# BUSINESS REPORT

Auto Insurance
Risk Assessment

**Manuraj Gupta**
manurajgupta213@gmail.com

# EXECUTIVE SUMMARY

## Overview

An Auto Insurance provider in France is trying to understand the underlying factors associated on making an auto insurance claim for a particular city. An analysis of demographic data was done to extract important insights and the same is presented in this report. The objective is:

- To understand the underlying factors associated on making an auto insurance claim
- To assess the underlying risk elements
- To derive insights for business improvement and make better pricing decisions

## Key Findings

1) The number of claims made per policy holder is directly correlated to the average density of the city in which the driver lives.
2) Customers having exposure > 0.75 account for almost half of the total number of claims made.
3) High claim rate is seen in cases where driver age is 18 years.
4) Claim rate rise in direct correlation to the exposure bucket.

## Recommendations

1) Higher premiums should be charged from customers in higher exposure bucket.
2) Drivers living in cities with high population density (like metropolitan cities) should be charged higher premiums.
3) Drivers who are in beginners category (Age=18) have high claim rate & hence should be charged higher premiums.

# **INTRODUCTION**

This report uses two major metrics to get insights from data. These two metrics are:

1) **Claim Percentage**: This metric shows the total number of claims made per policy holder during a given exposure period. This metric takes into account the total number of claims.

2) **Claim Rate**: This metric shows the number of customers who made a claim with respect to the total number of policy holders. Unlike Claim Percentage, this metric takes into account only whether a claim was made or not (irrespective of the number of claims) during the given exposure period.

| Total Policy holders | Total No. of claims | Claims per policy |
|---|---|---|
| 678013 | 36102 | 0.05 |

| Customer type | Number | Percent share |
|---|---|---|
| Made one or more than one claims | 34060 | 5% |
| Made no claims | 643953 | 95% |
| Total | 678013 | 100% |

To simplify the analysis, these two metrics have been examined with respect to three broad categories:

1) **Area**
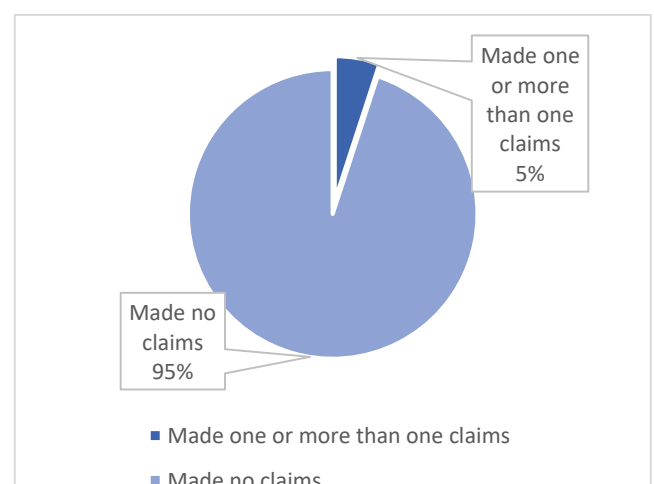2) **Exposure**
3) **Driver Age**
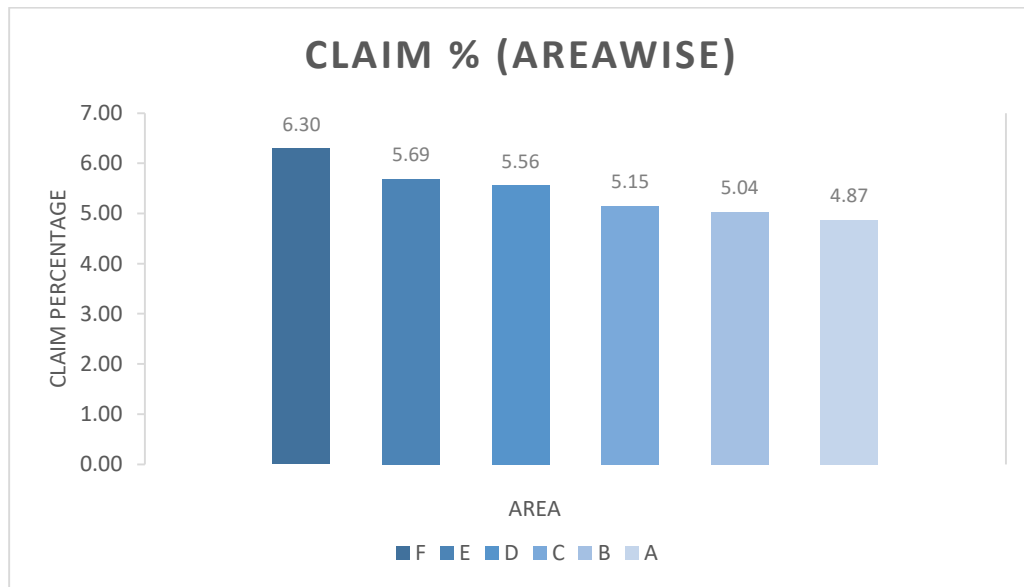


