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THE PRACTICE OF PRICE OPTIMIZATION

IN THE US INSURANCE INDUSTRY

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1. Introduction

There has been a spate of regulations in the USA, banning insurers from the use of price discrimination (read: "price optimization") when determining a customer's premium, enacted across at least 20 states and counting [1]. In a July 2018 Research Note[2], the UK's Financial Conduct Authority (FCA) also discusses discriminatory pricing in the financial services sector, with specific references to the insurance industry. Globally, the regulatory realm is aware of the increased incorporation of big data into the dynamic pricing models used by insurance companies, but questions remain as to whether this is a fair practice, something to be monitored, or even banned outright.

2. What is price optimization?

Price optimization utilizes mathematical models to include individual demand elasticities when calculating the price to charge customers. Put simply, the company's algorithms are designed such that they can estimate the price any one consumer is willing to pay for a product or service based on their historical spend and purchase patterns. However, use of this data, some of which is entirely unrelated to risk-based factors, can result in two consumers with similar backgrounds paying different amounts for the same product. This can be viewed as discriminatory and therein lies the rub.

From an economic standpoint, there are three levels of price discrimination as set out in the table below:

TYPE	EXAMPLES	DESCRIPTION
Third-degree	Insurance pricing	Younger/newer drivers often have higher insurance rates based on a higher risk of accidents. In addition, men pay a higher premium than women.[3]
	Movie theater discounts	Groups of people get discounts at the movies based on age group eg. Students and Seniors
Second-degree	Bulk discounts	Customers purchasing a higher quantity or in bulk, get a lower rate than if buying at retail
	Peak/Off-peak pricing	Electricity companies offer cheaper rates during evenings or late at night, since demand is more elastic at these times
First-degree	Haggling	Haggling with customers at the local market and discounting prices based on each customer's willingness
	Bespoke items	Going to a consultant or designer with bespoke or custom jobs leads to an individualized price for each customer
	Art auctions	Aside from a minimum reserve price, the price of the work is determined by what any one person is willing to bid for it

1. https://www.naic.org/cipr_topics/topic_price_optimization.htm
2. https://www.fca.org.uk/publication/research/price_discrimination_in_financial_services.pdf
3. https://www.confused.com/car-insurance/price-index

The most common type of price discrimination is third-degree, due to the ease of its implementation. Additionally, while first-degree price discrimination was an unrealistic and largely theoretical possibility for much of history, being restricted to specific instances and industries, in the digital age this type of price discrimination, or its near approximation, is not only possible but becoming increasingly prevalent.

It should be noted that price discrimination is not in and of itself illegal. Since the practice of first-degree price discrimination effectively eliminates any deadweight loss from the economy, it in fact provides for an efficient market by matching each consumer to the amount that they'd be willing to pay. It only crosses over into illegality when the discrimination is geared towards specific protected classes (race, gender etc.) or if it hampers competition.

However, given the increased use of digital fingerprinting technology, more and more sellers can personalize their prices to a greater extent. The expanded use of first-degree price discrimination is starting to raise questions about the ethical use of the practice in the expanded grey areas of its implementation. The profit maximization incentive for sellers will lead them to push this to its fullest extent within the legal structure (optimistically speaking). However, since this technology is a relatively recent evolution, the laws governing it are still in their infancy.

For instance, Uber incorporates surge pricing into their dynamic pricing model, which means people may pay different amounts while traveling the same route. However, when prices surged during the hostage crisis in Sydney or after Hurricane Sandy or even simply during a heavy snowstorm in New York (7x normal fare), it can be seen as exploitative. After intervention by New York's Attorney General, Uber agreed to cap its surge pricing during natural disasters or heavy weather. Similarly, the airline sector is known for charging passengers varied amounts for adjacent seats on the same flight. However, the dangers of dynamic pricing propped up again when Delta Airlines attempted to charge $3,200 for a flight out of Florida when Hurricane Irma was approaching the state[4].

3. Prevalence of price optimization in the insurance industry

It seems a reasonable ask to not discriminate against customers, but does the use of customer data, in the context of their spending habits, fall under this banner?

In the US, the crux of the matter is that the current insurance regulation in most states lays out the criteria that should be used in determining pricing for customers. Specific language relating to the fact that "[r]ates shall not be excessive, inadequate or unfairly discriminatory"[5] is prevalent in every state's regulation (except Illinois)[6].

4. https://psmag.com/economics/irma-reveals-exploitative-pricing-common-in-airlines
5. https://www.naic.org/store/free/GDL-1775.pdf
6. https://www.naic.org/documents/committees_c_catf_related_price_optimization_white_paper.pdf

The use of price optimization, in the sense of charging different prices for the same product, is viewed as a discriminatory practice and hence deemed inappropriate as a factor in determining the price of insurance.

