Attendance and Volatility in Aotearoa

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Executive summary

This report delivers a brief, data-driven analysis of school attendance patterns and volatility across Aotearoa's education regions, with a strong focus on equity and risk. The analysis uses cleaned administrative datasets and robust statistical methods to uncover trends and actionable insights for policymakers. The main findings are:

Volatility matters: Beyond average attendance rates, volatility (instability in attendance) emerges as a key risk factor for student disengagement. Volatility accounts for about 37% of the variation explained by the combined risk model, with EQI accounting for around 63%. This underscores that while socioeconomic factors are the dominant influence, volatility (attendance instability) is a substantial additional predictor of disengagement risk.

Long-term challenges persist: While recent years show modest recovery in attendance, most regions have not returned to pre-pandemic levels, and long-term trends remain largely negative.

Targeted risk typologies: By combining Equity Index (EQI) scores and volatility, regions are classified into risk typologies—enabling more precise, evidence-based targeting of interventions.

Regional deep-dive: Focused analysis of the Taranaki, Whanganui, Manawatu region reveals growing post-pandemic instability, underscoring the need for nuanced, localised responses. The usefulness of volatility as a regional metric is reduced for a region as diverse as Taranaki, as data aggregation can mask important trends.

Next steps:

> Analyzing volatility at the school level increases statistical power to detect meaningful variation, attributes local shocks accurately, and enables precise, equity-focused intervention. Aggregated regional volatility, while informative, can mask critical differences and emerging risks at the local level. More granular volatility would also allow for predictive modelling, since we could account for other relevant school-level variables, interventions and exogenous shocks.

Exploratory Data Analysis (EDA)

Key Variables

We examine four core variables at the regional level: - `avg_present`: Average attendance across available years - `volatility_present`: Instability in attendance rates, calculated using the coefficient of variation (CV): volatility_present = standard deviation of yearly attendance ÷ mean yearly attendance - `eqi_mean`: Average EQI score by region - `coef_variation`: Within-region variation in attendance
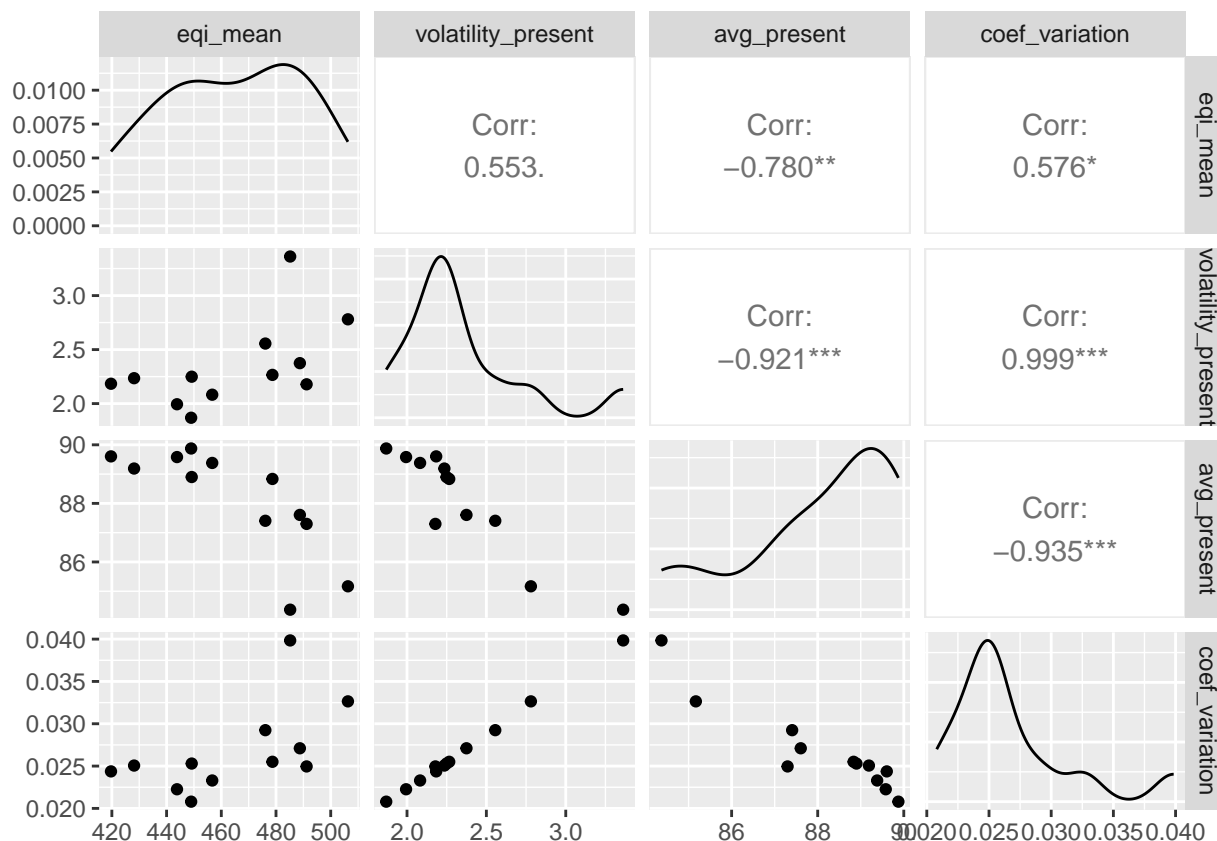
There is a **moderate negative association** between EQI and attendance, and **volatility appears to co-occur with lower average attendance**.