*Chart 1*

# KEY FINDINGS

## 1) AREA



*Chart 2*

From chart 2 above, it can be clearly inferred that Area F has the highest number of total claims made per policy holder during the given exposure period. Hence, insurance policy pricing should be done as per the area, having higher premiums for areas with high claim percentage.
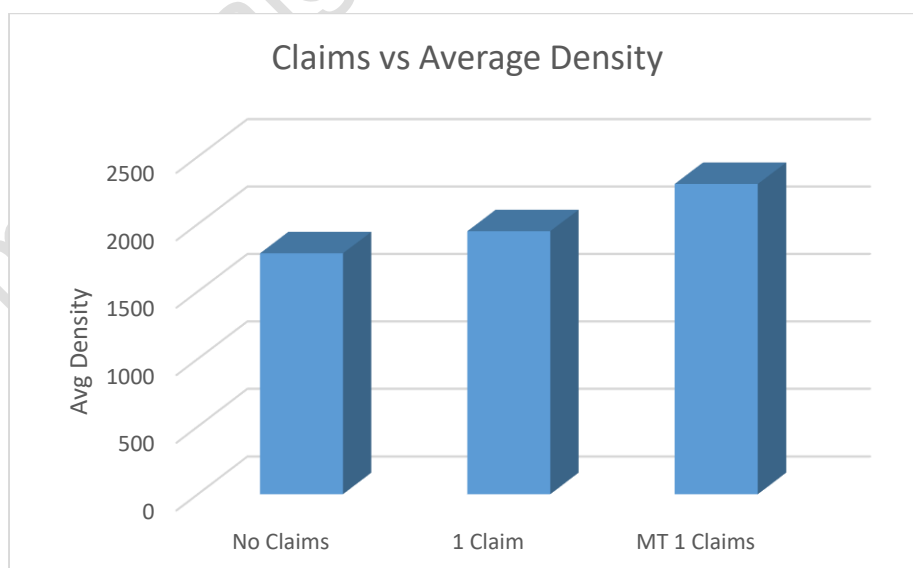


*Chart 3*

The density of city is the number of inhabitants per sq.km. The number of claims made per policy holder is directly correlated to the average density of the city in which the driver lives. Thus, the density is an important factor which determines whether a claim will be made or not. The pricing policy should be such that it charges higher premiums to those drivers who live in cities with high density (like metropolitan cities).

## 2) EXPOSURE

The exposure period is categorised into four buckets: E1 to E4. The criteria for buckets are => E1 = 0 to 0.25, E2 = 0.26 to 0.5, E3 = 0.51 to 0.75, E4 > 0.75.

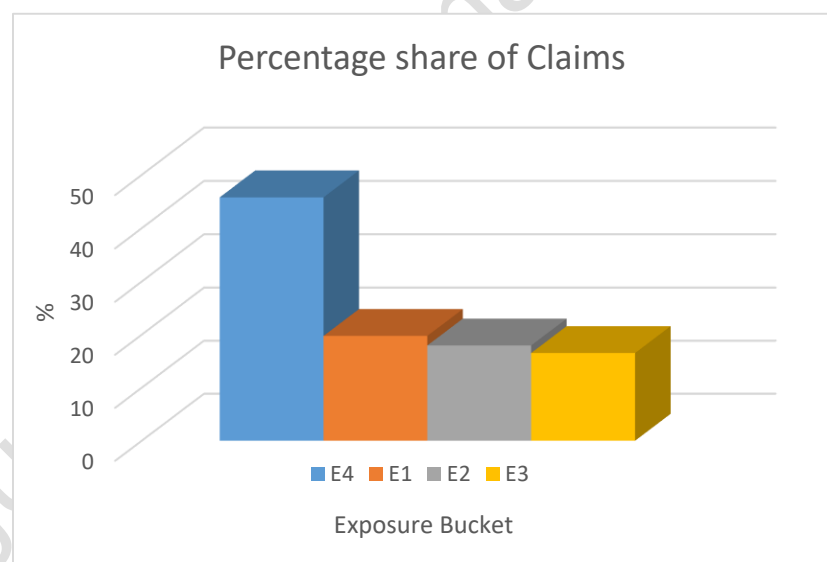| Exposure Bucket | Claim Percentage |
|---|---|
| E4 | 45.7648 |
| E1 | 19.7524 |
| E2 | 17.9519 |
| E3 | 16.5309 |



