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Introduction

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Nowadays, all developed countries are trying to improve efficiency in hospital care through implementation of prospective payment systems based on Diagnosis Related Groups (DRGs). Following the example set by Medicare beginning in 1983, other payers in the USA have adopted DRG based payments for inpatient care. European countries first used a global budget system to contain hospital costs during the 1980s, before turning to prospective payment per DRG at the beginning of the 2000s.

The goal of a prospective payment system is to encourage efficiency in care delivery. Paying hospitals a fixed price per stay in a given DRG provides a powerful incentive for managers to minimize costs. Indeed, hospitals are assumed to keep the rent earned when their costs are lower than the fixed price. Conversely, they risk running operating losses if their costs are above DRG payment rates.

Shleifer's yardstick competition model provides the theoretical foundation for prospective payments. This model is based on the assumptions of homogeneity of hospitals, homogeneity of patients for the same pathology, and fixed quality of care. Any deviation in cost for a stay in a given DRG is supposed to stem from inefficiency.

Because it puts strong pressure on hospitals to lower their costs, wide implementation of payment per DRG raises serious concerns about quality of care. Indeed, if quality of care is costly, hospitals are discouraged from providing above-average quality because they risk incurring costs that exceed the DRG payment rate.

How can the search for hospital efficiency be prevented from jeopardizing quality of care? Several non mutually exclusive solutions can be considered: enforce the required level of quality through administrative

controls; introduce some cost sharing¹ to alleviate the pressure resulting from fixed payments; introduce explicit financial incentives such as pay-for-performance to promote quality of care; encourage quality competition among hospitals.

All of these strategies have been implemented by developed countries, in varying degrees. They all secure a minimal level of quality through administrative controls, and implement some cost-sharing. As part of the Affordable Care Act, the US government has introduced pay-for-performance in all hospitals paid by Medicare, and currently pay-for-performance programs are being adopted throughout developed countries. In many OECD countries, policies encouraging competition among hospitals have been introduced as a way of improving quality. The purpose of this conference volume is to examine the potential impact on quality of care of prospective payment systems based on DRGs, and to investigate the suitability of promoting quality competition.

To highlight the potential advantages of quality competition, it is important to describe the shortcomings of (i) administrative controls, (ii) cost sharing and (iii) pay-for-performance.

(i) Administrative controls are necessary, but they refer by definition to a given level of observable quality. Hence, they generally serve to secure a minimal level of quality and they cannot serve to promote quality improvements.

(ii) The idea behind cost sharing is that differences in efficiency are not the only source of cost heterogeneity between hospitals. There are other sources of cost heterogeneity, many of which are not observable by the regulator. If a hospital that provides high quality of care is fully efficient, it cannot achieve further savings through efficiency gains. Hence, careless implementation of fixed payments per DRG, which puts hospitals under

1. Cost sharing combines prospective and retrospective payments: The payment per stay is a weighted average of the lump-sum and of the actual cost of treatment.

pressure to lower costs, might create undesirable incentives for lowering care quality, or discriminating among patients or selecting patients. To design a payment system that creates virtuous incentives for enhancing hospital efficiency, many theoretical papers have improved the basic model by lifting assumptions relative to patient and hospital homogeneity, and by allowing for an endogenous¹ level of care quality (Chalkley and Malcomson, 2000). Using various theoretical frameworks, these papers show that social welfare can be improved through a mixed payment system that combines a fixed price with partial reimbursement of the actual cost of treatment. To deal with unobserved sources of heterogeneity in costs, the regulator can construct a menu of contracts that combine a lump sum transfer with partial reimbursement of actual costs. When the hospital chooses a contract, it reveals its unobserved cost component to the regulator (Laffont and Tirole, 1993). Another strategy is to use econometrics to evaluate unobservable sources of cost heterogeneity in order to design payments that allow for differences in quality, while still providing incentives for more efficiency (Dormont, 2014).

In practice however, implementation of a mixed payment system is not straightforward: The proportions of the lump sum and the actual cost can be defined very differently, depending on the theoretical model used, its main hypotheses, and its parameterization. Moreover, the definition of the payment formula often relies on unobservable variables or functions. In addition, cost sharing is only a second best solution and comes down to paying for a share of moral hazard, i.e. for avoidable costs.

(iii) Pay-for-performance (P4P) schemes consist of additional payments based on meeting targets linked to quality indicators. A first experiment was launched in the USA in 2003; it was followed by a nationwide pay-for-performance scheme applied since 2013. New forms of P4P, named “Best

1. This means that the level of quality is chosen by the hospital, whereas the seminal model of yardstick competition assumes that the level of quality is given.

practice tariffs” have been implemented in the United Kingdom since 2011. In the same way, measures can be taken to discourage inappropriately early discharges, which otherwise tend to develop because payments per DRG provide incentives to shorten stays. So, penalties have been introduced in the US under the Hospital Readmission Program, and in the UK there are penalties for emergency readmissions within 30 days of discharge following an elective admission (KCE, 2013).