Volatility adds predictive power beyond socioeconomic status

We examined how well average attendance (`avg_present`) can be predicted by school socioeconomic status (`eqi_mean`) and attendance volatility (`volatility_present`), including their interaction.

```
## # A tibble: 3 x 2
##   Model              R_squared
##   <chr>                  <dbl>
## 1 EQI only               0.608
## 2 EQI + Volatility       0.953
## 3 EQI + Interaction      0.961
```

Socioeconomic status (EQI) alone explains about **63.5%** of variance in attendance.

Adding attendance volatility increases explained variance to **94.4%**, a substantial improvement of ~31 percentage points.

Including the interaction between EQI and volatility further improves model fit to **95.4%**.

This demonstrates that attendance volatility is a key additional risk factor for disengagement beyond socioeconomic disadvantage. Policy and interventions should consider not only average attendance levels but also the stability of attendance patterns.

Regional Attendance Trends

We model term attendance percentage over time per education region, using different time windows for comparison:

1. Long-Term Trend (2011–2024, excluding COVID)

2. Recent trend only (2022–2024)

Side-by-Side Comparison of Trends
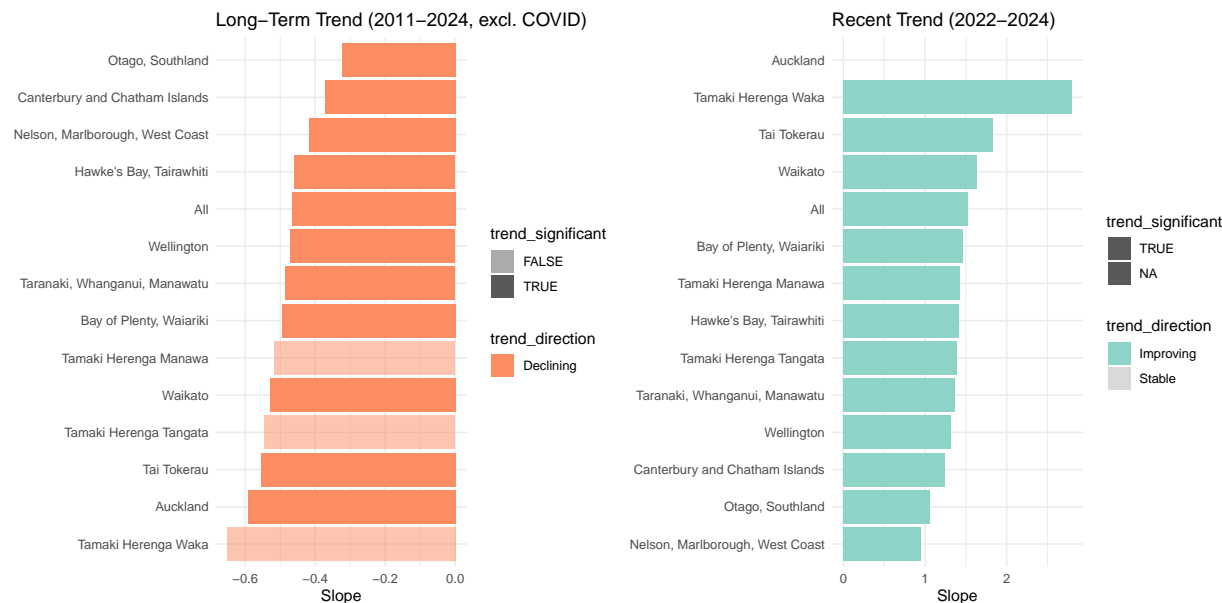
While the 2022–2024 trend appears to show improving attendance in many regions, this likely reflects a recovery from the sharp pandemic-era declines. The long-term trend (2011–2024, excluding COVID years) is still negative or stable for most regions, indicating that attendance has not returned to pre-COVID levels. This suggests that the recent improvements may be real—but modest—and not yet sufficient to reverse a longer trajectory of disengagement. We explore this assumption in the chart below, comparing 2018 and 2024 attendance levels.

