Towards Fair Pricing and an Optimized Customer Experience: A Study of the Drivers of Premiums and Insured Satisfaction

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ABSTRACT

This paper aims to identify ways to improve insurance premium pricing and claims management to optimize customer experience and increase customer satisfaction. It examines the interaction between variables with two objectives in mind: firstly, to assess the impact of certain aspects of claims management and insurance premiums on customer satisfaction and, secondly, to analyze the role of the cost and severity of claims in insurance premium pricing. Based on a sample of 90 SECA Assurances customers from the 2018–2024 period, and after confirming the endogeneity of the insurance premium variable, we opted for an instrumental variable estimation using the two-stage least squares (2SLS) method.

The results show that policyholder satisfaction depends largely on the human and informational dimensions of the service, which reinforce the technical and financial aspects. In addition, insurance premiums are mainly determined by the severity of claims, while the cost of claims does not provide a statistically significant explanation for the variation in premiums.

The originality of this paper stems from its integrated approach, considering pricing policies and claims management as interrelated constructs shaping customer satisfaction, thereby offering both theoretical and managerial contributions to life insurance service.

Ethical Considerations: Before starting this work, we made sure that all ethical requirements were respected. All participants were informed about the purpose of the research and agreed to take part voluntarily.

Conflict of Interest: The authors state that they have no conflicts of interest that could have influenced research or its results.

Data Availability Statement: For confidentiality reasons, the data cannot be shared publicly. However, they are available from the corresponding author upon reasonable request.

INTRODUCTION

In the insurance sector, customer satisfaction is a major strategic issue. Faced with growing competition and an increasingly demanding and volatile customer base, insurers seek to acquire, but above all to retain, their policyholders over the long term by focusing on the quality of communication, the reliability of information, the transparency of procedures, etc. (Hussen, 2015; Rijanto & Suryani, 2016; Chege, 2021). In this context, it should be noted that customer relations are based on a delicate balance between the customer's experience and the promise of support made to the customer at the time of subscription, which only truly materializes at a specific moment: when a claim is made. This balance is mainly expressed through two dimensions: the insurance premium and claims management. The premium is the price of protection, and its perceived fairness plays a

crucial role in the trust placed in the insurer (Xia et al, 2004; Bolton and Lemon, 2022). As for claims management, it reflects the moment of truth when the promise of protection is transformed into a concrete experience. It is at this critical level that the insurer demonstrates its credibility and commitment to the customer. The literature shows that speed of processing, clarity of communication, and personalized support are key determinants of satisfaction (Wirtz & Zeithaml, 2018). Conversely, poor claims management can lead to dissatisfaction and even customer loss. In reality, a premium that is considered high may be accepted if it is offset by efficient and empathetic service when settling a claim. Conversely, a competitive premium can lose all appeal if the customer experience is marked by delays, a lack of transparency, or a lack of consideration. Thus, customer satisfaction in insurance does not depend solely on the price level, but on an overall equation that combines perceived fairness in pricing and the quality of claims management. This raises a key question: "What is the combined effect of pricing and claims management on policyholder satisfaction, and what are the levers for improvement that can optimize the customer experience?".

This issue takes on particular significance in the Tunisian context, which is characterized by a rapidly changing insurance market, intensifying competition, and growing demands from policyholders for transparency and quality of service. In this context, SECA is a relevant case study, as it illustrates the current challenges facing Tunisian insurers: finding the right balance between fair pricing and efficient claims management in order to sustainably improve policyholder satisfaction. Therefore, analyzing the impact of pricing policy, especially that related to risk and claims management, on policyholder satisfaction is necessary in order to identify the main determinants and propose areas for improvement.

To address this issue, our study will be divided into four main sections: in the first section, we will present a review of the literature in order to assess the research hypotheses. Next, we will outline the methodology before presenting the results obtained, as well as the managerial implications, limitations, and future avenues for research.

LITERATURE REVIEW

Following on from the literature review, it appears necessary to develop a conceptual framework that formalizes the main constructs used in this research and explains the theoretical relationships that may link them.

