Insurance Economics Between Theoretical Ambitions and Empirical Relevance*

by Elmar Helten**

1. Introduction: intention and definition

The intention for studying this subject is based on two observations:

a) *Scientists* in insurance economics often transfer general economic theories and statements to insurance economics, without checking whether the economic models underlying these theoretical statements and their restrictive presumptions comply with the reality of insurance economics. This procedure would only be an internal scientific problem, if scientists did not have the ambition to advise insurance practitioners on the basis of their knowledge acquired this way and to work out proposals for solutions to practical problems. However, economic advice – like any political advice – can only be right if the underlying theories and models have been reviewed against a background of actual facts and data. This should really be self-understood. But often it is only the logical consistency of the theories and models, and rarely their empirical relevance, that is examined.

b) Sometimes people working in the practice of insurance economics use results from theoretical models or methods based on models to solve practical questions. However, they hardly ever check whether the conditions under which the statements and/or methods of the model theory were developed are satisfied. Such a superficial application of scientific models and methods only leads to pseudo-scientific solutions to practical problems, since the solution to such problems will not be better, just because scientific methods were used.

It seems to me that in both cases the possibilities of and the limits to theory-guided solutions to practical problems are misapprehended, which, by the way, can be observed not only in insurance economics, but also in other sciences describing empirical evidence. In the insurance sciences, particularly in insurance economics, it must always be remembered that the insurance sciences are *no formal sciences*, but *empirical sciences*. Formal science models and methods are only tools on the way to knowledge about the reality of insurance.

People working in the practice of insurance have to be reminded time and time again that there is no principal contrast between the insurance sciences and insurance practice. While insurance scientists are mainly interested in knowledge about the reality of insurances,

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people working in the practice of insurance act, that is, want to influence, to change the reality of the insurance. But management and decisions in insurance companies are based on ideas and knowledge of reality. This, however, is marked by traditions of the insurance business and by personal experience rather than new results from research activities.

Thus, insurance managers should be interested in general, i. e. more substantial hypotheses explaining the reality of insurance, worked out by the insurance scientists. But there is hardly any insurance company having a systematic library of scientific journals.

The Geneva Association has set itself the target of promoting insurance economics and reducing the discrepancy between insurance theory and the practice of insurance. It is undisputed that insurance economics was boosted by the Geneva Association and that it has caught up with the international development of general economics.

I think, however, that the discrepancy between insurance theory and the practice of insurance has not been reduced enough since the first seminar of the European Group of Risk and Insurance Economists. The discrepancy is often due to the fact that the quality of a scientific study, and thus the rank of the scientist in the scientific community, is assessed by criteria other than the applicability and usefulness of a scientific result in practice.

Like everything else, insurance economics is subject to fashion. Ever since the Austrian school of marginal utility, it has been common in economics to transform economic statements into mathematical forms. When these mathematical forms are used to calculate mathematical deductions, such as saddle points, intersections, marginal utility, optima etc., or to better examine formalized statements by empirical tests, this type of procedure is certainly not to be criticized. But if mathematics is only used in order to pretend precision or to immunize hypotheses, this pseudo-scientific behaviour must be referred to as “formula platonism” by analogy with Hans Albert’s “model platonism”. In order to improve the penetration of insurance practice with results from insurance economics, restriction to the essential formulae would be desirable.

This would also reduce the gap between insurance theory and insurance practice, and practitioners would be in a better position to criticize, but also to adopt the theoretically derived results on the basis of their experience.

Therefore, I want to try to

1. determine the epistemological position of a *Realtheorie (empirical theory) of insurance*, because this branch of research forces scientists to deal with the reality of insurance,
2. substantiate that there are possibilities in insurance practice to reduce the discrepancy between insurance theory and insurance practice, and
3. explain statements of the empirical theory of insurance by way of some selected examples.

