BARBARA CIEŚLIK, ILONA TOMASZEWSKA
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Customer motivation and satisfaction related to purchases of comprehensive car insurance in Poland

Complexity and unequal access to information for all parties involved are among the key characteristics of the market of comprehensive car insurance in Poland. This paper presents the results of a research project[1] aimed at investigating consumer motivation and satisfaction related to purchases of comprehensive car insurance policies. Qualitative studies (IDIs) delivered in-depth information about relations between different parties and potential issues that were scrutinized in the quantitative part of the study. A binary logit model based on replies to a CATI survey of a representative sample of 4,500 respondents helped the researchers to identify certain reasons of purchases of this type of insurance. A further analysis proved that the level of consumer satisfaction was, in fact, greater than that the authors had originally anticipated based on the level of consumer confidence in the insurance industry, which is discussed further in this paper. The authors relied on official statistics on the Polish car insurance market and data showing the age-based breakdown of motor vehicles in different geographical areas to present some tendencies and pinpoint specific factors affecting customer motivation and satisfaction related to purchases of comprehensive car insurance.

keywords: customer motivation, customer satisfaction, comprehensive car insurance, casco polisy

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Introduction

As shown below, in the paper's first section, the Polish market of comprehensive car insurance is relatively small in volume and sensitive to price changes. This is a consequence of the age structure of vehicles in Poland, which leads to the situation where only a small fraction of all cars are eligible for full motor insurance cover. Furthermore, many of the keepers of those relatively new cars (i.e. not older than four years) purchase only the (obligatory) motor third party liability (MTPL) insurance.[2] Given the above, it is all the more important to understand what factors affect consumer decisions to take out comprehensive insurance.

The first objective of this paper is to describe what motivates consumers to (or not to) purchase comprehensive insurance.

The second objective is to examine the level of satisfaction from having a comprehensive policy as compared to the level of satisfaction related to claims handling under the policy. There are some studies investigating consumer satisfaction on the car insurance market, but most of them are of a purely commercial nature and have the sole purpose of comparing the offers of insurers operating on a given market[3]. They often show a positive correlation between consumers' satisfaction and the likelihood of them purchasing a new policy from the same insurer[4]. This paper does not aim to make a similar comparison among insurance companies operating in Poland but rather constitutes an attempt to discern universal patterns and a causal link between customers' motivation and satisfaction.

This paper forms a part of a three-year study of the adequacy and reality of insurance products and coverage. While conducting the study, the researchers explored certain aspects of the operation of comprehensive motor insurance in Poland. The study included a CATI survey comprising a multiple-question form. However, this paper discusses only those of the answers to the survey questions that concern customer motivation and satisfaction related to the handling of actual claims. As the survey was conducted in 2017, the other data about the situation on the market are taken from the same time. Due to the postponed publishing the results of our research we added some new data to show the changes that could be observed in the last five years.

Section 1 presents an overview of the Polish market of comprehensive car insurance, along with some general remarks. Section 2 discusses the CATI data, which are used in section 3 to estimate the logistic regression associated with comprehensive motor insurance. Section 4 discusses consumer satisfaction. The paper ends with a conclusions section.

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2. In Poland, all vehicle keepers are legally obliged to take out MTPL insurance. Comprehensive car insurance (which covers the keeper's liability for damage caused by their own fault as well as thefts and acts of vandalism if not excluded) is much more expensive that the MTPL insurance plus has voluntary nature.

3. e.g. Bain&Company, *Customer Behavior and Loyalty in Insurance: Global Edition 2017*, https://www.bain.com/insights/customer-behavior-loyalty-in-insurance-global-2017/.

4. e.g. R. Morgan, *Shannons tops satisfaction for comprehensive car insurance*, http://www.roymorgan.com/findings/7412-shannons-tops-satisfaction-for-comprehensive-car-insurance-201711210108 – unpublished study of the Australian market.

1. Comprehensive Car Insurance in Poland

In Poland, 22 domestic insurers[5] sell both MTPL and comprehensive motor insurance (according to EIOPA, at the end of 2017 the concentration ratio for the largest three, five and ten insurance companies were 68%, 85% and 97%, respectively). According to the newest yearly bulletin of Polish Financial Supervision Authority (PFSA) the situation has not changed a lot in the subsequent years– the number of insurers offering automobile insurance remained the same and the concentration ratios (measured by gross written premium) in 2020 amounted to 69,5%, 89%, 95,8% for comprehensive car insurance and 65,1%, 77,3%, 93,6% for MTPL, respectively.[6] MTPL is mandatory for all car keepers while the comprehensive cover (called "autocasco" or "casco" for short) is optional. The latter is not always truly "comprehensive" as many insurers limit their liability in different ways. For example, some of the policies do not cover the risk of theft or pay for windscreen or glass replacements as well as damage to the tires. According to the authors assessment of such limitations of insurers' liability leads to the situation where a consumer's decision regarding the purchase of insurance is, first and foremost, based on pricing considerations. More than 90% of casco policies are sold in a package with MTPL insurance. Hardly ever do insurers offer casco policies as a stand-alone product. The pricing aspect is not the sole factor determining casco purchases, but it undoubtedly has the greatest impact on consumers' final decision. This conclusion remains in line with other studies of the Polish motor insurance market, which point to costs as the key factor.

Polish keepers of motor vehicles can choose from a wide range of casco products that vary in features such as deductibles, limits of coverage (as mentioned above), method of damage compensation and additional benefits. Moreover, almost all insurers offer several products of comprehensive car insurance.[7] The policy wording, in Poland traditionally referred to as "general terms and conditions of insurance" are, in the majority of cases, rather complex and unintelligible documents, so consumers are generally unable to fully grasp their meaning and compare different offerings in a sufficiently informed way.[8] The degree of complexity of the text of the general terms and conditions of insurance assessed by means of the FOG-PL linguistic analysis is higher than the degree of difficulty of scientific texts and only slightly lower than the texts of national laws and European regulations

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5.   According to the legal rules biding in Poland insurance products could be offered and delivered also by foreign companies that have just notified crossborder activity. Primarily this refers to the insurers formally based in other EEA Member States. Following notification, without necessity to get authorisation from the Polish FSA (as the Supervision Authority from the host state), they are permitted to run insurance activity in Poland on a cross-border basis either via Freedom of Establishment (i.e. FoE, which means carrying out activity in the form of branch) or via Freedom of Services (i.e. FoS, which means activity without any formal physical presence in a host state). Furthermore, also main branches of foreign insurers from third countries (i.e. beyond EEA borders) may act in Poland, however, in such cases, a special permission of the Polish FSA has to be previously granted to the company in question.

6.   Own calculations on the data from Biuletyn roczny. Rynek ubezpieczeń 2020 on knf.gov.pl.

7.   For instance, the major insurer Warta offers two types of comprehensive coverage, *Autocasco Komfort* and *Autocasco Standard* with certain upgrading options – see more on https://www.warta.pl/ubezpieczenia/samochod/ac/porownanie. Warta also offers insurance for vintage vehicles, or "classic cars" (*AC Warta Klasyki*), which is a novelty on the Polish market and remains beyond the scope of this paper.

8.   In most cases, general terms of insurance do not meet the KISS (Keep It Short & Simple) standard – they are proverbial "fine print" documents that may be 20 or so pages-long.

and requires about 20 years of education from the reader[9]. In one of the surveys 68% of respondents indicated that clearly and understandably constructed GTC is the most important element proving the high quality of insurance services[10]. According to another survey only 27% of consumers bother to read the contract they sign, one in five of which declares that they do not understand its content[11]. On the other hand, this complexity is due to the need to meet many requirements for the construction of general insurance conditions[12]. That is why it is an agent or a broker who plays a key role in the consumer's decision to purchase coverage. Due to the fact that an in-depth analysis of the conditions and the selection of the right insurance policy on its basis exceeds the capabilities of an average consumer, agents, multi-agents and brokers, play here the role of 'specialized traders'[13]. This is in line with the approach taken by the Insurance Distribution Directive (IDD). Professional advisors such as agents, brokers or Call Center consultants can effectively persuade a customer that buying a casco policy is a reasonable course of action, especially for newer and more expensive cars. The first phase of the study (individual interviews) revealed that these advisors are likely to follow their own agenda (for instance, seek to maximise their commission profits), which may actually be at odds with both the expectations of the consumer *and* the interests of the insurer, the phenomenon that can be described as a principal-agent dilemma in a three-party setting. Importantly, approx. 70% of the CATI respondents (as described below) purchased their casco policies through an exclusive agent who works for a specified insurer or multi-agent who is independent from any given insurer. However, it is difficult to assess the validity of these answers, as consumers tend to overlook the difference between these two types of insurance intermediaries.