In contrast, the FCA in the UK admits that there is a grey area that needs to be addressed and the increased use of big data cannot be labelled unsuitable across the board. Rather, they assert that "pricing practices for reasons other than risk or cost could create concerns for us, particularly if the consumer could be considered vulnerable. We would need to assess in each case whether there is a risk to our objectives, particularly our consumer protection and competition objectives[7]."

Proponents of the use of price optimization make the economic efficiency argument, i.e. insurance firms are simply matching prices to preferences evinced by the customer, calculating their willingness to pay and capitalizing on existing consumer surplus. For instance, imagine a customer who shows less of an affinity towards shopping around at the end of a mobile phone contract, and decides to re-up at the same or higher rate even though discounts may be available in the market. This data point is taken as a signal by the insurance company indicating how much they can increase a customer's premium as they are seemingly willing to pay that extra charge. Or at the least, that the customer is unwilling to make the effort to look for a lower price from competitors, which is an option equally available to all.

The other argument in support of price optimization is its prevalence in other industries. If the hospitality or airline industries can use it with no repercussions, then the same should be true of the insurance sector, and not limited by definitional verbiage. If regulation is passed to broaden the understanding of what is and is not considered discriminatory, the industry may be able to go down a different avenue. The major issue with this logic is that while it is mostly a luxury to travel by plane, stay in hotels and even ride a cab, insurance is a legal requirement that individuals must have. In this case, the use of price discrimination becomes questionable since consumers have no option but to purchase a product that may be unfairly priced.

Advocates of the use of price optimization in other industries also note that their goods/services are limited in their supply, and hence price is adjusted to cater to the existing demand. For example, Uber insists that surge pricing exists to entice more drivers to get on the road and offer their services during times of increased demand. However, research into Uber's pricing algorithm shows that the company's "...reliance on discrete surge areas introduces unfairness into their system: two users standing a few meters apart may unknowingly receive dramatically different surge multipliers[8]." Since the algorithm is a black box, it is difficult to determine why these differences occur, but one can infer that there are other factors at play than simple supply and

7. https://www.fca.org.uk/publication/feedback/fs16-05.pdf
8. https://www.ftc.gov/system/files/documents/public_comments/2015/09/00011-97592.pdf

demand. Whether this means that personal characteristics and profiles are being used is still to be determined. But if Google AdSense has been proven to display "statistically significant discrimination in ad delivery[9]," it is more than a hunch that people's personal information is being utilized in ways that are not completely transparent.

So, the supply/demand argument is debatable, and the opaqueness of price determination by insurance companies currently makes it difficult to clear them of personal profiling. In this environment, perhaps it is correct to ban the use of price optimization.

4. The case against price optimization

In the case of the insurance industry in the US, use of price optimization would violate the written letter of the laws being passed against its use. In the states where the practice hasn't been banned outright, debates against its use primarily rest on its perceived or inherent lack of fairness. It should not be the case that two individuals pay different rates for the same product due to non-risk-based factors, such as education or income.

One of the primary reasons behind this logical argument is the presence of bias in the data used as the basis for the premium calculation. It is true that bias is already present in the risk-based cost factors. For instance, the number of traffic citations received by a customer is an indicator of increased risk (and hence higher premium). Objectively, this seems like a reasonable indicator of how much risk a specific person poses for the insurer. However, the US Department of Justice has admitted to instances where certain regions in the United States are more likely to cite people based on racial profiling. If one looks at number of citations then, it would be heavily skewed towards minorities which would mean higher prices for that segment as a whole.

If insurance models incorporate other factors outside of risk when determining a customer's pricing, there is undoubtedly bias in this data as well. The simplest version of this would relate to a lack of knowledge and options in certain neighbourhoods. Think of the example above where consumer X decided to renew her mobile contract even though lower prices were available in the market. This could be due to a lack of knowledge of the offerings in the market or a lack of tools to access this comparison data. Both scenarios are not only possible, but probable in lower income neighborhoods, and relate to factors outside of the control of the individual, which is not explicitly reflected in the underlying data. In either case, the information asymmetry means that the customer may unwittingly, rather than unwillingly, pay a higher price for her mobile service. This should not, however, have a cascading effect, meaning that she now pays more for all services across the board. Invariably, arguments follow that it is not the company's fault or responsibility to ensure a level of market knowledge for

9. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2208240

customers, but "the customer should have known better" is hardly a valid justification.