2. The epistemological position of insurance economics as an empirical theory of insurance

The “overestimation of the formal aspects of human practice”,¹ which accompanies the neglect of the dynamics of empirical processes, makes it obvious to apply results from epistemology in order to carry out the process of cognizing insurance economics adequately

¹ Albert, H.: *Traktat über rationale Praxis*, Tübingen 1978, p. 26, Fn. 33.

from the point of view of a science describing empirical evidence. As early as 1921 Frank Knight explained in his monography "Risk, Uncertainty and Profit" that an "excursion into epistemology"² is necessary for the formalization of an adequate theory of (economic) action.

In the research program of insurance economics as an empirical theory of insurance the process of acquiring knowledge is based on the methodological and epistemological studies by Hans Albert,³ who mainly used topics from the economic and social sciences to exemplify and further develop Karl Popper's critical rationalism in Germany. Hans Albert represents *critical realism* which, in my view, is particularly suitable as an epistemological basis of insurance economics, because it departs from a consistent fallibilism, i. e. the principle, that methods, standards and ideals can be revised.

The temporary character of all hypotheses explaining insurance economics is an essential fact, since the dependence on coincidence (stochasticity) of the manifestations of insurance economics does not allow deterministic explanations a priori. For if a future event could be clearly determined, it would not be insurable. Therefore, it should be remembered that empirical examinations of stochastic laws are always associated with a first or second degree error and these must be conceded.

In critical realism a distinction is made between essence and manifestation. "The target of knowledge is understood as grasping the essence of things in order to make the manifestations which are directly accessible to us understandable!..." In order to gain real knowledge, one must go behind the manifestations: one must *transcend* perception. For this purpose certain restrictions inherent to the subject must be identified and overcome. Thus, knowledge also becomes an achievement of thinking which transcends perception, which nevertheless must follow perception time and again."⁴ So *experience and thinking* serve as a source of knowledge.

"Critical realism does not entrust... real knowledge to metaphysics superordinate or superior to the sciences and clearly distinguishable from them. It admits the possibility for them to acquire such knowledge... Thus, empirical science is itself involved in the search for the essence of things and the reason for the manifestations, which has characterized any real striving for knowledge ever since pre-Socratic times. It aims at a valid concept – a true description – of real facts and circumstances and thus at a valid explanation of the phenomena to which we have direct access.

By determining the knowledge program of the sciences describing empirical evidence like this, three acknowledgments are made:

- a) in contrast to idealistic views of all kinds, the existence of a reality independent of the subject,
- b) in contrast to phenomenalism, the recognizability of this reality, and

² Knight, F.: Risk, Uncertainty and Profit (1921), New York 1964, p. 197, quoted according to Albert, H.: Traktat, p. 25, Fn. 32.

³ Albert, H.: Kritik der reinen Erkenntnislehre. Das Erkenntnisproblem in realistischer Perspektive, Tübingen 1987.

Albert, H.: Die Wissenschaft und die Fehlbarkeit der Vernunft, Tübingen 1982.

⁴ Albert, H.: Kritik, pp. 46.

- c) in contrast to certain types of metaphysics, which claim to have a different access to reality, their recognizability by means of scientific tools".⁵

If this research program for insurance economics is approved, the question must be raised how this process of cognizing can occur.

The process of cognizing is usually initiated by the observation of an empirical phenomenon, such as the uncertainty as to the time of the death of one or more persons or the duration of diseases or the frequency and the financial consequences of car accidents. These facts are then described, defined, systemized and classified using colloquial language and a gradually developing special language. This can also be understood against the background of the historical development of insurance science.

Initially insurance economics, like any empirical science, was to strive for the understanding of real facts and their appropriate representation. This means striving for truth in a realistic sense. This "registration of facts", however, does by no means occur statically, but is to be adapted to conditions that change over time, but also to the perception of scientists that changes over time. So the registration of reality itself is an interactive process which is influenced by the subsequent interpretation of the data available.

Scientists looking for explanations or reasons for empirical phenomena all too often dispose of this typification and archiving of facts at the beginning of any scientific study of reality as an obsession with concepts. This disrespect for "data collection" leads to a gradual abandonment of the real facts and to a restriction to so-called "theoretical questions" or "model-analytic discussions".