It is very important to distinguish the customer service roles of exclusive agents and multi-agents. The Polish insurance market relies heavily on multi-agents, which translates into agents' lower loyalty to specific insurers and a greater impact on premium amounts[14]. This distinction can be seen even more clearly in the case of multi-agents working for "national networks of independent agencies" and those operating small independent practices. Legal requirements, specifying the obligations of the distributor, do not differentiate them depending on the nature of the agent (exclusive or multiagent), but indicate their overriding purpose, which is as follows:

1) aim to prevent and mitigate customer detriment;
2) support proper management of conflicts of interest;
3) ensure that the objectives, interests and characteristics of customers are duly taken into account.[15]

9. K. Barczuk-Grędzińska, *Badanie stopnia przystępności tekstów wybranych ogólnych warunków ubezpieczenia na polskim rynku*, „Oblicza Komunikacji" 11/2019, 178–211.

10. J. Iwko, *Model oceny jakości usług ubezpieczeniowych na polskim rynku*, rozprawa doktorska, Uniwersytet Ekonomiczny, Wrocław 2014.

11. K. Barczuk-Grędzińska, *Czytelność Ogólnych Warunków Ubezpieczenia – teoria i zastosowanie w praktyce ubezpieczeniowej*, rozprawa doktorska, Uniwersytet Ekonomiczny, Wrocław 2018.

12. M. Orlicki, *Kilka uwag o technice tworzenia ogólnych warunków ubezpieczenia*, „Wiadomości Ubezpieczeniowe" 1/2011, pp. 75–87.

13. P. Karaca-Mandic, R. Feldman, P. Graven, *The Role of Agents and Brokers in the Market for Health Insurance*, "Journal of Risk and Insurance", 85/2016, 1, pp. 7–34.

14. See: PIU report, Ubezpieczenia w liczbach 2020.

15. Commission Delegated Regulation (EU) 2017/2358 of 21 September 2017 supplementing Directive (EU) 2016/97 of the European Parliament and of the Council with regard to product oversight and governance requirements for insurance undertakings and insurance distributors.

The above indicates that the agents' approach to insurance distribution should have the same features. According to the authors, however, it could be reasonable to be doubtful as to whether, in the cases of multi-agents, there are no other variables involved in distribution of insurance product in a certain insurance company, such as a commission policy.[16]

On the other hand, multi-agents tend to perceive their involvement in insurance distribution as a long-term business. Accordingly, apart from the commission aspect, multi-agents do care about customer satisfaction and take measures to avoid complaints concerning the scope of cover or claims handling procedures.[17] The confirmation of the presented statement may be the position of the Polish Financial Supervision Authority (PFSA), announced in January 2022 (PSFA Statement, 2022). Referring to Art. 10 sec. 6 of Regulation 2017/2358, the PFSA refers to the distributor's obligation to regularly review its distribution solutions. It emphasizes the importance of understanding the insurance product and its compliance with the client's interests, goals and characteristics of the target market which is defined for him.

Because of its compulsory nature, Polish customers see MTPL insurance as a "quasi-tax", which leads them to choose the least expensive product on the market (the scope of MTPL cover is, by law, identical for all insurers). On the other hand, non-compulsory casco policies are hardly ever bought by consumers as a stand-alone product. Therefore, the price range of such policies should be considered in aggregate terms – as a total premium for both the MTPL and comprehensive coverage. A customer obliged to take out an MTPL policy evaluates their financial capability to decide how much they can spend on the MTPL/casco package. It thus seems that with MTPL premiums increasing, customers' willingness to buy a casco product should decrease. The above is also true in respect to the rising prices of casco products. Chart 1.1 presents the changes of MTPL/casco prices over a period of time, while Chart 1.2 shows the relation between the number of MTPL and casco policies, as well as the casco to MTPL percentage ratio.

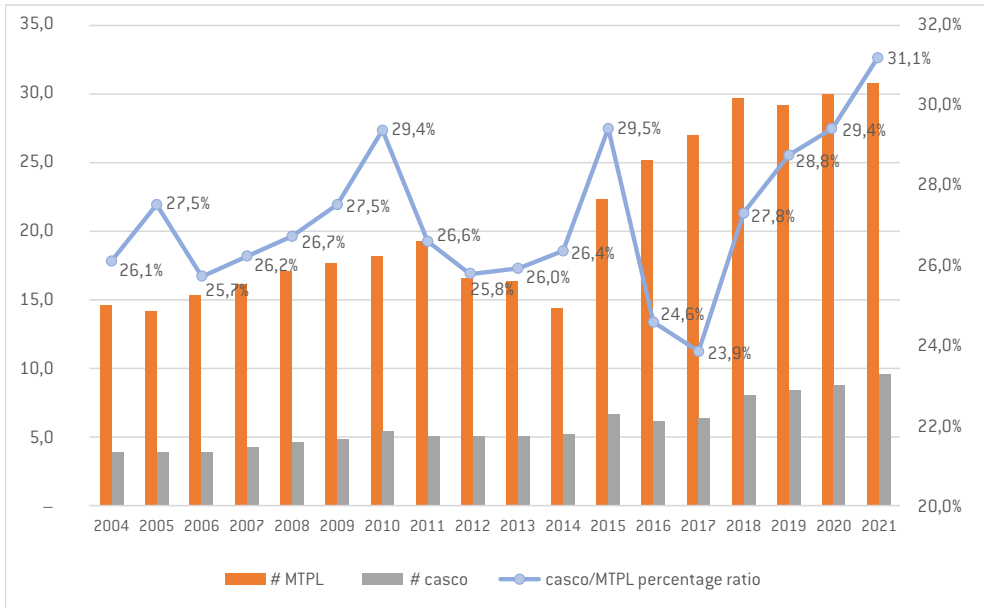**Chart 1.1 Average premium for MTPL/casco packages in PLN**
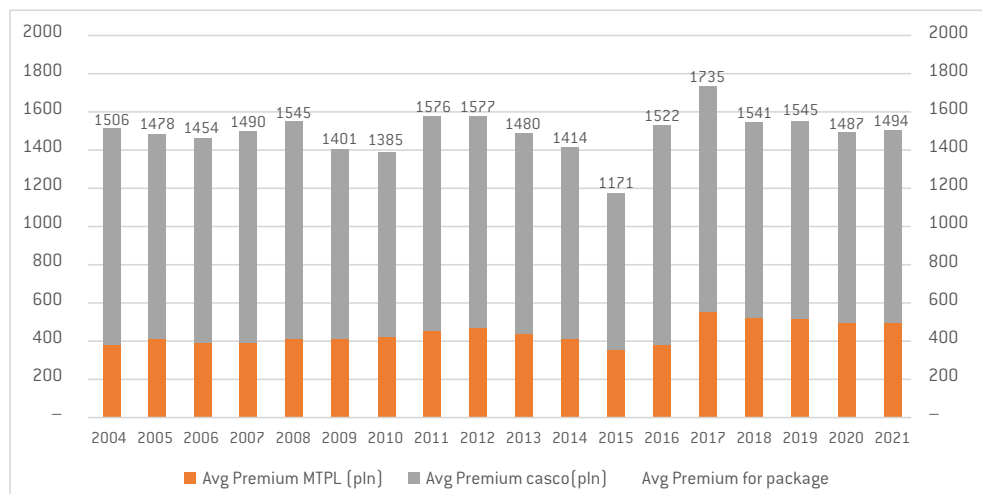
Source: Own analysis based on data of the Polish Financial Supervision Authority (KNF), Annual bulletin, Insurance market.

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16. J. Pokrzywniak, *Multiagent w ustawie o dystrybucji ubezpieczeń*, Wiadomości Ubezpieczeniowe 2/2019.

17. A. Czajkowska, *Analiza wymagań i potrzeb klienta w świetle ustawy o dystrybucji ubezpieczeń – zarys procesu*, „Wiadomości Ubezpieczeniowe" 4/2018.

Chart 1.2 Number of policies, in millions

Source: Own analysis of KNF data, Annual bulletin, Insurance market.

This pattern is visible in Charts 1.1 and 1.2 above, especially for 2017 compared to 2015. The lowest average premium for the MTPL/casco package in 2015 led to the highest volume penetration of casco. Conversely, the lowest casco penetration corresponds with the highest average total MTPL and casco premium (in 2017). Unfortunately, there are no data on the extremely complex coverage structure of casco policies and its temporal changes. However, according to market experts, when the prices are high, customers tend to choose cheaper products with more exclusions of liability or decide not to purchase a casco policy at all.

On the other hand, consumers show a certain degree of insurance awareness, which may generally be expressed by the saying "Search for a cheap MTPL and good casco cover". The level of awareness rises significantly after a customer needs to have their first claim settled, especially if the process proves to be troublesome, as was found in the first phase of this research.