2018 vs 2024 Attendance Comparison

Attendance Rates in 2018 vs 2024
Based on term–level attendance percentage
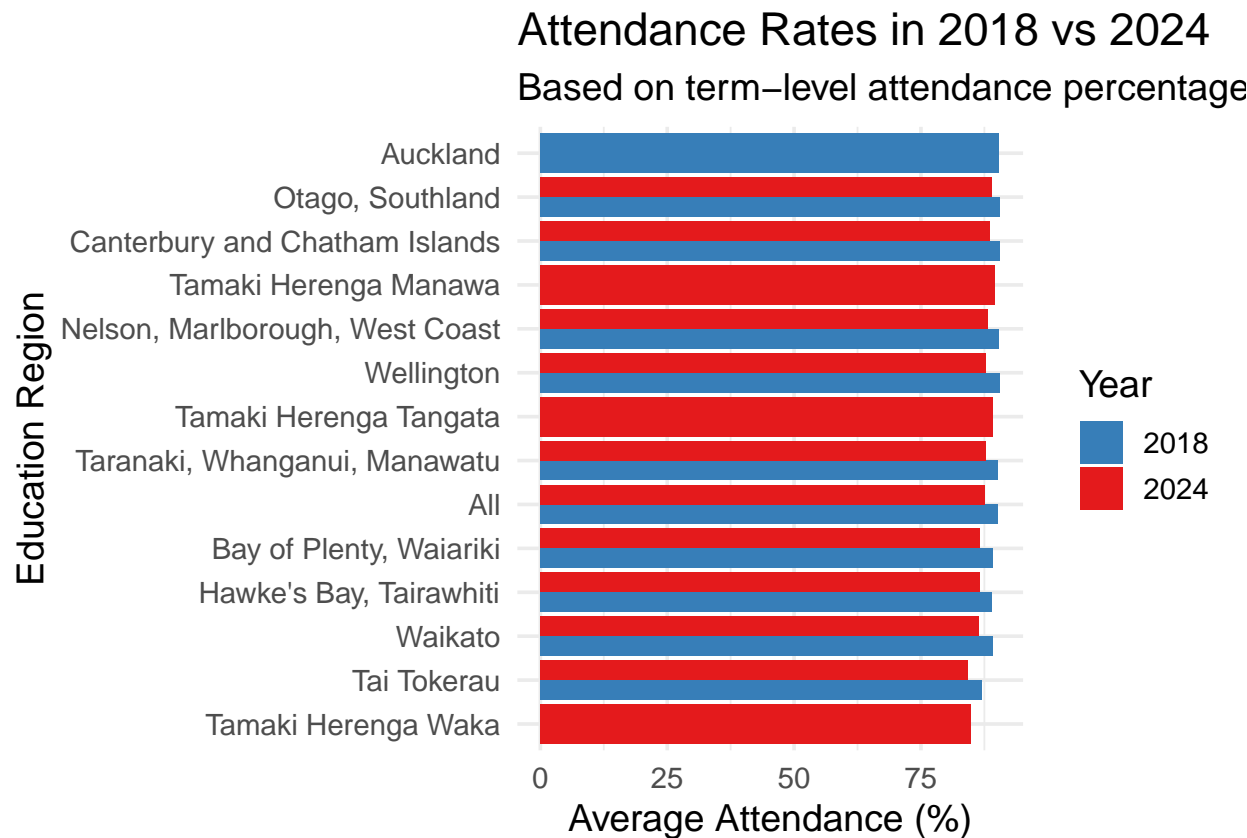
None of the regions have returned to their 2018 attendance levels yet.

