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## Risk Classification Efficiency and the Insurance Market Regulation

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**Abstract:** Given that the insurance market is characterized by asymmetric information, its efficiency has traditionally been based to a large extent on risk classification. In certain regulations, however, we can find restrictions on these differentiations, primarily the ban on those considered to be “discriminatory”. In 2011, following the European Union Directive 2004/113/EC, the European Court of Justice concluded that any gender-based discrimination was prohibited, meaning that gender equality in the European Union had to be ensured from 21 December 2012. Another restriction was imposed by EU and national competition regulation on the exchange of information considered as anti-competitive behavior. This paper aims to contribute to the recent policy debate in the EU, evaluating the negative economic consequences of these regulatory restrictions in terms of market efficiency.

**Keywords:** risk classification; asymmetric information; discrimination; adverse selection

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### 1. Introduction

Given that the insurance market is characterized by asymmetric information, its efficiency has traditionally been based on risk classification, which can be seen as a virtuous process designed to achieve the narrowest possible definition of a risk pool.

However, in reality, insurance market regulations often impose restrictions, and in this paper we analyze two of them.

First of all, in some cases, the use of classification variables, and gender is a recent example, has been considered “discriminatory” and has thereby been banned.

Second, the exchange of information between insurance companies, useful for obtaining data about the risk characteristics of the insured, has been recognized to be anticompetitive behavior.

This kind of regulatory restriction has given rise to a debate about how the advantages derived from risk classification efficiency justify special treatment of the insurance market.

With respect to the contribution of Dionne and Rothschild [1], who present a canonical insurance market screening model providing a rigorous analysis of the economic consequences of risk classification bans, the present paper contributes to this debate by trying to link the results of the formal economic literature with recent developments in regulatory policies.

## 2. Traditional Theory on Risk Classification

Traditional economic theory justifies risk classification on the basis of the market failure of informational aspects. In this sense, risk classification can be seen as a “remedy” for asymmetric information.

The theory distinguishes between two kinds of asymmetric information problems. First, adverse selection, that is, the “lemon market phenomenon” by Akerlof [2], poses a very difficult drawback in insurance markets because the parties wanting to buy insurance usually know much more about their risk characteristics than it is possible for the insurers to understand. The asymmetric information causes adverse selection within the insurance pool, as high-risk individuals realize that insurance is a good deal for them, contrary to low-risk individuals, who decide not to buy the coverage. As many high-risk people purchase insurance, higher payouts by insurance firms can force them to boost rates and that, in turn, makes the insurance less attractive to low-risk people.

As regards market functioning, adverse selection raises the cost of insurance, forcing low-risk customers to subsidize high-risk ones up to the point where the former are induced to drop out of insurance. This, in turn, raises again the cost of insurance and induces more and more customers to drop out of the market [3].

Moral hazard, on the other hand, depends on the insurance companies’ lack of information with respect to their customers’ behavior, affecting the occurrence and/or dimension of the loss. Provided that such behavior cannot be monitored by the insurance company at a reasonable cost, the insured has no incentive to take the optimal amount of care in order to avoid the loss or to reduce its magnitude.

To be precise, the term moral hazard includes two different issues. From an *ex ante* point of view, the insured may be able to influence the likelihood of loss and/or the severity of loss through self-protection and self-insurance activities, and if these are hidden actions, then expected losses could be inefficiently high. From an *ex post* point of view, the magnitude of the loss borne by the insurer payout can be adversely affected by claim build-up and/or fraud on the part of the claimant, or by “overconsumption” of covered services for repair of damages when co-insurance partially reduces the marginal cost of these services to control *ex ante* moral hazard.

In this case, a remedy could be to monitor the insured’s behavior in two ways: on the one hand, monitoring the level of care in preventing the loss (provided that the insured’s behavior has any influence over the risk); and, on the other hand, monitoring the amount of the claim in the case of loss occurrence, assuming the insured can influence the magnitude of the claim. However, considering the information asymmetry, precautionary behavior cannot be directly monitored by the insurance company and indirect indicators of the insured’s behavior may provide inaccurate information.

