Market imperfection and health insurance contract compliance: incentive mechanisms

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Abstract

This paper analyzes the contractual mechanisms in health insurance in the presence of an opportunistic insurer. This work focuses on modeling the opportunistic behavior of the insurer in a deferred settlement insurer-policyholder relationship model, followed by the value of the contractual relationship in a 2 to N agent model. This modeling is based on the model of Greif, (2003) and Fafchamps, (2004) in the context of the customer-supplier relationship. In this model, we deal with moral hazard in the insurer-insured relationship. Under the assumption that policyholders respect the terms of the contract and that there are two types of insurers, we obtain the following results: (1) for the contractual relationship to continue to exist, the penalties must be high enough to dissuade opportunistic behavior, but not so high as to scare away potential insurers. Penalties must also be effective enough to be a deterrent. (2) for a discount rate close to one and a positive profit margin, the fear of losing a relationship can by itself ensure that contractual commitments are respected and the insured-insurer relationship maintained. This result can be extended to a model with N agents. These results assume the existence of a relevant judicial mechanism.

Keywords: health insurance contract, incentive mechanism, opportunistic behavior, market imperfection.
J.E.L : C02, D15, D81, D86, I13

1. Introduction

Contracts generally involve an implicit commitment to trust (good faith) and fairness. The contractual relationship is considered problematic because agents are likely to engage in opportunistic behavior in a world where, due to the limited rationality of economic agents, contracts are necessarily incomplete (Jost, 2004 ; Williamson O. E., 2008 ; Williamson, 1971; Macneil, 1978). Opportunism is defined as the pursuit of self-interest through cunning and cheating (Williamson, 1975). It is considered the equivalent of bad faith and the opposite of trust (Boukouyen & al, 2020 ; Elsharnouby

& Parsons, 2013).

Opportunistic behavior is a key concept in neo-institutional theory that refers to the description of human behavior. Its essence is the aspiration of an individual to achieve his own selfish interests, accompanied by cunning and deception. It is not limited to moral reasons and conflicting interests of other agents. It is based on information asymmetry and ambiguity. Bounded rationality places opportunistic behavior at the root of the coordination problem. In a contractual relationship, due to informational asymmetry, the partner may not know all the circumstances and intentions of the other partner on the eve of signing the contract and also all the details of the partner's behavior once the contract is concluded.

Opportunism allows us to understand the use of asymmetrical information to the benefit and detriment of the interests of the contractors. Certain behaviors qualified as opportunism are identified as cheating (or fraud), lying and distortion of information (Wathne & Heide, 2000). Two types of opportunistic behavior are also identified: ex-ante opportunism and ex-post opportunism. Ex-ante opportunism occurs before or during contract negotiation. In this case, one of the contractors takes advantage of the asymmetry of information to disseminate false information or omit to transmit data that is important for the conclusion of the contract. This form of opportunism is referred to as adverse selection (Devos & al, 2012 ; Akerlof, 2003 ; Akerlof, 1970). As for ex post opportunism, it occurs during the execution of the contract, that is, once the contract between actors is established, this form of opportunism corresponds to the moral hazard situation (Devos & al, 2012 ; Akerlof, 2003 ; Akerlof, 1970 ; Arrow, 1970 ; Pauly, 1974 ; Helpman & Laffont, 1975 ; Marshall, 1976). In both cases, opportunism is considered a strategic behavior that relies on various fraudulent maneuvers in order to obtain a particular gain (Williamson, 1975).

The problem of opportunism between principal and agent has been studied by many authors, such as Hodgson, (2004) ; Hendry, (2002) ; Helper & Susan, (2000) ; Hodgson, (1998) ; Coase, (1988) ; Jensen & Meckling, (1976) ; Stephen, (1996) ; Williamson E. , (2000).

Opportunistic behavior generates three extremely important consequences for the understanding of the behavior of economic agents : first, the generality of contractual relationships means that the problem of opportunism penetrates all forms of interaction between economic agents. Moreover, opportunism generates enormous costs (transaction costs) in protecting against this type of behavior. And finally, the protection of the individual against opportunism is rather difficult and entails enormous expenses.

The ex-post opportunism that is the subject of study in this article manifests itself through the concept of moral hazard, which leads to a focus on strategic behavior that results from the unobservability of certain actions and which translates into non-compliance with commitments.

The failure of a party to betray the trust placed in it may therefore give rise to an action for breach of contract, regardless of the express terms of the contract. A breach of trust can be a source of conflict.

