Post-print of: Barros, Pedro Pita; Martínez-Giralt, Xavier "Selecting heath care providers: "any willing provider" vs. negotiation" in European journal of political economy, Vol. 24 Núm. 2 (2008) , p. 402-414, ISSN 0176-2680. The final version is available at DOI: 10.1016/j.ejpoleco.2007.10.001

Selecting health care providers: "any willing provider" vs. negotiation

Pedro Pita Barros[a], Xavier Martinez-Giralt[b*]
[a] Faculdade de Economia, Universidade Nova de Lisboa,
Campus de Campolide, PT-1099-032 Lisboa, Portugal
[b] CODE and Departament d'Economia, Universitat Autònoma de Barcelona,
Edifici B, 08193 Bellaterra, Spain

July 2007

Abstract

We study how a third-party payer decides what providers to contract with. Two mechanisms are studied and their properties compared. A first mechanism consists of the so-called "any willing provider" where the third-party payer announces a contract and every provider freely decides to sign it or not. The second mechanism is a bargaining procedure with the providers set up by the third-party payer. The main finding is that the decision of the third-party payer depends on the surplus to be shared. When it is relatively high (low) the third-party payer prefers the any willing provider system (negotiated solution).

JEL classification: I12, I18.

Keywords: Bargaining, health care provision, Any willing provider.

*Corresponding author. CODE and Departament d'Economia, Universitat Autònoma de Barcelona, Edifici B, 08193 Bellaterra, Spain. Tel.: +34935812192. Fax: +34935812461. *E-mail address*: xavier.martinez.giralt@uab.cat (X. Martinez-Giralt)

1 Introduction

There have been major changes in the health care sector worldwide in contractual arrangements between payers and providers of care. Countries with provision of health care organized around explicit contracts, such as the U.S., moved from retrospective to more prospective payment systems. Preferential provider arrangements have also been introduced. Countries with a delivery of health care based on National Health Service, such as the U.K. and Portugal, have sought to introduce some sort of explicit contracting.[1] The definition of a contract implies the specification of the organizations involved in the contracting process. The OECD has defined three broad models which organize health care financing and delivery: the public integrated system, the public contract system and the private insurance/provider model (see, for example, Docteur and Oxley, 2003). The public integrated model, covering countries with a national health service, such as the U.K., Spain, Italy, Portugal, has both public financing and public provision of health care. The public contract model involves public financing and private provision. The relationship is organized around contracts that have evolved from reimbursement to prospective payments, with ex-ante defined prices. Countries classified under this model include the Netherlands and Germany. Finally, the private insurance/provider model has both private financing and private provision of care, the main examples being Switzerland and the U.S., and contractual arrangements between the insurer and the provider are common. Even in countries with mainly public financing and delivery of health care, introduction of competition between providers involving a more contractual approach has been attempted, for example by, Sweden, Catalonia, New Zealand and United Kingdom. Countries under the public contract model, such as Germany, Austria and the Netherlands, have also sought to transform insurers into more active purchasers, with a role for selecting providers and defining performance criteria. See Figueras et al. (2005) for further details

[1]For hospital care, the creation of DRGs- Diagnosis Related Groups- is a leading indicator for the adoption of prospective payments. The U.S. introduced DRGs in the mid-eighties, Italy, Portugal, Spain and Australia in the late eighties, the Netherlands in the first half of the nineties, Switzerland, Austria, Norway and France in the second half of the 1990s, and Germany around 2003.

and country specific information.[2] Even before these reforms which introduced a clearer role for active purchasing, the French health care system had public contracts with selected private providers (clinics and hospitals) and, in the U.S., the federal programs Medicare and Medicaid correspond to the public contract model and the Veterans' Affairs programs were closer to the integrated model of health care.

Therefore, in several countries, a more explicit role is being given to active purchasing of health care and selection of providers as part of the contracting process. At the same time, there are concerns about freedom of choice and equity, as the discussion in the U.S. shows (see below). The contracting process can be set at the macro, intermediate or micro-level (see Figueras et al, 2005, for a typology of purchasing levels). At the micro level, see Frech (1991) and Charatan (2000) on the design of doctors' fees. Also, Brooks et al. (1997) investigate how the price of an appendectomy is set jointly by a third-party payer and a hospital.

We contribute to the discussion of the role of active purchasing by comparing two alternative means of contracting with providers at the micro level. One is direct negotiation between the third-party payer, and the provider. An alternative procedure is for the third-party payer to follow an "any willing provider" approach: it announces a price and a set of conditions, and any provider finding these acceptable is allowed to join the network. The empirical relevance of this approach is clear. In the US, "any willing provider" (AWP) laws have recently been the object of intense debate. Such laws force managed care firms to take into their networks of providers all those willing to accept the terms and conditions of the contract (price, quality and licensing).

In the economics literature, there are relevant studies. Simon (1995) studies both the characteristics of the states that have enacted AWP laws and their effect on managed care penetration rates and provider participation. Also, Ohsfeldt et al. (1998) explore the growth of AWP laws applicable to managed care firms and

[2]For example, in the period 2003/2004, there were several proposals in Germany which would have led to more freedom for insurers to selectively contract with providers and depart from the traditional collective contracting system.

the determinants of their enactment. Vita (2001) provides empirical evidence that AWP laws favor increases in health care expenditures while selective contracting tends to reduce them. These results have not been confirmed by subsequent research. Carroll and Ambrose (2002) report no impact on profitability from “any willing provider” laws. More recently, Morrisey and Oshfeldt (2004) re-examine the issue, including in the analysis “freedom of choice” laws (which force managed care firms to pay a fraction of the cost even if patients use a provider of their choice which is outside the selected network of the health plan). They look at the market shares of health maintenance organizations in markets under different intensity of “any willing provider” laws, finding a negative effect, though smaller in magnitude than that of “freedom of choice” laws.