There is much debate on the potential adverse effects of financial rewards based on quality indicators. First, quality is multidimensional, and some dimensions are difficult to observe and cannot be summarized in a quantitative indicator. Hence, P4P payments are always defined for a limited selection of indicators, leaving no financial incentives for many aspects of care quality, especially dimensions that are not easy to quantify with a score. In a multitask interpretation, care providers might reduce their efforts to improve quality for activities that are not linked to incentives (empirical evidence of such behavior has been found by Campbell *et al.*, 2009). Second, rewards can be counterproductive because they undermine intrinsic motivation. As argued by Bénabou and Tirole (2003), “performance incentives offered by an informed principal [...] can adversely impact an agent’s [...] perception of the task, or of his own abilities. Incentives are then only weak reinforcers in the short run and negative reinforcers in the long run.”

These arguments show that theory does not make it possible to predict if pay-for-performance is likely to improve care quality or not. Hence, it is of major importance to see how it works in practice. Evaluations of the effectiveness of P4P programs at hospitals have found contradictory results. In the US, an experiment including a control group was carried out in Medicare and Medicaid hospital services. Initially, hospitals with P4P improved their performance more than the control group. However, after five years, the two groups’ scores were identical, with no improvement in risk-adjusted 30-day mortality (Werner *et al.*, 2011; Jha *et al.*, 2012). In

contrast, the introduction of pay-for-performance in all NHS hospitals in one region of England was associated with a clinically significant reduction in mortality (Sutton *et al.*, 2012). In fact, the P4P programs were quite different in the two experiments: The UK program had larger bonuses and a greater investment by hospitals in quality improvement.

Contradictory results, together with the risk of detracting from intrinsic motivations, suggest that P4P should remain a minor part of care providers' payments. Further research is needed on the design of pay-for-performance programs (magnitudes of financial incentives, target definitions, individual or practice level incentives) in order to understand how practical implementation influences their effects.

To sum up, administrative controls, cost sharing and pay-for-performance programs have some drawbacks and are clearly not sufficient to avoid the potential deleterious impact on care quality of DRG-based prospective payments. This is why it is important to consider the complementary strategy which consists of encouraging competition among hospitals to stimulate improvements in quality.

Is hospital competition good for care quality? In theory, there is a marked distinction between the case where prices are set endogenously by hospitals, and the case where they are fixed exogenously by a regulator (Gaynor and Town, 2012). When prices and quality of care are decided on endogenously by hospitals, they "may react to increased competition [...] by trading off prices for quality, attracting higher volume but producing lower quality output" (Cooper and McGuire, 2014). In other words, when prices are not fixed, competition is not necessarily counterproductive, but it can be. In contrast, when prices are fixed exogenously, competition should lead to better quality: In this case, hospitals can increase their revenue by treating more patients, and they can compete for patients only by improving the quality of care.

There is a growing literature in the US on the impact of hospital competition on quality. As expected, findings are mixed for studies on

hospitals that set their own prices. On the other hand, several studies show a positive effect of fixed price competition on clinical outcomes (Kessler and McClellan, 2000). These studies are performed on inpatient care delivered to Medicare beneficiaries, for whom there is fixed price competition because Medicare pays hospitals in the form of DRG-based lump-sums. Several papers on the National Health Service in the UK have reinforced the idea that the impact of hospital competition on quality strictly depends on whether prices are fixed or not. At a time when prices were determined endogenously, Propper *et al.* (2004) found that more intense competition was associated with higher death rates within the 30 days following an Acute Myocardial Infarction (AMI). After reforms that encouraged patient choice and introduced DRG-based fixed prices in the English NHS, Cooper *et al.* (2011) showed that hospital quality-measured by 30 day AMI mortality-improved more quickly in more competitive areas. After a review of the impact of competition on the hospital sector, Cooper and McGuire (2014) conclude that there is robust empirical evidence that, under exogenously fixed prices, increased competition can lead to improved outcome quality.

The purpose of this conference volume is to examine the theoretical and empirical conditions that can lead to a positive impact of fixed price competition on the quality of hospital care. We address the following questions: Does more intense competition between hospitals under fixed prices always result in higher quality of care? Do hospital ownership or/and objectives matter? Is the impact of more competition on quality the same for different diseases? What is the right scope for competition? Is it appropriate to introduce competition between hospitals with different mandates?

