LESS DISCRIMINATION, MORE GENDER INEQUALITY: THE CASE OF THE ITALIAN MOTOR-VEHICLE INSURANCE

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Abstract

For years, insurance companies have been utilizing gender as a classification variable, typically in the insurance sector of motor-vehicle coverage. However, after the European Court of Justice decision "Test-Achats" (C-236/09, 1 March 2011), the practice of pricing insurance product on the basis of the sex of the insureds were no longer been allowed. The question addressed by this article is: what is the effect of such a ban on the market price? In this direction we analyze, on a legal point of view, the relevance of the concept of equal treatment affirmed in the so called "gender Directive" (2004/113/EC) and, on an economic point of view, the efficiency advantage of the use of risk classification by the insurance companies. Then using data of the Italian motor-vehicle insurance sector, we measure the influence on the premiums of the gender variable and others variables such as age, type of vehicle, geolocation, for the period 2011-2014. The finding is that, after the ban, the price of the insurance for male and female shows a higher difference. So finally we discuss these results in terms of a kind of inequality effect in the market, that may determine a situation contrary to that pursued by the ban.

Keywords: Discrimination, Gender, Insurance Market, Risk Classification

1. INTRODUCTION

In the actual mandatory motor-vehicle insurance system, "policies are not merely contracts but also are designed to perform particular risk management, deterrence, and compensation functions important to economic and social ordering" (Stempel, 2010, p. 1489). Recognizing this fact implies a particular attention on the way the insurance companies supply their policies, particularly in terms of the discrimination practice to determine the price.

When pricing insurance products, insurance companies take into account several factors to make their prices reflecting the customers' risks. Gender is one of such factors, and has long been used by European insurers in set the prices of the policies, where they consider that the risks covered depends significantly on the insureds' gender, especially in motor-vehicle and pension funds sectors (Eylenbosch and Verreth, 1996). However, the European Court of Justice decision "Test-Achats" (C-236/09, 1 March 2011) has ruled that the companies of the European Union are prohibited from using gender as an insurance-rating variable. Despite this regulatory ban, the use of gender in insurance pricing remains subject to debate, and claims of unfair or unequal treatment between men and women in insurance provision continue to be advanced against insurance companies.

Looking at the literature, some contributions consider the use of gender variable in insurance pricing to be unacceptable per se, even if it can be justified by statistical evidence and may be "fair" from an actuarial perspective (Thiery and Van Schoubroeck, 2006). This is because it appears to be unfair to set insurance premiums on the basis of factors over which an individual has no control, as in the case of gender. And the same could be said, for example, for age (Kelly and Nielson, 2006). Moreover, from the use of factors considering a particular individual characteristics, such as race and religion, it comes that the word "discrimination" has taken a negative connotation in terms of ethics and morality. Much has been written on the question of what distinguishes "good" discrimination from "bad" one, not only with reference to insurance market but also to other fields such as job market with particular focus on the specific question whether discrimination of particular types, such as racial discrimination in the workplace, is efficient or not (Becker, 1971; Posner, 1989).

On a legal point of view, over the years the Court of Justice has introduced the distinction between direct and indirect discrimination (Tobler, 2005) where the first refers to treating an individual less favorably than another for a certain aspect, inter alia sex, and the second occurs when the effect of certain, prima facie neutral, requirements has a disproportionately adverse impact on a specific group. The concept of indirect discrimination contains elements of substantive equality as it recognizes the existence of social and material differences between people. In doing so it seeks to promote equality de facto as opposed to equality in form.

In this perspective, we are going to investigate the following aspects: to describe the legal and economic features related to discrimination; to analyze the data before and after the ban for the period between 2011 and 2014; and to measure the influence of the gender variable on the premiums. The article is organized as follows: section 2 provides the legal background and a focus on the equal treatment principle; section 3 is devoted to explain the economic approach adopted in the study; section 4 presents the empirical evidences and related discussion while Section 5 concludes.