We address the question of how a third-party payer decides on the type of procedure to follow in contracting with providers. That is, we ask how does an insurance company make the selection of providers to which the individuals contracting on health care insurance access. The third-party payer faces a set of providers from amongst whom to choose. To make the problem tractable, we consider one third-party payer and two providers. The decision of the third-party payer consists in determining the price at which to reimburse the health care services offered to patients insured with the company. We study two different mechanisms. The third-party payer may bargain over the reimbursement policy with each provider, or may decide on an “any willing provider” policy. In the latter case, health plans accept any health care provider who agrees to conform to the plan’s conditions, terms and reimbursement rates. The questions we address are: which of these procedures should a third-party payer select and what should be the composition of the associated set of providers?

The comparison between the bargaining protocol and the “any willing provider” mechanism hinges upon the size of the surplus to be shared. Given that the “any willing provider” mechanism is a commitment to be ‘tough’ (in the sense that, once the third-party payer has announced the conditions for providers to join the network, they cannot be modified), the larger the surplus to be shared, the more valuable this commitment is.

Our paper is related to Davidson (1988) and Gal-Or (1997, 1999). Davidson looks at a model of wage determination where two firms bargain either with (i) the unions representing their respective workers, or (ii) a single union representing all workers. This latter scenario corresponds to our bargaining situation where the two firms and the single union correspond to two providers and the single third-party payer respectively. Davidson investigates the impact of the bargaining structure on wage determination. Our interest differs in two respects. On the one hand, the consequences of the failure of the negotiation with one firm/provider is to leave the rival firm as a monopolist in Davidson's model, while for us it implies that consumers patronizing that provider must bear the full price of the health care services provided. We seek to provide a rationale for the "any willing provider" mechanism. Davidson's scenario (i) represents an extension of our paper where several (two) payers negotiate with providers. This multipayer set-up is also used by Gal-Or (1997) to study the way in which third-party payers select providers with whom to contract. She considers two differentiated providers and finds that when consumers' valuation of accessing a full set of providers is small (large) relative to the degree of differentiation between payers, both payers choose to contract with only one of the (two) providers. Gal-Or (1999) also addresses the related issue of whether and how the formation of vertical coalitions between physicians and hospital enhances their bargaining power. In another direction, Barros and Martinez-Giralt (2005) address the issue of collusion between providers, and show that a third-party payer may prefer to contract with an organization of providers as this may dilute the bargaining power of more efficient providers. Glazer and McGuire (2002) analyze the interaction between a public payer (contracting on a "any willing provider" basis), a private one (selecting providers and adjusting prices according to quality), and a provider. This problem is complementary to ours, as we consider only one payer and two providers, and no quality choice. An overview of the theoretical literature and empirical results is provided in Barros and Martinez-Giralt (2006).

There are other possible mechanisms of interest. One is sequential bargaining where, after the third-party payer has finished the procedure with one provider, it starts again with the second provider. Sequential negotiations may considerably increase transaction costs. The implications of sequential bargaining are left for future research.

The paper is organized as follows. Section 2 sets out the model. Section 3 describes the equilibrium solution under bargaining and the equilibrium characterization associated with "any willing provider" contracts. Section 4 discusses the optimal negotiation format. Section 5 concludes.

2 Modeling assumptions

A population of people each have a potential health problem. Each member of the population has a given probability of being sick. The expected mass of consumers demanding health care is 1 and is distributed uniformly on a $[0, 1]$ horizontal differentiation line. The horizontal differentiation space represents the differences providers have in the eyes of the consumers. They can be objective, like geographic distance, or subjective, such as personal taste for one provider over the other.[3] The location of a consumer in the horizontal differentiation space is independent of the probability of occurrence of the illness episode. In terms of insurance choice models, this adds a background risk reinforcing the demand for insurance (Eeckhoudt and Kimball, 1992). The population is made up of patients and is, conceivably, a subset of all people insured. In the first-stage of the game, individuals face several possible states of the world (for example, healthy or sick). The uncertainty faced at this stage determines health-insurance demand. After realization of the state, if an individual is sick, (s)he demands one unit of health care. Providers are located at the extremes of the horizontal differentiation line. Whenever a patient cannot patronize his(her) most preferred provider, (s)he suffers a loss in utility (or under

[3]Implicitly, we assume that there are no quality differences across providers. Otherwise, a vertical differentiation dimension would have to be added to the problem. For quality issues in the provision of health care in the context of vertical differentiation models see Jofre-Bonet (2000) and the references therein.

the geographical interpretation, has to bear a transport cost). The patients' utility loss increases at a constant rate t per unit of distance in the differentiation space.

As the focus of the paper lies in the mechanism by which providers are selected, we abstract from the modeling of the insurance market. That is, we assume that prices and premia are already given.[4] In particular, we assume that consumers have full health insurance (meaning that they bear no extra payment when seeking medical care from an in-plan provider). This assumption is made for simplicity and does not change the qualitative features of the model. This would be the case if the insurance company offered only full insurance. The insurance contract defines a premium to be paid by consumers, which is taken as given at the moment of contracting with providers. It is also assumed that, when selecting providers, the third-party payer has already collected the insurance premia/contributions from consumers (for readibility, we will use interchangeably insurer and third-party payer; the same convention applies if the government or a public health fund is the insurer). Thus, total revenues of the third-party payer are exogenously given. A consumer when signing the insurance contract does not know beforehand the position (s)he will have on the horizontal differentiation line when sick. This implies that, when both providers are successful in reaching an agreement, consumers can patronize either of them and only bear the disutility cost. In case of disagreement with one provider, consumers have the choice of patronizing the in-plan provider at zero cost or the out-of-plan provider at full cost. If no provider reaches an agreement with the insurer, it gives back the premia to consumers and providers compete à la Bertrand in the market.

We restrict attention to equilibrium situations where the third-party payer con-

[4] We can see our analysis as part of a larger game, where first insurance is decided, then contracting with providers is done and finally patients choose which doctor to see. In the case of a monopolist (say, a National Health Service, or a regional sickness fund) there would be no specific guidance to how contributions are set (through tax system, income related or risk related). In the alternative situation of competition, choice of the set of providers would be relevant, as well as utility of patients in the event of absence of sickness. However. since the choice of which provider of health care to patronize is taken after the event of sickness occurs, consumers when choosing their insurance contract may face uncertainty regarding their future location in the differentiation space. Nonetheless, the problem of selecting providers is essentially the same, whatever the insurance arrangement prevailing.

tracts with at least one provider. The case of not contracting with any provider means that no insurance is, in fact, given. We ignore this case in the ensuing analysis. We also assume, for simplicity, zero production costs in the provision of health care. The qualitative results are insensitive to assuming any other symmetric technology. Naturally, asymmetric technologies may produce different results. However, those results would not be driven by the selection mechanism, which is our object of study, but by competitive advantages stemming from the technological differences.