1. Satisfaction

Customer satisfaction plays a decisive role in the insurance sector, as it reflects the extent to which customers' expectations are met by the services they receive. According to Oliver (1997), satisfaction can be defined as "the consumer's judgment of a consumption experience, resulting from a comparison between their initial expectations and the perceived performance of the service." Applied to the insurance industry, this concept reflects the insurer's ability to effectively meet the needs for protection, transparency, and prompt claims processing. A satisfied policyholder is more likely to remain loyal, renew their contracts, and share a positive image of the company, thereby contributing to its competitiveness and sustainability (Anderson & Srinivasan, 2003). Today's market is increasingly demanding and marked by the digitization of financial services. Improving policyholder satisfaction is therefore becoming a strategic lever for building trust, reducing cancellation rates, and ensuring sustainable growth (Ben Omrane & Bellouma, 2021).

2. Claims management

The claims management process is a central element in the relationship between the insurer and the insured, as it is the moment when the insurance company fulfills its promise of protection. It encompasses all stages from the reporting of the claim to the final settlement of the compensation (Cummins & Tennyson, 1996). The literature emphasizes that the quality of this process is multidimensional and based on several essential criteria, such as speed and efficiency of processing, transparency and clarity of procedures, fairness and accuracy of compensation, and the quality of communication and follow-up provided to policyholders (Kasilingam & Ramasamy, 2009). Some authors also highlight the importance of the relational dimension, where attentiveness, empathy, and responsiveness of claims managers directly influence policyholder satisfaction and loyalty (Harrington & Niehaus, 2004). Thus, claim management cannot be reduced to a simple technical or administrative operation, but must be understood as a comprehensive and multidimensional process that plays a

decisive role in building a lasting relationship of trust with insured parties. In this study, claims management will be considered as a construct comprising several key dimensions, namely: clarity of information, processing time, and perceived empathy. This approach allows claims management to be understood not as an isolated operation, but as a comprehensive and integrated process that plays a decisive role in building a lasting relationship of trust with policyholders.

The relationship between these dimensions and policyholder satisfaction will be presented below:

Clarity of information

According to the theory of informational transparency, customer satisfaction depends on their understanding of the processes, rights, and responsibilities associated with the insurance contract in the event of a claim. This approach is linked to the foundations of interactional justice theory, which emphasizes the importance of quality communication and the perception of fairness in service (Colquitt et al., 2001). In this context, Hussen (2015) conducted a study in Ethiopia showing that the reliability and clarity of the information communicated positively influences the satisfaction and loyalty of policyholders. This research highlights that policyholders attach great importance to transparent communication, particularly with regard to coverage and claims processes. In a similar vein, Rijanto and Suryani (2016) explored the impact of information transparency on customer cancellation behavior in the auto insurance sector. Their study shows that customers who receive clear and accessible information are less likely to cancel their contracts, reflecting a higher level of trust in their insurance. Such transparency therefore plays a decisive role in customer retention. Furthermore, Chege (2021), in a study of the Kenyan insurance market, emphasized that the clarity of information provided during customer interactions is a key factor in satisfaction. Such reliability not only improves customers' perception of their insurer but also contributes to strengthening their loyalty.

H1: Clarity of information has a positive effect on policyholder satisfaction.

Processing time

The time taken to process a claim is generally perceived as an indicator of the insurer's commitment to its customers and its organizational competence. So, based on the theory of expectation disconfirmation (Oliver, 1980), delayed claim processing causes frustration and dissatisfaction among customers, while fast claim processing, which is often expected by the insured, increases their satisfaction. This approach is complemented by the theory of procedural justice (Thibaut & Walker, 1975; Tyler, 1984; Greenberg, 1990), which highlights the importance of the perception of a fair and efficient process. In this context, Smith & Bolton (1998) demonstrated that in the US auto insurance sector, a rapid response to claims significantly increases customer satisfaction, which reduces their propensity to switch insurers.

This pioneering study highlighted that perceived speed of service was a major predictor of loyalty. Davidow (2003) explored this topic further in a study focused on the health insurance sector, indicating that short turnaround times for claims processing strengthen customer trust and commitment to the insurer, thereby improving long-term relationships. More recently, contemporary studies have confirmed and supplemented these findings, Kim et al. (2019) found that the speed of claims processing in South Korea reduces stress for insured customers and improves their overall satisfaction. Similarly, both Ahmed & Ghoneim (2020) and Zhou et al. (2021) validated the positive impact of speed in the health insurance sector in Egypt and the home insurance sector in China. Wang et al. (2018) showed that in the auto insurance sector in China, perceived speed in claims processing significantly improves customer satisfaction and loyalty. Khan & Ali (2020) also observed that the perception of long delays in health insurance claims resolution in Pakistan leads to a significant decline in satisfaction and increases the risk of policy cancellation. However, Singh and Sharma (2019) pointed out that communicating regularly about the status of the case reduces negative perceptions of delays and improves satisfaction, even when processing times are long. These studies support the idea that proactive time management and transparency play a key role in the relationship between perceived delays and customer satisfaction.