2. THE LEGAL BACKGROUND: THE PRINCIPLE OF "EQUAL TREATMENT"

As one of the first acts that reflect the general tendency to impose legal restrictions on the use of variable to differentiate prices by prohibiting methods considered "discriminatory", at a European level, we mention the Council Directive of 13 December 2004 (2004/113/EC), better known as the "Gender Directive", provided for equal treatment between men and women in the access and supply of goods and services. Particularly, article 5(1), implementing the principle of equal treatment between men and women in the access to and supply of goods and services, proclaimed a general ban of the use of sex as an actuarial factor in the calculation of premiums and benefits for the purposes of insurance and related financial services. This Directive makes effective the principle of equal treatment of individuals as a response to the observation that consumers cannot be charged different prices on the basis of factors such as gender. But, while considering the use of gender in the calculation of prices, the Directive contains one exemption: under Article 5(2), Member States can allow "proportionate differences in insurance premiums and benefits where the use of gender is a determining factor in the assessment of risk based on the relevant and accurate actuarial and statistical data, provided that Member States ensure that such data is compiled, published and regularly updated". In this case the implementation of measures aimed at complying with the unisex rule at national level could at best be deferred by Member States for a period of up to two years as from 21 December 2007, the date of entry into force of the EU Gender Directive.

As a matter of fact, most EU Member States implemented this clause allowing insurers to utilize risk-rating factor, as gender, to differentiate the price insurance policies, in the case of meeting the requirement for objective justification. In fact, after the negative reaction of the insurance industry to the EU Commission's earlier proposal, the European Council in 2008 decided to allow 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. However, in 2011 the European Court of Justice definitively took a decision that determined the end of the discretion by Member States.

In case C236/09 "Association Belge des Consommateurs Test- Achats", Advocate General Juliane Kokott stated that it is not compatible with EU fundamental rights to consider the gender of an insured individual as a risk factor in insurance policies, particularly incompatible with the principle of equal treatment for men and women under European Union law. She therefore proposes that the Court should declare invalid the relevant derogating provision in Directive 2004/113. In the final decision, the Belgian Law of 21 December 2007, which implemented the derogation offered by Article 5(2) of the "Gender Directive", was defined contrary to the principle of equality of individuals. In general, the Court of Justice 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 expressly refers. These Articles prohibit any discrimination on grounds of gender promoting the practice based on the equality between men and women. Particularly, the Court dismissed the argument of the derogation introduced by Article 5(2) in consideration of the objective difference of the situations concerning the premiums in view of the insured risk, declaring the two sexes are comparable in this respect.

In order to assist Member States with the implementation of the "Test-Achats" ruling at national level, the European Commission issued a Communication on 22 December 2011 and provide for a period of time because this ruling would have implications in all Member States that were still allowing gender differentiation. But, as stated on 6 February 2014 by EIOPA (the European Insurance and Occupational

Pensions Authority) in a Report on the implementation of the "Test-Achats", in December 2013, 25 out of the current 28 Member States had already been implemented the prohibition of gender differentiation.

As a consequence of the "Test-Achats" decision, the European insurers cannot any more differentiate premiums on the base of gender. Many critics were addressed to the ban, because it was expected to have a largely negative impact on consumers, particularly, in the insurance market where companies result to not be any more allowed to make decisions based on sound analysis of a relevant risk factor that may contribute to an efficient classification of the insureds (Sass and Seifried, 2014). "The decision by the European Court of Justice (ECJ) to ban the use of gender in insurance policies from December 2012 is disappointing news. The insurance industry has fought against the possibility of this for the last decade and will now do everything possible to manage negative effects for customers. Before this judgment, insurers were able to take gender into account when assessing a person's risk. Today's judgment means that insurers will be legally prevented from taking a person's gender into account when pricing insurance from December 2012. The judgment will particularly affect products which take account of the risk differences between men and women such as motor insurance and some annuity products. For example, young female drivers pay less for motor insurance because they are less likely to have accidents and therefore women make fewer claims than men" (ABI press release 1 March 2011).

