

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 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.

In chapter 2, Dormont and Milcent address the issue of the scope of competition. In France, public and private hospitals are subject to different mandates that influence their size and composition of activity, whereas prospective payments lead to budgets that are linear in the number of stays in each DRG. The implicit assumption underlying such payments is that there are no scale or scope economies. Actually, some hospitals receive an additional annual budget for activities such as teaching, research, palliative care, geriatrics, emergency care, or for having a high proportion of low income patients. But payment for stays in acute care is designed as if hospital size and composition of activity had no influence on cost per stay.

The starting point of Dormont and Milcent is that crude productivity measures indicate that public and private nonprofit hospitals are more costly than private-for-profit hospitals in France. Their work shows that the productivity gap is due to the mandate of public hospitals: They cannot specialize, and they cannot turn down patients. Once patient characteristics and production composition are explicitly taken into account, public hospitals are more efficient and the ranking is reversed. Lower productivity in public hospitals is explained by oversized establishments and by patient and production characteristics, but not by inefficiency in the short to medium term. Hence, reinforcing competition between public and private hospitals through a convergence of payment rates would provide incentives for public hospitals to change the composition of the care services they supply, a change that might be contradictory to their mandate.

Most theoretical models consider a single pathology, whereas in reality hospitals produce care services for patients affected by different diseases. Hospital care is not a homogenous product, and profitability, as well as sensitivity of demand to quality, can vary across diseases. What is the impact of more competition on care quality for different diseases? In chapter 3, Colla, Bynum, Austin and Skinner use US Medicare data to study how fixed-price competition affects quality of care for heart attacks, hip and knee replacements, and treatment of dementia. As stated in

Chapter 1, theoretical models predict that when prices are fixed, hospitals will compete for patients by improving quality for those diseases with the highest profitability and the highest demand elasticity. Colla *et al.* consider several diseases: treatment of Acute Myocardial Infarction (AMI), for which the elasticity of demand is low because ambulances take patients to the closest hospital; hip and knee replacements, for which demand elasticity with respect to quality is high, since surgery is scheduled in advance, which allows the patient to make an informed choice of hospital; and care for dementia, whose profitability is low or negative. In principle, we should expect a small or negligible effect of competition on quality for AMI patients, a sizeable positive association between quality and competition for hip and knee replacements, and a negative or null association for dementia.

For dementia patients, Colla *et al.* find that, according to several measures, poor clinical care is associated with competition, a finding that accords with theoretical predictions. For other diseases empirical evidence does not entirely support theoretical predictions. While the influence of competition on several quality indicators was sensitive to model specification for heart attack, hip and knee replacements showed no consistent association. Another important result is that the correlation coefficient between risk-adjusted AMI mortality and risk-adjusted hip or knee complications is zero: AMI quality cannot be considered a good summary marker for hospital quality, contrary to what is often argued in the empirical literature devoted to hospital competition and quality.

In chapter 4, Gobillon and Milcent study the effect on hospital quality of the prospective payment system gradually introduced in France between 2004 and 2008, which they interpret as a pro-competition reform. They evaluate for different types of hospitals the impact on AMI mortality of competition incentives engendered by the reform. Estimates are based on an exhaustive dataset of heart attack patients over the 1999 to 2011 period. They provide evidence that patients admitted to private nonprofit hospitals are less likely to die after the reform in markets that are not very

concentrated, but they do not find clear-cut impact of competition on mortality for public or for-profit hospitals. It should be noted that for-profit hospitals were already competing with each other before the introduction of the DRG based payment system.

The last section of the volume contains comments by Pedro Pita Barros and Jon Magnussen. They point out that the chapters examine the final stage of a more complete game, in which prices are determined by regulation in an earlier stage and quality decisions follow. For consistency, the implicit larger sequential game requires that quality can change more often than regulated prices, which might or might not be true, depending on the dimension of quality that is considered.

The paper by Brekke *et al.* provides an answer to the question of what conditions must be fulfilled for competition to have a positive impact on quality. Increasing competition between hospitals under fixed prices does not always lead to higher quality. The overall impact is ambiguous, but Brekke *et al.*'s clearly identify the direction of different forces. Pita Barros and Magnussen remark that the role of information asymmetries, uncertainty, adverse selection and moral hazard are ignored in chapter 1, whereas it is important to know if these factors affect results. Moreover, two other features deserve attention in future research: First, in systems with a National Health Service, the regulator can take advantage of competition between public and private hospitals, and use public hospitals and their objectives to intervene in the hospital market; second, quality is supposed to be product specific, whereas more general treatment would examine provider-wide, across-product quality. According to Pita Barros and Magnussen, chapter 2 challenges current views concerning the superiority of private management. It also questions the pertinence of using uniform regulated prices under the presence of economies of scale and scope, because public hospitals are mandated to accept all patients and to serve all medical needs. It would be interesting to extend the analysis to input-prices.

Commenting on chapter 3, Pita Barros and Magnussen call for information on how quality affects cost of treatment in each type of procedure and across hospitals. They criticize the use of the LOCI index to measure the intensity of competition. Indeed, this index was constructed for price competition, but prices are fixed in the empirical framework of chapter 3. Pita Barros and Magnussen then propose an adaptation of the LOCI index to quality competition under fixed prices. They conclude by asking if the results of chapter 3 provide sufficient understanding of how competition impacts quality to decide whether more or less competition is desirable. Their answer is “Not yet”, but that “this paper starts to walk the path leading to the answer.”