In Tunisia, a study by Nasri et al (2023) analyzed road accidents based on auto insurance claims data, examining in particular the determinants of policyholder satisfaction. Their investigation focused on a sample of claims reports collected from several local companies, with a focus on the relationship between driver behavior, level

of coverage, and policyholder satisfaction. The results show that policyholder behavior directly influences the claims-to-premiums ratio, a key factor in assessing service quality. In addition, the perceived level of coverage (liquidity of settlement, time taken to process the claim) determines the level of customer satisfaction. This study provides a relevant empirical framework in Tunisia regarding the impact of claim settlement times and procedures on customer satisfaction.

H2: A perceived long processing time negatively affects policyholder satisfaction.

Perceived empathy

According to the SERVQUAL model developed by Parasuraman et al (1988), which identifies empathy as one of the key dimensions of service quality, referring to the ability of staff to demonstrate attention, listening, and understanding toward customer needs, respectful and attentive treatment promotes satisfaction by strengthening customer trust in the service provider. In this context, Bahadur et al (2018) show that employee empathy has an indirect positive effect on customer satisfaction through customer emotional engagement and perception of service quality. Chege et al. (2019) showed that in the insurance sector in Kenya, the ability of employees to understand and respond to customers' emotional needs significantly improves their satisfaction. This conclusion is reinforced by the work of Karavadi and Reddy (2025), who identified empathy as a key factor in satisfaction in the life insurance industry in India, highlighting the importance of human interactions in the service process.

Furthermore, in a study of life insurance companies in Nepal, Upadhyay and Adhikari (2021) confirmed that empathy positively influences perceptions of service quality and, consequently, customer satisfaction and loyalty. Bahadur (2020) highlights that employee empathy strengthens trust in employees, which in turn improves satisfaction, itself a mediator of loyalty. Wieseke et al (2012) conceptualize empathy as a multidimensional construct (customer and employee empathy). They show that empathy increases customer satisfaction and that empathetic customers can mitigate the impact of an unsatisfactory experience on their loyalty. These results converge to show that empathy is an essential lever for strengthening the relationship between insurers and customers, particularly in this sector where trust and understanding of individual needs are paramount.

H3: Perceived empathy in claims management increases customer satisfaction.

3. The insurance premium

The insurance premium, which is the amount paid by the insured to get coverage, is also crucial to overall satisfaction. Indeed, according to consumer economic theory (Adam Smith, 1776), price is a determining factor in the purchase decision and in the evaluation of the perceived value of the service (Zeithaml, 1988). A premium that is considered too high can generate a feeling of overload and reduce satisfaction, while a premium that is perceived as fair or competitive reinforces the feeling of value for money and loyalty (Bolton & Lemon, 1999).

In this context, numerous studies have highlighted the impact of premiums, and more specifically perceived premiums, which reflect how customers evaluate the cost and fairness of insurance premiums, on policyholder satisfaction. Lee and Kim (2018) showed that in the auto insurance sector, a premium perceived as fair or competitive increases customer satisfaction, even when the actual amount is high. Similarly, Zhang and Zhao (2020) observed that the perceived premium influences the relationship between service quality and satisfaction in health insurance, emphasizing that customers constantly compare the perceived price to the value they receive.

However, Singh and Kaur (2021) demonstrated that transparency and communication about the composition of premiums reduce negative perceptions of cost, thereby increasing satisfaction and trust. These studies emphasize the importance of integrating perceived premiums into marketing and customer relationship management strategies in the insurance sector. In Tunisia, a study by Ben Amor et al. (2018) indicates that the perception of premium fairness significantly influences policyholder satisfaction and their propensity to renew their contract. Therefore, based on these studies, it can be said that the insurance premium, beyond its economic role, is a key lever in customer relationship management and overall satisfaction.

H4: A perceived expensive insurance premium reduces customer satisfaction and loyalty.

However, it should also be noted that the insurance premium must enable the insurer to build up the technical provisions necessary to meet its commitments, while generating a profit margin. Its calculation aims to determine a fair balance between the cost of risk for the insurer and the acceptable price for the insured. Thus, to set the amount of the insurance premium, the insurer considers several components that reflect both the technical aspects related to risk assessment and its own commercial aspects[1].