Differently to the European case, in USA, no such general ban on sex discrimination is yet in force (Avraham, Logue, Schwarcz, 2013), despite the fact that much debating took place on the fairness in contrast with the efficiency of the use of gender as a risk variable, particularly in the 1970s and 1980s within the literature over important judgments of the Supreme Court (Caracciolo di Torella, 2013). This principle was first spelled out in the USA in the case of Manhart where the Court ruled that the legislation considers it unlawful to discriminate "against any individual with respect to his compensation, terms, conditions, or privileges of employment because of such individual's race, colour, religion , sex or national origin" (City of Los Angeles Department of Water and Power v Manhart 435 US 702-1978).

On this point, in the next section, we are going to analyze the meaning of discrimination as a tools of risk classification on an economic efficiency point of view.

3. THE ECONOMIC APPROACH: THE EFFICIENCY OF RISK CLASSIFICATION

About the effects of "Test-Achats" decision, one of the main critics is related to the impact on the insurance market functioning due to the elimination of the use of gender as a risk classification variable. Looking at the economic theory, risk classification is considered a basic device to reduce the problems connected with asymmetric information, and particularly adverse selection.

Adverse selection comes from hidden information, i.e. the inability of insurers to observe risk profile of each individual, leading to supply policies based on the average risk of groups of customers. But given this, more high-risk individuals purchase insurance; higher payouts by insurance companies force them to raise rates which, in turn, makes the insurance less attractive to low-risk individuals. As a consequence, this may reduce the stability of the market equilibrium, and the market may completely break down, such as the famous "market for lemons" (Akerlof, 1970). To reduce adverse selection, in determining the premium to be charged, the insurance companies utilize risk classification distinguishing

the customers in such a way that the ones with similar loss probability are charged the same rate. If the risk classification is accurate and groups are homogeneous in terms of risk levels, the premium charged results to be not so far from the individual risk profile.

The choice of the variables in the risk classification system is clearly supported by statistical data: in this sense the differences in premiums paid by individuals for identical coverage are based on discriminatory classifications that are based on the group risk profile (Porrini, 2015). Definition of risk profiles is, therefore, essential to the insurance market functioning. Distinction of insureds into separate groups according to the specific exposure to risk allows insurers to charge premiums as close as possible to the insured's expected loss. In this way also the relatively low-risk customers, that would otherwise drop out insurance because found it to be too expensive, are also attracted. At the end of the day, this virtuous process is increasing the efficiency of the insurance market functioning with beneficial effects not only for the insurance companies, but to the whole society given that more individuals ends up to be insured at the lowest cost (Porrini, 2016).

Given the role of the classification of risk, the prohibition in using a variable, such as gender, appear as a potential limit to the possibility of charge different premiums to different groups of insureds based on differences in their risk level. In fact, on an economic point of view, an elimination of the use of a relevant rating factor such as gender cannot be achieved without effects on the market and, of course, these effects are most significant where the factor is highly correlated with risk. Practically, the removal of gender as a rating factor leading to unisex prices may result in the lower-risk gender experiencing increases in premiums in order to cross-subsidize the higher-risk gender (Hoy, 1982).

On a theoretical point of view, Crocker and Snow (1986) demonstrates that a ban in the use of risk-related characteristics such as gender or race, limiting the possibility of pricing insurance policies, is inefficient whenever categorization is costless. Their analysis, by contrast, suggests ambiguous welfare effects of banning costly categorization. About this last point, Rothschild (2011) reversed this latter conclusion, showing that such kind of bans are inefficient even when categorization is costly. On an empirical point of view, testing the efficiency of classification as a remedy for asymmetric information consequences, Dahlby (1983) found evidence that a ban limiting the practice of risk classification in auto insurance markets forces safer drivers, such as female drivers, out of the market. Dionne, Gourieroux and Vanasse (1998, 2001) proved that by an appropriate risk classification procedure, the insurers are able to significantly control for adverse selection in the motor-vehicle insurance market and no additional self-selection mechanism is necessary in terms of underwriting.

About the effects of the ban in gender discrimination outlined above, in the next section we propose an empirical analysis in the case of the Italian motor-vehicle insurance sector.