According to the neoclassical axiom, each rational individual seeks his or her own personal interest. This pursuit of self-interest may lead the individual to fail to respect or honor his or her contractual commitments, or to cheat. For example, intentionally rational individuals would rather cheat than fulfill a commitment that is unfavorable to them or against their interest. They may also take advantage of the freedom they are contractually granted to manage their principal's affairs in a way

that is unfavorable to the principal. This is all the more likely if they are acting as an agent, since they are supposed to have more skills or information than the insured. Opportunism can therefore be interpreted as a private manipulation of information in order to favour one's own interest.

The existence of informational asymmetry between the principal and the agent, i.e. one of the two agents has more or less information than the other about the states of nature. Information asymmetry refers to the axiomatics of perfect information. As soon as information is not perfect, the allocative efficiency of the market is called into question and transactions become costly, because the opportunism of agents generates uncertainty about the real situation. Information asymmetry is at the root of opportunistic behavior.

In this context of imperfect information, the theory of contracts focuses on the following question: how to construct an incentive mechanism that prevents the insurer from behaving in a way that is likely to harm the interests of the insured, or to be more precise, that leads the insurer to behave as if he were trying to maximize the insured's utility function?

In view of all the above, we ask ourselves the question: how can the insurer-policyholder relationship be promoted in a health insurance contract when the insurer is tempted in the short term to cheat?

The objective of this paper is to analyze a contractual mechanism in health insurance in the presence of an opportunistic insurer.

We postulate that, in order to guarantee the insurer-insured contractual relationship, the penalties for the insurer must be high enough to dissuade opportunistic behavior, without being too high so as not to scare away potential insurers. In addition, the fear of losing a contractual relationship with a potential insured appears to be an effective mechanism for enforcing health insurance contracts against an insurer that is tempted in the short term to cheat.

Insurance regulators have long been aware of the information problems that exist in the contractual relationship. Left to their own devices, ordinary consumers may know very little about the insurance they buy or the companies that provide that insurance; and once they have purchased insurance, they are vulnerable to insurer opportunism (or bad faith) because they cannot observe, for example, whether an insurer is providing satisfactory health risk treatment service (Sulzle & Wambach, 2005). These information problems are less likely to be solved by private contracts than those faced by insurers, and thus provide a broader justification for insurance regulation. Brokers could in theory solve some of these problems commonly found in insurance markets. But brokers create problems of their own and, in any case, are generally not available for small-scale transactions.

Insurance companies have private information about many things that affect the value of their products: for example, their creditworthiness (a promise to pay isn't worth much if the company can't pay), the meaning of the terms of their contracts, and their approach to investigating and reimbursing health care expenses or coverage.

Calling this information private does not mean that it is completely unobservable. For example, the written terms of an insurance contract appear in the insurance policy form (assuming the insurance company is willing to provide the policy in advance, which is not always the case in practice) (Schwarcz, 2011). But it is so time-consuming and costly to evaluate the terms of the contract or, indeed, most other observable aspects of quality, that no individual or firm will rationally make the effort (Harel & Procaccia., 2009). Other aspects of quality, such as past health risk management practices or

current financial strength, might be observable in theory, but such observation would require disclosure of information that the insurer prefers to keep private and that can only be interpreted in relation to information about other insurers (which poses a collective action problem, a classic justification for regulation). Other aspects of the quality of insurance products are completely unobservable to anyone at the time of purchase, because they depend on what happens in the future. Insurance is basically a promise to pay money in the future, sometimes far into the future. No one can observe today the financial strength and risk payment or underwriting practices of an insurance company in the future.

This private information creates the potential for adverse (reverse) selection, the risk that bad insurance contracts will drive out good ones, and (reverse) moral hazard, the risk that insurance companies will change their financial position and loss (expense) payment or assumption practices to the detriment of existing policyholders (Beal, 2001).

The remainder of this paper is divided into three sections, listed as follows: contract compliance mechanisms (section 1), then modeling the behavior of economic agents (section 2), and finally (section 3) the conclusion.

2. Contract compliance mechanisms

Several mechanisms have been identified in the economic literature to ensure contract compliance (Greif, 1993 ; Platteau J. P., 1994 ; Fachamps, 1996).