Two mechanisms of price formation will be studied. A way of contracting health care services frequently used by Governments and, to some extent, by private health plans or insurance companies involves the payer announcing a price, and providers deciding, on a volunteer basis, to join (or not) the agreement. This is known as "any willing provider" (AWP) contracts.[5]

Alternatively, the third-party payer may negotiate with the providers. We propose the Nash Bargaining solution as the equilibrium concept. The Nash bargaining solution yields outcomes that satisfy a set of four conditions (axioms). These axioms have been interpreted as the guiding principles that an arbitrator would follow to solve a situation of conflict.[6] The solution was shown to maximize the product of the gains of each bargainer over the fallback position.[7]

In our setting, the conflict appears because the insurer's cost represents the providers' revenues. Naturally, the outcome of the negotiation hinges on the parameters of the bargaining problem. These are the distribution of bargaining power among the players, and the so-called "status-quo", or the fallback values (that is, the outcome that would arise should the negotiation fail). Negotiations are car-

[5]Within this framework, providers may, or not, be allowed to balance bill patients, that is, they may charge, or not, an amount to consumers on top of the price received from the third-party payer. Balance billing has received some attention in the literature. See Glazer and McGuire (1993), Zuckerman and Holahan (1991) and Hixson (1991). Since balance billing in not crucial to our arguments, we assume it away. This assumption is also justified by the prohibition of balance billing in several countries.

[6]The axioms are: invariance to equivalent utility representations, symmetry, independence of irrelevant alternatives and Pareto efficiency. See Osborne and Rubinstein (1990, pp. 11-13).

[7]An overview of the use of bargaining in health care models can be found in Barros and Martinez-Giralt (2006).

ried out simultaneously with the two providers who decide their actions in a non-cooperative way. We assume that providers do not collude. The issue of collusion among providers is tackled in a companion paper Barros and Martinez-Giralt (2005).

There is a difference with existing literature that is worth noting. Fallback values in one negotiation in our setting, depend on the outcome of the other negotiation. This happens because providers, after each negotiation, compete in the market. Thus, the outcome of each negotiation is conditional on the expected price of the other provider. We force expectations to hold in equilibrium.

A detailed analysis of all these elements is beyond the scope of the present paper. Extensive expositions of bargaining theory are Binmore et al. (1992), Osborne and Rubinstein (1990) or Roth (1985). Also, a short introduction is provided by Sutton (1986).

Generically, providers may have different bargaining powers, so that the distribution of bargaining power will involve a parameter constellation for the third-party payer and the two providers respectively. However, we are interested in comparing different systems of negotiation between a third-party payer and a set of providers. To keep focus in this issue, we will assume that all providers have the same bargaining power, so that they will be symmetric in all respects. We could think of asymmetries in bargaining power as a way to capture differences in technology, size, quality, etc. between providers. In turn, this would imply that we would have to allow providers to react to the differential characteristic (e.g. invest in size, R& D, quality, etc.) introducing an additional stage in the game. In our perception, this implied modeling would add little to the determination of prices. We discuss the implications of this assumption at the end of the paper.

3 Equilibrium analysis

3.1 "Any willing provider" contracts

"Any willing provider" (AWP) contracts have the third-party payer announcing a price p, and leaving to the providers the option of joining, or not, the agreement. Although in reality AWP contracts also include conditions on dimensions other than price, here we concentrate on the price aspect to be able to compare the outcome of AWP contracts with the corresponding outcome of the negotiation procedure. In a world of two providers, the set of possible decisions defines four different sub-games in prices, which in turn define previous-stage profits for providers. Therefore, we first characterize the four subgames.[8] When both providers choose to join the agreement, demand is split in half. Each provider receives price p. Profits earned are $\Pi_i = p/2,\ i = A, B$. The third-party payer, in turn, obtains profits $R - p$, where R denotes its revenues coming from the premia collected from the insured individuals (exogenous at this stage). In the other polar case of both providers choosing not to join the agreement, the market game is back to the Hotelling price game. In this case, the third-party payer obtains zero profits as no insurance is contracted. Providers' equilibrium profits are $\Pi_i = t/2,\ i = A, B$.

The two last possible cases has one provider joining the agreement and accepting p, while the other stays out and sets freely its price. Without loss of generality, we assume provider A joins the agreement. Demand is defined by the location of the indifferent consumer, which is given by (see appendix):

$$tx = p_B + t(1 - x),\ \text{or}\ x = \frac{1}{2} + \frac{p_B}{2t}.$$

Since providers are not allowed to balance bill patients, someone visiting provider A pays nothing while if he visits provider B he pays the full price charged by the latter provider. The equilibrium price of provider B is $p_B = t/2$ and profits are $\Pi_B = t/8$ and $\Pi_A = 3p/4$. Third-party payer profits, $\widehat{\Pi}$, are given by the premia collected R net of the reimbursement to provider A and of a penalty F associated to the reduced choice of providers offered to the insurees.

The payoff matrix of the first-stage of the subgame is now given by Table 1:

[table 1 here]

[8]See the details in the appendix

For the outcome of both providers joining to be an equilibrium, it is necessary and sufficient that

$$\frac{p}{2} \geq \frac{t}{8} \text{ or } \frac{p}{t} \geq \frac{1}{4}.$$

On the other hand, for both providers to stay out of the agreement, we need to have $p/t < 2/3$. It is straightforward to check that there is no asymmetric equilibrium in pure strategies. The different possibilities can be traced in the (p, t) space as shown in Figure 1. Although this may appear natural given the symmetry of players, *à priori* one could not rule out that asymmetric equilibria may result from an *ex-ante* symmetric market structure.[9]

[Figure 1 about here]

We find that there is a range of parameter values for which both equilibria may arise. We use Pareto dominance (from the providers' viewpoint) as selection criterion, which ensures that only one equilibrium is selected. Thus, the equilibrium where both providers join the agreement occurs for $p/t \geq 2/3$ as, in the intermediate range, it is dominated by the other equilibrium candidate.

