Abstract This article deals with the social meaning of insurance contracts in the late medieval and modern society. Starting from the empirical analysis of one of the early marine insurance contracts which were stipulated in the second half of the 14th century, the hypothesis is suggested that the premium rate coincides with the estimated average frequency of sea accidents. By means of a proto-probability calculus, rate was used by the early insurers for trading risks. Therefore the main thesis arises that insurance premium is a way of giving a certain price to the uncertainty of the future and that it indeed represents the cost of such observation. A comparison with the original function of money in primitive societies based on reciprocity is finally developed in order to explain how time construction is contingent on social structures.

1. Introduction

Insurance is undoubtedly one of the most widely studied institutions of modern society, yet at the same time one of those least known by the social sciences. Only recently the idea that the sociology of risk should also include a sociology of insurance has been seriously taken into consideration, yet insurance “remains in the background in social sciences” and a real sociology of insurance is still “nascent”.

What is lacking is above all a theory that can observe insurance against the backdrop of society and the transformation of its structures between the 14th and 18th centuries. Sociology should take on this task, albeit without overlooking the contributions offered by the history of law and economics.

The aim of this article is to lay the foundations for a social theory of this kind on the basis of the empirical results of historical research into the origins of the insurance contract and on the basis of some fundamental principles of insurance theory in economics. § 2 provides an outline of the key stages which, between the first and the second half of the 14th century, led to the invention and juridical perfection of the marine insurance contract. The paragon contract that is taken into consideration is a Tuscan policy dated 1385, which – through the mediation of the Lloyd’s policy – is now the basis of the contemporary Japanese marine insurance contract. Going on the hypothesis that the premium rate corresponds to the

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estimated frequency of claims, the thesis proposed is that the insurance premium is the price of the observation of the future. § 3 shows how this thesis is confirmed by the modern economic theory of the estimate of the pure premium. The insurance institution thus appears to be a way in which the paradox of putting a certain price on the future-referred uncertainty may be managed. The paradox is unfolded by means of a fiction, i.e. the calculus of probabilities, that only during the 18th century is finally conceived of as a viable means to determine the price of life annuities. The evolutionary advancement occurs when instead of simply calculating a bet, people bet on calculus. § 4 introduces the idea that an insurance-based society builds a proper time over the time through the construction of periods marked by temporal breaks which have no real correlation in the flowing time. The hypothesis is that the high abstraction of this operation is a by-product of the higher complexity of the modern society compared to primitive societies based on interaction. Money and reciprocity are thus conceived of as functional equivalents for the social production of time (§ 5). Lastly some advantages of insurance compared to other ways of addressing the future uncertainty through the medium of money, such as saving for example, are taken into consideration (§ 6). In the conclusion, it is suggested that the generalized willingness to run risks represents a new form of “social solidarity”, and that modern society should be defined in this very sense as an insurance society.

2. Observing Future Has a Price

The origin of the insurance contract may be reconstructed historically only with a certain margin of approximation. This kind of contract is most likely to have begun being stipulated in the first quarter of the 14th century by Italian merchants operating between Genoa and Tuscany. In the ledgers of a modest Pisan businessman, Vanni di Bonagiunata di Stefano, Marcello Berti (1985: 417ff.) came across an account addressed to Gerardo Gambacorta dated 1322, in which it appears that Gerardo insured Vanni (“Gerardo Ganbachorta et li chonpagni [. . .] mi sigurò”) for the sum of 400 golden florins for seven bales of Pisan cloth which were to be transported on a ship belonging to Andrea di Bando of Porto Pisan to Salerno. In the contract it is specified that the good would travel “at the risk of sea and people” (“a rischio di mare et di gente”) and that for this insurance cover (“per la sigurtà”) Vanni was to pay 26 florins, meaning a rate of $6\frac{1}{2}\%$. On receiving news of the safe arrival of the goods in a letter dated 7th September, which reached Pisa on the 20th of the same month, Vanni states that he is “quite
satisfied” (“bene chontento”). From the note in the ledger, it is not clear whether the premium was paid beforehand or only on the safe arrival of the goods, as would appear to have been the case. Be as it may, there is little doubt that this is an insurance contract to all effects and purposes.

Marine insurance did not immediately substitute the more consolidated sea loan, but continued to be practiced successfully throughout the first half of the 14th century. Proof of this is to be found in the so-called Palermitan contracts, unearthed in the archive of the public notary Stefano d’Amato and dating back to 1350 (cf. Zeno 1936, Doc. CXCI: 230f.). The contracts are stipulated in Latin by Genoese merchants operating in Sicily and unquestionably feature all the requisites of marine insurance. On 15th March 1350, for example, the Genoese Leonardo Cattaneo and Isnardo Usumare declared that they had voluntarily insured (“sponte assecuraverunt”) the wheat that Alaono Grillo, a Genoese merchant, meant to transport on the sailing ship belonging to Daniele Pellegrino of Sciacca to Tunis. The overall compensation amounted to 30 gold ounces; Grillo paid four and a half ounces in advance, which corresponds to a premium rate of 15%. The insurers take on all risks of sea and persons (“suscipientes in se et super se omnem risicum periculum et fortunam dei maris et gentium quod et quam de predictis mercibus pervenire contigerit”) and commit to paying compensation within a month of the arrival of any news constituting cause for a claim to be made (“infra mensem unum habitis certis novis de damno et sinistro predicto”).