As to the rationale for purchasing a casco policy, the age of the vehicle seems to be a decisive decision-making factor. The fleet of passenger vehicles was 22.13 million at the end of 2017. A vehicle average age was 13.8 years, while the median age was 14 years[18]. These figures are a consequence of the highly developed imports of used cars, mostly being at least ten years old. Casco insurance is dedicated to vehicles not older than 20 years; however, the majority of insurers fix the vehicle age limit at the level of 15 calendar years. Casco insurance for vintage vehicles is still a niche product in Poland.[19]

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18. Automotive Industry Report 2018/2019, http://www.pzpm.org.pl/Rynek-motoryzacyjny/Roczniki-i-raporty/ Raport-branzy-motoryzacyjnej-2018–2019, p. 23

19. eg. P. Majewski, *Ubezpieczenia pojazdów zabytkowych*, „Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu" 342/2014, pp. 140–149 as well as S. Lenhardt, *Perspektywy dla rynku ubezpieczeń samochodów zabytkowych w Polsce*, „Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu" 415/2016, pp. 143–151.

The age structure of passenger cars in Poland is shown in Chart 1.3.

Chart 1.3 Age structure of passenger cars, as at the end of 2017 and 2020 (percentage shares)
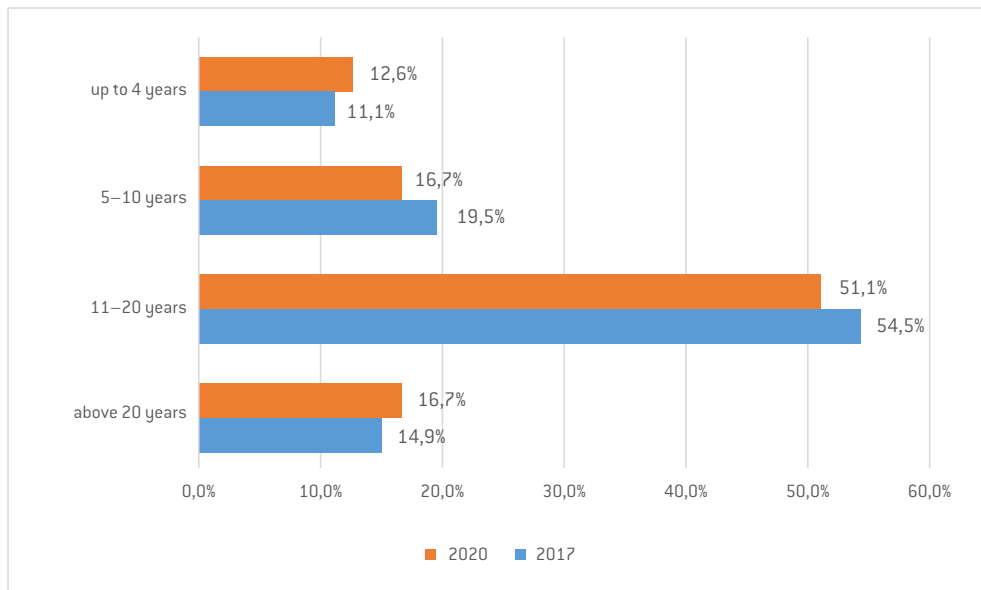

Source: an analysis of Polish Association of Automotive Industry (hereinafter: PZPM), based on Central Vehicles' Register (hereinafter: CEP)

According to statistics compiled by PZPM, approximately 58% of all passenger cars are insurable under a casco policy. This means that around 60% of the casco-eligible passenger cars are insured only in the MTPL scheme. Even within the group of vehicles not older than 10 years, there is a significant number of cars without casco coverage. The above poses the question: what is the real reason(s) for not buying comprehensive car insurance?

The low number of voluntary casco insurance policies (as shown by Chart 2.2 in the next section) is recorded in the administrative areas (provinces) with the high share of older vehicles. The low percentage share of comprehensive insurance policies in Lubuskie and Opolskie provinces coincides with the lowest percentage of one-year-old (or newer) vehicles (2% in each province) and the highest percentage of vehicles older than 31 years (15.6% and 18.7% respectively) registered in those provinces, as shown by Charts 1.4 and 1.5.
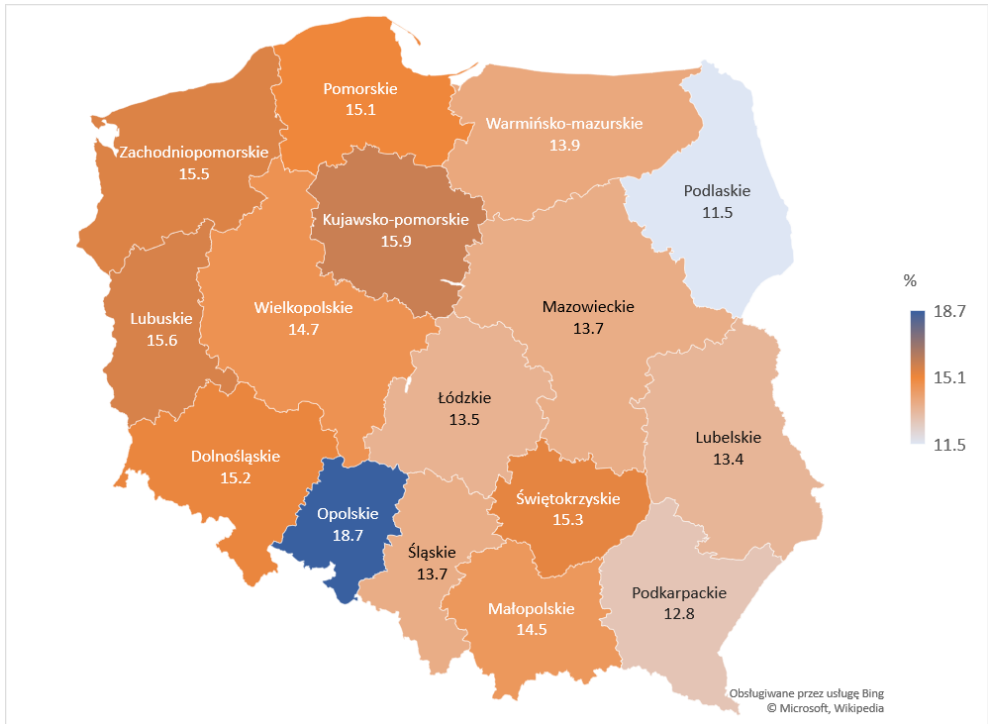
Chart 1.4 The percentage share of registered passenger cars not older than one year, broken down to provinces (2017)
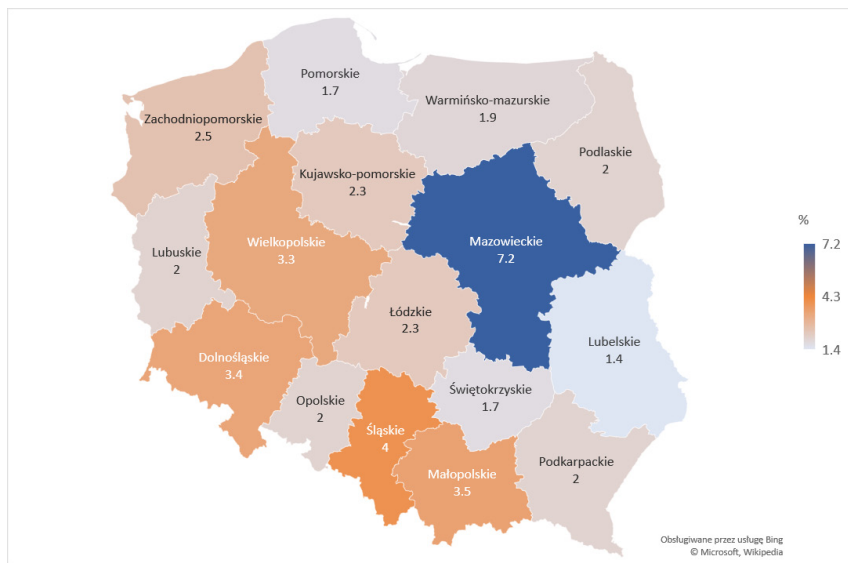
Source: W. Brol, *Wiek samochodów osobowych w Polsce w 2017 roku na mapach*, WBDATA, 11/12/18

Chart 1.5 The percentage share of registered passenger cars older than 31 years, broken down to provinces (2017)

Source: W. Brol, *Wiek samochodów osobowych w Polsce w 2017 roku na mapach*, WBDATA, 11/12/18

There are more old cars registered in Poland's western provinces as compared to eastern provinces. Some of these cars are not eligible for voluntary casco insurance. This uneven geographical distribution of older vehicles is a consequence of the proximity of the German market, which makes imports of used cars easier. The category of the oldest cars includes vintage cars.

Last, but not least, a crucial the key factor influencing the customer's decision to purchase an autocasco policy is the source of financing the purchase of a vehicle. For cars purchased on credit or leased, the bank or lessor generally requires a customer to buy a casco policy. In our study, unfortunately, this issue was marginalized due to the limited number of questions in the questionnaire.