As a result, customers have no incentive to adopt efficient risk-reducing behavior, since such behavior is not identifiable by the insurer and thus will never be reflected in lower premiums. From this perspective, moral hazard exacerbates adverse selection: moral hazard increases the risk within the pool (by increasing the expected loss and its variance), raises the cost of insurance and gives the low-risk insured the incentive to drop out of the market [4].

In theory, the central role of the adverse selection problem in the insurance market is evident, as is the necessity to correct a severe market failure deriving from incomplete information by the risk classification method.

From an empirical point of view, with regard to the role of classification as a remedy for asymmetric information consequences, Dahlby [5] found evidence that the prohibition of risk classification in auto insurance markets forces safer drivers, *i.e.*, female drivers, out of the market. Dionne, Gourieroux and Vanasse [6] examined auto insurance markets and concluded that risk classification eliminates residual adverse selection. Furthermore, few years later, the same Authors [7] showed that, by an appropriate risk classification procedure, the insurers were able significantly to control for adverse selection in the automobile insurance market and did not need any additional self-selection mechanism in terms of underwriting.

In contrast to the contributions just mentioned, Buchmueller and Di Nardo [8] found that community rating did not induce adverse selection by comparing the health insurance markets of three US states. Similarly, Schwarze and Wein [9] demonstrated that risk classification in the German automobile insurance market during the 1990s did not improve the efficiency of contracting and, therefore, risk classification was inefficient in this market.

### 3. Risk Classification in Practice

In determining the premium to be charged for insurance coverage, insurance companies must estimate the expected losses for the individual being insured. Accordingly, the target of a risk classification system is to ensure that individuals are grouped in such a way that those with a similar possibility of loss are charged the same rate.

For efficient risk classification, it is crucial to segregate uncorrelated risks as much as possible into separate, narrowly-defined risk pools in order to control adverse selection [10]. In fact, adverse selection, described above as the tendency of those with relatively greater risk exposure to seek insurance protection, can be efficiently controlled if an insurer efficiently collects in a risk pool individuals with a narrow range of risk exposure so the insurance remains financially attractive to each member of the pool. Otherwise, if the disparity between the premium and the risks added by low-risk members becomes too substantial, low-risk members may drop out of the pool.

Accurate differentiation basically aims at reducing the average risk faced by the insurance company through reducing the range of risk within the pool. Finding efficient risk pools is therefore essential.

In defining whether a risk classification is efficient, we take into account variable characteristics like homogeneity, separation, reliability, causality and incentive worth [11]. Homogeneity means that since all members of a category pay constant rates, their risk of loss should be very similar. The separation measures the categories' mean expected losses, which ought to be sufficiently different in terms of loss expectation to warrant their identification as a separate class. Reliability measures how much simple and

evident differences are utilized to classify the insured in an accurate way. Causality measures whether category distinctions are supported by characteristics associated with loss. Incentive worth means that a good category system ought to classify the characteristics inside the insured's control so as to produce the inducement to adopt low-risk characteristics.

From a market perspective, the division of the insured into separate risk pools according to the specific exposure to risk allows insurers to charge premiums as close as possible to the insured's expected loss. As a result, this also attracts the relatively low-risk customers who otherwise would not buy insurance which they find too expensive. Ultimately, this virtuous process increases the availability of insurance for the whole of society.

At the insurance market level, there are different premiums for identical coverage. This is attributable to the insurance industry practice of placing policyholders into groups which supposedly have a similar probability of loss: individuals in each group are then charged a similar premium. The distinctions of the risk classification system are clearly supported by statistical data showing differences in the rate of accident of the different groups [12].

Risk diversification, however, is costly for the company: on the one hand, the greater the risk that must be diversified, the more costly the diversification of investments becomes; on the other hand, the higher the average risk within a risk pool, the higher the cost of the insurance of such risks, and thus the higher the premiums that members of the pool have to pay.

