

In recent years, the insurance sector underwent profound changes due to technological innovations reshaping its traditional business model. The growing availability of large datasets, combined with advancements in big data analytics and artificial intelligence, is enhancing the informational advantage of insurance companies. With their expertise and privileged access to data, insurers can assess risk more accurately than policyholders. This raises the question of how competition unfolds in such a setting and what its implications are for market outcomes.

It is well known that in competitive frameworks in which insurers hold perfect and homogeneous information about the policyholder's risk, there emerge efficient outcomes and the absence of profits in equilibrium. However, in reality, insurers' informational advantages are often imperfect and heterogeneous, due for example to the use of different algorithms and data sources, leading to different risk assessments. We investigate the competitive implications of insurers' dispersed information advantages by assuming that each insurer receives a private signal about the policyholder's risk and offers a menu of contracts that may or may not reveal private information, resulting in informative (separating) or non-informative (pooling) equilibria. The interaction between competing and privately informed insurers delivers novel insights on contract design, information disclosure, and market efficiency.

We show that both informative and non-informative equilibria can be profitable for insurers. In informative equilibria, the signaling content of insurers' offers allows the policyholder to infer insurers' information. Hence, when choosing a contract, the policyholder gains market information and is more informed than insurers are when they issue their offers. This signaling problem endogenously generates a screening problem, and the interplay between the two problems determines novel and non-standard results in terms of equilibrium characterization. Because of the screening problem, informative equilibria are inefficient, as in the traditional Rothschild and Stiglitz's setup. At the same time, because of the signaling problem, strictly positive profits emerge in equilibrium for some (and possibly all) insurers. These results emerge even for negligible amounts of signal imperfection and differ from those obtained when insurers are identically informed, in which case the need to screen the policyholder based on market information is absent and profits can be zero.

We also find that there exist strictly profitable non-informative equilibria in which insurers make identical offers. In contrast to informative equilibria, these equilibria entail risk pooling and may be ex ante fully efficient. This is because the policyholder may reject undercutting deviations, thus hindering competition, when she holds optimistic out-of-equilibrium beliefs about insurers' estimates of risk. The signaling content of deviations sustains non-informative equilibria, exactly as for pooling equilibria in signaling games. Our main insights are robust to changes in insurers' information precision and market concentration, as well as to the presence of two-sided asymmetric information and withdrawable contracts.

Our findings contribute to the debate on the implications of innovative technologies in the insurance industry, showing that improved risk assessment capabilities may not necessarily erode profits or eliminate risk pooling. As insurers continue to refine their analytical models and incorporate new data sources, policymakers and regulators must consider the broader implications of these technological advancements. By highlighting the complex interplay between asymmetric information and competition, our study contributes to a deeper understanding of the evolving insurance landscape in the digital age.