CITIZEN RESEARCH INITIATIVE · MODAL SHIFT ANALYSIS

ALTO ridership against the modal-shift evidence

A synthesis of four research notes on rail–air substitution, rail–car substitution, the ALTO ridership envelope, and the operating subsidy frontier.

Headline finding

ALTO's published target of 24 million annual passengers by 2055 sits **2.6× above the CRI central case** and is incompatible with every other independent forecast for the corridor.

Modal shift versus air follows a logistic S-curve

Note 1 — rail captures the majority of the rail+air market below ~4 hours station-to-station

What the evidence shows

< 2 h — rail dominates (near full capture of rail+air market)

2–4 h — competitive zone (60–80% rail share, infrastructure decisive)

> 5 h — rail share collapses (only price-sensitive or rail-loyal travellers)

Empirical anchors

Paris–Lyon TGV: rail share 40% → 72%

Madrid–Barcelona AVE: ~75% rail share at 2 h 30 min

Madrid–Seville: rail share 16% → 52%

Beijing–Shanghai: 1,318 km in 4 h 18 min, rail-dominant

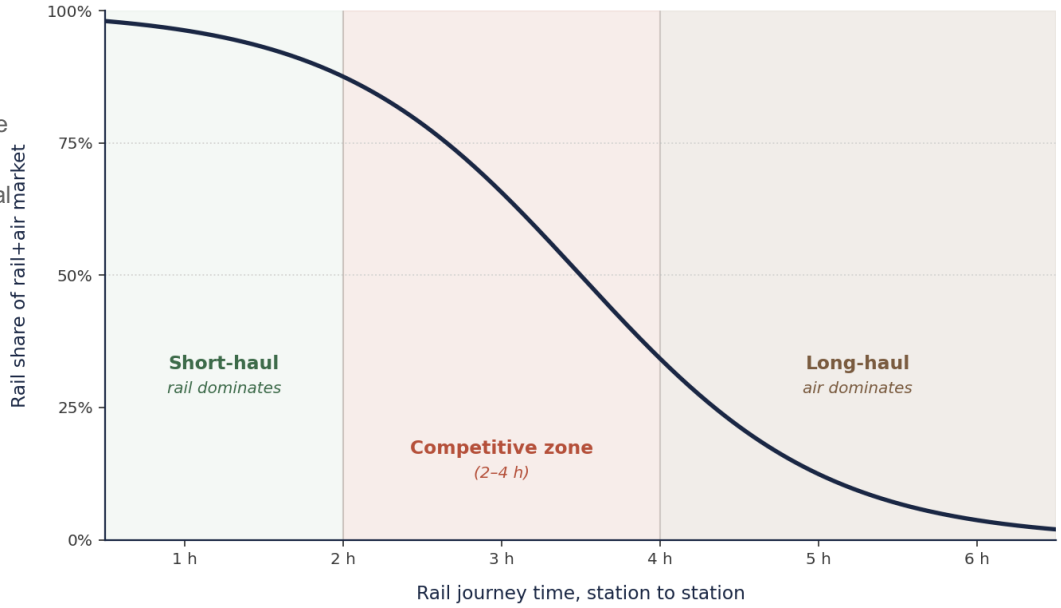


Figure 1 — rail share of the rail+air market, logistic curve with inflection at 3.5 h.

Modal shift versus car: harder in North America

Note 2 — the NA-calibrated S-curve is anchored on VIA Rail's ~13% rail share against road, with a 19-point shift in inflection

Why NA shifts the curve

Toll-free highways — 401/A20 corridor end-to-end

Low fuel taxes — ~1/3 of European levels

No congestion charging anywhere in Canada

Family-car economics — per-person car cost divides among occupants; rail charges per ticket