We consider now the problem of the third-party payer. This is the optimal choice of the price to minimize total health expenditure. Given the initial assumption of full insurance, all expenses will be paid, irrespective of the in-plan provider chosen by each particular consumer. The optimal value of p to be announced in the "any willing provider" contract is the lowest price that still allows both providers to accept. Thus, the optimal price is $p/t = 2/3$. This optimal price is also lower than t, which guarantees that the third-party payer prefers to announce "any willing provider" contracts instead of allowing free competition between the parties (and having to reimburse consumers for the care they would receive in a pure private market equilibrium).

[9]Most textbooks of game theory provide examples of 2×2 games of symmetric agents where only asymmetric equilibria exist. More structured market situations, like vertical differentiation, also result in asymmetric equilibria with *ex-ante* identical firms.

Note that the payer needs to announce a fee sufficiently high to induce participation of at least one provider. But in the equilibrium with both providers participating the fee is higher than it would have been with an offer where the payer extracted all the surplus (a so-called take-it or leave-it offer). In other words, the payer is willing to give away some monopoly (bargaining) power in order to induce an equilibrium with the participation of the providers. Thus, the (full) bargaining power that a too rigid payer would use in committing to a low fee is somewhat softened.

One could think of alternative ways to model fee schedules, such as a two-part tariff where the variable part could be linked to the demand of the provider. As we are only dealing with price schemes, appealing to real market situations, this type of scheme is beyond the scope of this paper. Alternatively, the payer could propose a price scheme conditional on the number of participants. In particular, a price,

$$p = \begin{cases} 2t/3 & \text{if one provider participates} \\ t/4 & \text{if two providers participate} \end{cases}$$

would yield a unique equilibrium $p = t/4$ with both providers joining the agreement. However, AWP regulation does not allow for discrimination among participants. Also, in our setting of perfect information, the equilibrium price should be renegotiation-proof, so fees are not to be expected to be adjusted once providers have agreed to the price. Table 2 summarizes the results.

[table 2 here]

3.2 Bargaining

By bargaining we refer to the situation where the third-party payer carries on negotiations simultaneously but independently with the providers.[10] The third-party payer has a bargaining power strength parameter given by δ and each provider is endowed with $1 - \delta$. Note that this situation does not correspond to a process

[10] The assumption of one third-party player negotiating "blindly" with two different possible providers is not realistic. Part of the bargaining power of the third-party payer resides in the fact that the level of toughness shown to each individual provider may be affected with how negotiations with the other provider are going. If the providers are symmetric, this is less important.

where after failing to close a deal with one provider, the third-party payer addresses the second one. In our scenario, the provider when accepting or rejecting a deal *does not know* the outcome of the other parallel negotiation process.

Three scenarios may appear. Both providers successfully close the negotiation with the third-party payer, none do, or only one is successful. We start by introducing some notation. Parameter R denotes again the (exogenous) premia collected by the third-party payer. Parameter F denotes the penalty to the third-party payer when one provider does not accept. This penalty is left unspecified at this stage. It captures the point that an insurer giving access to a smaller set of options in health care provision faces a cost (for example reputation, value of variety and freedom of choice to consumers, or money returned to insured people). By $\widehat{\Pi}$ we denote the third-party payer's surplus; Π_i are profits to provider i when both negotiations are successful; $\widetilde{\Pi}_i$ are profits to provider i when its negotiation succeeds while j's does not, $\overline{\Pi}_i$ are profits to provider i when its negotiation fails while j's is successful. Finally, $\underline{\Pi}_i$ are profits to provider i when both negotiations fail. Table 3 summarizes these alternatives.

[table 3 here]

Given that we are assuming away production costs in the provision of health care services, providers' profits are simply the revenues from providing treatment to those patients patronizing the respective facilities.

Surplus obtained by the third-party payer when negotiations are successful with both providers are given by $R - \Pi_A - \Pi_B$. When, say, only provider A reaches an agreement, the revenues to the third-party payer are $R - \widetilde{\Pi}_A - F$. Finally, if no negotiation succeeds, the third-party payer obtains zero revenues (as no insurance is contracted). We now characterize providers' profits.

No successful negotiation

In this case the market game is just a Hotelling price game with fixed locations.

The symmetry of the solution implies equal demand to each provider and prices are, in equilibrium, $p_i = t$, $i = A, B$. Associated equilibrium profits are $\underline{\Pi}_i = t/2$, $i = A, B$.

We use the Nash bargaining solution as equilibrium concept. In our set up, as two negotiation processes are carried out simultaneously, the computation of expectations of the rival's behavior is more involved. In the standard Nash equilibrium approach, the expectation is that the rival's equilibrium price is held constant. However in our framework, since the outcome of the other negotiation depends also on decisions taken by the third-party payer, we require, that expectations in equilibrium be correct. If say, negotiation between the third-party payer and provider A fails, the third-party payer anticipates that its negotiation with provider B will result in a different price. That is, we assume that both parties, provider B and the third-party payer are aware that the negotiation with provider A failed. In other words, we are imposing rational expectations in the sense that price expectations of the parties involved in one negotiation about the outcome of the other negotiation must be equal to the equilibrium outcome. Our approach is in line with the analysis of parallel bargaining of Chae and Heidhues (1999, 2004).

Next, we characterize providers' profits.

One successful negotiation only

First, take the case of only one provider accepting the price determined in the negotiation process.