The first of these mechanisms is based on emotions, such as guilt or shame. The feeling of guilt is a negative emotion by which an individual punishes himself for having violated a moral obligation. As Platteau J. P., (1994) explains very well in his article dedicated to market institutions, guilt is something that is shaped in the early years of life. Some individuals who were abused as children are unable to feel guilt. Not only the ability to feel guilt, but also the object of guilt is shaped by the early environment: some children are taught not to steal, others not to break gang rules. The moral development of individuals is also affected by their ideological and religious environment, which reinforces guilt for some offenses, but may also reduce it for others. Inter-ethnic or inter-class hatred, for example, may eliminate guilt for transgressions affecting members of another group. In his work on Kenya, Ensminger, (1992) describes how Islam spread in East Africa along trade routes because Muslim traders along the coast preferred to deal with other Muslims, presumably because they shared a common ethical code of compliance. Shame is another emotion that can also be mobilized for contract compliance (Barr, 2002a). In contrast to guilt, which is purely individual, shame involves judgment by others, whether real or merely anticipated. Like guilt, it can be manipulated and reinforced through various group practices. The difference is that the activation of shame requires a mechanism for the circulation of information about the wrongdoing. If this information is kept confidential, the fear of being laughed at by group members is minimal. The effectiveness of shaming as a contract compliance mechanism thus depends on the existence of a reliable system of information flow within the group. Compliance with contracts can also be ensured by the fear of prosecution in the courts. But for the courts to enforce contracts, the threat of legal action must be credible. In sub-Saharan Africa, this is rarely the case for three main reasons. First, the amount of damage suffered must be large enough to justify the expense, emotional investment, and time spent on a lawsuit. For most transactions that individuals face in their daily lives,

the amount at stake does not justify a rational recourse to justice. Take the example of buying a dairy product online, if after delivery and consumption, the product is found to be defective (or bad), it would not be rational to sue the deliverer, because the damage suffered is far less than the cost of litigation. Recourse to the courts is only credible for transactions of sufficient importance, such as the purchase of a house or the payment of a severance package. In African countries, the vast majority of commercial transactions are for very small amounts and for this reason alone are difficult to enforce through the courts. Even when the amount is large enough to warrant a lawsuit, the defendant must have sufficient assets to pay damages. If the defendant has nothing that cannot be seized, there is no point in suing. In poor countries, the vast majority of people have little property that is very difficult if not impossible to seize unless debt bondage is reintroduced (Srinivasan, 1989 ; Genicot, 2002), which no one suggests. In Sub-Saharan Africa, these problems common to all poor countries are compounded by an often ambiguous land law system (Adhola & al, 1991 ; Platteau, 2000). As a result, it is rarely possible for a creditor to seize the land assets of a delinquent debtor. Recourse to the courts requires that evidence can be provided, such as invoices, cash vouchers, etc. Given that a large proportion of the African population is illiterate, written evidence is rare and difficult to provide for the majority of people. All these elements combine to undermine the effectiveness of justice in protecting contracts. In the absence of an effective legal system, the role of the enforcers is to enforce contracts within the business community. It is true that the fear of violence or other illegal sanctions may discourage non-compliance with contracts. This is probably one reason why violence plays a diffuse role in various illegal businesses, such as the drug trade, prostitution, gambling, etc. Apart from violence, there are two other mechanisms of contract enforcement. The first is the fear of losing a business relationship, the second is the fear of losing one's business reputation and thus losing opportunities to trade with a business community. We briefly discuss these two mechanisms. Many manufacturers of manufactured goods are afraid of losing their source of inputs if they do not pay their suppliers (Lorenz, 1988). This argument can easily be formalized as a repeated game between customer and supplier (Kranton, 1996 ; Fachamps M., 2002). For the fear of losing a business relationship to be sufficient to enforce a contract, two conditions must be met: the debtor must be sufficiently patient and the business relationship must be difficult to replace In Sub-Saharan Africa, many potential debtors have few assets to cushion the shocks of everyday life (Fachamps, 2003). They frequently encounter financial and other difficulties that prevent them from meeting their contractual obligations. In terms of repeated gambling, they become impatient from time to time: in the event of a shock, money today is much more valuable than the prospect of losing future income. In this context, it is illusory to insist on compliance with contracts under all circumstances. We often speak of force majeure. However, not all debtors are alike; some are more financially vulnerable than others, and therefore represent different risks of non-compliance. The future value of a business relationship depends on how easily it can be replaced (Shapiro & Stiglitz, 1984 ; Ghosh & Ray, 1996). If a customer can immediately find an equivalent supplier, the loss of a supplier does not cause very serious damage. If, on the other hand, the supplier has a monopoly on an indispensable input, the loss of the supplier's confidence would cause irreparable

damage. In African economies, the number of large firms is generally very small. This often leads to quasi-monopoly situations on certain inputs. It is therefore reasonable to assume that the fear of losing a business relationship is likely to play a role in contract compliance. The fear of losing business reputation can also be formalized as a repeated game (Kandori, 1992 ; Greif, 1993 ; Fafchamps, 2002). The only difference is that loss of reputation results not only in a cessation of business with the person whose contract has been breached, but also with other potential buyers and sellers. Loss of reputation therefore affects the ease with which a business relationship can be replaced. Ultimately, if the loss of reputation is universal, any future exchange becomes impossible.