In insurance economics much can certainly be explained by asymmetrical information or moral hazard, and some phenomena of reality can certainly be justified by more or less extensive market regulation. But if these arguments crop up time and again and occur in each and every thesis in insurance economics, insurance economists seem to be too nailed down on these few paradigms. In Kuhn's sense more frequent changes of paradigms can only be recommended.

Following the knowledge program of the empirical theory of insurance economics, there are not only theoretical questions to be concentrated on, but explanatory hypotheses must be tested by way of empirical data time and again, in order to support or discard them. Only consistent criticism leads to progress in knowledge and a deeper and deeper penetration into the unsuspected contexts of insurance economics.

And dealing with the empirical study of statements of insurance theory forces you to descend into the "harder side of the practice of insurance" and gives you enough ground contact in order not to generate too unrealistic explanatory hypotheses. You cannot stick to a model or paradigm once fond of, but must drive the cognizing process by developing creative ideas or innovative hypotheses and also by permanently examining these hypotheses. In this respect the empirical theory of insurance necessarily reduces the distance between insurance theory and the practice of insurance.

It would certainly also make sense to create a risk measurement corresponding to biometrics or econometrics, so as to advance the aim of the empirical examination of hypotheses in insurance economics by these disciplines, just as beneficially for the practice of insurance as for insurance theory.

⁵ Albert, H.: Kritik, pp. 60.

3. Possibilities of insurance practice to reduce the discrepancy between insurance economics and the practice of insurance

In the perception of reality and the solution of practical problems the practice of insurance, as mentioned in chapter 1, also departs from concepts and the knowledge of reality. So it does not follow some naive empirism by any means. "Everday knowledge contains a lot of theoretical ingredients", says Albert, namely "general assumptions about real contexts." "Theory formation in the sciences is just a continuation of this cognizing practice... Therefore, it is of little help, if there is the tendency in the modern theory of science to let this continuity of everyday knowledge and science disappear by the appropriate demarcation efforts."⁶

But it is also of little help, if insurance practice cultivates the seeming contradiction between theory and practice in order not to perceive scientific knowledge, if it happens to be unwelcome or inopportune.

If the studies on the deregulation of the insurance markets written by theoretical scientists over the last few years had met the requirements of empirical research, the controversy over deregulation could be mentioned as an example to show how unwanted knowledge is ignored or combatted by people working in the practice of insurance. Since, however, most of these studies showed methodological shortcomings and departed from very restricted model assumptions and prejudices, this controversy, which was very delicate for insurance policy, is quite understandable.

Generally true knowledge can only be halted temporarily (see Galilei: "Yes it does move"). Therefore it is of good use to look for ways of cooperation between insurance theory and the practice of insurance in insurance economics.

Like at scientific faculties, it has become customary at some German business administration faculties to prepare diploma dissertations and theses in cooperation with people working in the practice of insurance. As a rule insurance practice suggests the subject and gathers empirical data. The university provides the model theory and methodological support. These studies have a two-fold positive effect. They confront scientists with up-to-date real-life scientific problems and show practitioners the state of scientific knowledge and the methodological knowhow.

The only problem that may arise in this type of cooperation is the publication of the research results which is required for theses. As a rule the insurance companies do not want their internal data and problem solutions, which are meant to give them an advantage over their competitors, to be published. Only "abstracting" the results from the specific conditions of the insurer studied will help in these cases. But again there is the danger of the thoughtless generalization of the results found in a particular situation, i. e. in one particular insurance company at one particular time. In our experience more general statements can only be achieved by enquiring in all or several companies of particular relevance on the question on hand.