2. CATI Data

For the purposes of analysing customer motivation and satisfaction related to purchases of comprehensive car insurance in Poland, theme-specific data were collected by means of computer-assisted telephone interviewing (CATI), conducted in July 2017 on a representative sample of 4500 randomly selected respondents (natural persons) who met the representativeness restrictions criterion. 2448 respondents (54.4%) owned a car, and 1093 (44.6% of all surveyed car owners) had comprehensive insurance for their car. It cannot be excluded that some of the respondents in their answers had in mind the colloquial meaning of the term "owning a car". It should be noted

that due to the construction of the tax system in Poland, relatively many natural persons are sole proprietors and in such a situation often have a car registered for their own company. It is even possible that some of the cases of declared car ownership concerned leased cars in the case of which the owner of the vehicle is *de facto* an external entity. This could have burdened the results of the study and, as a result, both the share of vehicle owners and the share of casco policy holders in the sample could turn out to be slightly higher than in the entire population, because in the case of leased cars purchasing insurance is required.

Additionally, in 2016–2017 the project team held three in-depth interviews (IDI) with market representatives (CEO of an insurance company, the manager and staff of an auto repair shop and a representative of a spare parts manufacturer).

The main variables used for compiling this paper are:
- Respondent demographics: age (in years), sex, education level (secondary or a higher level), the form of employment, income, hometown size, the province of residence,
- Q#1 'Have you got a car?' – a binary variable,
- Q#2 'Have you got comprehensive insurance for this car?'
- Answers to questions regarding the motivation (rationale for purchasing a policy) and the satisfaction level associated with conditions of insurance,
- Answers to questions on claims made, indemnity provided by the insurer and the satisfaction related to the claims handling process (including the performance of the auto repair shop if the car had been repaired).

The charts below show the share of positive answers to the two basic questions of the survey that can be interpreted as the conditional probability of having a car and having comprehensive insurance in the case of having a car.

Notably, the survey revealed substantial differences between provinces. The highest percentage of positive answers recorded in areas adjacent to the German border in Silesia represent a regional specificity already observed in other studies. This chart can, therefore, be treated as a confirmation that proper methods of a random selection of respondents were employed in the survey.

Chart 2.1 The share of positive answers to question #1 "Have you got a car?", broken down to provinces
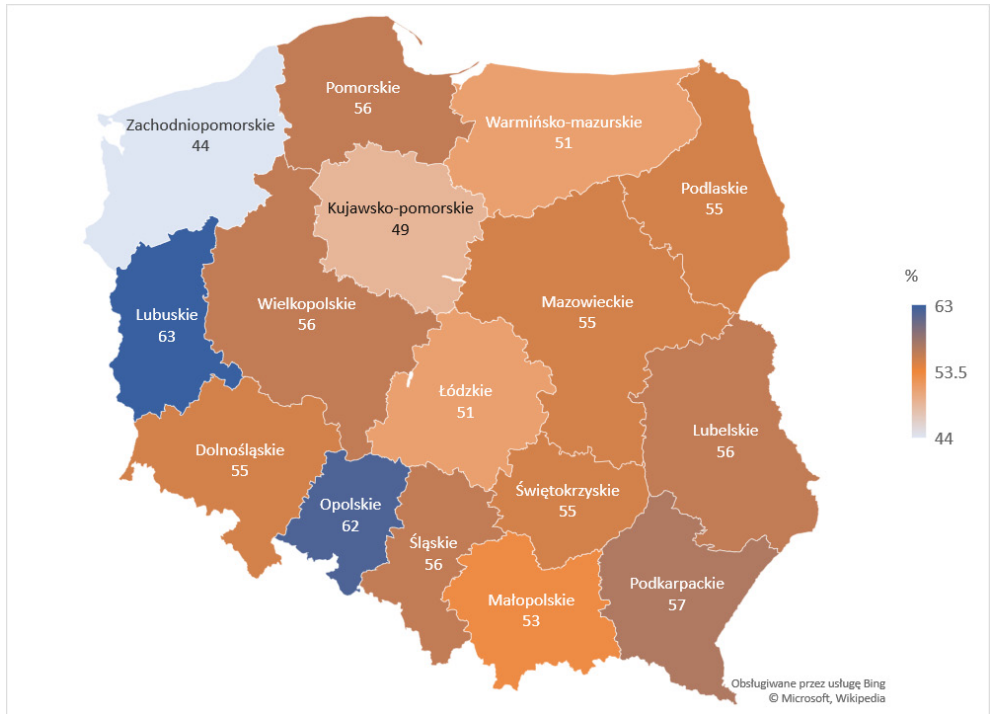
Source: own calculations based on CATI data

There is a visible (yet unsurprising) "inversion of colours" on Chart 2.2 as compared to Chart 2.1, meaning that in the regions in which the probability of having a car is higher, the inclination to insure that car is lower.

Chart 2.2 The share of positive answers to question #2 "Have you got comprehensive insurance for this car?", broken down to provinces
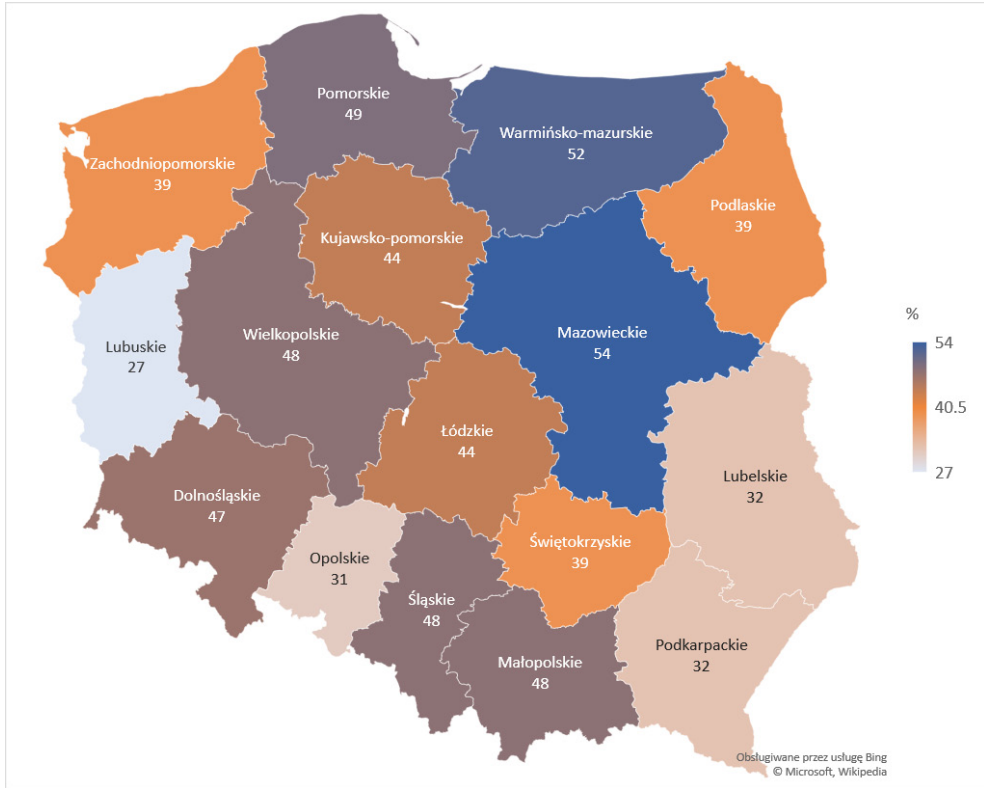
Source: own calculations based on CATI data

It was also found that men are more likely to have a car as compared to women, while women are significantly more likely to purchase comprehensive insurance, as shown in the table below.

Table 2.1. Gender-based distribution of positive answers to question #1 and #2

	Q1: Have you got a car?	Share	Q2: Have you got comprehensive insurance for this car?	Share
Men	1,529 (out of 2,263)	68%	621 (out of 1,529)	41%
Women	919 (out of 2,237)	41%	472 (out of 919)	51%
Total	2,448 (out of 4,500)	54%	1,093 (out of 2,448)	45%

Source: own calculations based on CATI data

The authors also found that the percentage of positive answers to the second question increases significantly with the age of a car owner, their hometown size and income and education levels, as shown in the next tables.