*Chart 4*

As chart 4 above clearly shows, the bucket E4 (Exposure > 0.75) accounts for almost half of the total number of claims made. Thus, it is a high risk bucket where likelihood of a customer making a claim is much higher than other buckets. The customers falling under this bucket should have premiums priced higher than premium for other buckets.
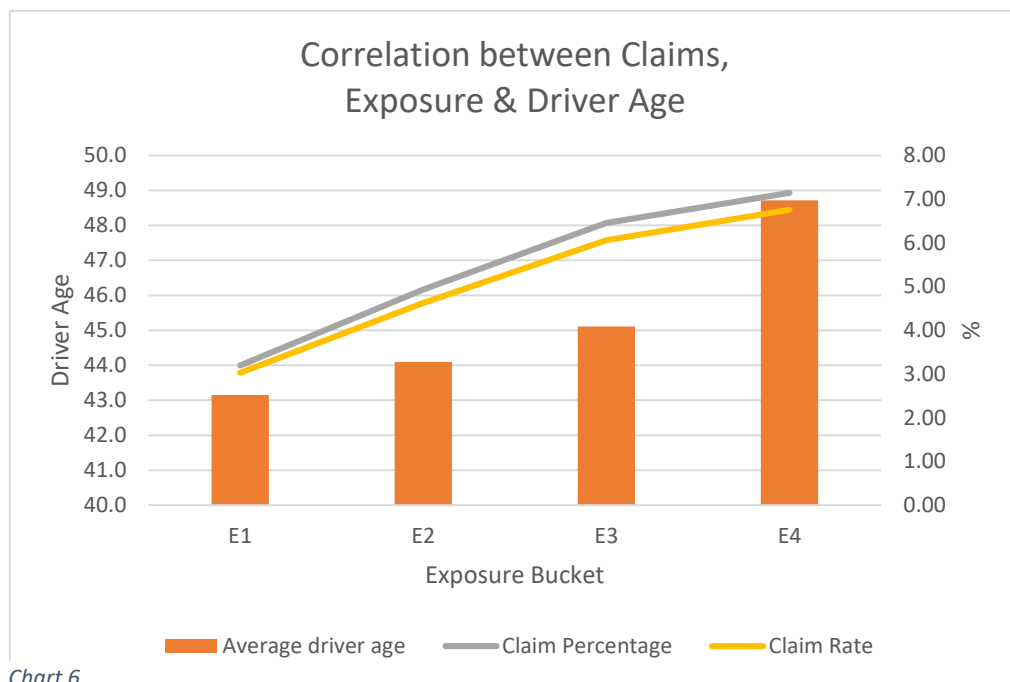
## 3) DRIVER AGE
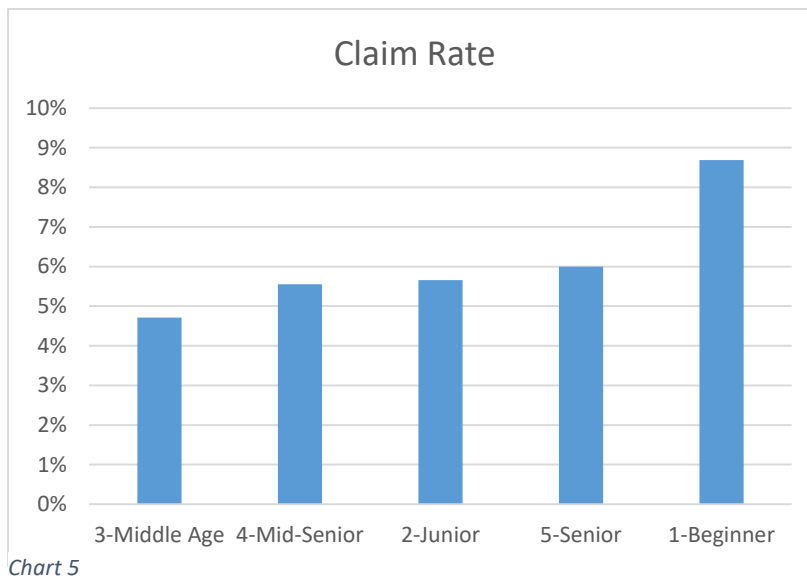
### Claim Rate

High claim rate is seen in cases where driver age is 18 years.

Thus, beginners have a higher likelihood of making a claim for given exposure period.

Hence, higher premiums should be charged from this category.

*Chart 5*

## Correlation between Claims, Exposure & Driver Age

| Exposure Bucket | Average Exposure | Average driver age | Claim Percentage | Claim Rate |
|---|---|---|---|---|
| E1 | 0.11 | 43.2 | 3.20 | 3.03 |
| E2 | 0.39 | 44.1 | 4.94 | 4.62 |
| E3 | 0.63 | 45.1 | 6.45 | 6.06 |
| E4 | 0.97 | 48.7 | 7.14 | 6.75 |

*Chart 6*

From chart 6 above, it can be clearly seen that both claim percentage and claim rate rise in direct correlation to the exposure bucket.

Also, the driver's average age is higher in buckets having higher average exposure.

Thus, mid-senior and senior drivers in E4 bucket have a higher claim percentage.

# Recommendations

1) The policy pricing should be set with respect to the exposure buckets. Higher premiums should be charged from customers in higher exposure bucket (E4).

2) The pricing should take into account the city and area in which driver lives. Drivers living in cities with high population density (like metropolitan cities) should be charged higher premiums.

3) Drivers who are in beginners category (Age=18) have high claim rate and hence should be charged higher premiums.

4) Drivers in mid-senior category (Age>45) and above are high risk customers especially in exposure bucket E4. Hence, this category is more likely to cause losses to company's revenue and hence high pricing should be done for these customers.