In the second half of the 14th century, particularly in Tuscany, early marine insurance contracts obtained a remarkable degree of juridical perfection; for this reason they were to serve as a model of reference for all modern marine insurance. Furthermore, the very fact that they are drawn up in an open form and in the Italian vernacular demonstrates the wide diffusion that these contracts reached in little over 50 years. A single policy may serve as a paragon case. In 1385 Francesco di Marco da Prato & Co. arranged insurance with three merchants on a cargo worth 400 florins travelling from Arles up to Porto Pisano, paying a 5% premium rate. Michele del Voglia & Co. committed themselves to an indemnity of 150 florins, Bartolomeo and Piero del Voglia to 150 florins and Michele di Carlo degli Strozzi to 100 florins. The insurance cover therefore implied a total premium of 20 florins, with a profit of 7.50 florins for each of the first two co-insurers and 5.00 florins for the third (cf. Bensa 1884, Doc. XI: 210–212).

The fundamental features of such contracts may be summed up in a few main points. First, they are insurances of fixed sums; this means that the limit of indemnity is established in advance and is
normally equal to all or part of the value of the cargo insured. The premium is calculated as a percentage of the insured value. For medieval merchants, such a relation was taken for granted to the extent that it could be left out of written contracts; while these do indeed mention the premium rates, they never specify the sum these rates relate to. Moreover, in early insurance contracts many insurers were already involved in covering risks. Each co-insurer could decide, through previous communication with the broker, the limit of indemnity to which he bound himself; he would then underwrite it in the contract but take no responsibility for the insolvency of the other co-insurers. Prepayment is, in all cases, the most important prerequisite for the conclusion of the contract; signing a contract without co-insurers cashing the premium would render it void.\textsuperscript{3} In this way, each co-insurer – through simple subtraction – could calculate in advance what his total loss would have been in the event of a claim. For Michele del Voglia & Co., for instance, the total loss would have been $150.00 - 7.50 = 142.50$ florins; for Michele di Carlo degli Strozzi, $100.00 - 5.00 = 95.00$ florins.

Now, in relation to each co-insurer, if one compares the two bare sums at the opening and conclusion of the insurance business (i.e. the total premium on one hand and the total loss on the other: $7.50/142.50$ or $5.00/95.00$), their difference is very clear. In the first case, the payment is certain (i.e. necessary) and happens in the actual present whenever one takes out an insurance policy; in the second case, the payment is uncertain (i.e. contingent) and happens, if at all, in a future present. The temporal difference between these operations represents the risk of insurance. The question is: what is the insurer’s motivation\textsuperscript{4} in concluding this kind of contract simply on the basis of a comparison of these two bare sums? It would seem, if one takes into account the fact that the calculus of probabilities was not available in the 14\textsuperscript{th} century, that there is a lack of orienting criteria. The only way out of this conundrum is to temporarily give it up and focus instead on empirical observation.

From the very beginning, the premium is set not in the form of a bare sum, but as a percentage of the insured cargo’s value. We lack a general historical study of the variation in premium rates in the Mediterranean sea between the 14\textsuperscript{th} and 16\textsuperscript{th} centuries, largely because it would be practically impossible. The empirical data in our possession are incomplete and often circumscribed to geographical areas such as the commercial circles of Genoa, Venice or Ragusa.\textsuperscript{5} When the insurance negotiation process was managed by a mediator (a broker), and not by a public notary, the stipulator of the policy was not obliged to conserve his documents, most of which may therefore be given up for lost. Historians sometimes manage to get around this
obstacle by studying the accounting ledgers of the merchants themselves, who tended to record the costs of insurance with great accuracy, both on the active and passive side, also adding information on the journey to be undertaken, the boat, the goods and the names of the insurers.

This is linked to the secondary issue regarding the criteria to be followed to calculate the premium rate. The most plausible hypothesis is that the merchants adopted an approach based on their own experience, as Benedetto Cotrugli (1602 [1573]: 75) in fact suggests in his treatise on trade, according to which, insurers must “aprir molto bene l’occhio alle novelle del mare, & al continuo dimandare, & spiare di corsari, di malagente, di guerre, di tregue, e di ripresaglie, & di tutte quelle cose che possono perturbare il mare. Debbono [ . . . ] sapere porti, spiage, distantie di luoco a luoco, & considerare la condizione delli patroni, & delli mercanti che assicurare si fanno, & delli navilij [ . . . ]” (“keep their ears well open to news of the seas, and to the ceaseless questioning and spying of corsairs, of ne’er-do-wells, not to mention of wars, of ceasefires and reprisals, and all else that may unsettle the waterways. They must [ . . . ] know the ports, the coves, the distances from one harbour to another, and consider the condition of the patrons and of the merchants who ask to be insured, as well as that of their fleets [ . . . ]”).