3. Formalization of the agency (or contractual) relationship problem

Two parties (insurer and individual) engage in a contractual relationship requiring the assumption of responsibility for an insured individual, against the risk of illness, according to the following steps: At date 0, the parties sign a contract and the insured pays the insurance premium knowing that, in order to improve the surplus of their exchange, the insured must invest in preventive efforts ex-ante and ex-post the realization of the disease risk at date 1, and the insurer must also be able to honor its commitments after the realization of the disease risk at date 2. It is admitted that the insurer does not observe the effort, but the result linked to the effort. It is assumed that the information between the parties is symmetric. Under the standard rationality assumption, this means that the different possible situations are common knowledge between the parties, and that each party perfectly observes the effort decisions made by the other. The optimal complete contract in this framework stipulates that each party i (i = 1, 2) undertakes to respect the clauses of the contract, for example for the insured by paying the premium and to make preventive efforts, failing which he will not be reimbursed for his health expenses in the event of illness by the other party (the insurer). For the insurer to take care of the insured. The difference between the insurance premium paid by the insured and the amount of the insurer's assumption of responsibility maximizes the total surplus of the relationship. The contract may also include a monetary transfer between the parties to distribute the gains of the relationship (If the relationship between the parties is only about the exchange of a good C for the payment of a premium P, then the optimal complete contract states that each party i (i = 1, 2) agrees to invest in the production of the contract C the amount B at date 0 and to exchange the amount α at date 2 for the payment of P or else lose the relationship). However, Grossman & Hart, (1986) make the assumption that unobservable or non-contractualizable variables are complex and too costly to describe clearly in the initial contract, making them unverifiable by the court. The optimal full contract as just defined cannot therefore be enforceable in such a setting since it is contingent on these various variables that are not, by assumption, verifiable by a third party. It is this hypothesis that leads the authors to qualify as incomplete the contract signed at date 0 by the parties.

The following section is devoted to modeling the contractual relationship between insurer and insured. Contrary to the previous section and for reasons of simplification of the modeling, we will stop at two periods or dates.

3.1.1 Model: insurer-policyholder relationship (deferred settlement)

Suppose a health insurance contract in which an insurer promises an individual to pay a premium P at time t_0 in exchange for coverage α at time t_1.

The breach of contract is equal to the non-payment of the premium, or noncompliance with the commitments made by the insurer to the insured, or both, i.e., the insurer's noncompliance with the commitment, leads the insured not to pay the next period's insurance premium.

At time t_1, the insurer decides whether to honor the contract or not.

The marginal utility of the premium P may vary across individuals.

Let π(P) be the cost, or loss of utility to the individual of paying P and $\pi(\alpha)$ the gain or utility associated with the health insurance product through coverage α, it constitutes both a gain to the insured and a cost to the insurer.

The cost of complying with the contract can vary according to exogenous shocks.

If the insurer, does not pay α, he keeps the premium P, but incurs four kinds of penalties (sanctions):

- Guilt, the cost of which for the insurer is noted G.
- Various forms of informal coercive actions (harassment, threats) as well as formal ones (legal action) whose cost is noted K(C), with C, the form of the contract (more or less formal).
- Two types of sanctions based on the repetition of interactions :

The cessation of future exchanges with the insurer leading to the loss EV and the negative impact on the reputation of the insurer with other potential insureds (or individuals) which results in the loss EW.

A rational insurer fulfills or honors its contract if :

The cost of enforcing or complying with the contract is less than the cost of any penalties associated with not complying with the insurance contract :

$$\pi(\alpha) \leq G + K(C) + EV + EW \qquad (1.1)$$

With :

$\pi(\alpha)$: Gain from the contract (utility associated with the insurance product) for the insured or individual.

$\pi(P)\ \Pr(payment)$: Expected cost from the payment of the premium, if any

$(G + K(C) + EV + EW)(1 - \Pr(payment))$: Expected cost of penalties if he decides not to pay.

Ex-ante incentive for the insurer

At t_0 the insurer separates from contract C in exchange for a premium P and a future assumption of α. $T(\alpha)$ and $T(P)$ are values of α and P for the insurer, respectively.