There is another possibility for cooperation mainly for insurance companies having their own research and development department like industrial enterprises. Such departments so far mainly exist in larger reinsurance companies. In these departments, as far as is known, there are almost exclusively natural scientists, mathematicians and lawyers, but

⁶ Albert, H.: Kritik, pp. 98.

no economists. Does this allow the conclusion that research and development work in the field of insurance economics is not necessary or that it is carried out better and at lower cost by management consultants? I do not think so, particularly when fundamental research and strategic considerations are concerned. Only for topical question do management consultants certainly have an advantage due to their larger and more flexible manpower. The obligations of university professors associated with teaching do not allow quick shifts or increases in capacity, particularly with the large numbers of students we have in Germany.

A completely different possibility for stronger scientific research for the purpose of describing empirical evidence would emerge, if university professors did no longer work for their universities exclusively, but could use some of their time working for companies. Today in Germany such additional work is only permitted for a maximum of one day per week in practice.

Finally it is also conceivable that the authorities funding universities establish laboratories or experimental companies – as is the case in the natural sciences and particularly in medicine. If the government finances the universities, it could tie the public companies closer to the (public) universities.

These proposals may seem utopian. In my view, however, insurance economics, understood as an empirical science – without a possibility to work in the practice of insurance – is an anachronistic restriction, unacceptable with today's state of the theory of science.

4. Examples for the empirical research of insurance economics

In the second part of my presentation I should like to demonstrate by way of some older and more recent as yet unpublished studies how insurance economics, understood as an empirical theory of insurance, was developed by empirical research.

4.1. Reinsurance decisions made by direct insurers

This research project, which was started just over 10 years ago and had long been completed,⁷ became the focus of attention again some months ago, because Münchener Rückversicherungs-Gesellschaft and Gesellschaft für Datenverarbeitung und Organisation (Cologne/Zurich) marketed one software product each, “RAIS” and “CAPRI”, for direct insurers, which do not only automate reinsurance accounts, but also support the decision to select reinsurance products.

The starting point of our considerations at the time was the observation that the forms of reinsurance contracts calculated in the risk theory as “optimum reinsurance decisions” were not or not exclusively applied in practice.

We wondered whether the premises of the theory that

- a) the *exclusively* assumed purpose of *risk minimization*,

⁷ Helten, E.: Zielstrukturen und Organisation von Rückversicherungsentscheidungen – erste Ergebnisse einer empirischen Untersuchung deutscher Schaden- und Unfallversicherungsunternehmen; in: Göppl, H., R. Henn (editor), Geld, Banken und Versicherungen 1982, vol. II, Karlsruhe 1983, 941-957.

Helten, E.: Vom Nutzen der Rückversicherung aus der Sicht der Erstversicherer, in: Rückversicherung – Anspruch und Selbstverständnis, published by EISEN und STAHL Rückversicherungs-AG and Hannover Rückversicherungs-AG, Karlsruhe 1986, 137-152.

- b) the risk aversion behaviour determined in a certain analytical function and
- c) the reinsurance decision assumed as one person's decision,

corresponded to reinsurance practice at all. Based on a representative poll among German casualty and accident insurances, we found that

- a) very different aims are followed by taking out a reinsurance, that
- b) not only risk-averse behaviour can be assumed and that
- c) the reinsurance decisions are not always the final decisions made by individuals, but are also made as group decisions.

Thus, due to the empirical examination, the theory on reinsurance decisions conceived here on the basis of the stochastic decision theory, or more strictly speaking its essential implications, had to be rejected as being irrelevant in practice and replaced by new, more complex explanatory hypotheses. On the basis of Keeney's and Raiffa's multidimensional stochastic decision theory and the experimental determination of risk preference functions, Schecfer succeeded in stating a decision-making process procedure in order to calculate optimum, i. e. target-oriented reinsurance decisions with triple targets and different risk preference functions. The problems of group decisions have not been solved yet, since this would require intensive questions on the coordination behaviour of those involved in reinsurance decisions. This is difficult, since such coordination procedures are rarely operationalized and intertemporal.

But since alternative calculations (deterministic simulation procedures) of reinsurance decisions can be simplified, the problem of target-oriented reinsurance decisions in direct insurance companies is easier to solve. In a decision-making group coordination is possible with the aid of the calculated alternative results and need not be carried out by way of experiments.