In general, it does not seem that distance plays a decisive role in the setting of the premium; travels to nearby ports reachable only via dangerous routes, such as those along the coasts of Corsica or Sardinia where there was a greater risk of so-called men-dangers, laid claims of higher premiums. However, it is more difficult to evaluate the impact of the seasons on navigation risks, although good sense would suggest that in seasons such as autumn, the rates would be higher due to the greater risks of stormy seas. Indeed, already in the ancient sea loan it was quite normal to insert a clause in the contract that foresaw a variation in interest rates on the sum lent for a return voyage on the basis of the season in which the ship was to leave harbour once it had reached its port of call. It is also clear that the goods loaded were virtually irrelevant in terms of the calculation of the premium rate, for what was insured was the overall value of the load, not its nature. On the other hand, great attention is placed on the type of craft used for the transportation of goods: not so much in view of its seaworthiness, but rather in terms of its defence capacities against attacks from pirates.

Be as it may, empirical research shows that despite the inevitable oscillations and deviances, by and large, premium rates show a remarkable degree of uniformity and congruence; any calculation was therefore carried out not arbitrarily but on the basis of rational
methods. Two further questions therefore arise. How can rates be calculated in order to determine the insurance premium? And why is the premium set in the form of a rate? The second question is the fundamental one, and the possibility of answering the first question depends on the second one. In historical law and economic literature there is neither the answer nor even the question.

By connecting the main features of early marine insurance contracts, it is possible to maintain a hypothesis based on a simple and every time fitting idea (that is, whatever the value of the cargo and the fixed premium rate, the result fits every time). Let us suppose that the premium rate coincides with the estimated average frequency $h$ of sea accidents (leaving aside the question of whether they are sea-dangers, man-dangers, or a combination of both). In the 1385 contract, the co-insurers estimate that on average five cargos out of 100, under the conditions standing at the moment the contract is concluded, go astray. Each co-insurer may now compare a certain profit (7.50 or 5.00 florins) with the probability of loss ($h \cdot 142.50 = 7.125$ or $h \cdot 95.00 = 4.75$), eliciting a difference that motivates him to undertake the risk. This estimate obviously does not coincide with the co-insurer’s future present (if the accident happens, each co-insurer has to pay out 150.00 or 100.00 florins), but with his present future: in other words, it coincides with his own observation of the future.

The advantage of this operation lies in the fact that it makes uncertainty manageable. After all, this is what insurance is: a “business of uncertainties” (Ericson and Doyle 2004: 148). It doesn’t produce more safety than before – the fact of being insured has no effect on the likelihood of encountering adversity – but rather it allows the parties to buy and sell that lack of information which is experienced as opacity of the future. This trade cannot be practised in an arbitrary fashion but must be based on a procedure which at least gives the illusion of being able to control that which is and remains uncontrollable. The illusion of control is obtained via calculation. Yet the single case, i.e. what happens in reality, cannot be pinned down to calculation. The solution lies in the construction, through the grouping together of similar cases, of a secondary reality to which one might refer – in the simplest of forms: the statistical mean.\(^7\) In this way, a not-calculable uncertainty is turned into a calculable one, while the issue of residual uncertainty is managed by checking the degree of correctness of the calculation and by bargaining with a possible post-decisional regret.

After all, if the future could be calculated there would be nothing else left to calculate. In each estimate of the future, the paradox of the calculus of its incalculability is unfolded. The fictitious nature of this construction may be fully understood as soon as it is noted that
in order to transform not-calculable into calculable uncertainty, the
pattern of past cases (those of which experience has been had) is
transferred onto the future which has yet to take place. In this
manner the insurer compensates for his inevitable cognitive limit, he
so to speak gains a gaze on the future by turning memory into
expectation. That is a real induction performance, yet the perform-
ing system is not consciousness but society. The implicit – and above
all indemonstrable – supposition of such reasoning is that the future
shall behave in the same way as the past. That is why risk can only
be observed in the medium of probability: the bare sum 142.50 (or
95.00) gives no measure of the uncertainty one has to cope with; on
the contrary, the product $h \cdot 142.50 = 7.125$ (or $h \cdot 95.00 = 4.75$)
does. This product is the future as it can be observed from the
present. The cost of such observation is the insurance premium.

The plausibility of this scientific explanation may be further
verified through some reflections. First of all, the premium does not
represent the cost of the future as such; if it did, one could not
explain why every co-insurer expects a gain of 7.50 (or 5.00) when
aware of the possibility of losing 150.00 (or 100.00). At the same
time, one could not explain why the policyholder may receive an
indemnity larger than the premium paid or, conversely, why he has
to pay for an event that does not happen. Rather, the premium
represents the cost of the observation of the future, twice over: once
by the insurer, who makes use of a very selective construction of
the past in order to project inferences about the future; and once by
the policyholder, who estimates the risk in relation to his own
capital. This is what finally drives the decision on whether it is
worthwhile to pay the insurance premium or whether it is better to
abstain, which in itself involves a risk.

The reasoning is, moreover, based on the fact that unlike the
actual present the future is contingent. If the future were impos-
sible, the policyholder would have no reason to insure himself; if
the future were necessary, the insurer would have no reason to
provide insurance (hence the problems which arise with retroactive
insurance contracts). The observation of future on the basis of a
premium rate in this respect replicates the logical structure of
future contingencies, about which the only thing one can know
with certainty in every actual present is that the future is uncer-
tain. Or as Lessio said: the uncertainty of capital must be first of all
reduced to a certain price.