The inclusion of certain variables may be costly for each company that decides to use a certain kind of risk classification on the basis of the force of market competition. However, competition between insurers induces a tendency for more risk classification with the effect that some customers pay less for insurance, but some pay more, and some may be excluded from insurance altogether.

From a public policy perspective, the reduced cost of insurance for some customers is offset by the increased cost for others; the classification process itself has costs, and the exclusion of some customers could give rise to problems from a welfare perspective [13].

From the point of view of the insurance company, a rate of distinction is not unfair if it is actuarially accurate and economically convenient. However, differences in premiums paid by individuals for identical coverage are based on classifications and any risk classification scheme discriminates; the issue turns on the "social acceptability" of the discrimination. The critical point of discrimination based on gender is analyzed in the following paragraph in the light of a European Union regulation.

#### **4. Risk Classification and Discrimination**

In 2004, the Council of the European Union adopted a Directive implementing the principle of equal treatment of men and women in terms of access to and supply of goods and services, including insurance, the so-called "Gender Directive".

This Directive is one of the first acts that reflect the general tendency to impose legal restrictions on insurance differentiation by banning methods considered to be "discriminatory".

Putting into effect the principle of equal treatment of individuals is a response to the observation that insurance consumers cannot have different policies on the basis of factors such as gender or age. However, this clearly affects the contractual freedom of enterprise, as outlined by Thiery and Van Schoubroeck [14].

The content of the Directive has been widely debated in the EU Member States, particularly in relation to the impact on the insurance market because of the prohibition on using gender as a risk classification variable.

In fact, after the firm resistance of the insurance industry to the EU Commission's earlier proposal, the European Council allowed insurers to diverge from the principle of equal treatment of men and women as long as they could prove that gender was a decisive factor in assessing risk. The EU Commission was ordered to monitor the implementation of this exemption and to review the situation after a five-year period (in 2008). From this point on, insurers would have to keep on proving statistically that they were not discriminating on grounds of gender.

In its last version, Directive 2004/113/EC, imposed, in theory, "unisex" premiums, but an exception is included in Article 5(2), allowing Member States, even after 2008, to vary treatment of women and men, based on actuarial data and reliable statistics which are updated regularly and available to the public.

However, in 2011, the Court of Justice ruled that a limitless derogation from the principle of equal treatment of men and women within the field of insurance, contained in Directive 2004/113/EC, was unlawful.

The occasion was a decision<sup>1</sup> in which the Association Belge des Consommateurs (Test-Achats) Mr van Vugt and Mr Basselier considered that the Belgian Law of 21 December 2007, implementing the derogation offered by Article 5(2) of Directive 2004/113/EC, to be contrary to the principle of equality of individuals.

In this judgment, the Court of Justice initially pointed out that the validity of Article 5(2) of that Directive should be assessed within Articles 21 and 23 of the Charter of Fundamental Rights of the EU, to which Directive 2004/113/EC expressly refers. These Articles prohibit any discrimination on grounds of sex and expect general assurance of equality of men and women.

The Court dismissed the argument that the derogation introduced by Article 5(2) does not conflict with the principle of equality between men and women as they are in objectively different situations with respect to premiums and benefits in view of the insured risk. In fact, according to the Court, Directive 2004/113/EC is based on situations where the two sexes are comparable in this respect.

The EC Court of Justice ruled that the use of gender as a risk factor by insurers should not result in individual differences in premiums and benefits based on gender, and that the derogation contained in Article 5(2) of the "Gender Directive", which permitted this practice, should cease to have effect from 21 December 2012.

Many critics were disappointed with the judgment, because they expected it to have a largely negative impact on consumers. Particularly, in the insurance sector, as individuals should not be treated unfairly because of their gender, the financial services providers should be allowed to make sensible decisions based on sound analysis of relevant risk factors.