Assume that provider i accepts the deal while provider j rejects it. The negotiation process between the third-party payer and provider i is described by,

$$\max_{p_i} (R - \widetilde{\Pi}_i - F)^\delta (\widetilde{\Pi}_i - \underline{\Pi}_i)^{1-\delta}.$$

The solution of this problem is given by,

$$
\begin{aligned}
p_i =& \frac{4}{3}\Big(\frac{\delta t}{2} + (1-\delta)(R-F)\Big); \quad & p_j = \frac{t}{2};\\
\widetilde{\Pi}_i =& \frac{\delta t}{2} + (1-\delta)(R-F); & \overline{\Pi}_j = \frac{t}{8}; \text{ and,}\\
\widehat{\Pi} =& \delta\Big(R - F - \frac{t}{2}\Big).
\end{aligned}
$$

The pair (p_i, p_j) will constitute an equilibrium price pair if (i) providers' prices and third-party revenues are non-negative and (ii) provider i does not want to quit the agreement (i.e. $\widetilde{\Pi}_i \geq \underline{\Pi}_i$) and provider j does not want to join it (i.e. $\overline{\Pi}_j \geq \Pi_j$).

Third-party revenues are non-negative iff $R - F \geq t/2$. This condition is also sufficient to ensure that $p_i \geq 0$ and that provider i does not have incentives to leave the agreement. Provider j does not want to join iff $R \leq t/4$.

Note that the latter condition is not compatible with the former, so that we cannot have an equilibrium with only one provider successfully terminating the negotiation with the third-party payer.

Two successful negotiations

We deal now with the conditions that must be satisfied if both negotiations are successful.

Given our assumption of full insurance and the symmetry between providers, an equilibrium with both providers accepting exists when the same price prevails for both. Hence, providers will share the market evenly and their profits will be given by half of the symmetric equilibrium price since total demand is normalized to the unit, $\Pi_i = p_i/2$.

The negotiation with provider i is described by the following problem,

$$
\max_{p_i} \Big[(R - \Pi_i - \Pi_j) - (R - F - \widetilde{\Pi}_j)\Big]^{\delta} (\Pi_i - \overline{\Pi}_i)^{(1-\delta)},
$$

where p_i denotes the fee for provider i. Note that although R cancels from the Nash maximand, the solution still depends on R because R determines the solution when there is only one successful negotiation which is the disagreement point for the bargain with two successful negotiations. And R affects the outcome when there is one successful bargain because it does not form part of the payoff when there is no bargain at all.

The fallback level of the third party payer is defined by the profits it obtains under the agreement with the other provider, net of the penalty associated to a smaller set of providers than the maximum possible, $R - F - \widetilde{\Pi}_j$.

The fallback for provider i is given by the profits available when the rival provider succeeds in its negotiation, $\overline{\Pi}_i$. This are the profits when provider i is out-of-plan, so that those patients patronizing it have to bear the full price of treatment, while its rival is an in-plan provider. This implies that the location of the consumer indifferent between either provider is given by $x(p_i) = \frac{1}{2} - \frac{p_i}{2t}$ and provider i's profits are given by $\overline{\Pi}_i(p_i) = p_i x(p_i)$. Thus, the maximizing price is $p_i = \frac{t}{2}$, and profits $\overline{\Pi}_i = \frac{t}{8}$.

We have now to define the profit value $\widetilde{\Pi}_i$, which are the profits to provider i when its negotiation succeeds, while provider's j negotiation does not succeed. This corresponds to equilibrium values of the previous case.

The first-order conditions of the maximization problems yield,

$$p_i = 2(1-\delta)(F + \widetilde{\Pi} - \frac{1}{2}p_j) + \frac{\delta t}{4}, \quad i, j = A, B;\ i \neq j.$$

Solving the first-order conditions and denoting the fallback value of the third-party payer as $\widetilde{R} \equiv F + \widetilde{\Pi}$, that is, the net payment by the third-party payer when negotiations fail with one provider,[11] we obtain the (symmetric) prices:

$$p^a = \frac{2(1-\delta)}{2-\delta}\widetilde{R} + \frac{\delta t}{4(2-\delta)} > 0.$$

Substituting the expression for $\widetilde{R}$,

$$\widetilde{R} \equiv F + \widetilde{\Pi} = F + \delta\frac{t}{2} + (1-\delta)(R-F)$$

we obtain,

$$p^a = \frac{2(1-\delta)}{2-\delta}\left[\frac{\delta t}{2} + (1-\delta)R + \delta F\right] + \frac{\delta t}{4(2-\delta)}$$

[11] The penalty F for not having one provider plus the payment to the remaining provider.

These (positive) prices are equilibrium prices if two additional consistency conditions are met: (i) no provider wants to leave the agreement and (ii) the third-party payer obtains non-negative revenues. Condition (i) requires $\Pi(p^a) = p^a/2 \geq \overline{\Pi}_i = t/8$. This is satisfied iff $\widetilde{R} > t/4$. Condition (ii) is fulfilled iff $R \geq p^a$.

Table 4 summarizes the results where, as in table 2, the first element in each box refers to provider A, the second to provider B, and in the case of profits, the third item corresponds to the third-party payer profits.

[table 4 here]

We can summarize the discussion in the following way: *It is not possible to find an equilibrium configuration where only one provider reaches an agreement with the third-party payer. Moreover, when $\widetilde{R} \geq t/4$ and $R \geq p^a$, both negotiation processes are successful and the equilibrium price is given by* $p^a = \dfrac{2(1-\delta)}{2-\delta}\widetilde{R} + \dfrac{\delta t}{4(2-\delta)}$.

This result implies that under an explicit bargaining procedure with identical providers it cannot be the case that only one negotiation is successful. Again, in our framework, the symmetry of players does result in a symmetric equilibrium. The disadvantage, in terms of demand, from being left out is greater than the advantage of being a price-setter. Moreover, it is not clear that the equilibrium price is smaller than the one prevailing in the stand-alone market (that is, without insurance to consumers). The condition for a higher price under bargaining relative to the stand-alone case is $\widetilde{R} \geq t/2$, which is compatible with the conditions for existence of a bargaining equilibrium.

It is also a straightforward matter to see that an increase in the bargaining power of the third-party payer (measured by a higher δ) means a lower price, as one intuitively expects. Algebrically, this property is given by

$$\frac{\partial \widehat{p}}{\partial \delta} = -\frac{2(\widetilde{R} - t/4)}{(2-\delta)^2} < 0$$

which follows from the assumptions underlying the result above.