This example shows that by linking theoretical hypotheses with the examination of these hypotheses in the practice of insurance – in this case by polls – as well as by the subsequent revision of the hypotheses, progress in empirical knowledge within the meaning of the empirical theory of insurance can be achieved. So the theory of reinsurance decisions by direct insurers has become more substantial, because it could set up more complex explanatory hypotheses. And it will also be interesting for theoreticians to see whether and how reinsurance decisions will change in the future, if they are influenced by decision support systems.

4.2. Success strategies of german life-insurers

The company targets of insurers have been investigated in Germany since the mid-sixties. First, inspired by the target discussion in general business administration, Farny⁸ analyzed the formal targets of insurance companies and pointed out the significance of certainty, growth and profits. These targets were then – at least partly – empirically examined

⁸ Farny, D.: Gewinn und Sicherheit als Ziele von Versicherungsunternehmen, in: ZVersWiss 56 (1967), 49-81.

by Kaluza,⁹ who carried out polls, while Farny¹⁰ is still investigating the growth and profit positions and paths of German insurance companies in longitudinal and cross-sectional analyses in his annual business report analyses. So it was obvious to look for explanations for these developments beyond the description of the growth and profit positions and paths. Kürble¹¹ determined various profit and growth ratios, set up hypotheses on the change of these ratios using the annual financial statements of German life-insurance companies and tested them empirically using multidimensional configuration frequency analysis.

This study indicates that known and seemingly natural explanations (ad hoc hypotheses) can also be confirmed empirically, that other explanations, which also seem trivial, however, could not be confirmed. Thus, the success strategies of some insurance companies are understandable, while other insurers have success which cannot be explained significantly from the hypotheses assumed and the data material examined.

Thus, among other things, Kürble proves for product features of various life-insurance companies that there is a link between the insurance benefits in case of survival, paid by a company for old contracts today, and the corresponding future payments shown in the exemplary calculation,

- that there is a connection between immediate high risk cover (= sum insured + immediate profit-sharing) and high payments in case of survival,
- that there is a connection between high returns on premiums in case of survival and high cancellation payments,
- that there is a connection between the price-worthiness of different products of identical companies, which, however, excludes term insurance.

To test the interrelations of growth and profits of the life-insurance companies with the explanation variables examined, Kürble uses configuration frequency analysis, for which the material used in the investigation must be dichotomized. Accordingly, four classes must be formed for the simultaneous explanation of profit and growth.

In details Kürble finds

- that a high acquisition cost rate is only rarely associated with high growth – measured in quantity and the sum insured,
- that a high proportion of commission payments in the total acquisition costs does not necessarily lead to high growth,
- that poor growth rarely follows from low cost,

and

- that above-average quality of the range of products positively influences the growth of a company.

⁹ Kaluza, B.: Entscheidungsprozesse und empirische Zielforschung von Versicherungsunternehmen, Karlsruhe 1978.

¹⁰ Farny, D. et al.: Die Geschäftsberichte der Kompositversicherung im Jahr 1986, in: Versicherungswirtschaft 1987, supplement to No. 19.

¹¹ Kürble, G.: Analyse von Gewinn und Wachstum deutscher Lebensversicherungsunternehmen. Ein Beitrag zur empirischen Theorie der Versicherung, Wiesbaden 1991.

When multi-dimensional configuration frequency analysis is applied it is seen that above-average growth (measured in growth of premium and sum) occurs together with high product quality, a large portion of term insurance business and low acquisition cost rates more frequently than expected from the statistics.

