

**Physicians' Balance Billing, Fees Negotiations and Supplementary Insurance**

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**Abstract**

The few countries that allow physicians to bill patients a fee above the one that is negotiated with the health authorities, do so according to varying arrangements. In particular, private insurers in France can offer policies to reimburse the totality of the expenses generated by physicians' balance billing. On the contrary, this practice is restricted in other countries by a strict regulation of the health insurance sector. This paper aims at analyzing the consequences of such varying legal arrangements, on the fees setting and on the resulting health expenses and levels of inequalities among the users of physicians' services.

## **1 Introduction**

In many countries, physicians' basis fee is the result of a negotiation between a health authority, representatives of medical doctors and sometimes representatives of health services users as well. In a few countries, some physicians are allowed to bill an extra fee on top of the basis fee. This practice is known as balance billing (BB, henceforth). The public health insurer reimburses the physicians' basis fee only, or a fraction thereof. The patients pay the extra fee, unless privately insured against it.

The few countries that allow physicians' to bill patients a fee above the one that is reimbursed by the health authorities, do so according to varying arrangements. In particular, private insurers in France can offer policies to reimburse the totality of the expenses generated by physicians' balance billing. On the contrary, this practice is restricted in Belgium by a strict regulation of the health insurance sector. In the US, additional prices are now limited to about 10% of the Medicare fee.

This paper aims at analyzing in a theoretical setting the consequences of such varying legal arrangements, on the fees setting and on the resulting health expenses and levels of inequalities among the users of physicians' services. It is generally assumed that BB increases inequalities because it restricts access. By how much? What does it depend on? Our approach specifically addresses the issue of access to physicians' services. Buchmueller et al (2004) explain that equity and access to physicians' services are definitely an issue in France where balance billing and unregulated supplementary insurance coexist. In particular, a study by Buchmueller, T. C. and A. Couffinhal (2004) found that, controlling for socioeconomic and demographic characteristics and detailed measures of health status, adults with private insurance were 86% more likely to visit a physician within a one month period than those without complementary coverage. This difference is comparable to differences between insured and uninsured adults in the US, where the insured/uninsured differential in out-of-pocket costs is much greater.

Rather than focusing on access, the existing theoretical papers on fees formation under balance billing analyze the important quality issue. Glazer and McGuire (1993) consider that the extra fee is a simple transfer from patients to physicians and its level is therefore irrelevant from the efficiency point of view. They do not recognize that some patients might stop seeking physicians services because those are too expensive. The same happens in Kifmann and Scheuer (2006) because of another assumption: Physicians have information about the patients willingness to pay and they are therefore able to perfectly price discriminate among them, allowing all patients to access their services. We depart from these papers by implicitly assuming asymmetric information about patients ability to pay, letting physicians to balance bill all patients with the same fee.

Intuitively, we could expect that allowing balance billing results in lower basis fees since physicians can compensate a lower basis fee with a higher extra fee. However, this direct effect goes along with an indirect effect with the opposite effect on basis fees. Indeed, the health authority anticipates the following effects: the physician's best reply to a higher basis fee is the setting of a lower extra fee, which is the price paid by the patients unless privately insured. This logically results in a higher demand for medical visits. Therefore, the trade-off faced by the health authority is the resulting higher consumers surplus against lower public expenses, provided physicians are granted a given level of revenue. When balance billing is not allowed, such a positive effect of the basis fee on the consumers surplus is absent since patients pay the same (say zero), whatever the level of the basis fee. Therefore the trade-off vanishes as the health authority only aims at reducing lower public expenses for paying the basis fees. Therefore, allowing balance billing need not lead to lower negotiated basis fees and to lower public expenses. Moreover, balance billing always increases inequality in access to physicians' services trivially because patients with the lowest revenues cannot afford the extra fees.

