

Selection of treatment under prospective payment systems in the hospital sector

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Abstract

A model of contracting for hospital treatments is presented. For a given diagnosis of the patient, two treatments are available: a high-intensity (surgical) treatment and a low-intensity (medical) treatment. A purchaser (the National Health Service, public or private insurer) offers a contract to the provider (the hospital) to maximise the patients' benefit net of costs. We show that if the *average* severity of the patient is private information known only by the provider, the hospital has an incentive to over-provide the surgical treatment to the low-severity patients. The optimal contract with asymmetric information is such that hospitals that provide a higher share of surgical treatments receive a higher price for the surgical treatment and a lower price for the medical treatment. This situation differs from current remuneration systems in which the price for each type of treatment is uniform. A related result is that with asymmetric information the optimal contract involves a higher transfer than with symmetric information.

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1. Introduction

Policy makers in several countries have reformed the remuneration system for hospitals replacing payment rules based on cost reimbursement with prospective payment systems, based on tariffs (LeGrand, 2000). In 1983 the Medicare Program¹ in the USA introduced a system

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¹ The Medicare Program provides health assistance to elderly and disabled people in the United States.

based on Diagnosis Related Groups (DRGs). A DRG is a weight that indicates the amount of resources necessary to treat a patient with given diagnosis (McClellan, 1997).² Several theoretical studies have analysed how the purchaser of health services (a public or private insurer) should design a payment system to induce the provider to maximise patient's benefits net of costs. In this literature a common assumption is that the payment to the hospital is *fully prospective*: given a certain diagnosis, the hospital receives a lump-sum payment for each patient treated (see for example, Newhouse, 1983; Shleifer, 1985; Dranove, 1987; Pope, 1989; Allen and Gertler, 1991; Rogerson, 1994; Ma, 1994, 1997, 1998; Ellis, 1998; Chalkley and Malcomson, 1998a,b; Beitia, 2003; Mougeot and Naegelen, 2005; Bos and De Fraja, 2002).³

Some recent empirical literature (McClellan, 1997; Gilman, 1999, 2000) has pointed out how this assumption may be simplistic. A fully prospective payment implies that the tariff cannot be influenced by the behavior of the provider. Although some determinants of each DRG tariff are exogenous for the provider (the type of hospital, and age and sex of the patients), others are not. For example, given a particular diagnosis, different treatments are available. The type of treatment provided is a choice variable of the provider (it is not exogenous) and is determined by the physician acting as the agent for the patient. In 2000 around half of the 500 DRGs were related to treatments (Gilman, 2000). It is common for more intensive treatments to be rewarded with higher tariffs.⁴

The present study analyses the optimal payment scheme when there are multiple treatments for a given diagnosis. For simplicity, we study the case of two possible treatments, taken to be a medical and a surgical treatment. Issues related to quality, access and cost containment effort are ignored. Patients are assumed to have differing severity of illness. A key assumption below is that the *average* severity of illness of the patients differs across hospitals, and is private information held by the provider. We derive the optimal contract that maximises the objective function of the purchaser of health services, given by the patient's benefit net of the cost of treatment weighted to reflect the social costs of taxation. The model can be seen as an application to the hospital sector of the Laffont–Tirole model (Laffont and Tirole, 1993, Chapter 1; see also Baron and Myerson, 1982), which analyses optimal contracting under asymmetric information using a mechanism-design approach.

Although the hospital sector is characterised by several sources of asymmetries of information, the mechanism-design approach has been applied in the hospital literature only in the last few years. For example, De Fraja (2000) and Beitia (2003) analyse the optimal contract when the asymmetry of information lies in the costs. Chalkley and Malcomson (2002) analyse the possibility of introducing cost-sharing when severity of illness is private information held by the provider. Lewis and Sappington (1999) investigate the optimal payment scheme which reduces incentives for dumping high-cost patients in the presence of screening costs (though they focus on linear reimbursement rules). Jack (2005) analyses the optimal contract when the degree of altruism of the

² Since 1983 other OECD countries have introduced similar arrangements. For example the United Kingdom, France, Canada and Australia have respectively introduced Healthcare Resource Groups (HRGs), Groups Homogenes de Malades (GHMs), Case-Mix Groups (CMGs) and Australian National DRGs (AN-DRGs).

³ In some cases it is optimal to combine the fully prospective price with a linear cost-sharing component (see Ellis and McGuire, 1986, 1990; Eggleston, 2005; Chalkley and Malcomson, 2002).

⁴ Using a sample of elderly patients in the years 1987 and 1990, McClellan (1997) finds that procedure variation accounts for two thirds of the total cost variation in 1987 and for three-quarters in 1990. This was even more the case after the introduction of the "second generation" of DRGs, which refined the "old" DRGs into two or more procedural and non-procedural categories (Gilman, 2000).

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