## 5. Risk Classification and Competition

Risk classification is also connected with the competitive structure of the market. On the one hand, competition can be seen as a virtuous process for achieving the narrowest possible definition of a risk pool. On the other hand, specific customer classification is utilized as a methodology of segmentation of

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<sup>1</sup> C-236/09 Test-Achats—1 March 2011.

the market based on the individualization of new risks. In this sense, insurance risk segmentation is a competitive tool with regard to other insurance companies.

In practice, insurance companies try to lure customers from competitors by offering membership of a pool whose premium is closer to the insured's expected loss because of the more discrete definition of the pool. In essence, the insurers are competing over the relatively low-risk insured of any risk pool, who are likely to select those insurers most able to price the risk the insured brings to the pool.

Competition therefore gives insurers the incentive to commit resources to the acquisition of costly information necessary for the constant improvement of risk classification, in order to be able to define narrower risk pools.<sup>2</sup>

In reality, given the difficulties of insurance companies in obtaining data on the insured's characteristics and behavior, information exchange can be seen as a useful instrument that allows insurance companies to improve their own information about their contractual counterparts. As explained above, in relation to the application of remedies to asymmetric information problems, at the screening stage insurance companies need information about insured individuals' risk profiles. After the policy is signed, insurers need information about customers' behavior to monitor the actions taken by the insured individuals.

Consequently, the exchange of data about customers' risk characteristics can improve the quality of the contracts supplied. As noted by Padilla and Pagano [15], the exchange of information in the banking market, though the same can be said of the insurance market, reduces the lock-in effects when customers deal with banks or insurance companies that they have used before. Although this is a disadvantage for the firm ex post, it constitutes an advantage ex ante in initial contracting, avoiding the problem associated with reduced market penetration owed to asymmetric information. In this context, more information can induce greater competition.

This suggests that possible benefits can be derived from information exchange in the insurance market. However, exchange of information behavior can be considered an anti-competitive practice because of its mere potentiality for giving rise to collusion.<sup>3</sup>

In other words, information exchange behavior can be included in the facilitating practices, defined as practices which try to limit the influence of factors that destabilize cooperative outcomes and to enhance the support for cooperative outcomes. Therefore, even if information-sharing in itself is not detrimental to welfare or a restriction on competition, the antitrust authorities may concentrate on detecting specific information exchanges that serve to sustain explicit and tacit collusion [16].

Therefore, exchange of information behavior is regarded as a facilitating practice in cases where the competition authority cannot directly combat collusion on price. This situation is quite common for two reasons. First, collusion is notoriously difficult to prove in court because of the scarcity or lack of statistical evidence that goes with collusive agreements. Second, in many cases, there are no explicit collusive agreements in a legal sense, but only forms of tacit collusion.

In terms of market functioning, information exchange behavior, because of the effect it has by distorting competition, would normally be regulated [19].

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<sup>2</sup> We consider the case in which there is no individuals' privacy cost to be monitored as regards gender, similarly to the case of age for automobile insurance analysed by Kelly and Nielson [17].

<sup>3</sup> For a detailed analysis of the trade-off between greater competition and increased potential for collusion, see [18].

In 1968, the Commission stated that, as far as information exchange behavior is concerned, it is difficult to distinguish between information that has no effect on competition and information that has an anti-competitive effect. However, this does not mean that Article 101 Treaty on the Functioning of the European Union (TFEU) is not applicable. In fact, information exchange, especially in an oligopolistic market, is a way of disclosing to competitors the conduct that the firms themselves have decided to adopt in the market, and this motivation was considered in the many decisions of national antitrust authorities against this practice by insurance companies.<sup>4</sup>

Ten years later, in 1978, the Commission clarified its approach towards information exchange.<sup>5</sup> First, the definition of anti-competitive behavior has to be made on a case-by-case basis by examining the features of each agreement. Second, the configuration of the market as an oligopoly plays a crucial role because, in this kind of market, information exchange increases transparency and reduces competition. Third, the nature of the data is important. Information exchange of statistical data, such as information on the production and demand in an industry, is not relevant. The exchange has to concern the individual company's data, such as information on prices, sales conditions, sales and output.