To achieve such reasoning, however, one has not to elaborate
probabilistic calculus; instead, one must have a certain awareness
of the average frequency of disasters in maritime trade. If one takes
into account that the insurers themselves were traders who under-
wrote insurance contracts in both active and passive ways, the
conclusion is that each of them was without any doubt in possession of this information. Here, the broker who received the demand and combined it with the available supply also played a central role. In insurance markets like the one in Venice, for instance, the broker took an active part in quantifying the premium rate, and his credibility was based on the reliability of his information (Nehlsen-von Stryk 1988: 82ff., 86; Tucci 1981: 149ff.). In this case, any asymmetry in the information pertains not to the relationship between insured and insurer, but to that between broker and insurer, and is somehow slackened by the fact that the insurers themselves know the tricks of the trade. The premium, finally, doesn’t depend immediately on the cargo’s value: cargo of lower value could be insured at a larger premium rate. What really matters is not the object insured (i.e. the concrete reality), but rather the observation of the uncertainty of the future. Hence Molina states that the premium (rate) either increases or decreases not only on the basis of the insured cargo’s value, but also on the basis of the greater or lesser danger to which the insurer is exposed. Risk, in other terms, cannot be defined as a thing, but rather as a form of observation.

3. Calculating Bets and Betting on Calculus

And modern insurance? The economic theory of insurance distinguishes between a net premium and a gross premium. The starting point for calculating the premium is the so-called “principle of equivalence”, according to which the indemnity payments expected by the company must be at least equal to the sum of the incoming net premium. To put it in another way: the net premium must coincide with the expected value of future indemnities (cf. Mahr 1951: 136ff.; Innami 1966; Farny 1995: 54). If N is the number of bets which are taken by the insurance society, P the net premium for each bet, T the total number of accidents and D the average sum of indemnity, the principle of equivalence can be simply defined as follows: N · P = T · D. Hence the net premium is: P = T/N · D. But the proportion T/N is simply the number of expected accidents against the total number of bets taken, which is the expected average frequency of accidents. Such a variable has already been marked with the symbol h. From the principle of equivalence, the bare net premium is, as a result, given by the equation: P = h · D.

While indemnity is quantified in advance for fixed sum insurance, for interest based insurance indemnity depends on the claim and the presence of franchises within the insurance policy. In the first case, the calculus of net premium is relatively easy: it is enough to know the frequency h. Here mortality and morbidity statistics are
normally used. In the second case, the calculus is more complicated; here accidents statistics are normally used. In both cases, however, one has to deal not with the future as such, but rather with an observation of the future. Compared to medieval insurance reasoning the very idea that it is possible to observe the unobservable by means of a fiction is the same. The medieval merchant put his trust in a proto-probabilistic estimate which was based on personal experience. On the contrary, the modern insurance company employs a complex actuarial mathematics. Yet they both start from the assumption that “the future will bear a resemblance to the past; that under the same circumstances the same event will tend to recur with a definite numerical frequency [. . .]” (Boole 1958 [1854]: 244f.).

In this way the medieval merchant had developed a temporal orientation that was really different from that of the Church, although the latter remains the leading one until the early-modernity.¹² In the 17th century the idea that the future is already determined is still prevailing in the society, while the very fact that it cannot be known is simply the consequence of the bounded rationality of human being. And if statistical calculations show that there is a regularity in the occurrence of chance, this is interpreted as an evidence of Providence. Also the idea of making the future present is conceived of as an institutionally unfeasible possibility. The problem is managed through the concept of sollicitudo. According to Francis Bacon (1842 [1597], I: 68), worldly cases may have or not a measure. The latter are unprofitable since they “oppress the mind and astonished the judgment”; they also are profane, “as those which savour of a mind which promiseth to itself a certain perpetuity in the things of this world”. Men should therefore live in the present, not projected into the future. They should be day’s men, not to-morrow’s men. The latter have too much cares. And the excess arises either because men dwell longer in their cares “than is requisite for due deliberating or firm resolving”, or because the chain of cares is “spun out to an over great length, and unto time too far off, as if we could bind the divine providence by our provision”.

Even though between the last 17th and the first half of the 18th century the mathematics of probability had already made available solutions which seemed custom-made for insurance industry, for a century they went unheeded. Hence the question has been raised, why people did so long prefer to bet on the future instead of planning it.¹³ The sociological hypothesis is that behind the arising of an insurance society there are deep structural changes which imply the functional differentiation of an economic system and the institutionalization of a new temporality consistent with the primacy of money in the whole society.

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What Bacon conceived of as an excess actually coincides with the temporality that money makes operative and insurance finally institutionalizes. The chain of cares has no limit in so far that time get into the time and the time-to-come is experienced as an open future (cf. Luhmann 2006 [1992]; Esposito 2013: 325ff.). “Open” means that the future does not exist and that is why it may be created and re-created over and over again by the observer who put together his own past and future and so produces temporal caesuras while making decisions. Whereas for medieval men the presentification of the future was an absurdity since the future does not exist and worrying about the future meant worrying about nothing, for modern men who live in an insurance society the presentification of the future means the creation of possibilities that otherwise would not exist.