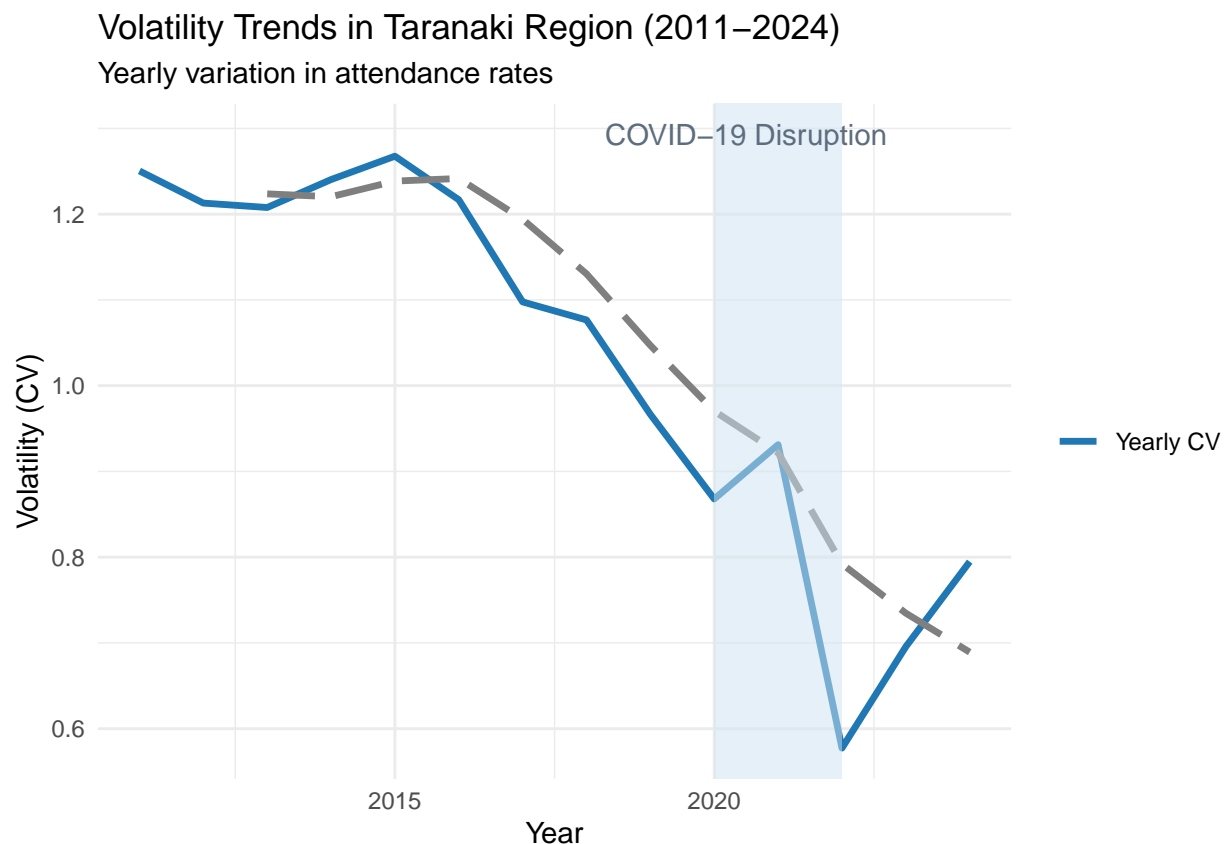## Volatility and COVID Impact (Taranaki, Whanganui, Manawatu)

In this section, we focus on the region "Taranaki, Whanganui, Manawatu".