4. EMPIRICAL EVIDENCE IN THE CASE OF ITALIAN MOTOR-VEHICLE INSURANCE SECTOR

In this direction the aim of this paper is to measure, in the case of Italian motor-vehicle compulsory insurance, the effects on the level of premiums of the ban determined by "Test-Achats". More in details, we would like to contribute to a better comprehension of the fact that a ban on the use of gender as a risk-rating factor does not necessarily deliver equal insurance prices on a gender point of view. Moreover, if there are any other factors in the insurance pricing models that are correlated with gender (including those that are valid risk-rating variables in their own right, such as, age, type of vehicle and geographical

location), these will also pick up the correlated gender-related risk in the resulting insurance prices (Schmeiser et al., 2014; Aseervatham et al., 2016).

We draw the data from the National Institute for the Supervision of Insurance (IVASS) that is an independent administrative authority, introduced with the Decree Law 6 July 2012 n. 95, converted into law 7 August 2012 n. 135, replacing the previous Institute called ISVAP. The IVASS dataset contains data about insurance classes, gross premiums, premiums from direct and indirect business also collected abroad, trends in motor insurance and in other sectors of business, disputes regarding motor liability insurance. For our analysis we extrapolated the motor-vehicle sector data for the period from October 2011 to January 2014, the data have a quarterly frequency, for a total of 10 quarters for each Italian Province. IVASS identifies sample profiles on the basis of the criteria useful for the fulfillment assigned to the Authority by art. 136 of the Insurance Code to address the analysis of motor-vehicle insurance prices for particular categories of insured, geographical areas, and the "bonus-malus" system, the latter to track over time the trend of the discounts characterizing the different geographical areas (Schwarze and Wein, 2005).

In particular, we consider the following variables:

- *Price* variable that refers to the amount paid as an insurance premium by male and female measured in thousands of euros;
- A*ccident* that represents the number of accidents in the six months prior to the survey;
  Gender that is a dummy variable with value 0 or 1, where 0 indicates male gender and 1 female gender;
- *Geolocation* that is a dummy variable assuming value 0 and 1, where 0 indicates the geographical location in Southern Italy and in the islands (Sicily and Sardinia) and 1 indicates the geographical location in Northern Italy;
- V*ehicle* that is a dummy variable referring to the type of vehicle, where 0 indicates the case of a car with 1300 cc and 1 the case of a moped with 200 cc or a motorcycle with 50 cc;
- *Age* that is a dummy variable, where 0 indicates that the driving person is 18 years old and more, and 1 indicates that who is driving is at least 40 years;
- *Change* that is a temporal dummy variable representing the period considered, where 0 indicates that the observation is occurred before the entry into force of the ban and 1 otherwise.

The following Table 1 summarizes the statistics of the variables.

Table 1
Summary Statistics

Dataset	Number of provinces	Variables	Mean	Standard Deviation	Minimun	Maximum
IVASS	21	PRICE	1,066	998.810	15	4,007
		ACCIDENT	293	422.334	5	2,907
		AGE	1	0.500	0	1
		GENDER	1	0.500	0	1
		GEOLOCATION	1	0.4872	0	1
		VEHICLE	1	0.500	0	1
		CHANGE	1	0.500	0	1

The estimation has been made for the 21 Italian provinces in which reliable data exist in relation to the Male Price, Male Accident, Female Price, Female Accident, Age, Vehicle. We analyze the panel data for the period from 2011 to 2014 that is the only time period for which all the variables are present in the IVASS database. Using a panel data analysis, four regressions have been conducted to verify the robustness of empirical results. The four regressions are the following:

- the first regression evaluates the effects of gender discrimination on the price before the ban;
- the second regression evaluates the effects of gender discrimination on the price after the ban;
- the third regression evaluates the effects of gender discrimination on the price for the entire period (from 2011 to 2014);
- the fourth regression evaluates the effects of gender discrimination on the price from 2011 to 2014, but with an additional dummy variable, the *Change* variable, introduced to verify the significance of the introduction of the ban.

