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Agenda

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Gender and insurance: unintended consequences of unisex insurance pricing

The European Court of Justice has ruled that the opt-out from the EU Gender Directive, which allows the use of gender as a risk factor in insurance pricing, contravenes the European Charter. What are the economic implications of a requirement for unisex insurance premiums and benefits? In particular, how effective is the rule in achieving gender-neutral insurance prices, and does it have any potential unintended market consequences?

On March 1st 2011, the European Court of Justice ruled that the derogation from the general rule of unisex insurance premiums and benefits in the EU Gender Directive will be invalid with effect from December 21st 2012.[1] This could change the practice in most EU Member States, including the UK, which currently allow insurance companies to use gender as a risk-rating factor and to differentiate by gender when pricing insurance policies, subject to an objective justification requirement.

A previous article in *Agenda* examined the economic impacts of a ban on the use of gender in insurance pricing,[2] drawing from a comprehensive study conducted by Oxera on behalf of the Association of British Insurers (ABI).[3] This article does not repeat the discussion of the dimensions of expected impact, but instead focuses on two key aspects that are often ignored in the debate:

- the (in-)effectiveness of a simple ban on the use of gender in achieving gender neutrality in insurance pricing; and
- the unintended consequences of unisex insurance pricing.

Can gender-neutral pricing be achieved?

A simple ban on the use of gender as a risk-rating factor in insurance pricing does not necessarily deliver gender-neutral insurance prices. To illustrate this point, consider the pricing of motor insurance with current premiums as set out in Table 1. There are two pricing factors: gender and engine size. Assume that motor insurance for a 3-litre car is twice as expensive as for a 1-litre car; that males pay twice as much for motor insurance as females; and that more young males drive high-powered cars than young females do—ie, as is observed in practice, there is a correlation between gender and engine size (a similar example could be based on mileage, which also tends to differ by gender). For simplicity, the assumption is that the insurance portfolio comprises 100 females and 100 males, of which 70 females drive a 1-litre car and 70 males drive a 3-litre car.

Table 1 The impact of removing gender as a rating factor: a stylised illustration

	Current premium (£)		Gender mix			
Engine size	Female	Male	Female	Male	Weighted average unisex rate (£)	Gender-neutral price (not sustainable) (£)
1-litre	1,000	1,500	70%	30%	1.150	1,250
3-litre	2,000	3,000	30%	70%	2,700	2,500
Ratio	2	2			2.35	2

Note: The weighted average unisex rate is calculated by taking the gender proportions into account. The gender-neutral price removes gender risk from pricing (ie, it does not allow the factor—engine size—to pick up the gender risk differential).
Source: Oxera (2010), report prepared for the ABI.

First, consider the scenario where the gender factor is removed from the pricing model and a unisex rate is introduced, but risk-based pricing using engine size is allowed to continue. For the motor insurance provision to remain commercially viable, the prices have to be adjusted so that the 1- and 3-litre risk pools each meet their costs. Ignoring any risk margin, the new prices can be calculated as a weighted average unisex rate for each risk pool, with the weights determined by the gender mix in each pool. In Table 1, for example, the current premium for female drivers of 3-litre cars is £2,000, and for male drivers it is £3,000. For the insurer to earn the same amount in premiums to cover its cost on 3-litre cars, it needs to set a unisex price at £2,700 to account for the fact that there are 70% males and 30% females driving 3-litre cars.

Put differently, the new weighted average unisex prices take account of the gender mix, and in doing so actually reflect part of the differences in risk that relate to gender. This is also reflected in the engine-size ratio (see 'Ratio' in Table 1). With the unisex rate, insurance for 3-litre cars is 2.35 times more expensive than for 1-litre cars, but this includes the gender risk differential. The true risk contribution of the factor—engine size—for a male or female driver would imply a price differential whereby the price of insurance for a 3-litre car exceeds that of a 1-litre car by a factor of 2 (as per the current gender-specific premiums in Table 1).