Obviously, the not-actual may not be actualized in an arbitrary way. The time-to-come should be problematized and de-problematized in order to get information. In this respect the calculus of probability has a clear advantage. It turns the regularities of chance – a very oxymoron – into rules for decision-making. Through reckoning the future is not more certain, that is reckoning does not eliminate the danger. It rather produces a fiction (the average man, the average life expectancy and so on) through which it is possible to know and even quantify what can not be known, and that is why it is employed for acting not for knowing, since it offers to the decision-maker an “ersatz security” which gives him the illusion of controlling what is and remains uncontrollable. In other words, the reckoning observer does not control the environment, he rather controls his lack of control on the environment and makes the riskiness of the enterprise somehow manageable. The aleatory of insurance contracts thus performs an integrative function, without the same integration becoming aleatory (after having received a premium the insurer is committed). For both the insurer and the policyholder the matter is not that of calculating the bet, but that of betting on calculus.

In this sense, a real “insurance company” – hence, a real “insurance society” – arises when the trade of uncertainty is institutionalized by means of the calculus of probability. The reluctance to employ this calculus may be culturally interpreted as resistance to the idea that the calculation of uncertainty can produce certain results. To go beyond this threshold of plausibility the early modern society should accept two counter-intuitive presuppositions:

(1) on the one hand, it should accept the idea that the only way out of too many risks is to run more risks than before. This
is one of the core principles of modern insurance industry (cf. Albrecht 1992: 21; Farny 1995: 33ff., 37ff.). Only when risks are shared by a pool of policyholders the calculus, i.e. the fiction may function. The regularities which arise from the aggregates of individual cases enables the company to balance claims expenses both in social and temporal terms. Insurers did always know it. Long before something like the calculus of probability was invented, Benedetto Cotrugli (1602 [1573]: 75) had suggested to underwrite “al continuo, & sopra ogni nave, perché l’una ristora l’altra, & di molti [the insurer] non può che guadagnare” (continuously and upon every ship, since they balance each other and through many policies [the insurer] makes a profit for sure). This does not remove the danger that the claim is catastrophic or that the disaster occurs sooner as foreseen. Yet, only after the arising of modern society Cotrugli’s suggestion becomes a business routine.

(2) The unusual idea should further be accepted that the problem is the solution. Time means at the same time uncertainty and certainty. What matters only depends on the standpoint from which it is observed: whether that of insurers or that of actuarial mathematicians (cf. Daston 1988: 115). Indeed, between the last 18th and the early 19th century it seems very clear that “nothing is more proverbially uncertain than the duration of human life, when the maxim is applied to an individual; yet there are few things less subject to fluctuation than the average duration of a multitude of individuals” (Babbage 1826 [2000]: 249 italics added). For the company this means that the bigger the pool of policyholders, hence the social spreading of binding insurance relationships is, the bigger the probability is that risks balance themselves as time goes by. This doesn’t mean – as somebody has suggested – that among policyholders some kind of solidarity arises in so far that insurance socializes responsibilities. The matter is not, as in medieval gilds and self-help communities, that of being member of a network of personal relationships where reciprocity works as a constraint for reproducing solidarity against dangers to which everybody is equally exposed. The matter rather is to take part in a market where trading risks and uncertainty is a way of getting profit opportunities. In this case reciprocity is only, so to speak, the epiphenomenon of the calculus of probabilities and the only solidarity one may speak of is the generalized, systemic trust in the circulation of money. In a society where money stopped to be changed every insurance would be meaningless.
4. Time Construction in Insurance Society

Future, like every system’s environment, remains in itself unreachable. Systems on the other hand always operate in the current present. The system does not therefore react to the future as such, but to its own construction of the future. The result is that the real future is not simply the consequence of the system’s operations, as though reality were a trivial machine, but rather the result of the system’s reactions to its own representation of the future. The system, one might say, gets ready to react to a future which never coincides with the future that afterwards becomes present. In insurance companies such a problem takes shape in budget administration, and particularly in the calculus of reserves.

Sociological system theory begins with the assumption that time is a form of observation based on the distinction before/after. The distinction cannot distinguish itself while it is used to observe reality. Consequently, every construction of time includes a blind spot that coincides with the observer himself. Without such a blind spot one could not speak of time as something real. Insurance companies temporally find their bearings through the construction of “periods”. Each period is marked by a beginning and an end. Such marks can in turn be observed through the distinction before/after.

Retroactive insurance, for example, provides cover for damages that have been caused by accidents which happened before the policy was taken out. In medieval early marine insurance contracts, such a possibility was already contemplated and managed by a clause which could make premium rates increase rapidly, in the event that the insurer suspected that the ship had already been wrecked. Instead, so-called “loss reserves” are a particular form of premium reserve that makes it possible for the insurer to cope with expected claims for damages that have already happened but which have not yet been settled by the end of the insurance period. Within the period it is possible to mark further temporal caesuras on the basis of fiscal years. Hence the necessity arises of setting other reserves, as for example the “premium reserves” which can be calculated on the basis of several methods. The most important probably is the so-called pro rata temporis method. Given a premium of 100 which includes 60 as net premium, 35 for expenses and 5 for profit, starting from the assumption that the contract has been concluded on 30th September 2010 and lasts one year, an amount of 45 in the form of reserve (i.e. negative stake during the current fiscal year) shall be transferred to the year 2011.