Understanding these different elements provides a better understanding of how insurance contracts are priced. The pure premium, also known as the risk premium, forms the technical basis for calculating the premium. It corresponds to the statistical estimate of the average cost of claims that the insurer will have to cover, distinguishing between normal claims and serious claims. It is calculated using complex actuarial methods that consider the frequency and average cost of claims for a given risk profile. In addition to this pure premium, a safety loading is added to take into account the volatility of technical results and to protect against unfavorable fluctuations in claims from one year to the next, as well as commercial components that include all costs incurred by the insurer to manage contracts and claims, the profit margin that the insurer wishes to generate on each contract, and applicable taxes.

This calculation process combines actuarial rigor and commercial considerations to offer premiums that are both fair and competitive, while taking into account factors that may influence the premium, such as the type of coverage (e.g., all risks insurance), the guarantees included, the perceived level of risk (e.g., for auto insurance: vehicle power, use (private/professional), annual mileage, claims history), and the insured's profile (age, gender, occupation, geographic location, history, etc.).

In this study, we will focus on the technical aspect of premium setting related to risk assessment by examining the effect of the average cost of claims and their severity.

The average cost of claims

According to actuarial risk theory, Dionne and Harrington (1992) assert that the premium is proportional to the expected loss, considering both the frequency and severity of claims. In addition, actuarial pricing theory deals with determining a fair and equitable premium for insurance contracts. Its objective is to set a premium that best reflects the insured risk while ensuring the solvency of the insurance company. It is in this context that Cummins and Weiss (2014) demonstrated that an increase in average claim costs leads to a proportional increase in premiums, particularly in the auto and home insurance sectors.

Furthermore, Boucher et al. (2020) show that changes in claims costs, particularly due to factors such as inflation or the complexity of repairs, are prompting insurers to regularly adjust premiums to maintain their profitability.

In Tunisia, while empirical studies remain scarce, sectoral analyses conducted by the Tunisian Federation of Insurance Companies confirm that premium trends are closely correlated with claims-related expenses, particularly in the motor insurance segment. These findings suggest that claims' costs are a key explanatory variable in setting premiums, in line with the economic fundamentals of insurance pricing.

H5: A high claims cost leads to higher premiums and generates dissatisfaction among insured clients.

The severity of the disaster

The claim severity, which corresponds to the extent of losses related to an insured event, is also considered a determining factor in setting insurance premiums. Cummins et al (1988) show the impact of serious claims (requiring hospitalization) on changes in auto and health insurance premiums. Dionne and Eeckhoudt (1985) showed that high claim severity leads to a significant increase in premiums, as it increases the insurer's financial exposure. In addition, Cohen and Einav (2007) studied data from the automotive sector and demonstrated that premiums are correlated with the severity of previous claims, reflecting the need to adjust rates based on potential costs. Dionne et al (2006) showed that accurate modeling of claim severity, combined with claim frequency, improves pricing and risk management in insurance companies.

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[1] Insurance premium calculation: methods and examples.

Eling and Luhnen (2010) discussed the ways in which the severity of claims (including hospitalization) is integrated into premium calculations and risk management. Barseghyan et al (2013) explain how the severity of claims impacts premiums via the choice behavior of policyholders. Outreville (2018) emphasizes that the frequency and severity of claims directly influence pricing, taking into account the specific risks of each customer segment.

To this end, the following hypothesis is formulated:

H6: The severity of the claim has a positive influence on high insurance premiums and generates dissatisfaction among insured parties.

In light of this literature review, customer satisfaction in the insurance sector can be influenced by several management practices, in particular the quality of the information provided, the time taken to process claims, managers' empathy, and the amount of the insurance premium. This in turn may depend on the characteristics of the claim related to risk, such as the cost of the claim, its severity, etc.

In this perspective, our study aims to go beyond traditional approaches. The objective is to identify levers for improving insurance premium pricing and claims management, with a view to optimizing the customer experience and enhancing policyholder satisfaction by examining the interactions between variables with a twofold objective: on the one hand, to assess the impact of certain aspects of claims management and insurance premiums on customer satisfaction, and secondly, to analyze the role of the cost and severity of claims in insurance premium pricing.