4 The preferred negotiation format

So far we have presented two different approaches to the insurer's problem of selecting providers. In order to have some basis for comparison, we have reduced the analysis to pricing decisions assuming away all other elements that enter both in the negotiations and in the "folder of conditions" of the AWP approach. Such elements include quality standards, time schedules, working conditions, etc. By reducing the analysis to the characterization of equilibrium prices, we are able to compare profits of the different agents in the different scenarios.

Note that the comparison between bargaining and AWP is only relevant for $p \geq 2t/3$ and also for $R \geq \min\{\frac{t}{2} + F, \frac{2t}{3}\}$. As shown previously, values of R above $\frac{t}{2} + F$ ensure non-negative profits to the payer under bargaining and also guarantee participation by the providers; values of R under $2t/3$ would yield negative surplus to the payer under the AWP regime.

From the point of view of the third-party payer,[12] the bargaining procedure is better than "any willing provider" if

$$\widehat{\Pi}_{SB} - \widehat{\Pi}_{AWP} = p - \left(\frac{\delta t}{4(2-\delta)} + \widetilde{R}\frac{2(1-\delta)}{2-\delta}\right) > 0.$$

This condition defines a line, as shown in Figure 2, which allows for a simple description of the basic economic intuition. The intuition runs as follows. If $\widetilde{R}$ is small, there is not much surplus to bargain for. Hence, prices will be below the price required in the "any willing provider" case to generate the acceptance outcome. The reverse occurs for high $\widetilde{R}$. Since the bargaining process transfers surplus, the "any willing provider" contract is equivalent to a "tough" bargaining position. The commitment to a price is more valuable when $\widetilde{R}$ is large.

[Figure 2 about here –]

[12] An alternative approach could be to take the providers' viewpoint. More generally, we could envisage an additional previous stage where providers and the third-party payer decide the negotiation format. Given that providers' revenues equal third-party payer expenses, this yields a battle-of-the-sexes type of situation. Typically, these games have multiplicity of equilibria. In this framework, our approach boils down to using the third-party payer viewpoint as an equilibrium selection mechanism. We find this more reasonable than the alternative approach because under AWP the third-party payer is the agent taking that makes the commitment.

Another property, resulting directly from the bargaining equilibrium, is that an increase in the bargaining power of the third-party payer leads to a larger region of dominance of bargaining as the preferred procedure. This follows immediately from the price of the bargaining equilibrium being negatively associated with third-party payer's bargaining power.

A comment is in order here. We have seen that under bargaining given the symmetry of the model both providers accept the same price. Why is it the case that under AWP announcing that price is not an equilibrium? Actually, under AWP we found that for any $p \geq t/4$ both providers join. Also, we have shown that there are two equilibria: where both providers join and where no provider joins. Artificially, (since the Pareto criterion does not select among the two equilibria) we are forcing $p > 2t/3$ to eliminate the equilibrium where no provider joins as it cannot be an equilibrium of the full three-stage game. In other words, we are imposing a conservative behavior on the third-party payer in the sense that we are not allowing it to announce a price $p \in (t/4, 2t/3)$ so that no provider would decide to accept.

In our two-provider world, it is never the case that one provider decides to join negotiations with the third-party payer, while the other provider remains outside any agreement. One may question whether this result is robust to the number of providers. We consider a natural extension of our two-provider model: assume that there are n providers in the market, each pair of providers is connected by a segment of length one of consumers. This means that now total market size is $n(n-1)/2$, and every provider competes with every other one. We are able to show that in equilibrium, there is no subset of providers which chooses to remain independent. By independent we mean providers that do not negotiate prices with the third-party payer. The intuition behind this outcome goes as follows: an increase in the total number of providers makes it less likely that any willing provider contracts will dominate. This is so because the equilibrium price under bargaining will be lower the higher the number of providers, while the optimal price under the any willing provider procedure is insensitive to the number of providers[13].

5 Final remarks

In this paper, we address a simple question: what negotiation procedure should a third-party payer select when contracting with health care providers? Two commonly observed alternatives have been considered: bargaining and "any willing provider" contracts.

The main finding of the analysis is that whenever the surplus to be shared in the bargaining is relatively high, the third-party payer prefers the "any willing provider" system. This is so because the simple price announcement constitutes an implicit commitment to be tough. This commitment is more valuable in the case of a bigger surplus.

Our analysis shows that finding voluntary use of "any willing provider" clauses in some circumstances but not in others is consistent with economic theory when a bargaining alternative is available. This can also be related to the mandatory use of "AWP" laws in some US states, while firms/managed care/ health plans may use it in other states, or opt for bargaining procedures.

Although most of the analysis has been done considering two providers only, we can extend the same arguments to an arbitrary number of providers. Moreover, under the symmetry assumptions used, the possible equilibria with an arbitrary number of providers are characterized by either all providers joining the agreement with the third-party payer, or none accepting its proposal.

Some caveats to the model deserve discussion.

First, the model assumes a profit maximising third party payer so that the effect of the method of selecting the providers on the utility of patients is ignored. Even though all patients always consume care under the various solutions, they are affected. Some will pay a positive price for care when choosing a provider outside the plan and some will chose different providers under different solutions.

[13] An appendix available at http://ppbarros.fe.unl/papers.html, shows that there is no subset of providers which choose, in equilibrium, not to negotiate prices with the third-party payer.

Second, the model does not tackle the issue of the insurance market. Instead we take the perspective of a third-party payer that, at the beginning of its activity, has a set of providers to choose among. We focus the attention in how this third-party payer determines the price at which to reimburse the health care services offered to patients insured with the company.

Third, we assume symmetry across providers. We conjecture that introducing asymmetries across providers, be it in the bargaining power vis-a-vis the third-party payer, or in the production costs of health care services, will not change the qualitative results, especially if price discrimination by the third-party payer across providers is not feasible. This seems to be, in general, the case. Payments to providers can differ according to patient characteristics but not according to providers' efficiency level. Of course, some exceptions exist (for example, high reputation doctors may be able to obtain a better value for consultation). We conjecture that the introduction of asymmetries would allow us to obtain equilibria characterized by some providers being associated with the third-party payer, while others remain independent. Once again, we believe the relative advantages and costs of the different bargaining procedures to still be present.