Table 2.2. The percentage of car owners having a casco policy, broken down to age groups

	Age 18−29	Age 30−39	Age 40−49	Age 50−59	Age 60+
Number of car owners	325	586	490	461	596
Percentage of positive answers to Q#2	37%	43%	44%	46%	49%

Source: own calculations based on CATI data

Table 2.3. The percentage of car owners having a casco policy, broken down to hometown size

	village	Below 20,000 citizens	20,000 − 100,000	100,000 − 500,000	over 500,000
Number of car owners	906	306	456	404	376
Percentage of positive answers to Q#2	35%	40%	46%	54%	60%

Source: own calculations based on CATI data

Table 2.4. The percentage of car owners having a casco policy, broken down to income brackets

	No income	Income up to 1,000 PLN	Income 1,000 − 2,000 PLN	Income 2,000 − 3,000 PLN	Income 3,000 − 4,000 PLN
Number of car owners	141	283	468	192	50
Percentage of positive answers to Q#2	26%	31%	27%	32%	38%
	Income 4,000 − 5,000 PLN	Income 5,000 − 7,000 PLN	Income 7,000 − 10,000 PLN	Income over 10,000 PLN	No answer
Number of car owners	23	13	5	8	61
Percentage of positive answers to Q#2	39%	40%	60%	71%	35%

Source: own calculations based on CATI data

The survey form listed four levels of education (1. Primary/incomplete primary/lower secondary school 2. Basic occupational or intermediate completed 3. Intermediate completed, post-secondary, unfinished higher 4. Higher completed 5. Refusal) but the researchers decided to aggregate them (1+2 and 3+4). Consequently, it turned out that nearly 60% of respondents with at least secondary level of education (3243) are car owners (1928). 930 of them (48.2%) have a casco policy. Among the remaining respondents, out of whom 1244 declared the below-secondary level of education and 13 refused to answer this question, the percentage of car owners amounted only to 41.3% (520 cars out of 1257). Only about 32% of those car owners (168 in 520 persons) had a casco policy. Accordingly, persons with above-secondary education level are, statistically speaking, more likely to own a car. Moreover, better-educated car owners are more likely to have a casco policy as compared to car owners with a lower level of education.

Table 2.5. The surveyed population of car owners and holders of a casco policy broken down to education levels

Education level	Number of respondents	Car owners	Casco owners
Secondary or higher	3243	1928 (59.5%)	930 (48.2% of car owners)
Below secondary	1244	515 (41.4%)	167 (32.4% of car owners)
No answer	13	5	1

Source: own calculations on data from CATI

3. Logistic regression model explaining casco purchases

There are many examples of using logistic regression to explain a binary variable representing, for instance, choices made by customers by their characteristics and other variables.[20] Logistic regression is one of traditional and efficient techniques commonly used for solving classification problems with binominal endogenic variable. One of the advantages of this approach over neural networks and decision trees is clear interpretation of parameters of the model that show the influence of various factors (exogenic variables) on the endogenic variable as it belongs to the class of generalized linear models (GLMs).

Logistic regression (logit model) is often used in many financial analyses such as credit scoring[21], predictive assessment of the customer's creditworthiness[22], insolvency risk assessment or non-repayment of the loan[23]. It is generally useful in many cases, where a probability of success[24] or failure[25] can be defined. The success may be understood as purchasing a given good.[26]

As we have not found in the scientific literature an example of the use of logit in the context in which we propose to use it here, our work seems to be pioneering in this aspect.

In our case the answers to Q#2 can be treated as binary variable realizations that can be explained by logistic regression on those of the collected variables that turned out to be significant

20. e.g. D.W. Hosmer, S. Lemeshow, *Applied Logistic Regression* (2nd ed.), JohnWiley & Sons, New York 2000 as well as R.E. Wright, *Logistic regression*. In L.G. Grimm & P.R. Yarnold (eds.), *Reading and understanding multivariate statistics* (pp. 217–244). Washington, DC, US: American Psychological Association, 1995 as well as C-Y.J. Peng, K.L. Lee, G.M. Ingersoll, *An Introduction to Logistic Regression Analysis and Reporting*, The Journal of Educational Research, vol.96, issue 1/ 2002 as well as A. Walsh, *Teaching Understanding and Interpretation of Logit Regression*, "Teaching Sociology" 15(2)/1987, pp. 178–183.

21. H.A. Abdou, J. Pointon, *Credit scoring, statistical techniques and evaluation criteria: A review of the literature*, "Intelligent Systems in Accounting, Finance and Management" 18(2–3)/2011, pp. 59–88.

22. M. Rubiul Yatim, E. Sudarmaji, Herlan, *Predictive Creditwortiness Modeling in Energy-Saving Finance: Machine Learning Logit and Neural Network*, "Financial Risk and Management Reviews" Vol 8, no. 1/ 2022, pp. 1–11.

23. G. Orlando, R. Pelosi, *Non-Performing Loans: Logit Model Applications*, 2020, pp. 1–103.

24. Bhandari, S. & Johnson-Snyder, A., *A Generic Model Of Predicting Probability Of Success-Distress Of An Organization: A Logistic Regression Analysis,* "Journal of Applied Business Research (JABR)" 34/ 2018, p. 169–182. 10.19030/jabr.v34i1.10107, pp. 169–182.

25. D. Swenson, *A Logit Model of the Probability of Divorce*, Journal of Divorce & Remarriage, 25/1996, pp. 173–194.

26. K. Grønhaug, O. Kvitastein, *Purchases and complaints: A logit-model analysis*, Psychology and Marketing. "Financial Risk and Management Review" 8/2006, pp. 21–35

at a=0.05. In order to construct an appropriate model, the concept of logit, i.e. the natural logarithm of the odds quotient, should be used, so the equation of the model is as follows:

$$ln \frac{p_i}{(1-p_i)} = \beta_0 + \beta_1 X_{1i} + ... + \beta_k X_{ki} + \varepsilon_i$$

Where $ln \dfrac{p_i}{(1-p_i)}$ called logit is the natural logarithm of the odds ratio, that is the probability of success divided by the probability of failure; $\beta_0, \beta_1, ... \beta_k$ are the parameters of the model, $X_1, X_2,$ ... X_k are the exogenic variables (determinants) and ε is a random component for an observation i (i=1,...,n, where n is the sample size).

Having estimates of the parameters of the model ($\widehat{\beta_0}, \widehat{\beta_1}, ... \widehat{\beta_k}$), it is possible to calculate the probability of success, which can be treated as the theoretical value of the endogenic variable, which in fact takes only the values of 0 and 1. This is given by an equation:

$$\widehat{p_i} = \frac{e^{\widehat{\beta_0} + \widehat{\beta_1}X_{1i} + ... + \widehat{\beta_k}X_{ki}}}{1 + e^{\widehat{\beta_0} + \widehat{\beta_1}X_{1i} + ... + \widehat{\beta_k}X_{ki}}}$$

As potential determinants (exogenic variables), in this case, it was possible to use the characteristics of a respondent from the survey imprint, such as age, sex, level of education and hometown size. The preliminary analysis carried out in the previous chapter indicated expectations as to the signs of parameters accompanying individual variables in the model. For instance, the sign of the parameter by the variable 'woman' is expected to be positive because women are significantly more likely to purchase a policy compared to men (see table 2.1). Similarly the sign of the parameter by the variable 'age' is also supposed to be positive, as the share of policyholders in defined age groups showed a trend that increased with the age of the respondents (compare table 2.2). The same applies to income, level of education and the number of inhabitants of the respondent's place of residence (tables 2.3–2.5), although here it should be noted that, due to the nature of the data, in the case of these characteristics of a respondent, their inclusion in the model required in each case the creation of a group of binary variables corresponding to individual variants of the selected characteristic. In all of the cases one of those binary variables had to be omitted to avoid collinearity – the omitted variable becomes in this case the reference level.

The resultant model is shown in the table below. It was estimated, based on 2340 observations, as some of the car owners refused to answer the question about their income. 1052 of those car owners had casco insurance.

Table 3.1. The estimation of logistic regression for the conditional probability of having comprehensive insurance (within the group of car owners)

	Coefficient	Standard error	z	Marginal effect	Sig.
const	-2.154	0.292	-7.373		
age	0.016	0.003	5.2645	0.00396	***
woman	0.650	0.095	6.838	0.16047	***
educ	0.310	0.117	2.641	0.07564	***
income_0_1	0.024	0.308	0.078	0.00594	***
income _1_2	0.007	0.258	0.026	0.00166	

income_2_3	0.159	0.256	0.619	0.03932	
income_3_4	0.501	0.269	1.860	0.12450	*
income_4_5	0.701	0.290	2.415	0.17322	**
income_5_7	1.554	0.321	4.831	0.35195	***
income_7_10	1.622	0.380	4.256	0.36040	***
income_10plus	1.965	0.388	5.065	0.41198	***
income_NA	0.783	0.286	2.739	0.19270	***
town_0_20	0.174	0.145	1.198	0.04332	
town_20_100	0.380	0.126	3.010	0.09455	***
town_100_500	0.596	0.132	4.513	0.14780	***
town_500plus	0.695	0.139	5.004	0.17195	***

Mean dependent var	0.449573	S.D. dependent var	0.497557
McFadden R-squared	0.082352	Adjusted R-squared	0.071793
Log-likelihood	−1,477.453	Akaike criterion	2,988.907
Schwarz criterion	3,086.791	Hannan-Quinn	3,024.563

Number of cases 'correctly predicted' = 1,514 (64.7%)
f(beta'x) at mean of independent vars = 0.247
Likelihood ratio test: Chi-square(16) = 265.18 [0.0000]

Almost all variables are significant and all groups of binary variables are significant as a block of variables (significancy test for group of variables showed that in all cases it is better to leave the entire group than to skip them). The coefficients of all variables meet the expectations which is discussed in detail below.