Some of these effects are reinforced by the presence of private insurance when it is not regulated. In particular, the extra fee increases even more when some patients are privately insured against the payment of the extra fee. This means that access to physicians' services is even more restricted. On the contrary, the reimbursement level is

lower when supplemental insurance and BB coexist. The explanation for this lower reimbursement of physicians' services is that reimbursement now only benefits those who are not privately insured while it has to be disbursed for all.

The paper is organized as follows. Section 2 describes the theoretical model used to analyze these issues. Section 3 presents and analyzes two polar cases: The 'Laissez-faire' case with no negotiated basis fee and the fully regulated case with no balance billing. Section 4 then combines the negotiation of a basis fee with the possibility of balance billing. Section 5 extends to the existence of some privately insured individuals. Section 6 concludes.

## 2 The model

We model the relationship between a representative physician, a continuum of individuals of mass 1 and a regulator. Individuals are characterized by income  $I$ , uniformly distributed upon support  $[0, 1]$ . They consume  $y$  units of a numeraire good and  $x = \{0, 1\}$  visit to the physician. We assume that individual decisions concerning medical insurance are done previously and that their health has suffered a negative shock. The consumers problem is therefore as follows:

$$\underset{x,y}{Max} \quad y + x.V - L \quad s.t. \quad \begin{cases} y + x.P \leq I \\ y \geq 0 \\ x = \{0,1\} \end{cases}$$

where  $L$  represents the health loss suffered by the individuals;  $V$  is the value to patients of a visit to the doctor. We assume  $V > 1$ .  $P$  is the part of the physician's fee to be paid by the patient. Simplifying, we can write their utility as:

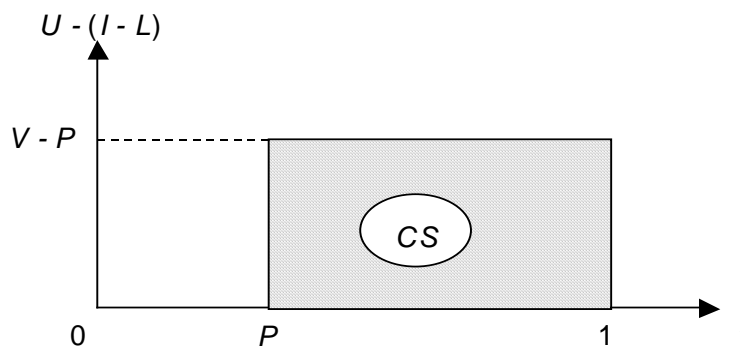
$$U = \begin{cases} I - L + V - P & \text{if } x = 1 \\ I - L & \text{if } x = 0 \end{cases}$$

and their decision as:

$$x = \begin{cases} 1 & \text{if } I \geq P \text{ and } V \geq P \\ 0 & \text{otherwise} \end{cases}$$

Therefore, the physician's demand and the consumers surplus are, respectively:<sup>1</sup>

$$D(P) = 1 - P, \quad \text{and} \quad CS = (V - P)(1 - P), \quad \text{provided } V \geq P.$$



The representative physician aims at maximizing his net revenue:  $\Pi = (P + R - c)(1 - P)$ , where  $R$  is the basis fee,  $P$  is the extra fee (consumers' price) and  $c$  is a constant marginal cost, with  $c < 1$ . We discard physicians' behaviors related to altruism, professional duty or paternalism.

<sup>1</sup> We only consider the part of the consumers surplus that is directly related to the visit to the physician.

The public expenses related to paying the physician the basis fee is  $PE = R.D(P) = R.(1 - P)$ . We assume that the regulator aims at maximizing the consumers surplus net of public expenses,  $S = CS - PE$ .

In what follows, we analyze three cases on top of the laissez-faire case, to ultimately compare them with each other. First, we consider that the regulator decides on the level of the physician's basis fee, without allowing the latter to charge an extra fee to his patient. In that case, there is no room for supplemental insurance. In the second case, we allow the physician to balance bill while supplementary insurance is ruled out. Third, the physician can balance bill and a proportion  $\lambda$  of patients is privately insured against disbursing an extra bill.