The last issue is quality. We have assumed away quality considerations. Thus, our analysis applies to the provision of services where quality can be easily monitored, or does not have a major impact on patients' selection of provider. Again, we conjecture that the essential trade-off in choosing between "any willing provider" contracts or an explicit bargaining procedure would remain. It would not change our insight related to the incentives of the third-party payer to choose one of the bargaining procedures proposed. This is left for future research.

The analysis leads to some testable predictions. The simplest one is that, whenever a high surplus to be shared exists, one should more frequently observe "any willing provider" contracts. Another one is that the number of providers should not have an impact on the selection of the bargaining procedure as long as the surplus per patient treated is kept constant. If the per capita surplus grows (decreases) with the number of providers in the market, then one should observe "any willing provider" more (less) often. These predictions have not been addressed in the empirical literature.[14] It is beyond the scope of the paper to empirically test these implications. The empirical testing of the model is left for future research.

[14] It should be pointed out that testing the implications of our simplified model with data coming from a world full of asymmetries in many dimensions and multiple players may be very involved.

Acknowledgements

We thank for comments and suggestions Gary Biglaiser, Paul Heidues, Clara Ponsati, Tommaso Valetti and two anonymous referees. Financial support of Fundación BBVA, the Barcelona Economics Program of CREA and projects 2005SGR-00836, SEJ2006-00538-ECON, and Consolider-Ingenio 2010 (Xavier Martinez-Giralt) and POCTI/EGE/58934/2004 (Pedro Pita Barros) is gratefully acknowledged. The usual disclaimer applies.

Appendix: computation of AWP equilibrium profits

(i) Both A and B accept the contract.

This case means that both firms face the same price p. Accordingly, from the consumers' viewpoint, their decision as to what provider to patronize hinges on minimizing the transport cost (or equivalently, the utility loss). Given the uniform distribution of patients, this yields demands of half of the market for each provider. As we assume away production costs, profits coincide with revenues. Therefore, each provider obtains profits $\Pi_A = \Pi_B = p/2$. In turn, the third-party payer obtains revenues equal to the premia collected net of the payments to the providers, that is $\widehat{\Pi} = R - p$.

(ii) Neither A nor B accept the contract.

This case corresponds to a situation without insurance. Both providers compete in the market for patients. Given the uniform distribution of patients, and given prices p_A and p_B, there will be one patient (and only one) indifferent between patronizing either provider. This is defined by the patient obtaining the same utility regardless of the provider visited. In other words, as the patient x satisfying $U(x, A) = U(x, B)$ where,

$$U(x, A) = Y - p_A - tx, \qquad \text{and} \qquad U(x, B) = Y - p_B - t(1 - x).$$

Therefore,

$$x(p_A, p_B) = \frac{1}{2} + \frac{p_B - p_A}{2t}$$

Profits are defined by

$$\Pi_A(p_A, p_B) = x(p_A, p_B)p_A, \qquad \text{and} \qquad \Pi_B(p_A, p_B) = [1 - x(p_A, p_B)]p_B$$

Solving the first order condition of the respective maximization problems, we obtain $p_A = p_B = t$, inducing $x = 1/2$ and $\Pi_A = \Pi_B = t/2$. Naturally the third-party payer obtains null profits.

(iii) Provider i rejects the contract, while provider j accepts it.

In this case, those patients patronizing provider j do not pay for the treatment as they as fully covered by the insurance. However, patients visited by provider i bear the full cost of the treatment. Hence, utility derived by a patient x addressing either provider is given by

$$U(x, i) = Y - p_i - tx, \qquad \text{and} \qquad U(x, j) = Y - t(1 - x).$$

Therefore, the indifferent consumer is given by,

$$x = \frac{1}{2} - \frac{p_i}{2t}.$$

As before, provider's profits are

$$\Pi_i(p_i) = x(p_i)p_i, \qquad \text{and} \qquad \Pi_j = [1 - x(p_i)]p_j.$$

Provider i's maximizing price, after solving for the first order condition, is $p_i = t/2$. Accordingly, its demand is $x(t/2) = 1/4$, and its profits $\Pi_i = t/8$. Then, $\Pi_j = 3p_j/4$. Third-party payer profits are $\widehat{\Pi} = R - F - 3p_j/4$.

References

Barros, P.P., Martinez-Giralt, X., 2005. Negotiation advantages of professional associations in health care. International Journal of Health Care Finance and Economics 5, 191–204.

Barros, P.P., Martinez-Giralt, X., 2006. Models of negotiation and bargaining in health care. In: Jones, A.M. (Ed.), Elgar Companion to Health Economics, Edward Elgar, London, pp. 233–241.

Binmore, K.G., Osborne, M.J., Rubinstein, A., 1992. Non-cooperative models of bargaining. In: Aumann, R.J., Hart, S. (Eds.), Handbook of Game Theory with Economic Applications, North-Holland, Amsterdam, pp. 179–225.

Brooks, J.M., Dor, A., Wong, H.S., 1997. Hospital-third-party payer bargaining: An empirical investigation of appendectomy pricing. Journal of Health Economics 16, 417–434.

Carroll, A., Ambrose, J., 2002. Any Willing Provider laws: Their financial effect on HMOs. Journal of Health Politics, Policy and Law 27, 927–945.

Chae, S., Heidhues, P., 2004. A group bargaining solution. Mathematical Social Sciences 48, 37–53.

Chae, S., Heidhues, P., 1999. Bargaining power of a coalition in parallel bargaining: Advantage of multiple cable system operators. Mimeo, Department of Economics, Rice University.

Charatan, F., 2000. US doctors win first round in battle for right to negotiate with HMOs. British Medical Journal, News extra 321: 72 (8 July). (BMJ.com 321 (7253):72i).

Davidson, C., 1988. Multiunit bargaining in oligopolistic industries. Journal of Labor Economics 6, 397–422.