For the attempts to explain profit ratios – annual surplus, ordinary profit before tax, value added – which were always correlated to the premium, the sum insured and the equity capital, significant explanations can be found, although less frequently. Kürble points out that the legal form does not seem to influence the return on premiums, for public insurance companies and mutual insurance societies are found among companies achieving both above- and below-average profitability. The market handling strategy does not have a significant influence on the return, because high and low returns on equity capital often occur together with contrasting market handling strategies. Thus, high insurance benefits, low commission rates and costs as well as below-average cancellation rates are offered by public companies and insurance societies exclusively. However, only 10 of the 18 companies of this legal form which were investigated showed above-average profitability, 8 companies below-average profitability. Those companies which do a lot of canvassing, which are mainly shareholders' companies and some insurance societies, also have both above- and below-average profitability.

Finally Kürble tries to explain simultaneous explanations of profit and growth by target determinants.

He finds that sales policy with a focus on product quality is a necessary condition for twofold success in profitability and growth and that twofold success, both in growth and orderly profit before tax correlated to the sum insured, occurs significantly frequently only in companies pursuing a low-price policy.

4.3. Comparison of the efficiency of the bonus-malus systems of the motor third party-liability insurances of some European countries

Since the freedom of services is being implemented faster than originally planned for the insurance industry, the insurance products of other countries are studied in Germany with growing intensity. In particular in the field of life insurances – due to the different concepts of life insurances for the purpose of covering risks or as an instrument for financing or capital investments – strong foreign competition is expected. The comparisons published so far, however, are of a descriptive nature only. A comparison of the insurance benefits has not been dared yet, in view of the fact that this is difficult even for domestic products, although they are based on the same calculation principles.

Another important insurance branch is that of motor third-party liability insurances. In some European countries they are under special state control. It may, however, be expected that this supervision will be revoked and that the freedom of services will be extended to this insurance branch. Then a comparison of the different tariffs, particularly of the bonus-malus systems, will become significant.

But comparisons of bonus-malus systems are also important for other reasons. In Germany the monopolies commission criticized the uniformity of the bonus-malus tariffs in motor third-party liability insurances. So if motor third-party liability insurances are to be deregulated, it will have to be considered whether company-specific bonus-malus systems make sense. So far bonus-malus systems differing from country to country, but uniform within the individual countries have been customary in Europe.

Another reason is the increasing individualization of insurance premiums not only according to ex ante criteria, but also ex post in dependence on the individual experience of the insured concerned. Thus, in Switzerland and Germany a bonus-malus system was introduced for industrial fire insurance as well.

All these problems of insurance practice make it obvious to measure the efficiency of bonus-malus systems empirically. In the risk theory three standards have been developed, the efficiency standard by Loimaranta, by Norberg and by Borgan/Hoem/Norberg. These efficiency standards check whether the aim of the bonus-malus systems to determine the individual expected value of claims as accurately as possible is achieved better or worse.

As a result of an empirical comparison of the bonus-malus systems in Belgium, Germany, Finland, Italy, Austria, Sweden, Switzerland and Spain, Boos¹² determined the following design features which contribute to the efficiency of a bonus-malus system:

- a) a bonus-malus system should include as many classes as possible,
- b) a bonus-malus system should include linear regrading mechanisms,
- c) a bonus-malus system should not contain a special regulation for particularly susceptible risks,
- d) a bonus-malus system should provide stricter penalties, i. e. any claim should entail regrading by several classes.

When the efficiency standards were developed a few years ago, this was first of all the answer to a theoretical question, since the bonus-malus systems applied in practice had essentially grown historically and developed on a theoretical basis in very few cases only. The empirical comparison of efficiency by Boos, however, demonstrates that the "systematic" bonus-malus systems, that is those not burdened with any special arbitrary features (e. g. rebate rescue, beginners' grouping), are the bonus-malus systems which are efficient as far as classification adequate to the risks is concerned.

This example clearly shows that for models and methods of the risk theory, too, empirical examination is even necessary, if these models and methods are to comply not only with criteria of formal science, but also with those of empirical science.

5. References for further examples of empirical research

When looking at the German journals in insurance economics "Versicherungswirtschaft", "Zeitschrift für Versicherungswesen", "Versicherungsbetriebe" and "Zeitschrift für die gesamte Versicherungswissenschaft" of the last seven years, it is striking at first that, compared to the total quantity of these journals, very few papers are found to use empirical material.