If, in the above example, the gender imbalance in each engine-size pool were even more extreme—say 99% males in the 3-litre pool and 99% females in the 1-litre pool—imposing unisex prices on these pools would have almost no impact on the price that males would be charged in the 3-litre pool and females charged in the 1-litre pool. As a result of the imposition of a ban on the use of the gender factor, most people would still be charged premiums that reflect gender-related risk—eg, 99 out of the 100 women would pay more or less what they paid before (just above £1,000), and the one female driver of the 3-litre car would pay considerably more (close to £3,000) because the premium is determined by the males in the portfolio.

The above illustration has used engine size as an example of another rating factor which in itself has a legitimate risk- and pricing-related role in motor insurance. Unless this (or another) rating factor is completely uncorrelated with gender, the pricing of the risk pools using this factor will automatically include gender risk in the price. Addressing this remaining gender discrimination is complex.

While engine size and other factors have a legitimate use as a risk-rating factor, there may be factors that are also correlated with gender but themselves have no risk correlation. For example (and, like the above example, this is taken to an extreme to illustrate the point), suppose there were two colours of car—say red and blue—which have no impact on risk, but are correlated with gender (say 80% of red cars (all 1-litre) are driven by males, 80% of blue cars (all 1-litre) are driven by females). The pricing of insurance with respect to car colour when gender is allowed as a rating factor is set out in Table 2—females pay £1,000 and males pay £1,500 for motor insurance, irrespective of the colour of the car.

Now assume that the insurer used car colour as a rating factor, even if it does not in itself have any risk correlation. The ban on the use of gender as a rating factor could then result in the creation of a red car pool and a blue car pool, with unisex rates determined by the gender balance in each pool, as shown in Table 2.

Again, the rating factor correlated with gender (here, car colour) would pick up the gender-related risks. If the correlation were perfect—ie, all females drove blue cars and all males drove red cars—the complete gender differentiation would be reproduced by using car colour as the rating factor.

In this example, because there is no risk attached to car colour, the use of this rating factor could easily be identified as indirect gender discrimination—and this could be banned without having further implications for risk-based pricing. The issue is more complicated if the rating factor is a true risk factor in itself, and is also

Table 2 The impact of removing gender as a rating factor: a stylised illustration

	Current premium (£)		Gender mix		
Car colour	Female	Male	Female	Male	Unisex rate (£)
Red	1,000	1,500	20%	80%	1,400
Blue	1,000	1,500	80%	20%	1,100
Ratio	1	1			1.27

Note: The unisex rate is calculated as the weighted average for each car colour pool, with the weights determined by the gender mix in each pool.
Source: Oxera (2010), report prepared for the ABI.

correlated with gender (eg, engine size). In this case, as explained above, there are two ways to remove gender risks from pricing: either the use of all gender-correlated risk factors also has to be banned, or transfer payments between risk pools are required. If neither of these is possible, pools with an above-average share of the higher-risk gender will be uneconomic to insure, while pools with a larger share of the lower-risk gender will be overly profitable.

An alternative approach would be to allow gender-correlated rating factors to be used (eg, engine size), and to accept that the pricing based on these factors will have to reflect both the risk impact of the factor itself and part of the gender risk differential. If such an allowable rating factor were perfectly correlated with gender then all the gender risk differential would still be included in the pricing.

While this approach is possible, it also creates its own problems. For example, in the car colour illustration above, if car colour presented a small real risk factor (for which there is some evidence, but not along the red/blue dimension), and if there were a high correlation with gender, the resulting price differential between car colours would reflect mainly the gender risk differential, and would be much greater than was justified by the actual colour effect.

In policy terms, it would therefore be necessary to specify how significant the actual risk differential would need to be, combined with the level of gender correlation, to make a factor acceptable as a pricing factor. This level of intervention in the acceptable risk models that insurers can use would be significant. It could also create a high degree of uncertainty about what would constitute acceptable pricing (in the legal sense) and what would not.