Docteur, E., Oxley, H., 2003. Health care systems: Lessons from reform experience. OECD health working papers, DELSA/ELSA/WD/HEA(2003)9.

Eeckhoudt, L., Kimball, M., 1992. Background risk, prudence and the demand for insurance. In: Dionne, G. (Ed.), Contributions to Insurance Economics, Huebner International Series on Risk, Insurance and Economic Security, Kluwer Academic, London, pp. 239–254.

Figueras, J., Robinson, R., Jakubowski, J. (Eds.), 2005. Purchasing to Improve Health Systems Performance, European Observatory on Health Systems and Policies Series, Open University Press.

Frech, H.E. III, 1991. Regulating Doctors' Fees: Competition, Benefits and Controls under Medicare. AEI Press, Washington DC.

Gal-Or, E., 1997. Exclusionary equilibria in health-care markets. Journal of Economics & Management Strategy 6, 5–43.

Gal-Or, E., 1999. The profitability of vertical mergers between hospitals and physician practices. Journal of Health Economics 18, 623–654.

Glazer, J., McGuire, T.G., 1993. Should physicians be permitted to 'balance bill' patients?. Journal of Health Economics 11, 239–258.

Glazer, J., McGuire, T.G., 2002. Multiple payers, commonality and free-riding in health care: Medicare and private payers. Journal of Health Economics 21, 1049–1069.

Hixson, J.S., 1991. Maintaining market discipline: A commentary. In: H.E. Frech III (Ed.), Regulating Doctors' Fees: Competition, Benefits and Controls under Medicare, AEI Press, Washington DC, pp. 170–173.

Jofre-Bonet, M. 2000. Health Care: Private and/or public provision. European Journal of Political Economy 16, 469–489.

Morrisey, L., Ohsfeldt, R.L., 2004. Do "Any Willing Provider" and "Freedom to Choose" laws affect HMO market share?. Inquiry 40, 362–374.

Ohsfeldt, R.L., Morrisey, M.A., Nelson, L., Johnson, V., 1998. The spread of state any willing provider laws. Health Services Research 33(5 Pt 2), 1537–1562.

Osborne, M.J., Rubinstein, A. 1990. Bargaining and Markets. Academic Press, San Diego.

Roth, A.E., 1985. Game-Theoretic Models of Bargaining, Cambridge University Press, Cambridge (Mass.).

Simon, C.J., 1995. Economic implications of "Any Willing Provider" legislation. Mimeo, University of Illinois-Chicago.

Sutton, J., 1986. Non-cooperative bargaining theory: An introduction. Review of Economic Studies 53, 709–724.

Vita, M.G., 2001. Regulatory restrictions on selective contracting: An empirical analysis of "Any Willing Provider" regulations. Journal of Health Economics 20, 955–966.

Zuckerman, S., Holahan, J., 1991, The role of balance billing in Medicare physician payment reform. In: H.E. Frech III (Ed.), Regulating Doctors' Fees: Competition, Benefits and Controls under Medicare, AEI Press, Washington DC, pp. 143–169.

Table 1: AWP providers' equilibrium profits.

A/B	Join	Not Join
Join	p/2 ; p/2	3p/4 ; t/8
Not Join	t/8 ; 3p/4	t/2 ; t/2

Table 2: AWP equilibrium magnitudes.

	A,B in	A in, B out	A,B out
Prices (p_A, p_B)	t/4, t/4	t/4, t/2	t,t
Demands (D_A, D_B)	1/2, 1/2	3/4, 1/4	1/2,1/2
Profits $(\Pi_A, \Pi_B, \widehat{\Pi})$	t/8,t/8,R-t/4	3t/16,t/8,R-F-3t/16	t/2,t/2, 0

Table 3: Providers' profits alternatives.

$i \diagdown j$	Success	Fail
Success	Π_i, Π_j	$\widetilde{\Pi}_i, \overline{\Pi}_j$
Fail	$\overline{\Pi}_i, \widetilde{\Pi}_j$	$\underline{\Pi}_i, \underline{\Pi}_j$

Table 4: Bargaining equilibrium magnitudes.

	A,B success	A success, B fail	A,B fail
Prices	p^a, p^a	$\frac{4}{3}\left(\frac{\delta}{t} + (1-\delta)(R-F)\right), t/2$	t, t
Demand	$1/2, 1/2$	3/4, 1/4	$1/2, 1/2$
Profits	$p^a/2, p^a/2, R - p^a$	$\frac{\delta}{t} + (1-\delta)(R-F), \frac{t}{8}, \delta(R - F - \frac{t}{2})$	$t/2, t/2, 0$

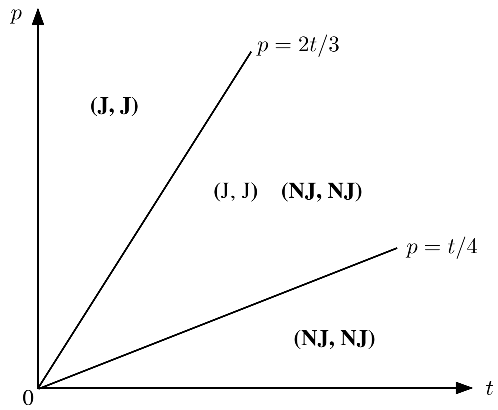

Figure 1: AWP equilibrium regimes.

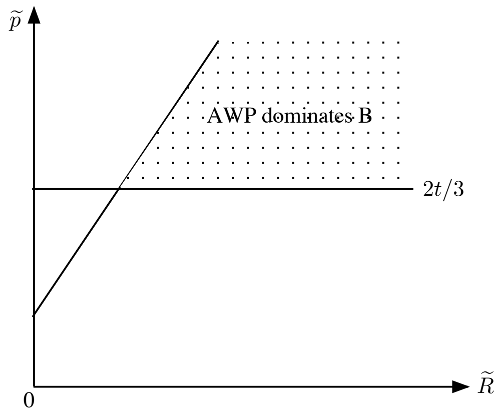

Figure 2: Optimal negotiation procedure.