To guarantee interior solutions, we also assume that  $V < 2 + c$ .

### 3 Benchmark: Two polar cases

The first is the pure market solution with neither public universal insurance nor private supplemental insurance. The physician decides upon his fee  $P$  so as to maximize his net revenue:

$$\Pi = (P - c).D(P) = (P - c).(1 - P).$$

The solution fee and the corresponding demand, physician's net revenue and consumers surplus are, respectively:

$$P_0 = \frac{1+c}{2}; \quad D_0 = \frac{1-c}{2};$$

$$\Pi_0 = \left(\frac{1-c}{2}\right)^2; \quad S_0 = CS_0 = \left(\frac{1-c}{2}\right)\left(V - \frac{1+c}{2}\right).$$

Only individuals with an income above  $P_0 = \frac{1+c}{2}$  can afford a visit to the physician.

In the second polar case, the patients are fully insured: the basis fee is reimbursed by the health authority and no extra fee can be billed ( $P = 0$ ). Therefore, all patients are always better off with a visit to their physician and their utility from this visit is  $V$ , no matter what their income level is. No inequality appears here other than the direct income-related one. The resulting physician's revenue, the consumers surplus and the public expenses are, respectively:

$$\Pi = R - c; \quad CS = V; \quad PE = R.$$

Anticipating this situation, the basis fee  $R$  is the solution to the following maximization problem for the regulator:

$$\underset{R}{Max} \quad V - R \quad st \quad R - c \geq \Pi_0,$$

with the reservation revenue  $\Pi_0$  defined previously as the solution to the laissez-faire case. Notice that we implicitly assume full negotiation power for the regulator. This assumption should be relaxed in a forthcoming version of the paper. The solution is therefore:

$$R_{FR} = \left(\frac{1+c}{2}\right)^2.$$

The resulting payoffs are the following:

$$\Pi_{FR} = \left(\frac{1-c}{2}\right)^2; \quad S_{FR} = V - \left(\frac{1+c}{2}\right)^2.$$

#### 4 Balance billing and no supplemental insurance

In the present case, the physician is allowed to bill an extra fee to the patients, to maximize his net revenue:

$$\Pi = (P + R - c) \cdot (1 - P).$$

The best reply of the physician to the setting of a basis fee in the previous stage is:

$$P = \frac{1 + c - R}{2}.$$

This extra fee is decreasing in the basis fee  $R$ . To decide the extra bill  $P$ , the physician trades off his revenue per patient against demand. When  $R$  increases, the revenue per patient increases as well, other things being equal. Therefore, a higher  $R$  allows the physician to focus more on demand when deciding the extra fee  $P$ . Therefore, a lower  $P$  is set to grant a higher demand.

The corresponding payoffs are the following, for both the physician and the regulator:

$$\Pi = \left(\frac{1-c+R}{2}\right)^2; \quad S = \frac{1-c+R}{2} \left(V - \frac{1+c+R}{2}\right).$$

One step backwards, we solve for the basis physician's fee in this case, which is the solution to the following regulator's problem:

$$\underset{R}{\text{Max}} \quad S = \frac{1-c+R}{2} \left( V - \frac{1+c+R}{2} \right) \quad \text{s.t.} \quad \Pi = \left( \frac{1-c+R}{2} \right)^2 \geq \Pi_0.$$

The basis fee is therefore

$$R_{BB} = V - 1.$$

Comparing this fee with the one obtained under full reimbursement, we obtain the following result.