$P(C) = T(P) < T(\alpha)$

A rational insurer evaluates his chances of being able to honor his commitments (respect the contract) (i.e., the probability that equation (1.1) is satisfied). He enters into the transaction or contract if the expected settlement is less than what is given :
$T(\alpha)\Pr(payment) \leq T(P)$
$T(\alpha)\Pr(T(\alpha) \leq G + K(C) + EV + EW) \leq T(P)$ (1.3)
With :
$T(\alpha)\Pr(T(\alpha) \leq G + K(C) + EV + EW)$: Early settlement (probability of payment function).
$T(P)$: The value of the contract
The state or the regulator can also influence the probability of settlement of the insurer or of compliance with the terms of the contract:
by influencing the form of the contract C (and thus the value of the penalty K):
Contract C_n can take N forms, each with a cost B_n to the insurer.
Lead the insurer to propose the form of the insurance contract such that the value of the transaction, net of transaction costs, is maximal.

$$\boldsymbol{Max}\ [T(P) + B_n - T(\alpha)\Pr(reglement \setminus C_n)]$$

Let be:
$T(\alpha)\Pr(payment \setminus C_n)$: anticipated cost to the insurer (a function of the probability of payment that depends on the form of the contract).
$T(P)$: cost of assumption.
B_n : transaction costs / contract development.
Equations (1.2) and (1.3) highlight the tension inherent in any contract.
If the penalties are too low, the insurer will not respect the terms of the contract that he himself offers at price P, because the penalties incurred are almost zero and consequently he will not pay the indemnities. Since the probability of payment is zero, a rational individual will refuse to enter into a transaction with the insurer.
Conversely, if the penalties are too high (in the insured's interest), or even higher than any conceivable gain for the insurer, then the possibility, however small, of having to face these penalties may dissuade the insurer from not respecting the terms of the contract he is proposing.
Partial Conclusion 1:
The existence of tension inherent in any contract: for the exchange to take place, penalties must be high enough to deter opportunistic behavior, but not so high as to scare off potential buyers. Penalties must also be sufficiently effective to be a deterrent. This assumes the existence of a relevant judicial mechanism in our states (amount of transactions involved / cost of litigation.
The next section extends the study to the value of the insurer-policyholder contractual relationship.

3.1.2 Value of an insurer-policyholder relationship: 2 and N agent models

This section analyzes the importance of the value of an insurer-insured relationship in the face of opportunistic behavior by the insurer. This section is divided into two parts: the first part deals with a two-agent model (insurer and insured). If the insurer does not respect its commitments, the relationship is broken. The second part extends the analysis to a model with N agents (several insurers facing several individuals wishing to be insured). In the event of a breach of contract with an insured (or a customer), the insurer starts looking for a new customer. The individuals do not have the possibility to observe the type (good or bad) of the insurer beforehand.

3.1.2.1 Two agent model

An insurer and insured have a long-term relationship. In each period (the year), the insured pays the insurance premium and receives a benefit from the insurer in case of illness.

If the insurer meets or honors its commitments, its instantaneous payoff is the amount of the premium normalized to 1 minus the amount of the assumption α : $1-\alpha$.

If the insurer does not honor its commitments to the insured its gain is the amount of the premium P, normalized to 1.

The discount rate for the insurer's gain is :

$\beta = \frac{1}{1-\delta} < 1$; Or δ is the periodic rate at which the insurer depreciates the future. The higher δ is, the more impatient the insurer is and β is close to 0.

3.1.2.1.1 Principle of the game

If the insurer respects the terms of the contract, the relationship with the insured continues. If the insurer does not respect the terms of the contract, the insured stops all exchanges with the insurer forever.

The value of the insurer's relationship with the insured:

If the insurer does not pay, it saves 1 for that period, but the insured will refuse any future transactions so it also bears the present value 1-α for future or future periods.

$$\sum_{t=1}^{\alpha} \beta^t (1-\alpha) = \beta(1-\alpha) + \beta^2(1-\alpha) + \beta^3(1-\alpha) + \cdots + \beta^{t+1}(1-\alpha)$$

$$= \beta(1-\alpha)(1+\beta+\beta^2+\cdots+\beta^t)$$

We obtain a geometric sequence of first term 1 and reason β $(\beta < 1)$ whose sum at infinity converges to $\frac{1}{1-\beta}$.

$$\sum_{t=1}^{\alpha} \beta^t (1-\alpha) = \frac{\beta(1-\alpha)}{1-\beta}$$

3.1.2.1.2 Insurer's decision criteria

The insurer will choose not to cheat if the gain from opportunistic behavior is less than the gain from complying with the contract :

$$1 + \beta.0 \leq 1 - \alpha + \frac{\beta(1-\alpha)}{1-\beta} \quad (1.4)$$

With:

1: The insurer's immediate gain when cheating, equal to the insurance premium

β.0: No future gain to the insurer if it cheats

1-α: Immediate gain if the insurer honors its commitments

$\frac{\beta(1-\alpha)}{1-\beta}$: insurer's future gains if commitment honored.