Multiple studies show that women are more likely to purchase non-mandatory insurance as they generally tend to look for safety more frequently than men. Scientific evidence in support of the statement that there is a statistically significant difference in the meaning of risk aversion between men and women, with women on average being more risk aversive can be found for example in some papers.[27] It is important to notice that a generalised statement that "women are more risk-aversive than men" is incorrect.[28] In our model among persons with average income living in a town of middle size, the probability of purchasing a casco policy is approx. 0.16 greater for women than for men (that is the marginal effect for a 'typical' respondent). The odds ratio (the probability of purchasing a policy divided by the probability of not purchasing it) for women is higher than for men by about 92% (as exp(0.65)/(1+exp(0.65))=1.916).

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27. M. Powell, D. Ansic, *Gender Differences in Risk Behaviour in Financial Decision-Making: An Experimental Analysis*, "Journal of Economic Psychology", 18(6)/1997, pp. 605–628, as well as R. K. Sarin, A. Wieland, *Gender Differences in Risk Aversion: A Theory of When and Why*, pp. 1–26, available at SSRN Electronic Journal. 10.2139/ssrn.2123567, 2012.

28. as proved in J.A. Nelson, *Are Women Really More Risk-Averse Than Men?*, "Global Development and Environment Institute Working Paper", 12–05/2012 as well as J.A. Nelson J.A, *Are Women Really More Risk-Averse Than Men? A Re-analysis of the literature using expanded methods*, "Journal of Economic Surveys" Vol.29 Issue 3/ 2014, pp. 566–585.

Gender-specific risk aversion tendencies can also be seen in the driving history of women and men. It is forbidden to differentiate tariffs due to the gender (see the ruling of the Court of Justice of the European Union of 1 March 2011 in the Test-Achats case, in which the CJEU ruled that different rates of premiums for women and men constituted gender-based discrimination), but it is possible to differentiate premiums based on the insurance and claims history of a vehicle's keeper. In Poland, it is the keepers of motor vehicles who are obliged to have motor insurance coverage. Customers with "good" insurance and claims history, namely those being insured for a longer period of time and having no claims in the period of 12 months, 3 years, 5 years or 10 years), pay lower premiums (however, those may also be affected by other tariff factors), which, in turn, leads to the greater probability of buying insurance.

The effect of education in our model is also significant — the secondary or higher level of education increases the probability by 0.076 on average, compared to those who had lower education or refused to answer this question, *ceteris paribus*. The odds ratio for more educated people is by about 36% higher than for the less educated (exp(0.31)/(1+exp(0.31))=1.36)

The coefficients of binary variables associated with income are almost monotonic within its group, which means that this probability increases consequently with income (the reference group here were people with no income). An example interpretation indicates that for people earning between 4 and 5 thousand zloty a month the odds ratio is about twice as large as for people with no income.

Similarly, the size of the city of residence has a positive effect on the likelihood of purchasing a policy — the estimated parameters and the marginal effects for this group of binary variables are monotonic. The reference category here was village.

The quality of the model is satisfactory. Although the McFadden R-square equals only 0.0825, the percentage of correct predictions amounts to 64.7% (1,514 out of 2,340), as shown in the classification table below.

Table 3.2 Classification table for logistic regression with cut value 0.5 and 0.449573

Cut 0.5:

ACC=64.7%		Predicted	
		Neg	Pos
Actual	Neg	990	298
	Pos	528	524

Cut 0.449573:

ACC=62.5%		Predicted	
		Neg	Pos
Actual	Neg	823	424
	Pos	453	640

Source: Own calculations based on the logistic regression model for CATI data

Table 3.2 was created for the default cut-off threshold equal to 0.5 and for the threshold 0.449573 equal to the mean value of the dependent variable. The relative operating characteristic (ROC) curve relating relative proportions of correctly and incorrectly classified predictions over a wide and continuous range of threshold levels presented on chart 3.1 shows that the quality of the model is satisfactory.

Chart 3.1 ROC curve for logistic regression
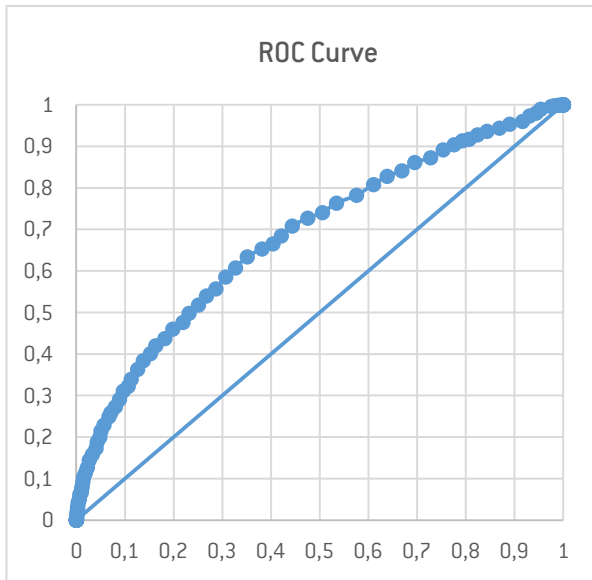
Source: Own calculations based on the logistic regression model for CATI data

To draw the accumulated LIFT curve for this regression, we presented our observations in the order of the estimated probability of having a casco policy and then divided them into ten groups. In chart 3.2, the bars show the percentage of casco policyholders within each group while the line shows the average value of predictions of the explained variable for each group.

Chart 3.2 Accumulated LIFT with percentage scale for logistic regression
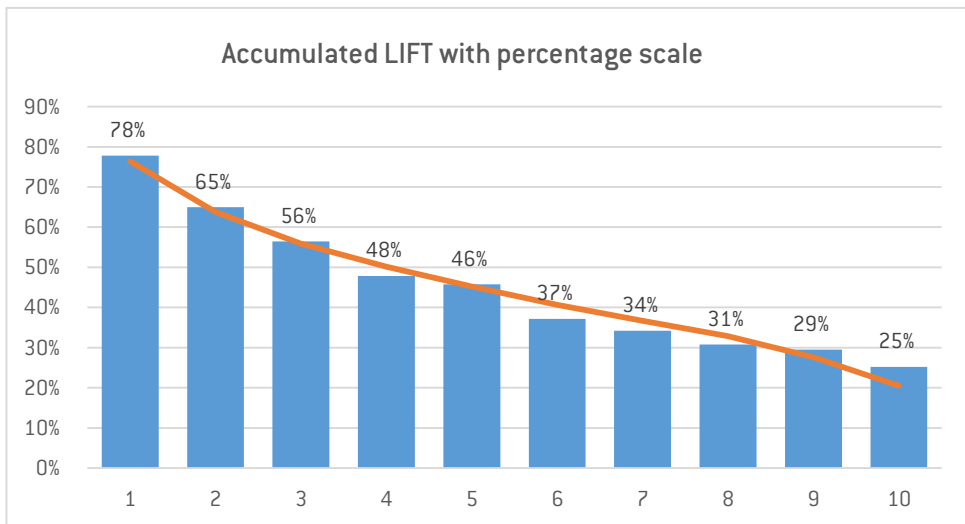
Source: Own calculations based on the logistic regression model for CATI data

4. Motivation

Sections 1—3 above discuss factors determining customer purchases of casco policies. At this point, let us briefly discuss the motivations behind the respondents' decisions to purchase (or not to purchase) comprehensive car insurance. The respondents were asked for reasons for their decision and permitted to formulate open-ended answers to this question. The answers were subsequently aggregated and summarised in the tables below. The percentages below do not sum up to 100% as some of the respondents gave multiple reasons while about one-third of the surveyed did not answer this question or gave the "I do not know" answer. The respondents gave over a dozen of different types of answers but, as partly shown in Table 4.1, two main reasons for purchasing a casco policy were most frequently cited: fear of collision and fear of theft. 355 people out of 1093 who had casco were afraid of collision with another car and 339 were afraid of being a victim of car theft. Arguably, these answers are rational ones, as people buy comprehensive coverage to mitigate the negative effects of occurrences they are afraid of.