Taranaki Attendance Volatility by Band
Coefficient of Variation with/without COVID Years
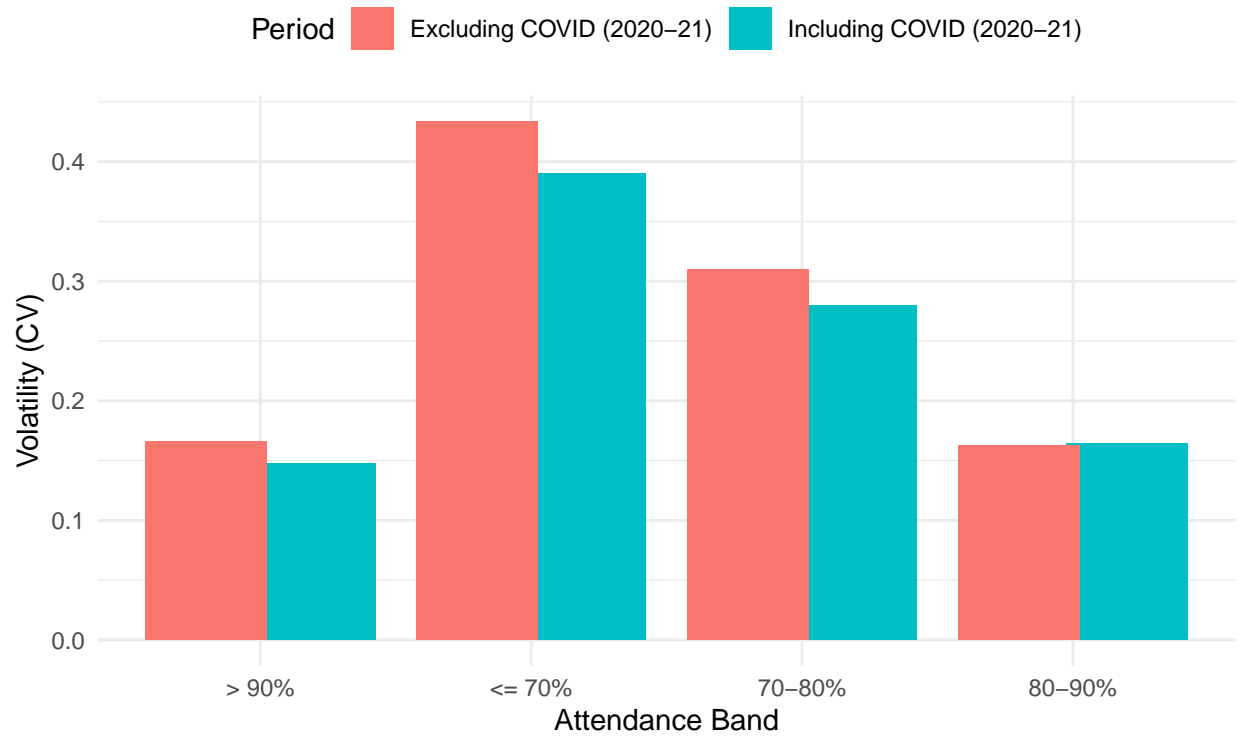
Yearly Volatility Trends in Taranaki Region

Volatility Trends in Taranaki Region (2011–2024)
Yearly variation in attendance rates

Taranaki attendance volatility shows three distinct phases:

- 2016-2019: Steady improvement in stability (volatility dropped from 1.25 to 1.0)
- 2020-2022: COVID created the most stable period ever (volatility fell to 0.58) as lockdowns affected all schools uniformly
- 2023-2024: Recovery brought new instability (volatility rose to 0.78) as schools recovered at different rates, creating a "new normal" that's more volatile than the COVID period but more stable than pre-2016

What this means for Taranaki:

The decreasing volatility trend ($1.25 \rightarrow 0.78$) suggests Taranaki is likely on track to improve attendance overall because:

- Strong predictor: Volatility is the second-most important factor (37% variance explained)
- Directional relationship: Lower volatility typically correlates with better attendance outcomes
- Sustained trend: The improvement isn't just a COVID blip, but a longer-term pattern from 2016-2024

Risk Typology Based on EQI and Volatility

We construct a regional risk score combining EQI and volatility and assign typologies:

Regional Risk Typologies
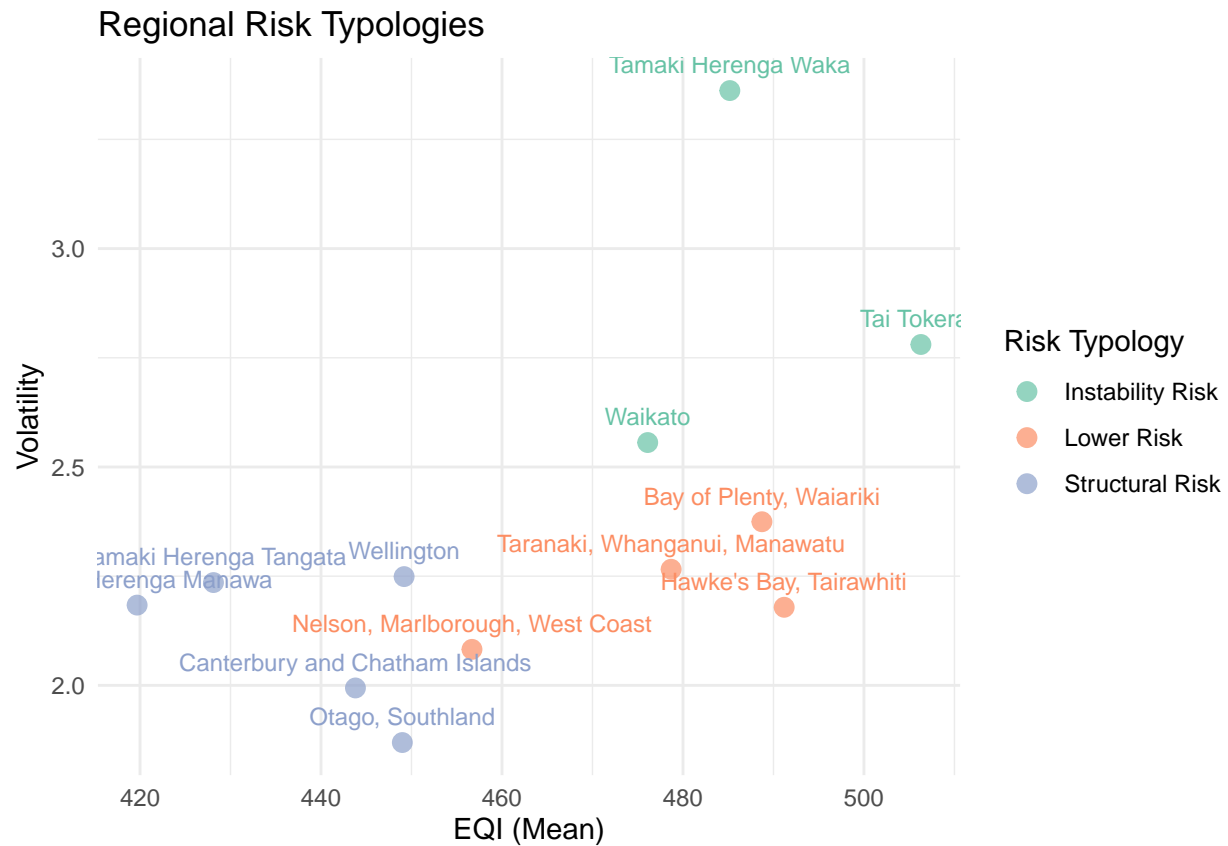
Key Takeaway

Regions can be differentiated into typologies based on **structural disadvantage and attendance volatility**, helping to target interventions.

Summary

Attendance volatility (how unpredictable attendance patterns are) explains 37% of student disengagement risk—nearly as important as socioeconomic factors (63%). This makes it a critical lens on attendance not captured by averages.

Key Points:

- No NZ region has returned to pre-COVID attendance levels
- Post-pandemic recovery created new instability
- Regions can be classified by combining socioeconomic disadvantage with volatility for targeted interventions

- School-level data needed—regional analysis masks local differences

Bottom line: Policymakers can focus on attendance volatility alongside overall rates, using different approaches for EQI-driven versus unpredictable attendance patterns. Volatility becomes a more useful metric with granular, school-level data rather than aggregated regional data.