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Manipulation and auditing of public sector contracts

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ABSTRACT

We model purchaser–provider contracts when providers can inflate reimbursable activity through manipulation. Providers are audited and fined upon detected fraud. We characterise the optimal price and audit policy both in the presence and absence of commitment to an audit intensity. Under 'non-commitment' the audit intensity increases in reported activity, allowing the provider to soften it by reducing activity together with the underlying service quality and manipulation. The purchaser then faces a trade-off between offsetting this tendency by raising price and committing to a low audit intensity by reducing price. We identify circumstances under which the two forces balance out.

1. Introduction

Over the past decades activity-based payments have grown to be the preferential mode of reimbursement for many public services, most prominently perhaps for health care (Le Grand and Mossialos, 1999). Understood to be payments linked to some contractible measure of performance (related to service volume, intensity and/or quality), these contracts provide incentives to increase activity (towards the performance measure) and at the same time contain cost. One example for such contracts is prospective health care payments based on Diagnosis Related Groups (DRGs). Typically, however, performance measures are imperfect — in the most basic case they may simply be activity-reports from the provider. Activity-based contracts may then induce providers to manipulate the payment to their advantage. It is well recognised by now that payment manipulations come in a variety of forms ranging from accounting contrivances to outright fraud. The most common forms of manipulation in the health care sector include the following: billing of services that were not rendered; rendering and billing of services without medical necessity; upcoding of services into more complex diagnostic groups attracting more generous reimbursement; and splitting (or unbundling) of a single treatment episode into a number of separate cases subject to additional elements of reimbursement. In any of these instances, the purchaser reimburses effective activity at excessive rates or it reimburses ineffective activity. The US Department of Health and Human Services (HHS) provide estimates for 'improper' Medicaid payments ranging between $12 and $23 billion amounting to 7 to 14% of all reimbursements (OIG, 2006a).[1] One way by which

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[1] In the UK, the NHS Counter Fraud Service reports for the time period 1999–2004 a total value of identified fraud and unlawful action amounting to £303 million and total financial benefits amounting to £1.2 billion, the latter accounting for recoveries of 'lost' funds and reductions in measured losses due to investigations (Gee, 2006). In Germany, the federal audit office (Bundesrechnungshof) estimates for 2010 that incorrect hospital reimbursements by statutory health insurers amounted to EUR 875 million out of a total of some EUR 50 billion (Bundesrechnungshof, 2011).

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health care purchasers seek to contain fraudulent activity involves auditing providers' billings and investigating suspected cases of fraud. The US Medicare Integrity Program, which was initiated in 1996 in order to safeguard the programme payments, has been expanding to a volume of $714 million in 2005, of which 29% was spent on auditing the cost reports that are used to adjust prospective payments, 23% was spent on post- and pre-payment medical reviews of Medicaid claims, and 17% was spent on benefit integrity, i.e. on investigations into medical fraud (GAO, 2006). Additional resources are allocated to HHS and FBI to investigate health care fraud and abuse.[2] Even when combining these funds, they amount to less than 0.02% of total Medicaid and Medicare spending ($520.8 billion). As Becker et al. (2005) point out, this hints at potentially high rates of undetected fraud.[3]

Examples from other areas of public service include the educational sector, where schools and teachers are increasingly rewarded on the basis of student attainment (as measured by test scores; see e.g. Jacob and Levitt, 2003), and labour market qualification programmes, such as the US Job Training Partnership Act Programme (JTPA), where case workers are paid on the basis of the number of unemployed they manage to place in employment (see e.g. Courty and Marschke, 2003).

These examples illustrate the substantial amounts of resources at stake in the process of committing, detecting and prosecuting public sector fraud. It is surprising that the topic has received relatively little interest in the economic literature. In this paper, we investigate from a theoretical perspective the optimal payment scheme and audit policy when providers engage in manipulation of activity-based reimbursements. We expressly take into account that the purchaser can influence the extent of manipulation not only by way of an audit (an enforcement effort) but also by adjusting the price on reported activity; and that the fee and auditing effort not only have a bearing on manipulation but also on the quality of provision.

