points and distinction awards.

One of the aims of the study was to examine whether the type of contract held, (full time or maximum part time) and/or bonus payments (discretionary points and distinction awards), were good predictors of activity after controlling for age and other consultant characteristics. To determine the relationship between contract and bonus payments, and activity, a hierarchical mixed generalised linear model was used based upon restricted maximum likelihood estimates. While specialties were pooled to maximise the power to detect change, specialty was also included as a random effect, together with age and hospital Trust, so that hospital level effects, such as severity of case mix, differences in staffing and average size of surgical teams could be captured.

Somewhat unexpectedly, the results from the hierarchical mixed model shown in Table 3 suggest that consultant surgeons with a maximum part-time contract have substantially higher activity rates than those with a full time contract (129 more FCEs per year, 95% CI 97-160). In addition, consultant surgeons who hold discretionary

10. Using PROC MIXED in SAS version 8

points undertake significantly more activity than those without (95 FCEs, 95% CI 62-128), and those with a distinction award of any grade have a tendency towards higher activity rates. This however does not reach statistical significance (48 FCEs, 95% CI –4 to 103) and is determined only by 'B' award holders. These results were supported when the analysis was repeated using HES data for 1999/2000. The correlation between activity rates per surgeon in the two years was high, above 90 per cent, and the associations between contract and bonus payments on activity rates were replicated. The relationship between activity and the type of bonus payments and contracts held by the consultant appeared to be robust, with maximum part time contract holders delivering more activity than full time contract holders.

Table 3: Multi-level model results

Effect	Estimate	Error	Df	95% CI	P value
Intercept	875	145	0		
Contract MPT vs FT	129	27	3167	97 to 160	<0.0001
Discretionary point any vs none	95	17	3167	62 to 128	<0.0001
Distinction award any vs none	48	16	3167	-4 to 99	0.07

Discussion

The discussion focused on the application of incentives in practice. It was argued that, from a psychology perspective, the importance of FFS is linked to the simple fact that it is an incentive and that the amount is of secondary importance. If this were the case, why does the private sector continue to pay FFS? It was noted that there is now increasing international evidence that mixed incentive schemes, which allocate about 10% to FFS, are more effective.

There was also a question about whether there a difference in personal characteristics between doctors who work in both private and public hospitals that might explain the higher productivity of part-time contracts. The top 10% of 'private doctors' also work part-time in the public sector. Its was also suggested that teams may be more effective when dealing with part-time rather than full-time staff consultants. This highlighted the importance of linking team data with ativity measures in order to assess whether there is in fact a difference in the performance of doctors measured with and without teams.

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