Table 4.1 The key, top-of-mind reasons for purchasing a casco policy

Answers	Indications	Percentage
Fear of collision with another car	355	32%
Fear of being a victim of car theft	339	31%
Fear of acts of vandalism (intentional damage to the vehicle caused by an unknown person)	90	8%
Fear of damage to the car body, windscreen or glass	72	7%
Fear of damage to onboard devices	48	4%
Fear of onboard devices being stolen	30	3%

Source: Own calculations based on CATI data

The respondents were also asked to give other reasons for purchasing a casco policy (a selection of possible answers was provided). 50 respondents stated that comprehensive coverage had been required by a bank or lease company and 49 said they habitually purchase comprehensive cover ("I always buy this insurance"). Other frequently given answers referred to "safety", "convenience and peace of mind" and the "general fear of collisions" or the fear of "unforeseeable events" and "high repair costs". Only 20 respondents stated that they have a new car, and three said that their car was expensive, which arguably is a good reason to insure a car. A few respondents said they were persuaded by someone or received a good deal. Very few respondents pointed to a motivation that could be interpreted as based on negative selection — 4 respondents said that they drove a lot, and two admitted that their cars were occasionally operated by younger and less experienced drivers.

The 1355 respondents who purchased only MTPL cover for their car gave two main reasons for this decision, which both can be interpreted as based on negative motivation or even as a consequence of an obstacle. It is quite possible that most of the respondents that gave the negative answer would buy full coverage if it were available for their car or less expensive. A few percent showed "positive" motivation, likely a consequence of well-developed insurance awareness: those

respondents believed that the probability that they cause a collision is very low or presented a low level of risk aversion, so they deliberately decided not to purchase a casco policy.

Table 4.2 Main reasons for not purchasing a casco policy

Answer	Indications	Percentage
My car is too old	505	37%
Comprehensive insurance is too expensive	484	36%
I do not cause collisions; I will not damage my car	71	5%
I am not afraid of car theft	22	2%

Source: Own calculations based on CATI data

There are different motives to buy insurance but purchases of non-mandatory insurance are most frequently motivated by risk aversion. Customer perception of insurance is therefore primarily a product of the claims handling process. Moreover, while a decision to purchase the first policy is driven by a desire to avoid losses, positive experiences with the claims handling process often influence a decision to renew coverage.

5. Satisfaction

The next phase of the study is focused on consumer satisfaction. Being aware of the problem of self-selection bias already described by some researchers[29], the authors expected that respondents less satisfied with the casco insurance might be more willing to answer the questions which could result in lower average level of declared satisfaction. This did not happen as the questionnaire was a part of a greater commercial study with many questions concerning different areas.

The customer is increasingly interested not only in the service itself, but also in the entire process of its provision. That is why customer service is so important at every stage of the insurance service process.[30] For this reason there were three questions concerning satisfaction in our research. What transpired was that the respondents had a problem with the distinction of:

• their satisfaction from having a policy stating specific terms of insurance,
• their satisfaction related to claims settlement,
• their satisfaction related to the quality of services performed by the repair shop.

The satisfaction from having a casco policy is significantly higher among the insureds who notified a claim, as shown in Table 5.1 and on Chart 5.1. This, arguably, seems to be a reasonable correlation as people often say 'I have not used my insurance as I had no claim'. Another common opinion circulating among the general public is expressed by the statement 'I have finally used my policy after so many years of paying and not using it'. In this context, it is striking that the general level of satisfaction from having a casco policy is very high among all customers – also those who 'did

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29. e.g. G. Nicolini, G.& L. Dalla Valle, Overview about bias in customer satisfaction surveys and focus on self-selection error, Department of Economics University of Milan Italy, Departemental Working Papers, 2009.

30. J. Iwko, *Koszty jakości a wartość konsumencka usług ubezpieczeniowych*, „Wiadomości Ubezpieczeniowe" 2/2013.

not need to use the insurance'. Arguably, this may be a consequence of a kind of rationalisation mechanism. According to psychologists, people who made a decision tend to comfort themselves by convincing themselves that it was a good choice which is known as 'confirmation bias'.[31] Unfortunately, it was impossible to ask more precisely if the respondents' satisfaction was merely a product of having additional coverage or was based on more in-depth knowledge of the coverage in question.

Table 5.1 Satisfaction from having a casco policy

	Customers with at least one claim (N=205)	Customers with no claim (N=888)	All customers (N=1093)
Very satisfied	49%	34%	37%
Rather satisfied	43%	49%	48%
Rather dissatisfied	5%	5%	5%
Very dissatisfied	3%	3%	3%
Hard to say	2%	9%	7%

Source: Own calculations based on CATI data

Chart 5.1 Satisfaction with having a policy
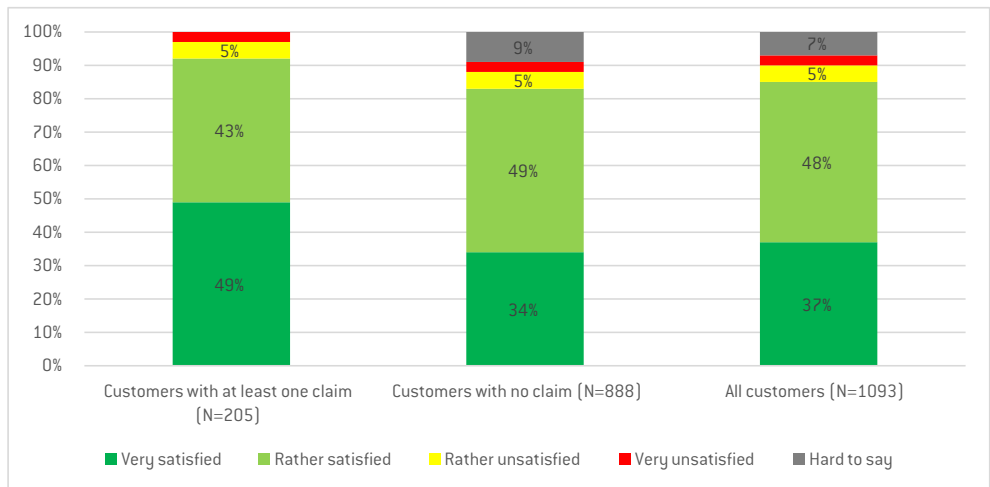
Source: Own calculations based on CATI data

Depending on the purchased type of comprehensive car cover, customers can choose from three options of claims settlement: repair in an approved service centre (ASO in Polish), repair in a car workshop and a payment in cash based on cost estimation made by licenced liquidator. The availability of some of these options often depends on the age of the car. The option of having the car repaired in an approved service centre with the exclusive use of the vehicle manufacturer's spare

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31. E. Jonas, S. Schulz-Hardt, D. Frey, N. Thelen, *Confirmation Bias in Sequential Information Search After Preliminary Decisions: An Expansion of Dissonance Theoretical Research on Selective Exposure to Information*, "Journal of Personality and Social Psychology" Vol. 80, No. 4/ 2001, pp. 557–571.

parts is available for cars not older than ten years. The car workshop repair option and the payment in cash option are available for cars of all ages that are insurable under a casco policy. The car workshop repair option involves no cash payment to the policyholder; non-manufacturer's spare parts may be used. A payment in cash involves the preparation of a cost estimate of the required repairs, which serves as a basis for a cash payment made directly to the policyholder.

In order to increase the level of customer satisfaction and reduce the costs of the whole claims handling process, insurers simplify the relevant procedures. An example of this trend is simplified procedures of claims settlement, which are commonly referred to as "fast-track claims settlement" services. In the fast-track mode, claims are assessed and paid (or denied) based on a customer's photographic evidence sent to insurers. The whole claims settlement process, from the notification of loss to the payment of compensation to the customer's account, takes up to several days. The fast-track mode is available for all claims settlement options. However, this mode is subject to restrictions concerning the maximum amount of payable compensation (which is several thousand zloty, i.e. up to one thousand euro). Invoice processing is similarly simplified: in certain situations, insurers' payments are made based on repairers' invoices and no prior acceptance of costs is required.

In the past, insurers preferred the cash payment method of claims settlement, considering it the most cost-effective solution. Customers were also satisfied with this method because they were paid in cash and could freely choose the repairer. The disadvantage of the cash payment method is the lack of certainty that the damage will be repaired.

Nowadays, insurers prefer the car workshop repair method, referring policyholders to a network of partner repairers who are contracted to perform repair services on favourable commercial terms, based on the benefits of scale.

The highest costs of claims handling process are associated with repairs made in approved service centres. This form of claims settlement is mostly chosen for relatively new vehicles. This method does not involve payment of compensation from the insurer to the policyholder.

More and more customers consider the "cashless" methods of claims settlement the most optimal and desirable.

A quite controversial matter is the assessment of a total loss. If the costs of repairing the vehicle exceed 70% of its value as of the date when the loss occurred, the repair is considered to be economically unfeasible and the vehicle is classified as a total loss. If damage occurs, a loss adjuster can easily classify an older car with low value as a total loss. Such a situation, while preferable for the insurer, is often incomprehensible for the customer. Whether or not a vehicle is classified as a total loss depends on internal policies of the insurer and the method of valuation applied during the claims settlement process. If an insurer classifies a car as a total loss, the customer is likely to receive lower compensation: the value of the vehicle on the date of loss decreased by the residual value may ultimately be lower than the estimated value of loss). Insurers' readiness to declare total loss often annoy customers and decreases customer satisfaction related to the claims handling process.