Of particular interest are the so-called “equalisation funds”. They were introduced in the 1920s and served to balance the fluctuations
of indemnities or provide cover for highly unlikely but very expensive risks, thereby keeping the incoming premium fixed. Their function is a temporal balance reached by saving, in a prudential way, during the best years in order to create a fund from which the company can later draw off money to face extraordinary needs in the worst years (see Gürtler 1959: 152f.; Karten 1988: 763ff.). In short: the company expects deviations in the calculus of claim settlement during the time and reacts in advance through a saving strategy which takes the form of a fund. The company deals not only with the uncertainty of the future but also with the uncertainty of the calculus of uncertainties; it copes not only with the unforeseen but also with the unforeseeable (i.e. with surprises) and it makes anticipated corrections available in sight of errors which have not yet been made.

In any case, the basic problem of all reserves is that the company cannot retain the whole premium, listing it in the budget as profit, but must put aside premium shares to secure the company’s future commitments: in short, to ensure its solvency. The company’s profit therefore depends on the future uncertainty. But how can one predict how much to put aside if the future is uncertain? The approach, as always, is to prepare in the present the past one will need in the future, knowing that without a providence of this kind, in the future it could be too late. German economic theory of insurance speaks of “calculus of success” (Erfolgsrechnung): since no company can know in advance what kind of or how many accidents it will have to pay out in coming years, the solution is to take into account the previous years so as to draw information from this experience and produce more or less probable inferences about the coming years. This separation and recombination of past and future horizons on the basis of short- and long-term rationality is a never-ending process and it makes a correction of inferences possible on the basis of the future that in the meantime has become past (cf. Gürtler 1931: 18). Insurance society operates in this very sense as an anticipatory learning system.

This brings the reasoning back to the insurance “principle of realisation”. Like all decisions, the underwriting of an insurance contract unfolds temporal horizons which would not exist without the decision. The matter is not simply that each decision is taken over time; more radically, it is that time itself is produced by decisions. Social systems cannot depend on the immediacy of their constantly changing relation to the environment and leave the reproduction of their operations to chance. Time is used to increase the system’s complexity and make the improbability of its reproduction more probable. This can be done in several ways. In the case of an insurance society, for instance, the premium cannot be
held back and paid out only at the end of the period when the total number of claims and the average cost of indemnities to be shared among all insured parties is definitely known; this would relieve the insurer of all risk and leave the policyholder uncertain of the premium to be paid. On the contrary, the main function of insurance consists in taking up the certainty of an actual cost in order to rid oneself of the uncertainty of future costs, without having the certainty that one has done the right thing. And vice versa: if the policyholder is rid of the uncertainty of his future, the insurer cannot arbitrarily set the premium amount while awaiting the future to see if the calculus was right or wrong. Any insurer’s decision would otherwise be burdened with an unbearable uncertainty (Gürtler 1931: 15).

Every insurer has therefore to cope from the very beginning with the uncertainty of the future – a performance that coincides with the function of money and of economy in general (cf. § 5). Such a form of providence, however, comes up against difficulties which depend on the fact that time is an observer’s construction. Insurers face, in this sense, the paradox of coping with the unknown in a known way, giving to that the operative form of a premium. In this regard Werner Mahr (1951: 228) spoke of “insurance-technical relation of indeterminacy”: the more exactly the total sum of indemnities the insurance company has to pay is established, the more indeterminate and uncertain is the premium that has to be cashed to face such commitment; and conversely, the more exactly the premium amount to be paid is established, the more indeterminate and uncertain is the company’s capacity to ensure its performances. The business success of insurance companies clearly depends on this dilemma. But the dilemma becomes irresolvable when one takes into account that the very attempt to calculate the future is observed in the society and produces reactions. Companies do not take into account, in other words, that the insurance cover they offer is a starting point for those insured, not the result of their decisions. To re-introduce such effect into the calculus they should take into account the very fact that the future depends on reaction to the availability of a calculus about the future, yet it is very hard to control such self-referential dynamics, as the well known problem of moral hazard clearly proves.

5. Reciprocity and Money

In order to fully understand the evolutionary improbability of the insurance institution, a socio-historical comparison may be useful. The basic assumption is that social time becomes a trade object through binding relationships. The presence of a third party makes
time scarcer but also ensures against the uncertainty of the future (cf. Esposito 2010: 61). In this respect, sociological theory has from the very beginning recognized two main alternatives: reciprocity and money.

In archaic societies people dealt with the uncertainty of future needs through reciprocity. They who gave (i.e. made gifts) bound their partners and increased their regard among them. Such regard – like capital – was a measure of the future one could rely on. This connects to the fact that, as a rule, a gift should not be returned immediately. What in a modern economy is regarded as normal, in a primitive economy was conceived of as deviant. A simultaneous return had indeed meant giving up any social bond and, more importantly, nullifying the production of available time. The delay of counter-performance, on the contrary, ensured a future enjoyment of goods for the satisfaction of still indeterminate needs. Under conditions of low complexity, the network of personal contacts relied on the psychic memories of the people involved. Deferment could also be symbolized through objects which were given at the moment of performance. These symbols of deferment were symbols of binding and their main advantage was their social visibility: on the one hand, they could be traded as objects; on the other, as symbols, they made the availability of social time arising. Symbols combined, in other terms, the need for marking something so abstract and immaterial as time-to-come with the possibility of giving to this mark a social concreteness. Hence, a primitive form of money arose: it functioned not as a medium of exchange, but as a guarantee of reciprocity. Such semi-objects reinforced the chain of mutual performances and worked at the same time as memory-aids for later counter-performances (Thurnwald 1936: 284): a way of, so to speak, remembering the future.