For example, while shoe size might be easily identifiable as a factor that might not be allowed (given that, albeit a good proxy for gender, shoe size is unlikely to be a risk factor in itself), there may be a grey area around factors such as occupation (already used in motor insurance, because of the higher motor accident risk for certain occupations) or the insured's weight and height (not currently used in life insurance, but potentially a legitimate risk factor given the adverse health implications of a high body mass index). This issue relates to the question of suitable (and allowable) proxies following the ban on the use of gender.

Overall, a simple ban on the use of gender as a risk-rating factor in pricing models does not necessarily achieve gender-neutral prices. If there are good risk factors that are highly correlated with gender, the outcome for male and female consumers will be that prices still largely reflect the gender risk differential, raising questions about what the objective of the ban was in the first place. Greater gender neutrality in pricing would otherwise also require a ban on the use of factors that are correlated with gender. This could indeed be very costly (if not impossible) to implement.

Unintended consequences

A ban on the use of gender restricts the way in which insurers can price risks, and requires adjustments in the supply of insurance, with potentially adverse consequences for consumers, who ultimately bear any cost increases or other supply-side adjustments. Examples of such effects are examined below.

Use of other rating factors which are themselves correlated with gender

As indicated above, if insurers are allowed to continue to use legitimate risk factors (such as engine size) which are themselves correlated with gender, the requirement for gender-neutral prices within a particular insurance pool will tend to increase the impact on price of any gender-correlated characteristics which are currently used in any risk model. All else being equal, this will manifest itself as the gender-neutral price being closer to the current price for the gender that represents a higher proportion of the pool, rather than settling halfway between the current male and female prices.

In addition, insurers may look for the underlying risk characteristic that can itself be measured in a gender-neutral way. So, for example, insurers could possibly seek to apply psychometric tests to identify individuals with relatively high risk-taking behaviour. In this way, they could identify a high-risk pool and a low-risk pool along this dimension, and price each accordingly. In theory at least, if all the dimensions that currently lead to the gender-correlated risk differential can be identified, the resulting risk pools would exhibit no remaining gender-correlated risk. However, taken overall, the resulting distribution of prices would still result in, on average, men and women paying different prices for the same insurance cover. (Indeed, for the reasons set out below, probably more in total.)

Furthermore, if insurers seek to use other risk factors that are like engine size—namely, risk-related in themselves but with the unintended consequence of a correlation with gender—it will be a legal (not economic) question as to where the precise boundary will be drawn to distinguish between the use of characteristics of this sort that are legitimate and proportionate, and where it would be deemed to be indirect gender discrimination.

From an efficiency perspective, these alternatives can be expected to be less accurate for risk-pricing purposes and/or more costly to implement. Gender is a simple and readily available factor that is correlated

with risk (in some cases causally—eg, certain medical conditions apply only to males or to females).

In addition to efficiency and practicality considerations, there can be concerns from a societal point of view, since the alternative methods can be:

- more intrusive—while most people do not mind revealing their gender, this may not be the case when it comes to the disclosure of detailed medical information or lifestyle choices, or, in the case of motor insurance telematics, being tracked when driving;
- perceived as 'unfair'—if a gender ban results in greater weight being placed on other rating factors, this will result in redistribution along these other dimensions (eg, age, medical history, occupation or engine size), which might not be perceived as fairer than the gender-based differentiation, and it may compromise other aspects of individual rights;
- not effective in achieving full gender neutrality, and indirectly discriminating by gender, as explained above.

Targeted marketing and distribution

If insurance companies cannot directly price according to gender or adjust policy conditions depending on the gender of the insured, they may seek to control the gender mix (and attract the lower-risk gender) through targeted marketing and distribution—eg, advertising in relevant magazines, running promotional campaigns aimed at a particular gender, changing their distribution partners, adjusting the terms of distribution, and bundling insurance with other single gender-attractive goods or services.

