



Reference pricing and firms' pricing strategies

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ABSTRACT

Within a horizontal differentiation model and allowing for heterogeneous qualities, we analyze the effects of reference pricing reimbursement on firms' pricing strategies. With this analysis we find inherent incentives for firms' pricing behavior, and consequently we shed some light on the time consistency of such policy. The analysis encompasses different reference price rules: (i) reference price as the minimum of the observed prices in the market, (ii) reference price as a linear combination of firms' prices. Results show that under the "minimum policy" firms are not able to coordinate on higher prices while the "linear policy", implicitly, provides a coordination device. We have also found that, relatively to the "linear policy", when the reference price is the minimum of observed prices, after policy implementation, total and private expenditures are higher and consumer surplus and firms' profits are lower. With quality differentiation both the minimum and linear policies unambiguously lead to higher prices.

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1. Introduction

Expenditure in pharmaceuticals is one of the major factors behind the growth of total expenditure on health care in OECD countries. Indeed, on 2005 it represented an average of 17% of total health expenditure (ranging from 9% to 32%), being this weight bigger in low income countries (OECD, 2007). Furthermore, since 1995 expenditure in pharmaceuticals has been rising at a rate of 4.6%/year, faster than the total health spending growth of 4.0%, amounting to, between 1995 and 2005, a *per capita* spending rise of more than 50% (OECD, 2007). Since in most countries these expenses are borne publicly (average public share of 60% across OECD countries (OECD, 2007) they have been one of the main targets of public policy. Namely, through the launch of regulation policies, competition incentives, reimbursement schemes, antitrust policies, among others. Despite of being targeted to affect different sides of the market, the goal of these policies tends to be unique: the control of (public) pharmaceutical expenditure policies either through quantity control (demand side measures) or through price control (supply side measures).

On the demand side, in publicly funded systems, traditionally, consumers have always paid a proportion of the total price – co-payment – with the remaining being borne by the third party payer. This partial accountability for drug costs is on the basis of moral hazard problems, by which, there exists (non-optimal) over consumption of prescription drugs. Associated with the moral hazard problem, this sort of policy is also believed to be quite limited in providing competition incentives as well as exposing consumers to risks by limiting the risk-spreading feature of health insurance. These drawbacks, namely the first two, lead policy makers either to abandon or complement this reimbursement system. It has been in this context that policies such as reimbursement ceilings, special schemes for the reimbursement of orphan drugs and reference pricing policies were born.

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This paper focuses on the latter. More precisely we analyze the impact of reference pricing policy on firms pricing strategies by considering two different reference pricing rules and a scenario where drugs quality might differ.

Internal reference pricing¹ (RP) is a regulatory mechanism consisting of clustering drugs according to some equivalence criteria (chemical, pharmacological or therapeutic) and defining a reference price for each cluster. The third party payer, then, will just reimburse not more than that price for each drug on that cluster. If a consumer buys a drug with price lower or equal to the reference price of that cluster, then the co-payment he faces is null. Otherwise, if the drug bought is priced higher than the reference price, the consumer will bear, fully or partly, the difference between the reference price and the drug price. Even though its formulation varies from country to country, reference pricing is generally seen as an efficient mechanism in cutting drug prices by encouraging self restraint, in controlling relative demand of highly priced drugs and in encouraging the appropriate use of drugs. Based on this premises, third party payer's pharmaceutical expenditure would be controlled.

However, the effectiveness of this mechanism ultimately depends on its ability in enhancing competition in the drug market and on the promotion of financial responsibility by consumers and pharmaceutical firms. Indeed, despite being a demand side measure, competition enhancement, and consequent price reduction, has been often pointed as the rationale for the implementation of such policy (Lopez-Casasnovas and Jonsson, 2001; Ma, 1994). Based on the premise that competition in the pharmaceutical market is insufficient due to patients and prescribers weak information and/or insensitivity to prices, reference pricing is believed to increase demand sensitivity to prices and hence promote competition between firms. Indeed, by making patients liable for the extra drug cost above reference pricing, the latter creates incentives for the substitution between close substitutes and consequently enhances price competition. Since there is no direct price and quantity control, the efficacy of reference pricing as expenditure control cannot be taken for granted.