The dependent variable Price for each model have been regressed on independent variables Accident and on dummy variables i.e. Gender, Geolocation, Age, Vehicle and Change.

$$LnPrice_{i,t} = \alpha + Ln\beta_1 Accident_{i,t} + \beta_2 Gender_{i,t} + \beta_3 Position_{i,t} + \beta_4 Age_{i,t} + \beta_5 Vehicle_{i,t} + \varepsilon_{i,t}$$

$$LnPrice_{i,t} = \alpha + Ln\beta_1 Accident_{i,t} + \beta_2 Gender_{i,t} + \beta_3 Position_{i,t} + \beta_4 Age_{i,t} + \beta_5 Vehicle_{i,t} + \varepsilon_{i,t}$$

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$$LnPrice_{i,t} = \alpha + Ln\beta_1 Accident_{i,t} + \beta_2 Gender_{i,t} + \beta_3 Position_{i,t} + \beta_4 Age_{i,t} + \beta_5 Vehicle_{i,t} + \beta_6 Change_{i,t} + \varepsilon_{i,t}$$

The Table 2 shows the results of the four different regressions with the impact of the variables analyzed on the dependent variable Price.

The model (1) shows the impact of independent variables on dependent variable *Price* before the ban, that corresponds to the period of time when the risk variable distinguishing between men and women was still in use. The second model (2) shows the effect of independent variables on dependent variable *Price* after the ban, that corresponds to the period of time when the use of risk variable distinguishing between men and women was not allowed anymore. The model (3) evaluates the impact on the dependent variable for the entire period, before and after the ban. Also the last model (4) shows the impact on the dependent variable for the entire period but with the addition of the variable denominated *Change* which measures the impact of the ban on the *Price* variable.

The columns labeled (1), (2), (3) and (4), included in Table 2, report the results of the four-separate OLS regressions. The values in the Table are the coefficients, standard errors (in parentheses), their p-values, and summary statistics, as indicated by the description in each row. The results of the first regression analysis show how all the variables taken into consideration are significant, which is expressed by the *p*-value that for each variable is equal to (< 0.001).

The first variable is *Accident*, as the number of accidents increased by 1%, our dependent variable recorded an increase of 0.17%. The second variable is a dummy variable *Gender* and the result of the

analysis demonstrates that the price paid by women is bigger than the one paid by male before the ban for a variation equal to 7%. For the third variable, *Geolocation*, the result of the analysis indicates that the insureds located in the Southern Italy paid a price higher than the insureds located in the Northern Italy. Furthermore, the analysis shows a close relation between *Price* and *Age*, demonstrating that the individuals under 40 years pay a lower price than the ones with at least 40 years. The last variable considered in the analysis is *Vehicle* and its significance demonstrates that ensuring a car with 1300 cc is more expensive that ensuring a moped with 200 cc or a motorcycle with 50 cc.

Table 2
Regression Results

Regressor	Ln Price (1)	Ln Price (2)	Ln Price (3)	Ln Price (4)
Ln Accident	0.1731 *** (0.0116)	0.1520*** (0.0152)	0.1621*** (0.0036)	0.1622*** (0.0037)
Gender	0.074736*** (0.0268947)	0.199021*** (0.0354538)	0.136634*** (0.0168783)	0.136737*** (0.0167945)
Position	−0.39053*** (0.0265301)	−0.37432*** (0.0347642)	−0.38211*** (0.00800568)	−0.38218*** (0.00802427)
Age	−1.05948 *** (0.0252200)	−1.00999*** (0.0330462)	−1.03451*** (0.00742123)	−1.03453*** (0.00744598)
Vehicle	−1.01677*** (0.0251114)	−1.04218*** (0.0329536)	−1.02979*** (0.00615764)	−1.02980*** (0.00615593)
Change				0.00789257 (0.00705567)
Summary				
SER	0.363870	0.477256	0.425480	0.425588
Adj. R^2	0.813733	0.709634	0.756987	0.757007
Obser.	672	672	1,512	1,512

*** 0.1% significant level

Focusing on the summary statistics of regression (1), it is possible to notice that the adjusted R^2 assumes a value equal to 0.813733, quantifying the extent to which the explanatory variables explain the variation in the dependent variable.