**Result 1.** The basis fee can be higher when balance billing is allowed than when it is not.

Formally, using  $\tilde{V} = 1 + \left( \frac{1+c}{2} \right)^2$  where  $1 < \tilde{V} < 2 + c$ ,

$$\begin{cases} R_{BB} \geq R_{FR} & \Leftrightarrow & V \geq \tilde{V} \\ R_{BB} < R_{FR} & \Leftrightarrow & \tilde{V} < \tilde{V} \end{cases}$$

The intuition behind this result is the following. On top of increasing the physician's revenue, the basis fee  $R$  plays the role of limiting the extra fee  $P$ , paid directly by the patient. Therefore, the regulator needs not aim at the lowest  $R$  since he personally trades off patients surplus against public expenses, even though the participation constraint of the representative physician would have been satisfied with a lower reimbursed basis fee. This effect was not present when balance billing was forbidden.

The table presented in the Appendix summarizes the solution to this case, together with the polar cases presented in the benchmark and the case allowing supplemental insurance, analyzed in the next section. This table helps establishing the following results.

**Result 2.** The fee  $P$  is higher when balance billing is associated to a reimbursement, than under the laissez-faire situation. Formally,  $P_{LF} > P_{BB} > P_{FR} = 0$ .

Therefore, reimbursement still increases access to physicians' services, even if not for everyone.

**Result 3.** The public expenses can be higher when balance billing is allowed than when it is not, despite the lower demand for physician's services under balance billing. Physician's revenue is higher when balance billing is allowed while the consumer surplus net of public expenses decreases with balance billing.

Formally,  $D_{BB} < D_{FR}$ ,  $\Pi_{BB} > \Pi_{FR}$ ,  $S_{BB} < S_{FR}$ , and there exists  $\hat{V}$  with  $\tilde{V} < \hat{V} < 2 + c$ , such that

$$\begin{cases} PE_{BB} \geq PE_{FR} & \Leftrightarrow & V \geq \hat{V} \\ PE_{BB} < PE_{FR} & \Leftrightarrow & V < \hat{V} \end{cases}$$

**Proof.**

$D_{BB} < D_{FR}$  and  $\Pi_{BB} > \Pi_{FR}$  come from direct comparisons using the table in the appendix.

Using the same table, we see that  $PE_{BB}$  is increasing in  $V$ .

Evaluated at  $V = \tilde{V}$ , we have  $PE_{FR} = \left(\frac{1+c}{2}\right)^2 > PE_{BB} = \frac{(V-c)(V-1)}{2}$ .

Evaluated at  $V = 2 + c$ , we have  $PE_{FR} = \left(\frac{1+c}{2}\right)^2 < PE_{BB} = \frac{(V-c)(V-1)}{2}$ .

Therefore, for  $V > \hat{V}$  high enough,  $PE_{BB} > PE_{FR}$ .

A similar analytical argument is used to show that  $S_{BB} < S_{FR}$  (available upon request from the author). QED

That means that balance billing does not always allow to save on public expenses dedicated to physicians' fees. On the contrary.

## 5 Balance billing and supplemental insurance

We now consider that potential patients can take up private insurance against the disbursement of the extra fee  $P$ . Let us start analyzing this decision. We use the dual theory formulation of expected utilities (*add references on dual theory*) to model individual choice of private insurance taking.

Let  $\mu$  be the true probability that an individual gets sick and needs to disburse the extra fee  $P$ . Let  $\alpha\mu$  be the true probability that an individual gets sick, with  $\alpha > 1$ . There is a competitive insurance market offering full coverage of the extra fee  $P$  against the payment of a premium denoted  $q$ . Individuals will therefore take up insurance if:

$$I - q \geq \alpha\mu(I - P) + (1 - \alpha\mu)I \quad \Leftrightarrow \quad \mu \geq \frac{q}{\alpha P}.$$