In primitive societies, therefore, reciprocity was the most important means of creating temporal bonds. Here, performances and counter-performances linked together in a circular rather than a linear way, so that every action was already a reaction to past reactions – a recursivity with neither beginning nor end. The result was a widespread and generalised debt of gratitude which in modern money economics is replaced by a widespread and generalised indebtedness. In both cases, indeed, the matter is the social trading of time. They who bound people by means of a debt of gratitude (i.e. through gifting), got a credit that could stretch endlessly, being renewed periodically by ritual events like festivals or wedding meetings. This kind of time-binding through reciprocal commitment only works if a reference to the past in the form of memory, and a reference to the future in the form of expectation are combined together. Only those who remember that they have
received aid and support can expect that sooner or later the giver will expect a counter-performance.

In tribal societies the temporal boundaries of memories and expectations are widely indeterminate, fading backwards into the darkness of past generations and forwards into the lack of dues necessary for full payment. In these societies the never-ending production of temporal caesuras which modern insurance companies make possible had been incomprehensible, taking into account the fact that in the latter case any caesura depends on a contractual decision, whereas in primitive societies reciprocity is a duty institutionalised on the level of the whole society. The capacity to loose and recombine temporal caesuras depends on the greater abstraction of modern insurance institutions, which set aside all binding primary social relationships (order or family membership) and construct their reference to reality through fictions whose advantage consists of their consistency with a society no longer based on interactions. In this way, the requisite of social solidarity is no longer the common destiny of those who are exposed to the same dangers, but the reflexivity of risk proneness.

6. Saving or Insurance?

Insurance is based on the money-mechanism; it has been rightly defined as a “bare money business” (Endemann 1866: 551). Money itself is a form of providence for the future (cf. Luhmann 2005 [1970]: 259f., 269; 1988: 268): it ensures the satisfaction of indeterminate needs. Money, like economy on the whole, makes it possible to postpone any decision about the satisfaction of future needs, while at the same time ensuring the satisfaction itself in the current present. In this sense, capital is a measure of the certainty of possibilities of coping with the uncertainty of time-to-come.22

Insurance exploits the reflexivity of money-mechanism (both money and the contingent availability of money may be bought and sold for money) and sharpens the providence function of the economic system: insurance turns the uncertainty of future needs into the certainty of a current requirement.23 It is not enough to resign oneself to the emergence of critical situations and wait and see what will happen; it is necessary to somehow provide for it already in the present, that is in advance. Uncertainty is not turned into certainty – how many and what kind of needs will arise in the future remains unforeseeable; one can however prepare a certain way to manage the uncertainty of the future without deleting it. On the contrary, uncertainty is doubled: providence, like any form of precaution, ever implies costs (here the insurance premium) that could also be unnecessary. One copes in this case with the basic uncertainty of
criteria for managing the uncertainty of the future. In sociological terms, one runs a risk.

This, however, still fails to explain why one does not prefer to save money rather than taking out an insurance policy. This opposition somehow replicates the binary structure of the economy code. Starting from the problem of money scarcity, one has to decide whether to pay or to abstain. Saving normally takes place in order to satisfy indeterminate needs: one provides for future needs as if they were certain and produces a kind of second-order certainty; that is, if the need really arises, one has the financial means to satisfy it. This in turn generates problems of money allocation on the basis of long- and short-term rationality, according to which too many worries about future needs would be irrational in relation to the satisfaction of current needs and vice versa. From saving as such, however, one cannot get any criteria to answer the question about allocation. How is it possible to know how much money must be saved if it is impossible to know what needs will really arise in the future?