Our main assumptions are the following: (i) the activity reported by the provider increases in quality but can also be inflated through a manipulative effort; (ii) activity is observable to the purchaser, while quality and manipulative effort are not; (iii) manipulative effort can be detected through an audit but auditing is imperfect (i.e. with a certain probability the audit reveals nothing); (iv) the purchaser chooses a price and the frequency of audit; and (v) upon detection the provider pays a fine that increases in the extent of manipulation. Depending on institutional setting and/or enforcement costs, the purchaser collects only a share of this fine.

We derive the optimal price and audit policy for the purchaser under two scenarios: a) The purchaser can commit to an audit policy (commitment scenario). Here, the purchaser decides on price and audit intensity before the provider chooses activity, quality and manipulation. b) The purchaser cannot commit to an optimal audit policy (non-commitment scenario): Here, the purchaser decides on price; then, the provider chooses the amount of activity, quality and manipulation; and finally the purchaser observes activity and decides the intensity of the audit.

The main results are the following. The presence of manipulation generally reduces the optimal tariff paid to a provider, implying a reduction in the power of incentives. Manipulation is costly for the purchaser as it wastes resources but does not generate any benefit for clients. By setting a lower marginal tariff, the purchaser can thus discourage manipulative effort. Auditing reduces the incentive to manipulate and, therefore, mitigates the downward distortion in price. Under commitment, optimal auditing trades off the cost savings from lower manipulation against the cost of auditing. Audit intensity is adjusted for induced quality changes and for its impact on transaction costs in relation to the enforcement of fines.

In the absence of commitment the purchaser infers high levels of manipulation from high levels of reported (observed) activity and responds with a high frequency of audit. Anticipating this, the provider strategically distorts downwards the level of activity, by choosing lower levels of manipulation *and* quality. Thus, lack of commitment has a disciplining effect on the provider but it also reduces quality incentives. When determining the price in the first stage, the purchaser takes into account that by inducing higher levels of activity (i) she can offset the provider's strategic reduction in activity, but (ii) will also trigger a costly increase in ex-post auditing intensity. While this suggests a much more complex pricing rule as in the case of commitment, surprisingly perhaps, we find that the two effects in (i) and (ii) exactly offset each other and, indeed, do so for a very general specification of the reimbursement, cost and 'fining' functions. Overall the purchaser attains a higher net utility when being able to commit.

1.1. Related literature

Our study contributes to the literature on provider incentives in health care (see e.g. Ellis and McGuire, 1986; Ma, 1994; Chalkley and Malcomson, 1998; Rickman and McGuire, 1999; Jofre-Bonet, 2000; Jelovac and Macho-Stadler, 2002; Dranove and Spier, 2003; Eggleston, 2005; Mougeot and Naegelen, 2005; Levaggi, 2007; Olivella, 2003; Porteiro, 2005; Siciliani, 2007; Barros and Martinez-Giralt, 2008; Kuhn and Siciliani, 2009) and the public sector more generally (as surveyed in Dixit, 2002; Burgess and Ratto, 2003; Courty and Marschke, 2003). Our main departing assumptions from the existing literature are the following: i) we explicitly allow for manipulative behaviour and ii) the purchaser can audit the provider. Courty and Marschke (2003), Dafny (2005) and Kuhn and Siciliani (2009) also consider manipulation in public service contracts. Courty and Marschke (2003) observe that 'contract gaming' is akin to a multi-tasking set-up (e.g. Holmstrom and Milgrom, 1991), where manipulation is a costly effort

[2] In 2005, HHS and FBI received $160 million and $114 million, respectively, in order to combat health care fraud (OIG, 2006b). HHS secured $1.47 billion in judgments and settlements to the benefit of Medicare and Medicaid.

[3] A number of empirical studies have examined issues related to health care fraud in the US. Hillman et al. (1990) and Swedlow et al. (1992) provide evidence of inappropriate use of (MR) imaging. Carter et al. (1990) find that one third of the change in Medicare's case-mix index between 1986 and 1987 was due to upcoding or 'DRG creep' (see also Silverman and Skinner, 2004). Dafny (2005) finds evidence that higher tariffs led to an increase in upcoding rather than treatment intensity.