From (1.4) we have :

$$\alpha \leq \frac{\beta(1-\alpha)}{1-\beta} \quad (1.5)$$

The inequality (1.5) called the no-cheating constraint is a strong incentive to comply with the insurance contract.

$\frac{\beta(1-\alpha)}{1-\beta}$: Representing the profit margin is positive.

Let us rewrite (1.5) :

From the instantaneous present gain to cheat and the long-run loss from the disappearance of the insurer's relationship with the insured.

$$T(\alpha) = \alpha \leq \frac{\beta(1-\alpha)}{1-\beta} = EV \quad (1.6)$$

$\frac{\beta(1-\alpha)}{1-\beta}$: insurer's future gain if commitments honored or contract fulfilled.

EV: future monetary value of the contractual relationship.

$T(\alpha) = \alpha$: insurer's immediate gain if contract is not honored, retains (or gains) α.

The gain from honoring the insurance contract in the long run is greater than the immediate gain from opportunistic behavior.

Partial conclusion 2 :

For a discount rate close to 1 and a positive profit margin, the fear of losing a relationship can therefore alone ensure that contractual commitments are respected and maintain the link between the insured and the insurer.

3.1.2.2 N-agent model

We assume two groups of agents who exchange repeatedly over time: the insured and the insurers. The insurers are also divided into two types of insurers: good ones (who honor their commitments) and bad ones (who do not honor their commitments).

The type of insurer is not immediately observable, so the individual has to experiment with the insurer or health insurance company by taking out an

insurance contract with that insurance company and trying it out. The experimentation cost $C > 0$ lasts for one period.
The proportion of good insurers in the insurance market is θ.

3.1.2.2.1 Terms of the game

An uninsured individual randomly selects an insurer and incurs a cost C to test whether it is a good or bad insurer.
If it is a good insurer, it enters into a long-term relationship in the next period.
If it is a bad insurer, he withdraws from the insurance contract and chooses another insurer the next period.
The expected gain of a good insurer linked to an insured is the same as before. It corresponds to the profit margin of the insurer on all transactions, present and future:

$$1-\alpha+\sum_{t=1}^{\alpha}\beta^t(1-\alpha)$$
$$=(1-\alpha)+\beta(1-\alpha)+\beta^2(1-\alpha)+\beta^3(1-\alpha)+\cdots+\beta^{t+1}(1-\alpha)$$
$$=(1-\alpha)(1+\beta+\beta^2+\cdots+\beta^t)$$
$$V^M=\frac{1-\alpha}{1-\beta} \quad (1.7)$$

The expected gain from an insurer seeking an insured :
$V^S=(1-\theta)\beta V^s+\theta\beta V^M-C$ (1.8)
$-C$: Search cost
θ : Proportion of good insurers
$1-\theta$: Proportion of bad insurers
$(1-\theta)\beta V^S$: Gain if the insurer is a bad insurer
$\theta\beta V^M$: Gain if the insurer is a good insurer
The expected gain from an insurer seeking a customer or new insured.
Simplifying by V^S and expanding V^M we have :
$V^S=\frac{\theta\beta(1-\alpha)-C(1-\beta)}{(1-\beta)(1-\beta+\theta\beta)}$ (1.9)

3.1.2.2.2 Under what conditions will an insurer deceive an insured?

We assume that the insured respects the terms of the contract: pays the insurance premium regularly and acts in the interest of the principal.
If the insurer cheats, the instantaneous gain is the same as before: 1. However, the future gain if he cheats is different, since it is no longer 0, but V^S (he enters the process of finding a new insured).

The no-cheating constraint

- The short-term gain from opportunistic behavior must be less than the long-term gain from compliance.

$1 + \beta V^S \leq 1 - \alpha + \beta V^M$ (1.10)

$1 + \beta V^S$: represents the short-run gain from the insurer's opportunistic behavior

$1 - \alpha + \beta V^M$: represents the long-run gain from complying with the contract. It is equal to the insurance premium, normalized to 1 - the assumption + the expected future discounted gain.

With :

1 : the cost of the contract or the insurance premium.

α : The assumption

βV^M : The expected discounted future gain

$\alpha \leq \beta(V^M - V^S) = EV$ (1.11)

The value of a relationship: the difference between the expected payoff if the individual finds a good insurer and the expected payoff if he finds a bad insurer.