A further question may be raised: saving takes time. The one who saves must have time enough to put money aside, while the one who takes out an insurance policy has cover from the very moment he pays the premium. Here the functional advantage of insurance can be grasped. Those who save rather than pay give up taking decisions and wait until they have money enough to face their needs, which in the meantime could change, making saving insufficient or even unnecessary. On the contrary, those who take out insurance buy the time they would have spent putting aside the sum of money indispensable for satisfying more or less indeterminate needs. The matter is not, as the so-called “theory of needs” stated, to reduce the costs of possible needs which could arise in the future to a minimum, allocating the required savings among policy holders, but rather and in a more radical way to reduce any coping with the uncertainty of the future to a certain cost. In this way, the management of contingency becomes calculable, again twice over: first, by the insurance company, where the saving/insurance dilemma re-appears in the form of options between reserve or re-insurance (see above § 4); secondly, by the insured, who can now put the cost of the insurance premium into his budget and use the future at his disposal (that is, the time along which he has insurance cover for possible needs whose satisfaction is ensured as soon as the premium is paid) for acting and taking decisions. What is calculated is not the future as such, which still remains unforeseeable, but one’s current relation to the uncertainty of the future. In this very sense premium is the price of the observation of the future.
The most striking consequence of all is that in this way the motivation to run risks increases. Risk is a self-reference concept which designates any coping with the uncertainty of the future in decision-making processes. Those who run a risk know that dangers depend on something else (for medieval merchants either on sea or on other men), but the economic consequences of damages depend on themselves and on any precaution they eventually took (or took not). The merchant who loses a cargo at sea, does so because of a storm or pirates, but he can avoid financial ruin if, by facing these dangers, he providentially took out insurance. Risk works therefore on a more abstract level which implies a redoubling of reality: every event receives a dual status, as irreparable damage and as repayable risk. In the first case one has to deal with the irreversibility of the real; in the second case one has to deal with an economic reversibility which could also be unnecessary (the policy holder who falls ill gets money back, not health). In this way, insurance turns every danger into a risk (Luhmann 1996 [2013]) and makes available a kind of “time bind” that enables people to take decisions which are right also when they are wrong: it is much better to take out an insurance and run the risk of paying premium in vain than be caught off-balance.

On the other hand, uncertainty is the main resource for taking decisions. But it must be to some extent manageable. Were everything otherwise possible, the mere injunction “Take a decision!” would be paralyzing. The evolutionary advantage of the insurance institution is that it enables a calculation of future uncertainties even though it does not ensure the certainty of the future outcome, so that the uncertainty the whole society is able to cope with finally increases instead of decreasing.

Notes

1 This is the opinion of Ericson, Doyle and Barry (2003: 3). Cf. also Baker and Simon (2002), especially the essays of the first part of the book, whose title is “Toward a Sociology of Insurance and Risk” (italics added).

2 Kimura (1965; 1983) demonstrated that the modern Japanese marine insurance policy derives from the 18th-century Lloyd’s policy, which in turn is a faithful reproduction of the 14th-century Florentine policy.

3 About this requisite see Nehlsen-von Stryk (1988: 84, 88ff.): the Venetian uxanza coincides with the Florentine insurance laws and they both were to be recovered by the Ordinances of Barcelona.

4 The concept of motivation should be understood in a sociological, rather than psychological, sense. For the present inquiry it is of no importance to know what medieval merchants thought of the use of money for trading; it is of great importance to understand what kind of reasoning made more probable such an improbable decision as the insurance risk.
The main empirical enquiries are those of Mario del Treppo (1957: 512ff., 520ff.; 1972, Appendix II: 639–733) relative to the commercial circles of Barcelona during the 15th century; those of Alberto Tenenti (1978: 1987; with Branislava Tenenti 1985: 63ff.; Table III: 341ff. and Appendix II) relative to the commercial circles of Ragusa during the 16th century; and lastly those of Federigo Melis (1975) regarding the Tuscan insurance market between the 15th and 16th century. See also Nehlsen-von Stryk (1988, Ch. I and Appendix I), and Branislava Tenenti (1985) for the commercial circles of Venice; Heers (1959: 12ff.) and Doehaerd (1949) for the commercial circles of Genoa.

Cf. Demosthenes, Against Lacritos, xxxv, 10–13, in which the interest rate rises from 225‰ to 300‰ if the ship sets sail after the first day of autumn.

See the fundamental observations of Knight (1921: 128, 167). The psychological concept of “illusion of control” has been used by Langer (1975) to designate the change of external with internal attributions. What should be conceived of as a matter of chance (luck) is rather conceived of as a matter of ability (skill).

According to Luhmann (1991: 81) risk is a form for form-shaping in the medium of probable/improbable.

Lessio (1609: 310): “Periculum sortis incertum debet reduci ad certum pretium”.

The inquiries of Alberto and Branislava Tenenti (1985: 243ff., 370) about marine insurance contracts concluded in Ragusa between 1563 and 1591 have shown that the average gain of insurers were consistent with the average frequency of claims (about 5%).

Premium “atque accrescit vel decrescit non solum pro maiores aut minores valorem rei quae assecuratur, sed etiam pro maiores vel minores periculos cui assecurator se exponit” (Molina 1733, II, Disp. DVII: 659) – listing three main criteria: the kind of ship on which the cargo has been loaded, the length of trip, the presence of pirates.

According to the well known thesis of Jacques Le Goff (2000 [1977]).


The double meaning is intentional.


Cf. Gürtler (1931: 16) and Farny (1992) on the basis of the distinction “internal/external calculus of periods”.

Instead of the so-called “reserves for catastrophic risks”, today insurance companies prefer to take out re-insurance policies, but this issue goes beyond the limits of the present inquiry.

The classical sociological inquiry is that of Mauss (1923–24). See also Thurnwald (1936: 281ff.).


See Manes (1913, § 3: 13). The leading work is Gobbi (1938).


According to Luhmann (1995: 574) the irrationality of saving in an economy based on indebtedness depends precisely on this.

It has been always recognized but without explanation. Cf. Gobbi (1938, § 41: 30); Arrow (1974: 137): insurance “permits individuals to engage in risky activities which they would not otherwise undertake”.

Cf. Ewald (1989: 391). Such redoubling has a correspondence in the redoubling of scarcity that is produced by money.

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