5. Addressing the root cause

Instead of banning or restricting the use of data in these grey areas, perhaps part of the regulators' focus should be on the security of customer information in the first instance, i.e. how or why are the insurance firms able to get access to customer information at all, particularly information as sensitive as that which is currently being poached? It is logical to think that customer data should be owned by each individual. Regulation could ensure that people are choosing the end-users of their data, rather than it being disseminated due to obscure language in hundred-page Terms & Conditions documents full of legalese.

In addition to these "voluntary" disclosures of data, the high-profile hacks that are being reported with increased frequency are even more problematic. For instance, private credit histories of nearly 15 million customers were hacked in a data breach at Experian in 2015[10]. In 2018, it was revealed that Cambridge Analytica had access to the private data of 50 million Facebook users, which were reportedly used to target political advertisements[11]. Such breaches have spurred the need for increased regulatory oversight.

The European Union's General Data Protection Regulation (GDPR) that came into effect in May 2018, is a step in this direction, attempting to put control of personal information back in the hands of consumers. The UK also passed the Data Protection Act in May 2018[12] to complement the GDPR. Additionally, the Open Banking movement across the globe which is specific to the banking industry, as the name suggests, focuses on ensuring customers have a voice in who can access their data.

Data privacy in the US, however, is governed by more disaggregated sector and state specific laws (apart from the multinational companies affected by the GDPR). The Health Insurance Portability and Accountability Act (HIPAA, 1996) deals with privacy in the healthcare sector. The relevant law speaking to the information-sharing practices for the financial services industry is the Gramm-Leach-Bliley aka the Financial Modernization Act of 1999[13]. Most recently, in June 2018, California passed a data privacy law, the California Consumer Privacy Act[14], which goes into effect in January 2020. Like the GDPR, this Act mandates that customers are told what their data is being used for, and given the ability to opt out of sales and marketing campaigns as well as delete any personal information. While this does not relate specifically to the insurance industry, nor does it impact the rest of the country directly, all companies with customers in California will have to abide by its rules.

10 https://www.theguardian.com/business/2015/oct/01/experian-hack-t-mobile-credit-checks-personal-information
11 https://www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influence-us-election
12 http://www.legislation.gov.uk/ukpga/2018/12/pdfs/ukpga_20180012_en.pdf
13 https://www.ftc.gov/tips-advice/business-center/privacy-and-security/gramm-leach-bliley-act
14 https://www.pbwt.com/content/uploads/2018/06/California-Consumer-Privacy-Act1.pdf

Similarly, regulation could be designed specifically for the insurance industry to:

(i) Increase transparency in rate calculation: for example, mandating that insurance companies must communicate to the customer the true extent of their data being utilized in rate determination and

(ii) Regulate the disclosure of customer information to companies where this could be used in the adverse interest of customers: for example, restricting the extent of the information that third-party service providers can provide to insurance companies, or restricting the extent of personal information that an insurance company can procure

6. Conclusion

At its core, insurers are attempting to maximize the amount they can charge each customer, relying on information asymmetry to achieve this, and thereby maximizing profit. With the advance of 'big data', this gulf is widening. Customers are increasingly at a disadvantage and in need of regulatory oversight to constrict the bounds of acceptable use of personal information in arriving at personalized pricing.

As a corollary, there is a larger debate from an ethical standpoint of utilizing a customer's information 'against them.' Just because the tool exists, does not mean it has to be engaged. In the era of focusing on social impact and double bottom lines, is sheer adherence to profit maximization as the ultimate goal still acceptable? And even in that scenario, could it be achieved by alternative measures such as cost reductions or increasing revenues through more innovative products or enhanced customer service?

Regulators seem split on the extent of customer information that should be used in determining insurance rates, with certain jurisdictions considering more restrictions than others. There is also disagreement over who bears the onus for educating customers, whether it is the responsibility of the regulators, the insurance companies, the third-party data providers, or the customers themselves. What is becoming increasingly apparent is that this gap is not something consumers can traverse on their own. Regulators are attempting to ensure a level playing field but may in fact be treating the symptom rather than the cause.

In a profit maximizing world, price optimization may not be considered a heinous practice. However, two aspects in this situation should provide pause for the regulators to err on the side of conservatism. The facts are that there is uncertainty over the legitimacy of using private consumer data towards something that may have a negative financial impact on the individual, and more importantly, the idea that the data that may be inherently biased in the first place. Perhaps the state authorities of Maryland, Colorado, Connecticut et al. have the right idea in banning its use until such time as it can be properly understood and regulated.

About

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ContactEngine is a Cloud based Customer Communication Management Platform specializing in omni-channel communication and outbound call centre automation, allowing global brands to digitally transform the customer journey. Its intelligent automation of customer conversations disrupts the traditional call centre model and targets operational KPI's harder and faster whilst also significantly improving contact rate and customer experience.

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