Application of EU competition policy to the insurance sector started at the end of the 1980s, when the European Commission began seriously confronting anti-competitive arrangements between insurance undertakings. So far, the Commission has mainly had to deal with agreements between insurers. It has, therefore, mainly been required to apply Article 101(1) TFEU, which prohibits agreements between undertakings restricting competition in a substantial part of the Common Market. Any agreements between insurers on commercial premiums belong to the category of price-fixing agreements, which are always contrary to Article 101(1) TFEU and cannot be exempted.<sup>6</sup>

The Commission has also recognized that certain characteristics of the insurance sector require a degree of cooperation between insurers. Article 101(3) TFEU grants exemptions to agreements that would otherwise be prohibited when they improve the economic conditions of a particular sector and provide benefits to consumers. Most of the Commission's work in relation to the application of competition rules to the insurance sector has been devoted to the definition of the types of agreements that could benefit from this exemption.

In 1992, the Commission adopted a block exemption regulation in the insurance field for certain categories of agreements, decisions and concerted practices in the insurance sector. This Commission Regulation exempts certain agreements within the insurance industry from cartel prohibition on the basis of some peculiarities of the insurance industry.

In any event, the exchange of data in order to elaborate common statistics will only be exempted if one additional condition is fulfilled: insurers exchanging data should not be obliged to use the statistics obtained for the calculation of their premiums. In relation to this condition, common statistics should always indicate that they are purely illustrative.

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<sup>4</sup> Notice on co-operation between enterprises concerning agreements, decisions and concerted practices in the field of cooperation between enterprises, *OJ C75* of 2 July 1968.

<sup>5</sup> *Seventh Report on Competition Policy*, Brussels-Luxembourg, April, 1978.

<sup>6</sup> In 1984, the Commission condemned a recommendation from the German Association of Property Insurers to its members to increase their commercial premiums by a fixed percentage (Decision of 5 December, 1984, *Verband der Sachversicherer*, *OJ L35/21*). The Court of Justice upheld the Commission's decision (Judgement of 27 January 1987, 45/85).

In conclusion, the Commission Regulation made it clear that an exchange of data that is more detailed than necessary for the calculation of net premiums would not be allowed. In addition, any exchange of information aggregated in such a way that it becomes meaningless from a statistical point of view and attempts only to harmonize prices between insurers would also not be covered by the exemption provided by Regulation 3932/92 [20].

The European Commission is in the process of reviewing Commission Regulation 358/2003 on the application of Article 81(3) of the Treaty to certain categories of agreements, decisions and concerted practices in the insurance sector. The preliminary assessment of the Commission is that the block should be extended in relation to some of the practices currently covered and terminated in relation to others. The Commission will also take into account the need of insurance companies for information to build an efficient risk classification system. However, we do not know how much this will affect the final decision in terms of exemption for the insurance market.

## **6. Which Is the Best Regulation?**

Given the asymmetric information issue, insurance market efficiency depends substantially on information that insurers can gather on the risk that they are covering. These factors help to determine the premium that must be set for different risk categories, in order to allow fully for the likelihood of a claim and the cost of that claim. The more information that an insurer can gather, the more accurately a policy can be priced.

There are many good economic reasons for classifying insurance risks according to their type and the most relevant one is that it increases the efficiency of contracting in terms of adverse selection and moral hazard. Consequently, the benefits to society are less total damage and a lower average price of policies. The multiple benefits of risk classification are, however, conditional on general principles, such as the non-discrimination principle, and the market structure.

Moreover, regulations cannot provide exemptions that determine special treatment for the insurance market, which very frequently takes the shape of an oligopoly, and where in many countries the antitrust authorities have already detected collusive behaviors.