Compared to the previous case, i.e., after adopting opportunistic behavior, the insurer still has a chance to form a new relationship, but for this he will have to bear a cost C.

- By replacing V^M and V^S with their expressions, we can rewrite the constraint as follows:

$\alpha \leq \beta \frac{C+1-\alpha}{1-\beta+\beta\theta} = EV$ (1.12)

If $\theta = 0$, in other words if no replacement is possible and thus $C = 0$, we naturally return to condition (1.5) of the two-agent model.

- Assuming a situation where $C = 0$ (search or replacement cost of insurer is zero), the value of a relationship, EV, is a decreasing function of θ.

As the proportion of good insurers increases in the market, the value of the relationship decreases.

If $\theta = 1$, the condition becomes:

$\alpha \leq \beta \frac{1-\alpha}{1-\beta+\beta} = \beta(1 - \alpha)$ (1.13)

$\alpha < 1$ (100%), the condition is met and the insurer will not cheat. The fear of losing a relationship is sufficient to ensure compliance with the insurance contract.

Partial conclusion 3:

Two groups of agents who trade repeatedly over time. Under the assumption that an insured respects the terms of the contract: regularly pays the insurance premium and acts in the interest of the principal. The result obtained is identical to the result of the two-agent model: the fear of losing a relationship alone can ensure that contractual commitments are respected and maintain the link between the two groups of agents.

3.2 General conclusion

This article attempts to answer, in one way or another, the question posed by the theory of contracts in a context of imperfect information: how can an incentive mechanism be constructed that prevents the insurer from behaving in a way that is likely to harm the interests of the insured? The objective here is to analyze the contractual mechanisms in health insurance in the presence of an opportunistic insurer (or moral hazard on the health insurance supply side). To do so, we proceeded to model the opportunistic behavior of the insurer using a model of the insurer-insured relationship with deferred settlement, followed by the value of the contractual relationship through a model of 2 to N agents based on the model of Greif, (2003) and Fafchamps, (2004) in the framework of the customer-supplier relationship. Under the hypothesis that an insured (or insureds) respects the clauses of the contract (pays the insurance premium regularly and acts in the interest of the principal) and the existence of two types of insurers (good or bad insurers). The results are as follows: first, in order for the contractual relationship to continue to exist, the penalties must be high enough to deter opportunistic behavior, but not so high as to scare off potential insurers. The penalties must also be effective enough to be a deterrent. Second, for a discount rate close to 1 and a positive profit margin, the fear of losing a relationship can therefore alone ensure that contractual commitments are respected and that the contractual relationship between insured and insurer is maintained. This result is also valid for the N-agent model.

References

Akerlof. (2003). Writing the "The Market for Lemons"': A Personal and Interpretive Essay. *The Official Web Site of The Nobel Foundation*.

Akerlof, G. (1970). The Market For Lemons Quality Uncertainty and The Market Mechanism. *Quarterly Journal of Economics*, 488-500.

Arrow, K. J. (1970). *Essays in the Theory of Risk-Bearing.* London: NorthHolland.

Coase, R. H. (1988). The Nature of the Firm: Origin. *Journal of Law, Economics, & Organization*, 3-17.

Devos, J., & al. (2012). *In: Dwivedi Y., Wade M., Schneberger S. (eds) Information Systems Theory. Integrated Series in Information Systems.* New York, NY: Springer.

Elsharnouby, T., & Parsons, E. (2013). When Relationship Marketing Goes Wrong : Opportunism and Consumer Well-Being. *Journal of Relationship Marketing*, 141-163.

Ensminger, J. (1992). *Making a Market: The Institutional Transformation of an African Society.* New York: Cambridge University Press.

Fachamps. (1996). The Enforcement of Commercial Contracts in Ghana. *World Development*, 427-448.

Fachamps, M. (2002). Spontaneous Market Emergence. *Topics in Theoretical Economics*.

Fachamps, M. (2003). *Rural Poverty, Risk and Development.* Cheltenham, UK: Edward Elgar Publishing.

Fafchamps, M. (2002). Spontaneous Market Emergence. *Topics in Theoretical*.