RESEARCH METHODOLOGY

The data is collected from customers whose car insurance policies are managed by SECA Assurances and Risk Management, a Tunisian brokerage firm that plays a key role in claims management on behalf of its customers, and interacts directly with several partner insurance companies such as GAT Assurance, Assurances MAGHREBIA, C.O.M.A.R., etc. Although SECA is not strictly speaking an insurance company, its status as an intermediary gives it a broad and in-depth understanding of management practices and the perceptions of policyholders.

The initial sample included 122 SECA clients who reported auto claims during the period from 2018 to 2024. Excluding cases currently being processed and unusable respondents, we arrived at a final sample of 90 valid observations.

As part of this study, we used an instrumental variable (IV) model to analyze, on the one hand, the determinants of policyholder satisfaction and, on the other hand, the factors influencing insurance premiums. This model allows us to correct for the potential endogeneity bias between insurance premiums and customer satisfaction. Indeed, premiums can influence satisfaction, while themselves being determined by risk-related characteristics of claims, which makes the ordinary least squares (OLS) estimator biased. We therefore use a two-stage estimation (2SLS) method, which allows us to obtain unbiased and economically interpretable coefficients. In the first stage, the insurance premium variable "PRIME" is explained by instruments considered exogenous, namely the cost of the claim 'CS' and the severity of the claim "GS." In the second stage, the customer satisfaction variable "SATISF" is regressed by the insurance premium 'PRIME' as an instrumental variable and by the dimensions of claims management, namely the clarity of information "CI," processing time "DT," and empathy "EMP." This econometric framework provides a more rigorous interpretation of the causal effect of the explanatory variables and constitutes a solid basis for analyzing the results.

$$\text{SATISF}_i = \alpha_0 + \alpha_1 \cdot \text{PRIME}_i + \alpha_2 \cdot \text{DT}_i + \alpha_3 \cdot \text{EMP}_i + \alpha_4 \cdot \text{CI}_i + \varepsilon_{i1} \qquad (1)$$

$$\text{PRIME}_i = \beta_0 + \beta_1 \cdot \text{CS}_i + \beta_2 \cdot \text{GS}_i + \varepsilon_{i2} \qquad (2)$$

SATISFi: *Overall* customer satisfaction is measured by questions inviting the insured to rate their overall level of satisfaction with their insurer on a Likert scale. The items used aim to capture the overall assessment of the experience with the insurer, the degree of conformity between initial expectations and the services received, the intention to renew or remain loyal, and the propensity to recommend the company to other customers. The overall

score is obtained by calculating the average of the responses to the various items (Fornell et al, 1996; Taylor, 2002; Yusuf et al, 2018).

PRIMEi: The measurement of the insurance premium was based on a subjective approach, relying on the perception of the insured regarding the premium, in particular their assessment of its high or costly nature. The data is collected using a questionnaire that includes four items designed to capture this perception, namely the assessment of whether the premium is expensive or excessive, the fairness of the amount paid in relation to the coverage offered, the perceived value for money, and satisfaction with the cost of insurance. These items, formulated in terms of a premium perceived as expensive, were rated on a Likert scale. A composite score for perceived premium cost was constructed by calculating the average of the responses to the various items, after recoding the items where necessary. This approach is consistent with the academic literature, which emphasizes that the perception of a costly premium is a key determinant of customer satisfaction (Pooser and Browne, 2023; Sukmawan and Zulganef, 2023).

DTi: Claim processing time: Using a questionnaire, claim processing time was measured across five items focused on the perception of slow processing. These items captured different aspects of this perception, including the general impression of slow processing, exceeding the initially expected time frame, perceived delays at different stages of the process, late communication on the progress of the claim, and the total duration considered excessive. Each item was evaluated on a Likert scale to construct a composite score reflecting satisfaction with the speed of processing.

EMPi : Empathy: Respondents rated their perception of the claims manager's empathetic attitude using four items based on active listening skills, understanding emotions, considering the customer's point of view, and responding kindly to their concerns. All items were rated on a Likert scale, and the overall empathy score was calculated as the average responses. This commonly used approach captures the subjective and relational dimensions of interaction while providing a reliable measure of perceived empathy in financial and insurance services.

CIi : The clarity of information was measured using items relating to the impact of communication on customer satisfaction in the service sector. This approach assesses the insurer's ability to provide simple, understandable explanations of procedures, coverage, and conditions related to the contract and claims processing. The respondents were asked to rate, on a Likert scale, their level of agreement with statements about the clarity of information, the explanation of technical terms, and the availability of all the information needed to make an informed decision. This approach makes it possible to assess policyholders' perceptions of the quality of communication, a key element of client satisfaction.