The first (1) and second (2) regression analyze two different time periods: in the post-ban period (2), in relation to column (1), the variables *Ln Accident, Geolocation, Age, Vehicle* have similar results. It is important to emphasize the different impact of the *Gender* variable, because after the ban the inequality between male and female increases. In fact, the result of the analysis demonstrates that the difference between the price paid by women and by men was 7% before the ban, but it becomes 19% after the ban. In this case R^2 assumes a value equal to 0.709634.

The third Model (3) measures the effect produced on the dependent variable by the independent variable for the period from 2011 to 2014. The results of the analysis show how all the variables taken into consideration are significant, given the *p*-value that for each variable is equal to (< 0.001). The independent variable has a similar impact in the models (1) and (2), and the only variable that presents a

different impact is *Gender*. So, the results of the analysis demonstrate that for the total period considered the difference between the price paid by women and by men is 13%. Focusing on the summary statistics of regression (3), it is possible to notice that the adjusted R^2 assumes a value equal to 0.756987.

The model (4) considers the same period of model (3) but in the analysis the additional dummy variable *Change* is introduced with the goal to measure the impact caused by the ban on the dependent variable *Price.* The relationship between the variable *Change* and the dependent variable is not significant, not even if the observation was carried out before or after the ban; the other variables confirm the trend of the third regression (3). From the results obtained, we can say that in the pre-ban period the price paid by women is 7.5% more than the one paid by men.

As an example, in the case of two insured individuals of different sex, but with the same type of vehicle, province of residence, and age, for every 1,000 euros paid for the premium the difference is equal to 75 euros. The situation changes in the post-ban period: the data analysis shows that, with the same conditions, every 1,000 euros paid for the premium a woman pays 200 euros more than male counterpart, with an increase of 125 euros compared to the previous period.

We can conclude that the effect of the gender discrimination ban is that women are not directly discriminated by gender (that is not any more a risk variable used by the insurance companies) since, after the ban, the premium is the same for male and female, but there is less gender equality because in the same conditions a woman pays more that a man, given the effects of other risky variables.

5. CONCLUSIONS

As we have seen, on an economic point of view, the limitation in the use of a relevant rating factor such as gender may have effects on the market experiencing increase in premiums. This means that an analysis of the effects of banning the use of gender as a risk variable has to be done weighing the negative effects deriving from a restriction on risk-based pricing, as well as against the wider distributional impacts and other aspects of fairness that may be compromised (Abraham, 1985).

The policy debate around the use of gender in insurance pricing often appears to be primarily concerned about “equal treatment” of men and women and, in this perspective, the differentiation on the basis of gender is not acceptable from a wider social point of view. From an economic perspective, however, the use of gender-based pricing does not produce a “fair” treatment because finally the individuals of a certain gender end up paying higher premiums (Oxera, 2011).

In this article, we have demonstrated that unisex rating regulations may produce gender differences in insurance premiums. Moreover, we have given our contribution to the debate about the fact that gender differences may remain in premiums after the implementation of unisex tariffs and that pricing reflects characteristics that differ between sexes in a way that proxies for the omitted gender variable, giving rise to a sort of “indirect discrimination”. Particularly, using data of the Italian motor-vehicle insurance sector before and after the ban (2011-2014), we have measured the influence of the gender variable on the premiums. As a result, after the ban, the price of the insurance for male and female shows a higher difference, and consequently the market appears to be characterized by more inequality.

We can then conclude that a simple ban on the use of gender as a risk-rating factor in insurance pricing does not necessarily deliver gender-neutral insurance prices. And our result is that a ban in the use of gender as a risk-rating factor does not deliver equal insurance prices on a gender point of view. This is because other factors in the insurance pricing models correlated with gender (in our model: age, type of vehicle and geographical location) pick up the correlated gender-related risk in the resulting insurance prices.

Our findings reveal a discrepancy between the objective of Test Achats at bringing insurance in line with the other EU equality measures and the results in terms of a real equal treatment of men and women in the market. From this, we could derive interpretative consequences suggesting that insurance regulation has to take into account not only the formal gender discrimination but also indirect form of discrimination. As a conclusive remark, given the role of the insurance in question as part of the insurance industry larger role as a social and economic instrument, we can say that further researches are needed to test the real effects of the ban in using gender as a risk variable to evaluate whether with prohibiting the gender discrimination the target of equality between men and women is really implemented.

