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# Hospital quality choice and market structure in a regulated duopoly

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## Abstract

This paper analyzes the optimal structure of a regulated health care industry in a model in which the regulator cannot enforce what hospitals do (unverifiable quality of health) or does not know what hospitals know (incomplete information about production costs) or both. We show that if quality is unverifiable the choice between monopoly and duopoly does not change with respect to the verifiable case but, if there are fixed costs (assumed to be quality dependent) and the monopoly is the optimal market structure, the quality level of the operative hospital decreases. Asymmetry of information introduces informational rents that can be reduced by increasing the most efficient hospital's market share. A monopoly is chosen more often.

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## 1. Introduction

Financing and organization of health care markets are based on the triangular relationship between three different economic agents: consumers, providers and purchasers of health care.

The separation between providers (public and private) and purchasers (health authorities, general practitioners, insurers, etc.) requires provision of health care to be governed by contracts (NHS Reform, Act 1990). These contracts lay down a complex set of behavioral incentives for providers with financial consequences. As Chalkley and Malcomson (1996) recall: "A key issue in contracting for health services is how to design contracts to induce

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providers to supply appropriate standards of service while keeping costs down. [...] The most obvious message from this discussion is that forms of contract need to be tailored to circumstances. . . . That is, the form of the optimal contract will crucially depend on market structure, on demand conditions and on information, among other things.

The purpose of this paper is to analyze the role of market structure in the relationship between purchasers and providers of health care, whether purchasers can use competition as a device for increasing social welfare and how this role is affected by frequent problems that arise in the health care industry, such as unverifiability of quality and asymmetry of information about costs.

The issues discussed here are significant for the health care industry. We attempt to construct a model that reflects competition between hospitals in a public system (such as the NHS system) where a fixed price per patient is paid by the state rather than by patients. Hospital services are differentiated by geographical location, and monitoring of standards or quality control can be very expensive, or indeed impossible for some aspects of service.

For some specific hospital services (heart surgery, cancer treatment, etc.) everybody gets treatment and patient demand reacts only to changes in the gap between the quality of service provided by different hospitals. If hospitals care about profits, sole sourcing never achieves quality above the enforceable level, while either competition or contestability (either dual sourcing or sole sourcing with threat of entry) can help to maintain appropriate standards.

We show that under complete information about hospitals' cost and contractible quality, the benchmark, quality provision and market structure depend on patients' transportation costs as well as on the difference in productivity between hospitals. Given a transportation cost, the more productive hospital is required to produce higher quality and obtains a higher market share than its competitor. If the difference in productivity is great enough, the gap between quality levels is such that all patients prefer to be treated in the more efficient hospital and the less efficient hospital does not provide health care (sole sourcing).

The above results serve as a benchmark for assessing the effectiveness of a two-part tariff as the payment mechanism when quality is non-contractible because it is not verifiable. We show that unverifiability of quality does not affect the market structure. Moreover, under dual sourcing the absence of verifiability has no impact on quality levels. Competition between hospitals via quality can be used as a device to maintain an appropriate level of services when that level cannot be verified. The regulator uses a two-part tariff so that competition takes place and, at the same time, hospitals' profits are limited.

This result does not apply under sole sourcing. The absence of verifiability can affect quality levels depending on whether there are fixed costs. If there are no fixed costs, the regulator can indirectly control quality through contestability: verifiability does not matter. However, if fixed costs are considered, the regulator has to decide whether the benefits of contestability outweigh the fixed cost. We show that, in general, it could be better from a social welfare point of view to allow the operative hospital to reduce quality: verifiability matters.

Using a principal-agent model we show that when hospitals have private information about costs they have to be paid a rent in order to induce them to reveal their private information truthfully. These rents represent an additional marginal social cost, which decreases with the hospital's efficiency level. This implies that the more efficient hospital's market share has to be increased through an increase in the quality gap, in which case sole sourcing is more likely.

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