CSi : The average cost of claims (compensation + related expenses) / number of claims, measured objectively based on internal data, expressed as the average amount in dinars compensated per claim.

GSi : Severity of the incident measured using a dichotomous variable coded 0 if the incidents are deemed non-serious and 1 for at least one serious incident. An injury is considered serious if it requires hospitalization. According to Baker et al. (1974), this criterion allows serious injuries to be objectively distinguished from minor injuries. It indicates a sufficiently serious physical injury requiring intensive medical care.

ϵi_1, ϵi_2: Random error terms: As part of this research, the Likert scale used to measure respondents' perceptions and attitudes is a numerical scale ranging from 1 to 10, where 1 means "strongly disagree" and 10 means "strongly agree". The choice of this scale is justified by the desire to capture greater granularity in the responses, allowing for a finer distinction between different levels of satisfaction, perception, or attitude. According to Coelho and Esteves (2007), the 10-point scale improves statistical sensitivity without compromising psychometric reliability. Moreover, in cultural contexts where individuals in Tunisia are familiar with 10-point ratings, such as in education systems, this scale is more intuitive and easier for respondents to interpret. Finally, the 10-point scale facilitates statistical processing, particularly in the context of multivariate analyses, by providing a more varied distribution of data and reducing the effects of capping or excessive grouping of responses.

FINDINGS AND DISCUSSION

Using level data, initial examination of descriptive statistics and preliminary results revealed an asymmetric distribution of the claim cost (CC) variable, accompanied by marked heteroscedasticity, calling into question the validity of ordinary least squares (OLS) estimates. In order to stabilize the variance, minimize the effect of extreme values, and improve the linearity of the model, we opted for a logarithmic transformation of CS. The econometric tests performed on the basis of this transformation confirmed the validity of the instrumental variable estimation. The Durbin–Wu–Hausman test of endogeneity of the premium (PRIME) produced a significant chi-square statistic ($p = 0.0062 < 0.05$), indicating that the PRIME variable is indeed endogenous and therefore requires estimation using instrumental variables. Subsequently, the relevance of the instruments was tested through first-stage regression. The severity of loss variable (GS) was found to be significantly and positively correlated with the endogenous PRIME variable, with a statistically significant coefficient (coeff = 2.46; $p = 0.025 < 0.05$), while the disaster cost variable lCS is weakly significant (coeff = 0.623: $p = 0.079 < 0.1$).

In addition, the Sargan over-identification test ($\text{Chi}^2 (1) = 0.034$; $p = 0.8532$) shows that the instruments are valid in terms of exclusion and are not correlated with error, but they are not powerful enough. Indeed, the F statistic for the excluded instruments is less than 10 ($F = 2.77$), which attests that the lCS and GS instruments remain too weak to guarantee a solid identification of the causal effect of the strength of the instruments used. The Anderson identification test ($\text{Chi}^2 = 5.57$; $p = 0.0617$) also supports the limited identification.

Furthermore, the multicollinearity test shows that there are no major multicollinearity issues. However, when testing the normality of the residuals, the skewness and kurtosis results reject the normality hypothesis (p-value = 0.000 < 0.05). On the other hand, the Breusch-Pagan/Cook-Weisberg heteroscedasticity test Cook-Weisberg test reveals no evidence of heteroscedasticity in the errors of the first-stage model (model explaining PRIME) (p-value=0.8610 > 0.05), indicating that the errors of the first-stage model comply with the assumption of constant variance. Nevertheless, there is heteroscedasticity in the residuals in the second-stage model explaining satisfaction (p-value=0.000 < 0.05).

The correction of normality and heteroscedasticity leads us to apply robust errors on Stata to confirm the stability and overall reliability of the estimates. Even if the tests reveal a relative instrumental weakness, the use of robust errors makes statistical inference more reliable.