Being a demand side measure, with firms setting freely their prices, firms behavior is only influenced indirectly via demand effects. Furthermore, despite of the heterogeneity of the reference pricing rules in the different countries, conceptually they share the same feature of being endogenous to firms pricing strategies. On the top of the non-optimality issues that may arise with this formulation, one should add the incentives that profit maximizing rational firms to reformulate their pricing strategies in order to achieve higher profits. In fact, by accounting for the fact that each period the reference pricing level will be calculated having as basis observed prices in the previous period, firms will have an incentive to price at higher levels than they would in the absence of reference pricing. If firms do strategically revise their strategies, by optimally anticipating the effect on the reference pricing level, then the effectiveness of reference pricing in enhancing competition might be jeopardized.² Hence, the aim of this article is to analyze whether reference pricing policies facilitate higher prices allowing firms to exert market power and, consequently, restrict competition.³

Even though the existing literature on reference pricing has been mainly empirical, some authors have contributed to the analysis through the development of theoretical frameworks (see for example Borrell and Merino-Castelló, 2006; Brekke et al., 2007; Danzon et al., 2000; Danzon and Liu, 1996; Merino-Castelló, 2003; Mestre-Ferrandiz, 2003; Morton, 1999). Among these studies, two deserve a special attention given their proximity to the model we aim at developing. In the work by Mestre-Ferrandiz (2003), the author compares the impact of a reference price and a co-payment system in the pharmaceutical market with generic competition. Using a horizontal differentiated model where two firms compete *à la Bertrand*, the author concludes that, just for some reference price level, a reference pricing policy can control pharmaceutical expenditure and reduce drug prices. Merino-Castelló (2003), studies the impact of reference pricing on the price setting strategies of pharmaceutical firms (generic and branded) on a vertical product differentiated model. The author concludes that reference pricing is indeed effective in enhancing price competition as, after reference pricing had been implemented, branded prices decrease while generic prices remain constant. Nevertheless, this price competition increases the usage of branded drugs in detriment of generics.

The study of pricing behavior is not fully contemplated in the above mentioned articles. Even though the analysis by Merino-Castelló (2003) and Mestre-Ferrandiz (2003) focus on the impact of reference pricing on firms' pricing strategies, their assumptions do not allow to conclude on this matter. Indeed, our analysis differs from these contributions in two distinct ways: (a) in our model reference pricing is endogenously obtained as a function of firms pricing strategies and (b) firms are non-naive in the sense that they anticipate the impact of their strategies on reference price calculation. In effect, in our analysis we study explicit reference pricing formulations and consider a different timing of implementation of the policy in order to better fit reality.

¹ Internal reference pricing, as opposed to external reference pricing, compares product prices within a single country.

² Note that this requires that a positive lag of time exists between firms knowing their products are listed (and therefore will be subject to reimbursement) and the reference price announcement as, for example, happens in Portugal (where this lag goes up to 3 months) Australia (where lists are updated quarterly and the reference system revised annually). A survey on reference pricing implementation issues can be found in Lopez-Casasnovas and Jonsson (2001).

³ Note that, within this context, there are several other elements that influence firms pricing strategies. Manufacturers' pricing strategies depend critically on the bargaining power and incentives of pharmacists and wholesalers, and, in particular, on their ability to substitute between generically equivalent products and to profit from such substitution. For example, in Spain and in the Netherlands, generic manufacturers might strategically coordinate on higher prices so that the margins allowed to wholesalers increase and consequently better conditions are offered to pharmacies in order to influence the dispensation of their own drugs in detriment of competing drugs. Despite the importance of these issues their analysis is not contemplated in this paper (the interested reader should see (Borrell and Merino-Castelló, 2007)).

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