Genicot, G. (2002). Bonded Labor and Serfdom: A Paradox of Voluntary Choice. *Journal of Development Economics*, 101-127.
Ghosh, P., & Ray, D. (1996). Cooperation in Community Interaction Without Information Flows. *Review of Economic Studies*, 491–519.
Greif. (1993). Contract Enforceability and Economic Institutions in Early Trade : The Maghribi Traders' Coalition. *American Economic Review*, 525-548.
Grossman, S., & Hart, O. (1986). The Cost and Benefits of Ownership: A Theory of Vertical and Lateral Integration. *Journal of political Economy*, 691-719.
Harel, A., & Procaccia., Y. (2009). On the Optimal Regulation of Unread Contracts. *Available at SSRN*.
Hart, O., & Moore, J. (1988). Incomplete Contracts and Renegotiation. *Econometrica*, 755-785.
Hart, O., & Moore, J. (1990). Property Rights and the Nature of the Firm. *Journal of Political Economy*, 1119-1158.
Hédoin, C. (2017). *Théorie des jeux et analyse économique des institutions.* Gilles Campagnolo: Philosophie économique.
Helper, & Susan. (2000). Economists and Field Research: You Can Observe a Lot Just by Watching. *American Economic Review*, 228-232.
Helpman, E., & Laffont, J. (1975). On Moral Hazard in General Equilibrium. *Journal of Economie Theory*, 8-23.
Hendry, J. (2002). The Principal's Other Problems: Honest Incompetence and the Specification of Objectives. *Academy of Management Review*.
Hodgson. (2004). Opportunism is Not the Only Reason why Firms Exist: Why an Explanatory Emphasis on Opportunism May Mislead Management Strategy. *Industrial and Corporate Change*, 401- 418.
Hodgson, G. M. (1998). Competence and contract in the theory of the firm. *Journal of Economic Behavior & Organization*, 179-201.
Holmstrom, & Milgrom. (1991). Multitask principal-agent analysis : incentive contracts, asset ownership, and job design. *Journal of Law, Economics and Organizations*, 24-52.
Holmstrom, B. (1979). Moral Hazard and Observability. *Bell Journal of Economics*, 74-91.
Holmstrom, B., & Milgrom, P. (1994). The firm as an incentive system. *American Economic Review*, 972-991.
Jensen, M., & Meckling, W. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *The Journal of Financial Economics*, 305-360.
Jost, S. (2004). La théorie des coûts de transaction de Williamson et la surveillance des banques dans l'UE. *Institut européen de l'Université de Genève*.
Kandori, M. (1992). Social Norms and Community Enforcement. *Review of Economic Studies*, 63-80.
Kranton, R. E. (1996). The Formation of Cooperative Relationships. *Journal of Law, Economics, and Organizations*, 214-233.
Lorenz, E. H. (1988). *Neither Friends nor Strangers: Informal Networks of Subcontracting in French Industry.* New York: in D. GAMBETTA (éd.), Trust: Making and Breaking Cooperative Relations, Basil Blackwell.
Macneil, I. R. (1978). Contracts: Adjustments of Long-term Economic Relations under Classical, Neoclassical, and Relational Contract Law. *Northwestern University Law Review*, 854-906.
Marshall, J. (1976). Moral Hazard. *American Economie Review*, 880-890.
Pauly, M. (1974). Overpro vision and Public Provision of Insurance. *Quarterly Journal of Economies,*, 44-62.
Platteau, J. P. (1994). Behind the Market Stage Where Real Societies Exist : Part I - The Role of Public and Private Order Institutions. *Journal of Development Studies*, 533-577.
Platteau, J. P. (2000). Allocating and Enforcing Property Rights in Land : Informal versus

Formal Mechanisms in Subsaharan Africa. *Nordic Journal of Political Economy*, 55-81.
Schwarcz, D. (2011). Re-evaluating Standardized Insurance Policies. *University of Chicago Law Review* , 1263-1349.
Srinivasan, T. (1989). On Choice Among Creditors and Bonded Labour Contracts. *The Economic Theory of Agrarian Institutions*.
Stephen, F. H. (1996). Lawyers, transaction costs and opportunism. *Journal of Institutional and Theoretical Economics*, 146-53.
Stiglitz, J. (1977). Monopoly, Non-linear Pricing and Imperfect Information: The Insurance Market. *Review of Economie Studies*, 407-430.
Sulzle, K., & Wambach, A. (2005). Insurance in a Market for Credence Goods. *Journal of Risk and Insurance*, 159-76.
Wathne, K., & Heide, J. B. (2000). Opportunism in Interfirm Relationships: Forms, Outcomes, and Solutions. *Journal of Marketing*, 36-51.
Williamson. (1975). *Markets and hierarchies: analysis and antitrust implications - a study in the economics of internal organization.* New York: Free Press.
Williamson, E. (2000). The New Institutional Economics : Taking Stock/ Looking Ahead. *Journal of Economic Literature*, 595-613.
Williamson, O. E. (2008). Transaction Cost Economics: the precursors. *Economic Affairs*, 7-14.