Table 1 : The estimation

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IV (2SLS) estimation


Estimates efficient for homoskedasticity only
Statistics robust to heteroskedasticity

                                              Number of obs =         90
                                              F(  4,    85) =    2241.62
                                              Prob > F      =     0.0000
Total (centered) SS    =      199.225         Centered R2   =     0.9951
Total (uncentered) SS  =      2316.25         Uncentered R2 =     0.9996
Residual SS            = .9704940517          Root MSE      =      .1038


                         Robust
    SATISF      Coef.   Std. Err.       z      P>|z|      [95% Conf. Interval]

     PRIME    .2525636   .0174998     14.43    0.000     .2182646    .2868626
        DT    .2611802    .005135     50.86    0.000     .2511158    .2712447
        CI    .2511515   .0040143     62.56    0.000     .2432837    .2590193
       EMP    .2575272   .0048069     53.57    0.000     .2481058    .2669485
     _cons   -.1532523   .1145897     -1.34    0.181    -.3778439    .0713394

Underidentification test (Kleibergen-Paap rk LM statistic):            5.898
                                          Chi-sq(2) P-val =            0.0524

Weak identification test (Cragg-Donald Wald F statistic):              2.771
                         (Kleibergen-Paap rk Wald F statistic):        3.090
Stock-Yogo weak ID test critical values: 10% maximal IV size          19.93
                                          15% maximal IV size          11.59
                                          20% maximal IV size           8.75
                                          25% maximal IV size           7.25
Source: Stock-Yogo (2005).  Reproduced by permission.
NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.

Hansen J statistic (overidentification test of all instruments):      0.028
                                          Chi-sq(1) P-val =            0.8660

Instrumented:          PRIME
Included instruments:  DT CI EMP
Excluded instruments:  lCS GS
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As shown in the table above, the estimation by instrumental variables via the two-stage least squares method (2SLS) indicates that the satisfaction model is highly significant overall, with high explanatory power ($R^2 \approx 0.995$), high predictive accuracy (Root MSE ≈ 0.10) and $F_{(4, 85)} = 2241.62$ (Prob > F = 0.0000). Therefore, 99.5% of the variation in customer satisfaction (SATISF) is significantly explained by the explanatory variables (PRIME, DT, EMP, CI). Indeed, clarity of information has a positive and significant effect on customer satisfaction (Coef. = 0.2511515; P-value = 0.000). This suggests that customers who receive clearer and more understandable information are generally more satisfied, which is consistent with the findings of Hussen (2015) and Chege (2021). It therefore confirms that better communication and well-explained information contribute to a positive customer experience. In addition, customer-perceived empathy significantly increases customer satisfaction, with a slightly higher coefficient (Coeff = 0.2575272; P-value = 0.000). Insureds are therefore more sensitive to empathy. This result confirms the findings of previous studies by Chege et al. (2019), Karavadi and Reddy (2025), Upadhyay and Adhikari (2021), and Bahadur (2020), which show that empathy is a key lever for strengthening the relationship between insurers and customers.

In addition, we note that the long processing time perceived by customers has a positive impact on customer satisfaction. Every additional day in processing time is associated with an increase in customer satisfaction of 0.2611802. That is, the longer the perceived processing time, the more satisfied the customer. This result dismisses the hypothesis that customers appreciate a company that responds quickly to their requests and contradicts the findings of several studies (Smith and Bolton, 1998; Davidow, 2003; Wang et al, 2018; Kim et al, 2019; Khan and Ali, 2020; Ahmed and Ghoneim, 2020; Zhou et al, 2021). Though this may seem counterintuitive, it could reflect a situation where longer processing times are perceived as a more rigorous or complete process, thereby increasing satisfaction.

On the other hand, the perceived expensive insurance premium positively affects customer satisfaction, with a significant coefficient of 0.2525636. This suggests that when insurance premiums increase, customers remain satisfied. This result rejects the hypothesis that a premium perceived as expensive leads to dissatisfaction and confirms the findings of Lee and Kim (2018), which show that in the auto insurance sector, a premium perceived as fair or competitive increases customer satisfaction, even when the actual amount is high. We can therefore argue that premiums have a positive causal effect on satisfaction, subject to caution due to the demonstrated instrumental weakness.

Using the first-stage model explaining the insurance premium by the cost and severity of the claim (Appendices), we admit that the cost of the claim and its severity fail to explain the insurance premium strongly. In fact, although the severity of the claim (GS) leads to a significant increase in the amount of premium paid by insureds ($p<0.05$), the negative effect observed for the cost of the claim (lCS) is not statistically significant, thus rejecting the hypothesis that the higher the cost, the more the insurer is obliged to increase the premium to cover them.

CONCLUSION

To study the combined effect of pricing and claims management on policyholder satisfaction and identify areas for improvement to optimize customer satisfaction and experience, we conducted this study on a sample of 90 observations, adopting an instrumental variable model to identify, firstly, the effect of cost and severity of claim on insurance premium, and secondly, the effect of premium, clarity of information, empathy and processing time on customer satisfaction.