I think that this is due to

- a) the prejudice that the statistical description of reality can only lead to dull numbers anyway,
- b) the many data used in such studies and
- c) the often missing knowhow in measuring theory and statistical methods in view of the methods of empirical social research to be applied.

¹² Boos, A.: Effizienz von Bonus-Malus-Systemen. Ein Vergleich der Tarife der Kraftfahrzeug-Haftpflichtversicherung einiger europäischer Länder, Wiesbaden 1991.

The majority of empirical studies deal with the quantitative registration of reality. This includes the primary statistical surveys, in particular polls and the secondary statistical compilations of business reports of the insurance companies. These studies are guided by theory. As a rule they use ad hoc hypotheses or hypotheses taken from general economics. This is mainly clear from the wording of the questions and from the classifications of the empirical data. Explanations for empirical facts, however, are rarely provided in these studies, or at least not in a form to be tested. From the point of view of statistical methods these studies are restricted to descriptive methods.

The minority of the empirical studies tries to reach the aim of the empirical theory of insurance, that is, to find, confirm or reject explanations for empirical facts. There are very few of them. They are mainly recognized by the explicit wording of the hypotheses and the use and interpretation of significance tests. I only paid attention to the papers by Kürble and Schwake,¹³ by Finsinger, Grüne-Henze and Graf v. d. Schulenburg¹⁴ as well as by Kürble and Wieland.¹⁵

Looking through the Geneva Papers from 1985 up to this day I found that, after all, half of the studies can be classified as empirically descriptive, but only four studies as empirically explanatory. These are the studies by Gustavson and Lee¹⁶ and by Urrutia¹⁷ in volume 11 (1986) as well as the studies by Pitelis¹⁸ and by Cummins and Harrington¹⁹ in volume 12 (1987).

6. Conclusion

The empirical analysis of the German journals on insurance economics and of the Geneva Papers of the last few years showed that insurance economists are still on their way to an empirical theory of insurance. However, in order to improve both the scientific standard and the empirical relevance of insurance economics, the process of cognizing propagated by critical realism, which should occur in an empirical science, should be supported. Therefore, if it can agree with my appeal for an empirical theory of insurance, the Geneva Association should particularly support THIS research strategy, which certainly takes more effort than naive empirisms. Last, but not least, because any strategically thinking management should be interested in supporting its strategy by an empirical science.

¹³ Kürble, G., E. Schwake: Größenvorteile bei Schaden- und Unfallversicherungsunternehmen, in: ZVersWiss 73 (1984), 113-131.

¹⁴ Finsinger, J., R. Grüne-Henze, J.-M. Graf v. d. Schulenburg: Zum Verhalten der Nachfrage auf dem Kraftfahrzeughaftpflichtmarkt, in: ZVersWiss 76 (1987), 667-683.

¹⁵ Kürble, G., J. Wieland: Preiswettbewerb auf dem Markt der Autoversicherung, in ZVersWiss 78 (1989) 335-355.

¹⁶ Gustavson, S., C.-F. Lee: Risk-Return tradeoff, Income Measurement and Capital Asset Pricing for Life Insurers: An Empirical Investigation, in: Geneva Papers 11 (1986), 24-43.

¹⁷ Urrutia, J. L.: The Capital Asset Pricing Model and the Determination of Fair Underwriting Returns for the Property-Liability Insurance Industry, in: Geneva Papers 11 (1986), 44-60.

¹⁸ Pitelis, C. N.: The Substitutability Between Discretionary and Contractual Saving and the "Propensity" to Save Profit and Wage Income in the UK, in: Geneva Papers 12, (1987), 37-49.

¹⁹ Cummins, J. D., S. E. Harrington: The Impact of Rate Regulation in U.S. Property-Liability Insurance Markets: A Cross-Sectional Analysis of Individual Firm Loss Ratios, in: Geneva Papers 12, (1987), 50-62.

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