Our final concern is that insurance market regulation needs to be addressed to stimulate competition between insurance companies, because this will determine the search, in business terms, for different variables of classification, such as experience-based ones, which will be very useful for an efficient market, without implying any discrimination or the need to share information among competitors.

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## **Conflicts of Interest**

The authors declare no conflict of interest.



## References

1. Dionne, G.; Rothschild, C.G. Economic effects of risk classification bans. *Geneva Risk Insur. Rev.* **2014**, *39*, 184–221.
2. Akerlof, G.A. The market for lemons: Quality uncertainty and the market mechanism. *Q. J. Econ.* **1970**, *84*, 488–500.
3. Riley, J. Informational equilibrium. *Econometrica* **1979**, *47*, 331–359.
4. Einav, L.; Finkelstein, A.; Levin, J. Beyond testing: Empirical models of insurance markets. *Annu. Rev. Econ.* **2010**, *2*, 311–336.
5. Dahlby, B.G. Adverse selection and statistical discrimination: An analysis of Canadian automobile insurance. *J. Public Econ.* **1983**, *20*, 121–131.
6. Dionne, G.; Gourièroux, C.; Vanasse, C. Evidence of adverse selection in automobile insurance markets. In *Automobile Insurance: Road Safety, New Drivers, Risks, Insurance Fraud and Regulation*; Dionne, G., Laberge-Nadeau, C., Eds.; Kluwer Academic Publishers: Norwell, MA, USA, 1998; pp. 13–46.
7. Dionne, G.; Gourièroux, C.; Vanasse, C. Testing for evidence of adverse selection in automobile insurance market: A comment. *J. Political Econ.* **2001**, *109*, 444–453.
8. Buchmueller, T.; Di Nardo, J. Did community rating induce an adverse selection death spiral? Evidence from New York, Pennsylvania, and Connecticut. *Am. Econ. Rev.* **2002**, *92*, 280–294.
9. Schwarze, R.; Wein, T. Is the market classification of risk always efficient? Evidence from German third party motor insurance. *German Risk Insur. Rev.* **2005**, *1*, 173–202.
10. Hoy, M. Categorizing risks in the insurance industry. *Q. J. Econ.* **1982**, *97*, 321–336.
11. Abraham, K.S. Efficiency and fairness in insurance risk classification. *Va. Law Rev.* **1985**, *71*, 403–451.
12. Crocker, K.J.; Snow, A. The efficiency effects of categorical discrimination in the insurance industry. *J. Political Econ.* **1986**, *94*, 321–344.
13. Thomas, R.C. Some novel perspectives on risk classification. *Geneva Pap. Risk Insur.-Issues Pract.* **2007**, *32*, 105–132.
14. Thiery, Y.; Van Schoubroeck, C. Fairness and equality in insurance classification. *Geneva Pap. Risk Insur.-Issues Pract.* **2006**, *31*, 190–211.
15. Padilla, A.J.; Pagano, M. Sharing default information as a borrower discipline device. *Eur. Econ Rev.* **2000**, *44*, 1951–1980.
16. Porrini, D. Information exchange as collusive behaviour: Evidence from an antitrust intervention in the Italian insurance market. *Geneva Pap. Risk Insur.* **2004**, *29*, 220–234.
17. Kelly, M.; Nielson, N. Age as a variable in insurance pricing and risk classification. *Geneva Pap. Risk Insur.-Issues Pract.* **2006**, *31*, 212–232.
18. Kuhn, K. Fighting collusion by regulating communication between firms. *Econ. Policy* **2001**, *32*, 168–204.

19. Porrini, D. Insurance regulation. In *Regulation and Economics*; Van den Bergh, R.J., Paces, A.M., Eds.; Edward Elgar Publishing: Cheltenham, UK, **2012**; pp. 529–557.
20. Fernandez, M.F.; Graells, A.S. A missing step in the modernisation stairway of EU competition law—Any role for block exemption regulations in the realm of regulation 1/2003? *Compet. Law Rev.* **2010**, *6*, 183–201.

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