Predicted rail share of rail+car market

ALTO Toronto–Ottawa (τ ≈ 0.44): **~51% NA / 67% EU**

ALTO Toronto–Montréal (τ ≈ 0.56): **~41% NA / 58% EU**

HPR both pairs (τ ≈ 0.65–0.67): **~33% NA / 50% EU**

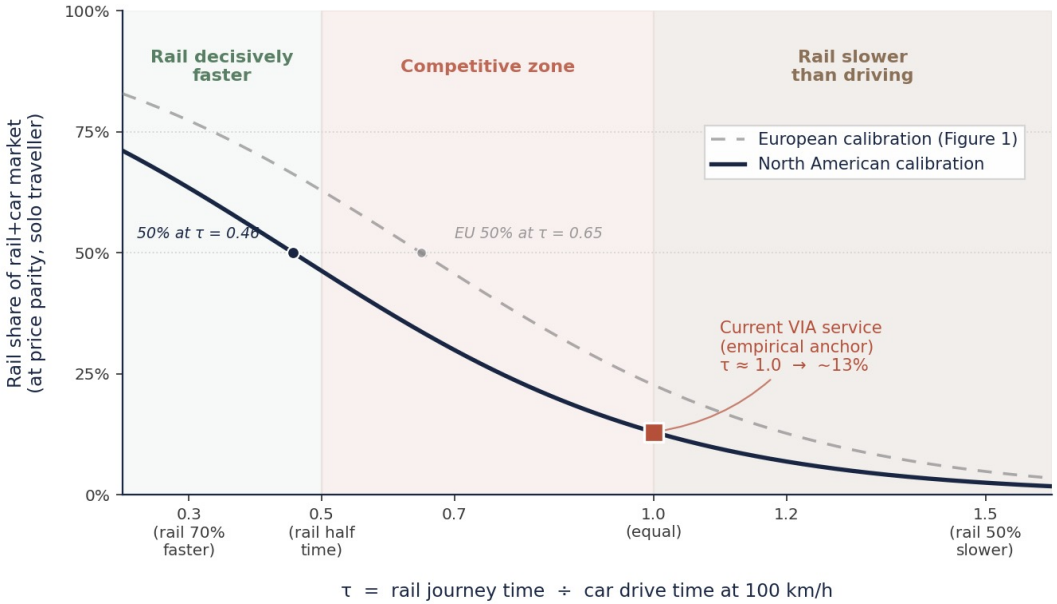


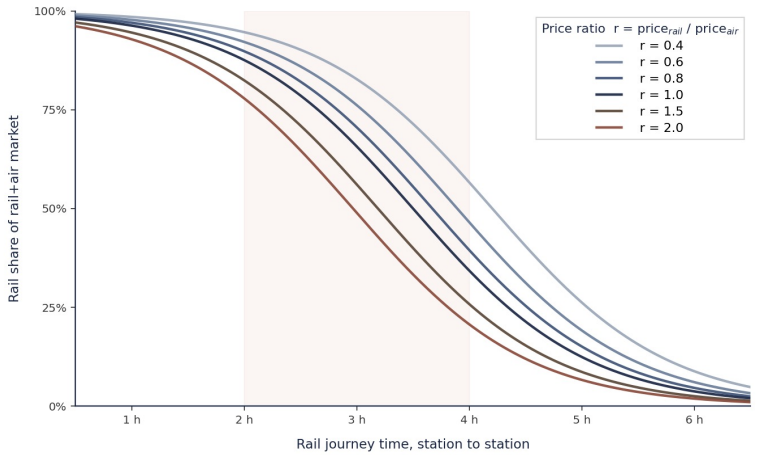
Figure 1b — NA-calibrated rail-vs-car S-curve. Inflection shifts left from τ = 0.65 (Europe) to τ = 0.46 (NA).