Assuming that  $\mu$  is uniformly distributed upon the support  $[0, 1]$ , the demand for private insurance is therefore:

$$\lambda = 1 - \mu = 1 - \frac{q}{\alpha P}.$$

We now turn to the equilibrium premium  $q$  that prevails on a competitive private insurance market. This premium is such that profits of the insurance companies are zero:

$$\int_{\frac{q}{\alpha P}}^1 (q - \mu P) = q \left(1 - \frac{q}{\alpha P}\right) - \frac{P}{2} \left(1 - \frac{q}{\alpha P}\right) \left(1 + \frac{q}{\alpha P}\right) = 0 \Leftrightarrow q = \frac{\alpha P}{2\alpha - 1}.$$

Therefore, the demand for private insurance in this competitive market is:

$$\lambda = 1 - \frac{q}{\alpha P} = 1 - \frac{1}{2\alpha - 1} = \frac{2(\alpha - 1)}{2\alpha - 1}.$$

We now turn to the representative physician's problem. This stage can be considered as simultaneous to the private insurance choice problem since the latter is independent of the physician's choice of  $P$ , at equilibrium.

We know that a proportion  $\lambda$  of the physician's services users are privately insured against the extra fees.<sup>2</sup> Those users' problem is therefore equivalent to the one analyzed under full regulation. Their demand is therefore  $\lambda \cdot 1$ . The remaining  $(1 - \lambda)$  patients pay the extra fee and their problem is equivalent to the one under balance billing without supplemental insurance. Their demand is thus  $(1 - \lambda) \cdot (1 - P)$ . The total demand faced by the physician is therefore  $D = \lambda + (1 - \lambda) \cdot (1 - P) = 1 - (1 - \lambda)P$ . The physician sets the extra fee to maximize his revenue:

$$\Pi = (R + P - c) \cdot (1 - (1 - \lambda)P).$$

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<sup>2</sup> In what follows, we use the notation  $\lambda$  as such because its expression is based on an exogenous variable  $\alpha$  only.

The solution to this problem gives us the physician choice of  $P$  as a best reply to the basis fee  $R$ :

$$P = \frac{1 - (1 - \lambda)(R - c)}{2(1 - \lambda)}.$$

This fee is increasing in  $\lambda$ . Therefore, for a given level of the basis fee, the access to physicians' services is more severely restricted when supplementary coverage applies. Also, as in the former case, it is decreasing in  $R$ . The corresponding demand and total physician's net revenue are as follows:

$$D = \frac{1 + (1 - \lambda)(R - c)}{2}; \quad \Pi = \frac{1}{1 - \lambda} \left( \frac{1 + (1 - \lambda)(R - c)}{2} \right)^2.$$

The demand is surprisingly enough decreasing in  $\lambda$ , while the total net revenue is increasing in  $\lambda$ .  $\lambda$  influences the demand through two opposite effects. The first is a direct one since more insured individuals means more visits to the doctors since more people are fully reimbursed. However, this also increase the extra fee, decreasing the demand from those who are not privately insured. The second effect dominates the first one here.

Notice that the physician's profits are always higher than in the *laisser-faire* situation, whatever the level of the reimbursed basis fee  $R$ :

$$\Pi = \frac{1}{1 - \lambda} \left( \frac{1 + (1 - \lambda)(R - c)}{2} \right)^2 > \Pi_{LF} = \left( \frac{1 - c}{2} \right)^2.$$

Therefore, one step backwards, the regulator's problem reduces to:

$$\text{Max}_R \quad S = (1 - (1 - \lambda)P)(V - R) - (1 - \lambda)(1 - P)P$$

$$\text{such that} \quad P = \frac{1 - (1 - \lambda)(R - c)}{2(1 - \lambda)}.$$

The solution reimbursed basis fee is therefore:

$$R_{SI} = V - \frac{1 + \lambda}{1 - \lambda},$$

and it is decreasing in the proportion of privately insured individuals  $\lambda$ . That means that the reimbursement lowers when supplemental insurance and balance billing co-exist. The intuition for this lower reimbursement of physician's services is that reimbursement now only benefits those who are not privately insured while it must be disbursed for all.