The findings reveal that a slow turnaround time is perceived by customers as a more rigorous and complete process, which in turn increases their satisfaction. This goes against conventional theories. What's more, an increase in the insurance premium also seems to lead to an increase in customer satisfaction. Both of these results can be explained by the empathy of managers and the clarity of the information they provide, which play an essential role in customer satisfaction and confidence, even in the presence of longer processing times or higher premiums. Customers highly value the quality of the insurer's relationship and transparency, which offsets the impact of perceived slow processing times and high premiums. In other words, when customers perceive that the insurer shows empathy and communicates clearly, they are more tolerant of longer delays and higher premiums, considering that the service provided justifies these constraints.

In line with the findings of Singh and Sharma (2019), regular communication on the status of the case reduces negative perceptions of delays and improves satisfaction, even when processing times are indeed long. In addition, as Singh and Kaur (2021) mention, transparency and communication about the composition of the premium reduce negative perceptions of cost, thereby increasing satisfaction and trust.

Thus, policyholder satisfaction depends largely on the human and informational aspects of the service, which justify the technical and financial aspects. It is therefore recommended that advisors and managers be trained in empathetic communication and transparency to strengthen relationships of trust and improve the quality of information and clarity of explanations regarding pricing through digital media that allow easy access and simplified understanding of contracts and claims.

It is also advisable to digitize and implement performance indicators to measure responsiveness and customer satisfaction, thereby reducing file processing times. Finally, the pricing policy must be adjusted to ensure perceived fairness by introducing customization mechanisms tailored to risk profiles and loyalty programs. According to the results, the severity of the claim (GS) plays a significant role in determining the premium. It is therefore recommended to refine pricing by giving greater weight to severity indicators in order to better reflect the actual risk and ensure fair pricing. All of these actions contribute to aligning technical performance and relationship quality, thus ensuring a better customer experience and sustainable profitability for the company. However, the remarkably insignificant influence of the average cost of claims (CS) on insurance premiums requires further investigation. This result does not necessarily justify insurers not using the cost of past claims to adjust premiums, but rather that the cost of claims does not provide a statistically robust explanation for the variation in premiums.

In addition to the severity of claims, the introduction of other factors such as claims history, claims frequency, and the nature of coverage would provide a better understanding of the complexity of premium pricing. Furthermore, the sample of 90 SECA ASSURANCE customers who have made automobile claims appears to be limited in relation to the total number of customers. It would therefore be appropriate to expand the database in order to improve the statistical robustness of the results and their representativeness in relation to the overall population of policyholders. Extending the study to a larger and more diverse sample, including different categories of contracts and several types of claims, would allow for more generalizable conclusions. In addition, the integration of longitudinal data, tracking policyholders over several periods, would provide a better understanding of rate changes and customer satisfaction over time. Ultimately, these elements could be taken into account in other improvement projects in future research.

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APPENDICES

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Tests of endogeneity
Ho: variables are exogenous


Robust score chi2(1)          =  7.48889  (p = 0.0062)

Robust regression F(1,87)     =  9.23864  (p = 0.0031)


_____


F test of excluded instruments:

  F( 2,   84) =    2.77

  Prob > F     =   0.0684

Sanderson-Windmeijer multivariate F test of excluded instruments:

  F( 2,   84) =    2.77

  Prob > F     =   0.0684


. vif
```

Variable	VIF	1/VIF
EMP	1.07	0.931668
DT	1.07	0.934337
PRIME	1.03	0.973923
CI	1.02	0.983882
Mean VIF	1.05	

```
. vif
```

Variable	VIF	1/VIF
GS	1.85	0.540698
lCS	1.85	0.540698
Mean VIF	1.85	

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of SATISF


        chi2(1)      =     27.73
        Prob > chi2  =    0.0000




Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of PRIME


        chi2(1)      =      0.03
        Prob > chi2  =    0.8610



                    Skewness/Kurtosis tests for Normality
                                                   ─────── joint ───────
    Variable │    Obs  Pr(Skewness)  Pr(Kurtosis)  adj chi2(2)  Prob>chi2
─────────────┼──────────────────────────────────────────────────────────
    resid_iv │     90     0.0000        0.0010        29.16        0.0000

. swilk resid_iv

                Shapiro-Wilk W test for normal data

    Variable │    Obs       W        V         z      Prob>z
─────────────┼─────────────────────────────────────────────
    resid_iv │     90    0.79262   15.686    6.071    0.00000
```