Price shifts the whole modal-shift curve

Fare-to-comparator price ratio (r) determines where the corridor sits within each S-curve family

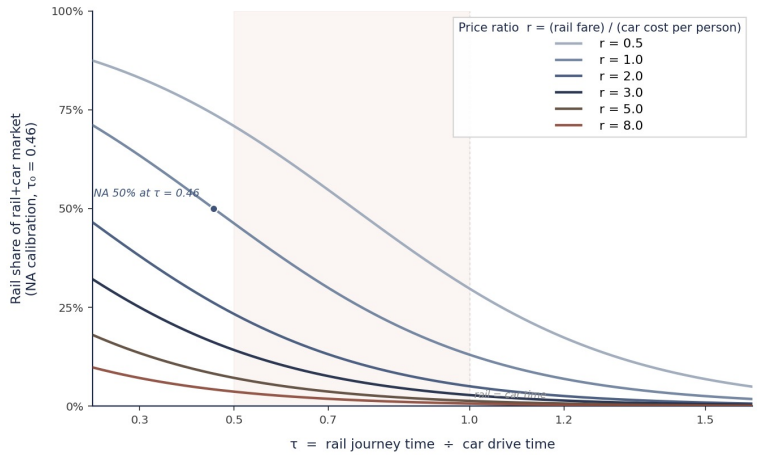
Air-to-Rail

Rail share of the rail+air market vs station-to-station time, at six rail-to-air price ratios.



Road-to-Rail

Rail share of the rail+car market vs τ, at six rail-to-car per-person price ratios.



Price elasticity differs

Road-rail substitution is more price-sensitive than air-rail (γ = 1.5 vs 1.0); families amplify this effect.

Group travel hurts rail

Per-person car cost divides among occupants; rail charges per ticket. A family of 4 faces r 4× higher than solo.

Regime mapping

Regime A r ≈ 0.55 / Regime B r ≈ 1.0 / Regime C r ≈ 1.4 — each selects a different curve in the family.

The ridership envelope at 2055 is 3.7 to 17.2 million

Note 3 — three demographic trajectories under Regime B (moderate subsidy, fares at parity with air)

9.2M

CRI central case at 2055 (Regime B)

Framework

Ridership = **population** × **per-capita trips** × **modal share** × ramp-up.

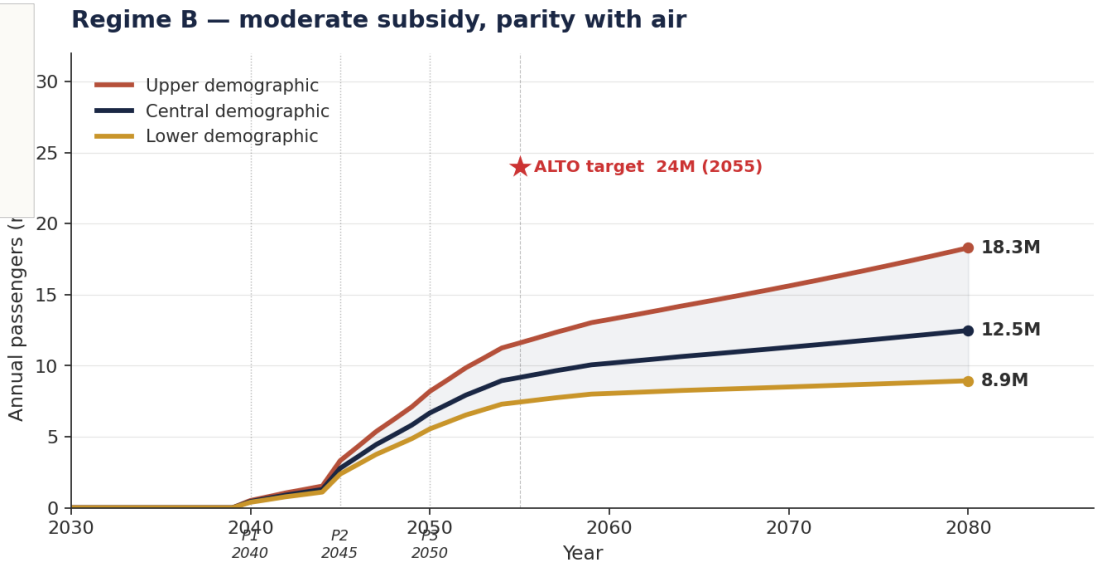
Demographic inputs (post-2024)

14.9M corridor population (2025)