Only 205 out of 1093 surveyed policyholders (19%) notified at least one claim under a casco policy in the last two years, 4 out of them had two casco claims within this period so the total number of claims was 209. Those 205 respondents were asked to estimate their satisfaction related to the claims handling process and the quality of services performed by the car repair workshop (if the car had been repaired which concerned 149 policyholders). Also in this case, the general level of satisfaction was very high – 85% of the surveyed claimants were at least 'rather satisfied'

with claims settlement, but the level of satisfaction varied depending on the selected settlement method, as shown in Chart 5.2.

Chart 5.2 Satisfaction related to the claims settlement process
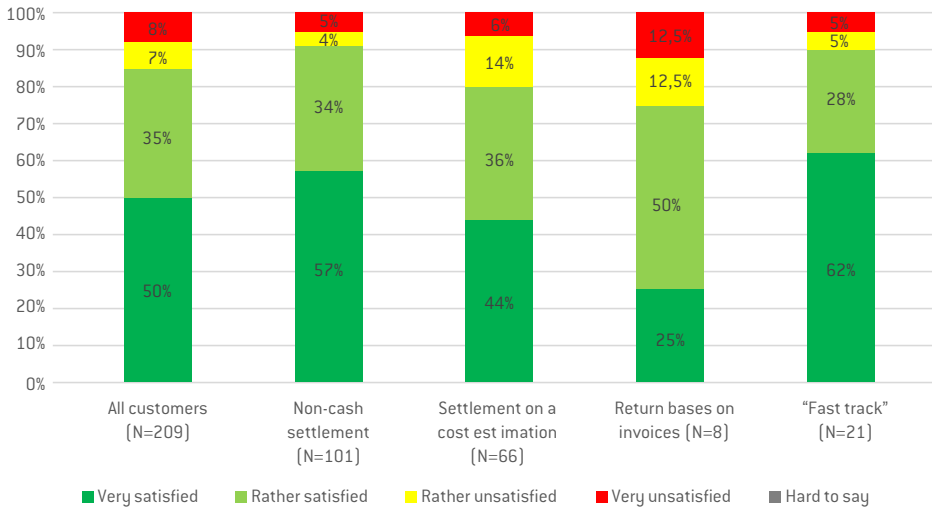
Source: Own calculations based on CATI data

It can be found on chart 5.2 that customers prefer cashless settlement (when they just have their cars repaired) to the other two options: settlement on costs estimation (when they get payment in cash and nobody asks them if and where they had repaired their cars) and return based on invoices (which is the least popular option chosen by only 8 customers who were relatively less satisfied). The first option was chosen by the highest number of insureds (101) and the level of satisfaction related to settlement process was very high compared to the next two options. The last option, so-called fast track, is available only with minor claims and, as it is clearly evident on chart 5.2, is the most attractive to customers.

It may be noticed that the numbers of customers whose claims had been settled according to those four options shown on chart 5.2 do not sum up to 209, which is the total number of claims, as some of the respondents did not remember which variant of claim settlement they had experienced.

The option of the claims settlement most frequently chosen by respondents was a "cashless" repair in an approved service centre or a car shop (48%). This option was slightly more popular among women (55%), as compared to men (45%).

Only 17 out of 205 customers (8%) made an attempt to obtain a better settlement of their claim either by providing their own cost estimate or by submitting a complaint to the insurer. Only two customers went to court, and very few sought professional legal representation.

149 customers had their cars repaired. 87% were at least "quite satisfied" with the repair.

Chart 5.3 Satisfaction related to the car repair.
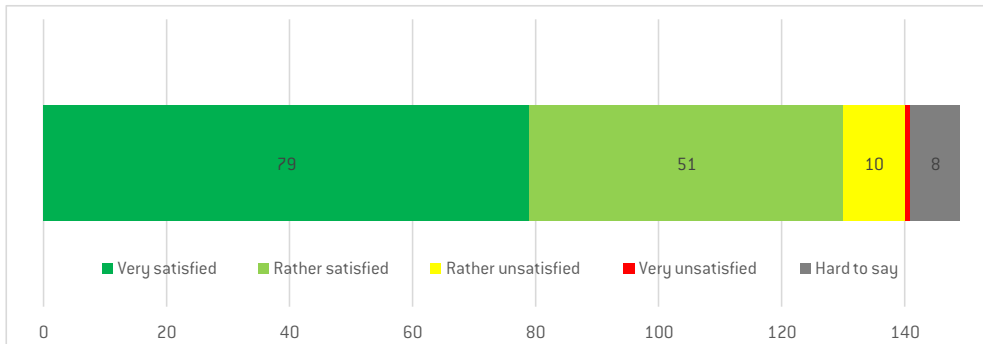
Source: Own calculations based on CATI data

Conclusions

This paper reveals several issues that show determinants of customer motivation and satisfaction related to comprehensive car insurance. First of all, the willingness to purchase comprehensive car insurance depends on vehicle characteristics, primarily the age of the car. Notably, the availability of comprehensive coverage is subject to restrictions based on the age of a car sold in Poland. Since premiums are the primary driver of purchasing motivation, comprehensive coverage offerings are adjusted to the needs of retail consumers and tailored as multi-options products with substantially different ranges of cover.

The age of a car, together with socio-demographic characteristic of its keeper, is the key factor of purchase / non purchase comprehensive insurance policy. The model of logistic regression shows a reasonable approach to obtaining and retaining of comprehensive car insurance. Interestingly, gender also matters, probably due to specific features of households and a lower willingness to purchase an old car among women. In more affluent households, women use cars more frequently. Perhaps not surprisingly, the survey confirmed a positive correlation between the willingness to purchase a casco policy and the age, place of residence, income and education level of car keepers. The motivation to purchase a comprehensive policy increases with the car keeper's age, size of their hometown as well as income and education level. Also, this correlation can be easily explained in rational terms. More experienced respondents with greater insurance awareness and savings should be more interested in living their lives in a more secure way, which is accompanied by greater willingness to have casco insurance coverage and a larger degree of risk aversion. The survey notably shows no strict correlation between the motivation to buy casco insurance and the declining car theft statistics in Poland. The fact that purchases of comprehensive car insurance result from obligations imposed by lenders was only mentioned in answers to additional questions. The respondents who decided against purchasing comprehensive car insurance gave the age of the car and premiums pricing as rationales behind their choices.

However, the most interesting finding of the study is a very high level of customer satisfaction, which increases among respondents with claims history. This shows that insurers operating on the Polish market make substantial efforts to provide services that ensure an appropriate customer experience. The policyholders who have the first-hand experience with claims handling procedures

expressed higher levels of actual (and not merely potential) satisfaction. At the same time, different levels of satisfaction were shown for different methods of claims settlement, which underlines the importance of time-efficient (simplified) and convenient (cashless) claims handling processes.

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Motywacja i satysfakcja klientów związana z zakupem ubezpieczenia autocasco w Polsce

Złożoność i nierówny dostęp do informacji dla wszystkich zaangażowanych stron to jedne z kluczowych cech rynku ubezpieczeń samochodowych w Polsce. W artykule przedstawiono wyniki projektu badawczego mającego na celu zbadanie motywacji i satysfakcji konsumentów związanych z zakupem polisy autocasco. Badania jakościowe (IDI) dostarczyły informacji na temat relacji między różnymi stronami oraz na temat potencjalnych problemów, które zostały przeanalizowane w ilościowej części badania. Binarny model logitowy oparty na odpowiedziach na ankietę CATI reprezentatywnej próby 4 500 respondentów pomógł naukowcom zidentyfikować pewne czynniki zwiększające prawdopodobieństwo zakupu typu ubezpieczenia. Dalsza analiza wykazała, że poziom zadowolenia konsumentów był w rzeczywistości większy niż pierwotnie przewidywali autorzy w oparciu o poziom zaufania konsumentów do branży ubezpieczeniowej, który omówiono w dalszej części tego artykułu. Autorzy oparli się na oficjalnych statystykach polskiego rynku ubezpieczeń samochodowych oraz danych pokazujących podział wiekowy pojazdów mechanicznych na różnych obszarach geograficznych, aby przedstawić pewne tendencje i wskazać konkretne czynniki wpływające na motywację i satysfakcję klientów związane z zakupami kompleksowego ubezpieczenia samochodu.

Słowa kluczowe: motywacja klienta, satysfakcja klienta, ubezpieczenie autocasco, polisa AC

BARBARA CIEŚLIK, PHD — Warsaw School of Economics
ORCID: 0000-0002-0492-9488

ILONA TOMASZEWSKA, PHD — Warsaw School of Economics.
ORCID: 0000-0002-2719-3389