6. REFERENCES

Abraham K. S. (1985). Efficiency and fairness in insurance risk classification, *Virginia Law Review, 71*, 403–451.

Akerlof G. A. (1970). The market for lemons: Quality uncertainty and the market mechanism, *Quarterly Journal of Economics*, *84*, 488–500.

Aseervatham V., Lex C., & Spindler M. (2016). How do unisex rating regulations affect gender differences in insurance premiums?, *The Geneva Papers on Risk and Insurance - Issues and Practice*, *41*(1), 128-160.

Avraham R., Logue K. D., & Schwarcz D. B. (2013). Understanding insurance anti-discrimination Laws, *Southern California Law Review*, *87*, 195-274.

Becker G. (1971). *The economics of discrimination*. Chicago: The University of Chicago Press.

Caracciolo di Torella, E. (2013). No sex please: we're insurers, *European Law Review*, *38*, 638-654.

Crocker K. J., & Snow A. (1986). The efficiency effects of categorical discrimination in the insurance industry, *Journal of Political Economics*, *94*, 321–344.

Dahlby, B.G. (1983). Adverse selection and statistical discrimination: An analysis of Canadian automobile insurance. *Journal of Public Economics*, *20*, 121–131.

Dionne G., Gourièroux C., & Vanasse C. (1998). Evidence of adverse selection in automobile insurance markets. In G. Dionne, & C. Laberge-Nadeau (Eds.), *Automobile Insurance: Road Safety, New Drivers, Risks, Insurance Fraud and Regulation* (pp. 13–46). Norwell: Kluwer Academic Publishers.

Dionne G., Gourièroux C., & Vanasse C. (2001). Testing for evidence of adverse selection in automobile insurance market: A comment, *Journal of Political Economy*, *109*, 444–453.

Eylenbosch A., & Verreth K. (1996). Equal treatment for men and women in complementary pensions: Answers or unresolved questions?, *Journal of European Social Policy*, *6*(2), 123-146.

Hoy M. (1982). Categorizing risks in the insurance industry, *Quarterly Journal of Economics*, *97*, 321–336.

Kelly M., & Nielson N. (2006). Age as a variable in insurance pricing and risk classification, *Geneva Papers on Risk and Insurance - Issues and Practice*, *31*, 212–232.

Oxera (2011), *The impact of a ban on the use of gender in insurance*. www.oxera.com/publications. (Retrieved December 7, 2011.)

Porrini D. (2015). Risk classification efficiency and the insurance market regulation, *Risks*, *3*(4), 445-454. doi:10.3390/risks3040445

Porrini, D. (2016). Risk classification in natural catastrophe insurance: The case of Italy. *International Journal of Financial Research*, *7*(1), 39-49.

Posner R. A. (1989). An economic analysis of sex discrimination laws, *University of Chicago Law Review*, *59*, 1311-1335.

Rothschild C. (2011). The efficiency of categorical discrimination in insurance markets, *The Journal of Risk and Insurance*, *78*(2), 267-285.

Sass J., & Seifried F. T. (2014). Insurance markets and unisex tariffs: is the European Court of Justice improving or destroying welfare?, *Scandinavian Actuarial Journal*, *2014*(3), 228-254.

Schmeiser H., Störmer T., & Wagner J. (2014). Unisex insurance pricing: Consumers' perception and market implications, *The Geneva Papers on Risk and Insurance - Issues and Practice*, *39*(2), 322-350.

Schwarze R., & Wein T. (2005). Is the market classification of risk always efficient? Evidence from German third party motor insurance, *German Risk Insurance Review*, *1*, 173–202.

Stempel J. W. (2010). The insurance policy as social instrument and social institution, *William & Mary Law Review*, *51*, 1489-1582.

Thiery Y., & Van Schoubroeck C. (2006). Fairness and equality in insurance classification, *Geneva Papers on Risk and Insurance - Issues and Practice*, *31*, 190–211.

Tobler C. (2005). *Indirect discrimination. A case study into the development of the legal concept of indirect discrimination under EC law*. Antwerp: Intersentia.