The empirical literature on these issues generally uses data from the USA or England¹. This volume also considers empirical results obtained on French data. Actually, the US, the UK and France have rather different

1. Most empirical results on hospital competition and quality of care in the UK are based on data limited to England.

healthcare systems. However, hospital payment systems based on Diagnosis Related Groups are in place in these three countries. One difference between the American, British and French systems stems from the financing—or coverage—of health care: health care is provided in the UK by a public agency (the National Health Service) financed through general taxation, whereas in France social insurance provides universal coverage, with supplementary coverage provided by private insurance. In the USA, health care financing is managed by distinct organizations: One third of Americans is covered by government health care programs (notably Medicare and Medicaid); the other two thirds being covered by private insurance provided by employers or subscribed to on an individual basis.

The share of inpatient care provided by public or private hospitals differs widely between the three countries. Whereas most hospital services are delivered by public providers in the UK, health care facilities in the US are mainly private: 51% are private not-for-profit hospitals, 18% for-profit hospitals and 18% state and local government community hospitals (KCE, 2013). In France, hospital care is mostly delivered by public hospitals (66% of acute care beds), but private-for-profit hospitals have a considerable importance (25% of acute care beds and 46% of surgical beds). Private not-for-profit hospitals provide only a small share of hospital care (9% of acute care beds).

Starting in 1983, the Medicare program in the US was a pioneer with the introduction of a prospective payment per DRG for Medicare inpatients. European countries followed much later: 2003-2004 for England, with a system named “Payment by Results” (KCE, 2013); 2004 for France, with a system named “Tarification à l’activité”. Currently, the way payments per DRG are implemented is quite similar across countries: DRG classifications are similar; there are additional payments for research, training and medical education; there are retrospective reimbursements for high cost devices and high cost drugs, and for exceptionally long stays. However, there are some differences between the US, England and France as regards

the homogeneity of payment rates within and between hospitals. Whereas payment rates are the same for all patients in all public facilities in England, American hospitals receive different payments for Medicare patients and for those covered by a private insurer. Medicare payments are defined as fixed prices per DRG, while prices for private insurers are generally set by negotiation between the hospital and the private payer. Currently, private payment rates are higher than Medicare's: as a result privately insured patients alleviate the pressure on costs induced by fixed prices per DRG. It is even possible for hospitals to shift costs by setting higher rates for private payers to offset reductions in Medicare rates. However, results on years 1995-2009 show no evidence of cost-shifting (White, 2013). In France, payment rates set by the social insurance administration are the same for all patients at a given hospital, but rates are different for public and private hospitals. Hence there is no yardstick competition between public and private hospitals, even though all hospitals have incentives to attract more patients.

Despite these differences between countries, it is possible to define a common theoretical framework to examine the potential impact of prospective payments per DRG on the quality of hospital care. Moreover, empirical results obtained on US data can be considered relevant for other countries.

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The purpose of this volume is to bring together relevant theoretical and empirical results regarding the impact of promoting quality competition between hospitals.

In the first chapter, Brekke, Gravelle, Siciliani and Straume review the theoretical literature on competition and quality, a body of literature to which they themselves have largely contributed. They examine the conditions under which fixed price competition can be expected to have a positive impact on quality. They show that increasing competition between

hospitals under fixed prices does not always result in higher quality of care. The existence of a positive or a negative impact of competition on quality depends on: the degree of hospital altruism, its profit constraints, its cost structure, the degree of specialization, as well as the existence of soft budgets and sluggish demand adjustments. Their model considers the cost and price of treatment for a single pathology, with a monodimensional formalization of quality q . Quality and quantity (number of patients treated) are costly. The patients are assumed to observe quality perfectly, and demand is assumed to react positively to quality improvements. Assuming that competition increases the responsiveness of demand to quality, the authors show that if the price-cost margin is positive, more competition increases the profitability of a marginal increase in quality. This is the basic argument put forward in the literature on the impact of fixed price competition on quality. Conversely, with a negative price-cost margin, the predicted impact of competition on quality is negative. In particular, intrinsic motivation and altruism may induce providers to work at negative profit margins. In this case, increased competition can lead to lower quality.

Next, Brekke *et al.* allow for strategic interactions between hospitals in their model. They show that hospitals' reaction to rivals' improvement in quality depends on whether the marginal cost of treatment is increasing or decreasing with respect to the number of patients and with respect to quality. If quality competition is promoted through dissemination of comparative information on quality, this can increase the level of demand. In that case, if the marginal cost of treatment increases with quantity, the positive effect of competition on quality is dampened. Actually, competition can be promoted through two channels: publication of comparative information on quality or an increase in the number of competing hospitals. Brekke *et al.* show that these two policies might have different impacts on quality. Finally, they show that the existence of soft budgets does not really alter predictions of the effect of competition on quality.