Any such activity is likely to increase the costs of the transaction process (raising average prices for all customers) and could be considered wasteful from an economic point of view.

Concluding remarks on fairness and pension annuities

In the private pension annuity market, the current gender-differentiated premiums imply that women tend to receive a lower annuity payment in any year (Table 3). However, this payment stream can in general be expected over a longer period of time, such that, for the same lump-sum purchase price, women nonetheless receive the same (or indeed higher) total expected annuity benefit as men.

This example (which at the general level also holds for other insurance products in terms of the expected costs and benefits of insurance policies) raises a number of interesting points. For example, it suggests that, at an individual level, women may pay more or receive fewer benefits than men from the annuity contract, but, at the group level, the payments made by women pay for the benefits enjoyed by women, and the payments made by men pay for the benefits enjoyed by men. The requirement for unisex premiums and benefits is consistent with a view of what constitutes 'fairness' at an individual level, but this may not be considered 'fair' at the group level. That is, if annuity rates were equalised (say at the weighted average between male and female rates, with the weights determined by the gender mix in the portfolio), for the group of men the annuity would be worth less than before, and worth less relative to the value for women—in principle, individual men may decide to drop out of the market (if they have the choice to do so).

Where gender is correlated with the risk and cost of insurance provision, gender-differentiated pricing means that, as a group, men and women pay for themselves. With gender-neutral pricing they do not—one gender effectively cross-subsidises the other. In some circumstances, the gender that pays 'too little' may be able to exploit this outcome in a way that undermines the operation of the market, creating a potential market failure. If there is a second-hand

Table 3 Pension annuities and life expectancy

	Current premium (£)	Number of years expected to live	Total annuity benefit (£)	NPV of annuity benefit (5%) (£)	NPV of annuity benefit (10%) (£)
Male	6,510	17.37	113,079	74,395	52,654
Female	6,111	20.04	122,464	76,244	52,059

Note: This table shows the average annual annuity payments for a 65-year-old, non-smoking man and woman (standard annuity, purchase amount £100,000, single-life, non-escalating), obtained from a price-comparison website in the UK. Life-expectancy data is based on Office for National Statistics Interim Life Tables, using 2006 to 2008 data. The total annuity benefit is calculated as the simple product of the annual annuity payment and the number of years expected to live, without discounting. The NPV refers to the net present value of the annuity payments, at two different illustrative discount rates.
Source: Oxera (2010), report prepared for the ABI.

market in the services provided, the gender that pays too little may be able to sell their purchase for more than they paid for it—because its value is higher than the price they pay. In the annuity example above, because women will tend to live longer, they may be able to sell the average future income stream that the annuity represents for more than they have to pay for it under a unisex price. Unless additional restrictions are put in place, this is an unstable outcome, and providers would have to react by selling the product to the favoured gender at a price that is above the second-hand value. Since this price would be above the real costs, there is a risk that this could compel the providers to make super-normal profits—an outcome that is not in the general consumer interest.

[1] The EU Gender Directive of December 13th 2004 (Council Directive 2004/113/EC) prohibits all discrimination based on sex in the access to and supply of goods and services. In principle, the Directive therefore also prohibits the use of gender as a factor in the calculations of insurance premiums and benefits in relation to insurance contracts. However, by way of derogation, the Directive provides that EU Member States may permit exemptions from the rule of unisex premiums and benefits as long as they can ensure that the underlying actuarial and statistical data on which the calculations are based is reliable, regularly updated and available to the public.
[2] Oxera (2010), 'The use of gender in insurance pricing: unfair discrimination?', *Agenda*, September.
[3] Oxera (2010), 'The use of gender in insurance pricing: analysing the impact of a potential ban on the use of gender as a rating factor', Association of British Insurers research paper 24.