1.68 intercity trips per resident

StatCan LG / M1 / HG growth: 0.5% / 1.0% / 1.6% per year

Reflects 2024 federal NPR cap

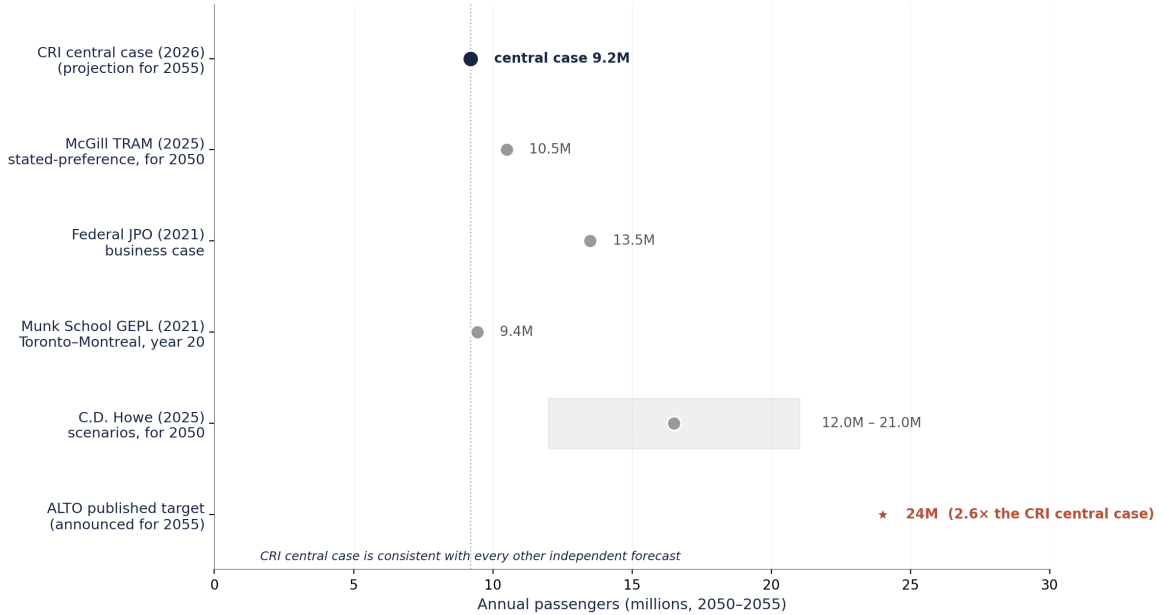


Regime B — central 2055 reading: 9.2M; 2080 reading: 12.5M (central), 8.9–18.3M envelope.

The 24M target is the outlier

Every independent forecast — academic, federal, and policy — clusters around the CRI central case.

CRI central case is reduced by the 2024–25 immigration inflection: the federal cap on non-permanent residents broke the corridor's demographic trajectory, lowering the central forecast relative to pre-2024 expectations.



Pre-cap demographics: all independent forecasts — including the 2025 McGill and C.D. Howe studies — use pre-2024 population assumptions; only the CRI analysis incorporates the federal NPR cap.

Post-pandemic business travel: hybrid work and AI-mediated meetings structurally reduce corridor business travel below pre-2020 baseline (Note 3) — a head-wind absent from older forecasts.

THE VERDICT

The 24-million target fails three independent feasibility tests

1

Modal-shift framework

Reaching 24M requires modal share above the 40 per cent ceiling implied by the NA-calibrated S-curves in Notes 1 and 2. Even ALTO's heaviest-subsidy regime, with deeply discounted fares, plateaus near 11–12M annual riders at the modal-shift ceiling.

2

Demographic baseline

The 2024 federal Immigration Levels Plan capped non-permanent residents, producing a structural break in corridor population growth. Pre-2024 forecasts assumed continued surge; post-2024 trajectories are materially lower. 15–25 per cent of the gap to ALTO is demographic alone.

3

Subsidy frontier

Pushing past Regime A toward 24M requires operating subsidy above $5B per year with full federal cost approaching $7B per year under the proponent's own $75B capex base case — outside any defensible operating-regime choice on the corridor.