Pita Barros and Magnussen say that Gobillon and Milcent's analysis is a welcome addition to the literature on hospital competition, where there are few studies on Europe. However, the use of AMI quality as “a general marker for hospital quality deserves to be discussed more thoroughly.” (we have seen that this approach is challenged by the results of Colla *et al.* in chapter 3). In addition, the results of Gobillon and Milcent are rather disappointing for people who believe in the merits of competition: they show an effect of market concentration on the quality of private non-profit hospitals, but no effect on the quality of public or private for-profit hospitals. More analysis should be devoted in future research to evaluating the influence of care quality on the demand for care, and to evaluating how costs vary with quality in France.

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Should we encourage quality competition among hospitals in order to improve quality of care? The effects of increased competition depend on many determinants that have been examined in this volume, and they can vary across diseases. The authors present valuable evidence for a limited number of conditions. To further enlighten the debate on the effects of hospital competition, it is essential to collect more accurate data for each major DRG on costs and care quality at the hospital-stay level.

One condition required for competition to induce better quality is connected to marginal profitability. Hence, regulated prices influence the impact of competition on quality. As stated by Pita Barros and Magnussen, it is necessary to consider the complete game, including the determination of regulated prices. Moreover, a hospital's cost function is unlikely to be separable between diseases, and reputation exists for a hospital as a whole and not only for separate diseases.

All of the studies presented here focus on supply side, but a key assumption in hospital competition models is that the demand for care is sensitive to quality. Actually, not much is known about the drivers of hospital choice by patients or referring doctors. Quality has several dimensions, and the information provided to patients can be detailed in some dimensions and less complete on others. As a result, patients may focus on a dimension of quality that is not very important for health outcomes (Huesmann and Mimray, 2015). What is the impact of more competition in such a case? More research is needed on the demand side.

References

- (Bénabou and Tirole, 2003). BENABOU, R., TIROLE, J., "Intrinsic and Extrinsic Motivation," *Review of Economic Studies*, 70, 3, 2003, 489-520.
- (Campbell et al., 2009). CAMPBELL, S.M., REEVES, D., KONTOPANTELOS, E., SIBBALD, B., ROLAND M., "Effects of Pay for Performance on the Quality of Primary Care in England," *New England Journal of Medicine*, 361, 4, 2009, 368-378.
- (Chalkley et al., 2000). CHALKLEY, M., MALCOMSON, J.M., "Government Purchasing of Health Services," in A.J. Culyer and J.P. Newhouse (Ed.), *Handbook of Health Economics*, Amsterdam, Elsevier, 2000, 847-890.
- (Cooper et al., 2011). COOPER, Z., GIBBONS, S., JONES, S., MCGUIRE, A., "Does Hospital Competition Save Lives? Evidence from the English Patient Choice Reforms," *Economic Journal*, 121 (August), 2011, 228-260.
- (Cooper and McGuire, 2014). COOPER, Z., MCGUIRE, A., "Competition on the Hospital Sector," *Encyclopedia of Health Economics*, 2014, 117-120.

- (Dormont, 2014). DORMONT B., "Heterogeneity of Hospitals," *Encyclopedia of Health Economics*, 2014, 456-461.
- (Gaynor and Town, 2012). GAYNOR, M., TOWN, R., "Competition in Health Care Markets," in M.V. Pauly, T.G. McGuire, P.P. Barros (Ed.), *Handbook of Health Economics*, vol. 2, Amsterdam, Elsevier, 2012.
- (Huesmann and Mimray, 2015). HUESMANN, K., MIMRA, W., "Multi-Attribute Quality Competition with Imperfect Signals," *Communication to the 16th annual European Health Economics Workshop*, Toulouse School of Economics, May 2015.
- (Jha et al., 2012). JHA, A.K., JOYNT, K.E., ORAV, E.J., EPSTEIN, A.M., "The Long-Term Effect of Premier Pay for Performance on Patient Outcomes", *New England Journal of Medicine*, 366, 17, 2012, 1606-1615.
- (KCE, 2013). KCE, "A Comparative Analysis of Hospital Care Payments in Five Countries," *KCE Report 207*, 2013.
- (Kessler and McClellan, 2000). KESSLER, D., MCCLELLAN, M., "Is Hospital Competition Socially Wasteful?", *The Quarterly Journal of Economics*, 115, 2000, 577-615.
- (Laffont and Tirole, 1993). LAFFONT, J.J., TIROLE, J., *A Theory of Incentives in Procurement and Regulation*, Cambridge, MA, MIT Press, 1993.
- (Propper et al., 2004). PROPPER, C., BURGESS, S., GREEN, K., "Does Competition between Hospitals Improve the Quality of Care? Hospital Death Rates and the NHS Internal Market," *Journal of Public Economics*, 88, 2004, 1247-1272.
- (Sutton et al., 2012). SUTTON M., NIKOLOVA S., BOADEN R., LESTER H., McDONALD R., ROLAND M., "Reduced Mortality with Hospital Pay for Performance in England," *New England Journal of Medecine*, 367, 19, 2012, 1821-1828.
- (Werner et al., 2011). WERNER R.M., KOLSTAD J.T., STUART E.A., POLSKY D., "The Effect of Pay-for-Performance in Hospitals: Lessons for Quality Improvement," *Health Affairs*, 30, 4, 2011, 690-698.
- (White, 2013). WHITE C., "Contrary to Cost-Shift Theory, Lower Medicare Hospital Payment Rates for Inpatient Care Lead to Lower Private Payment Rates," *Health Affairs*, 32, 5, 2013, 935-943.