Given this level of reimbursed basis fee  $R$ , the physician's best response in terms of extra fee is therefore:

$$P_{SI} = \frac{2 + \lambda - (1 - \lambda)(V - c)}{2(1 - \lambda)}.$$

This extra fee can be shown to increase with  $\lambda$ . Therefore, the extra fee is higher with private insurance ( $\lambda > 0$ ) than without it ( $\lambda = 0$ ). This means that access to physicians' services is even more restricted when supplementary insurance is available.

To summarize the effects of supplementary private insurance in a market for physicians' services in which balance billing is permitted, the following result presents the overall comparison, based on the table in the Appendix, between the present case with

supplemental insurance and the one of the former section without supplemental insurance.

**Result 4.** The existence of a competitive market for private insurance against the risk of disbursing an extra fee to physicians, results in lower basis fees, higher extra fees, a lower demand for physicians' services, i.e. a more restricted access to those, lower profits to physicians and lower public expenses.

Formally,  $R_{SI} < R_{BB}$ ,  $P_{SI} > P_{BB}$ ,  $D_{SI} < D_{BB}$ ,  $\Pi_{SI} < \Pi_{BB}$ , and  $PE_{SI} < PE_{BB}$ .

Public expenses are lowered by the possibility of private insurance because reimbursed basis fees are lower and so is the demand for reimbursements, i.e. for physicians' services. The physician's profits decrease with supplemental insurance despite a higher level of the extra fee. This is due to the lower basis fee together with the more limited utilization of their services.

## 6 Conclusion

To be written.

## References

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## Appendix

Laisser-faire	Full reimbursement	BB, no supplemental insurance	BB & supplemental insurance
$P_{LF} = \frac{1+c}{2}$	$P_{FR} = 0$	$P_{BB} = 1 - \frac{V-c}{2}$	$P_{SI} = \frac{2 + \lambda - (1 - \lambda)(V - c)}{2(1 - \lambda)}$
$R_{LF} = 0$	$R_{FR} = \left(\frac{1+c}{2}\right)^2$	$R_{BB} = V - 1$	$R_{SI} = V - \frac{1 + \lambda}{1 - \lambda}$
$D_{LF} = \frac{1-c}{2}$	$D_{FR} = 1$	$D_{BB} = \frac{V-c}{2}$	$D_{SI} = \frac{(1 - \lambda)(V - c) - \lambda}{2}$
$\Pi_{LF} = \left(\frac{1-c}{2}\right)^2$	$\Pi_{FR} = \left(\frac{1-c}{2}\right)^2$	$\Pi_{BB} = \left(\frac{V-c}{2}\right)^2$	$\Pi_{SI} = \frac{1 - \lambda}{4} \left(V - c - \frac{\lambda}{1 - \lambda}\right)^2$
$S_{LF} = \left(\frac{1-c}{2}\right) \left(V - \frac{1+c}{2}\right)$	$S_{FR} = V - \left(\frac{1+c}{2}\right)^2$	$S_{BB} = \left(\frac{V-c}{2}\right)^2$	$S_{SI} = \frac{\lambda}{1 - \lambda} + \frac{1 - \lambda}{4} \left(V - c - \frac{\lambda}{1 - \lambda}\right)^2$
$SC_{LF} = \left(\frac{1-c}{2}\right) \left(V - \frac{1+c}{2}\right)$	$SC_{FR} = V$	$SC_{BB} = \left(V - 1 + \frac{V-c}{2}\right) \left(\frac{V-c}{2}\right)$	$SC_{SI} = \dots$
$PE_{LF} = 0$	$PE_{FR} = \left(\frac{1+c}{2}\right)^2$	$PE_{BB} = (V - 1) \left(\frac{V-c}{2}\right)$	$PE_{SI} = \frac{1 - \lambda}{2} \left(V - \frac{1 + \lambda}{1 - \lambda}\right) \left(V - c - \frac{\lambda}{1 - \lambda}\right)$