Swedish Motor Insurance

Case-Study Report

Territorial Performance Review – Swedish Motor Insurance Data
(SAS Studio × Tableau workflow)

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1 Project Mandate

Purpose. You asked for a rapid assessment of territorial (zone) performance that would:

1. Rank zones by cost per policy
2. Identify where claims are most frequent
3. Pinpoint zones that suffer from both high frequency **and** high severity
4. Derive actuarially fair premium multipliers (relativities)
5. Package the evidence in clear Tableau visuals for management

The analysis answers all five questions using the latest accident-year extract **SwedishMotorInsurance.csv** (2 182 records, 7 variables). Four Tableau charts (Exhibits 1 – 4) deliver the narrative from diagnosis to remedy.

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2 Data Exploration & Cleaning in SAS

Step	What was done	Rationale / QC
Import	`sas filename src "/home/u64256136/SwedishMotorInsurance.csv"; proc import datafile=src out=work.motor_raw dbms=csv replace; guessingrows=max; run;`	`guessingrows=max` forces SAS to scan the entire file and assign the right data types.

Schema check	`proc contents` confirmed all seven variables were already **numeric**.	Prevented accidental type conversions later.
Data hygiene	*No* orphan rows, negative payments or zero exposures detected. Two rows with Payment=0 and Claims>0 were retained (severity handled correctly).	Kept the dataset intact; flagged anomalies for follow-up.
Numerical coercion	Defensive array loop converted any mis-typed character columns to numeric.	Guarantees downstream math doesn't error out even if future files change.
Exploratory stats	`proc means` on raw fields; `proc freq` on Zone confirmed seven distinct zones with ~14 % of records each.	Early sense-check: exposure distribution looks uniform; cost distribution does not.

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3 KPI Construction

See Github SaS file

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4 Export to Tableau

See Github SaS file

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5 Visual Storytelling in Tableau

Exhibit	Construction	What it shows
1. Avg Cost per Policy (bar)	Zone on Rows, Pure Premium on Columns, sorted Desc	Zones 1-2 are ~40 % dearer than average; Zones 4-7 are cheap.
2. Frequency × Severity (bubble)	X = Freq, Y = Sev, Size = Exposure, Colour = Multiplier, cross-hair at portfolio means	Zones 1-2 sit top-right (bad), 6-7 bottom-left (good). Bubble size shows Zone 1 is also huge.

3. Premium Multiplier (bar, ref = 1.00)	Bars coloured diverging red > 1, green < 1	Concrete surcharges/credits: +39 % on Zone 1, –35 % on Zone 7, etc.
4. Cumulative Loss Pareto	Bars = Loss $, dual-axis line = Cum % Loss, 80 % constant line	Only three zones (4 → 1 → 2) generate ~80 % of total loss—where action matters.

These four charts, sequenced, let executives grasp the "where, why, what, and how much" in under five minutes.

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6 Key Findings & Business Impact

Highest average cost per policy – Zones 1 & 2 outliers; Zone 1 ≈ $327 vs portfolio $236.
Claims most frequent – Same zones.
Double-whammy zones – 1 & 2 high freq and high sev; 6 & 7 low-low.
Premium multipliers – 1.39×, 1.10×, 0.85×, 0.75×, 0.65×, etc.
Visualization flow – Exhibits 1-4 walk from diagnosis to prescription.

Projected financial lift: Applying the relativities lifts combined ratio an estimated 4-5 pts while offering credits in profitable territories, maintaining growth appetite in Zones 6-7, and keeping average rate change portfolio-neutral.

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7 Next Actions

1. **Rate-filing package (Q3).** Pass Exhibit 3 multipliers to Product; test state caps.
2. **Live monitoring.** Deploy a Power BI / Tableau dashboard mirroring Exhibits 1-4.
3. **Severity deep dive – Zone 2.** Claims audit to isolate cost drivers (legal, parts).
4. **Growth campaign – Zones 6-7.** Feed credit story to Distribution & Marketing.

8 Closing Thought

Our loss leakage is overwhelmingly territorial. Two zones account for ~65 % of total incurred loss while three profitable zones subsidise the rest of the book. By applying actuarially indicated surcharges of +10–40 % in Zones 1-2 and credits up to –35 % in Zones 4, 6 & 7, we lift the combined ratio an estimated 4-5 points without penalising good risks. The four attached visuals demonstrate the cost ranking, the frequency-severity mechanism behind it, the exact premium multipliers, and a Pareto curve proving that three zones alone drive 80 % of loss. Coupled with focused underwriting, claims, and marketing actions, this targeted package realigns price to risk, frees capital for growth in profitable territories, and provides regulators with a clear fairness narrative. We recommend filing the new relativities in Q3 for Q1 effective dates and activating the live monitoring dashboard to ensure ongoing adequacy.