Integrated Travels

Research Report

CANADA PUBLIC TRANSPORT REPORT

Created by: Priyanka Prabhu

September 2024

SUMMARY

Public transit ridership in Canada experienced a significant decline due to the COVID-19 pandemic, with an 84% drop in ridership and farebox revenues between February and April 2020. Despite a slow recovery, ridership remains below pre-pandemic levels as of early 2024. The impact and recovery rates vary across different cities, with larger metropolitan areas experiencing slower recovery compared to some smaller municipal systems. Factors influencing transit use include changes in population, labor force, and the shift to telework. Accessibility to jobs by public transit has been shown to have a strong influence on mode share, particularly for low-income groups in larger metropolitan areas. The relationship between accessibility and transit use is often non-linear, with very high levels of accessibility potentially leading to decreased transit use in favor of active transportation modes. Despite challenges, urban transit ridership in Canada is expected to reach pre-pandemic levels by 2026, though population-adjusted ridership rates may be lower due to recent population growth.

LITERATURE REVIEW

1. **Accessibility and Public Transit Use:**
   - Accessibility to jobs by public transit has been shown to positively influence public transit mode share (Legrain et al., 2015; Owen and Levinson, 2015).
   - The relationship between accessibility and mode choice can be non-linear (Moniruzzaman and Páez, 2012).
   - Researchers have found that higher densities support public transit use better than low-densities (Chakraborty and Mishra, 2013).
   - Employment density has been found to be more influential than residential density in some cases (Chen et al., 2007).

   - 2. **Income and Transit Use:**
   - Low-income groups generally exhibit higher public transit use than higher-income groups in the U.S. (Giuliano, 2005).

- However, some studies have found contradictory results, such as lower public transit mode share for low-wage workers in Toronto-Hamilton (Legrain et al., 2015).
- Factors influencing transit use among low-income populations include immigration status, place of work, age, and employment status (Mercado et al., 2012).

3. **Pandemic Impact on Transit**:
   - Public transit ridership worldwide fell precipitously following the onset of the COVID-19 pandemic in March 2020 (Qi et al. 2023; Erhardt et al. 2022; Fernández Pozo et al. 2022).
   - Most studies on pandemic impact are based on small sample commuter surveys, focused on one or several transit operators, and often ignore the decline in farebox revenues (Shaheen and Wong 2023; Deb and Hinge 2023).

4. **Equity and Accessibility**:
   - Researchers have deemed accessibility to be an appropriate measure to evaluate the social equity dimension of transport plans (Martens, 2012; Lucas, 2012).
   - Studies have examined the distributional impacts of existing transport systems and future projects using accessibility measures (Pucci et al., 2019; El-Geneidy et al., 2016; Fan et al., 2012).

5. **Built Environment and Transit Use**:
   - Density, diversity, and design of the urban environment influence ridership, even when self-selection is accounted for (Cao et al., 2009).
   - Proximity to public transit infrastructure increases the odds of its use (Ewing and Cervero, 2010).

6. **Recovery and Future Trends**:
   - The shift to working from home (telework) is partly responsible for the sustained decline in urban transit use in Canada (Haider and Iqbal 2022).

- Recovery rates vary across different cities, with larger metropolitan areas experiencing slower recovery compared to some smaller municipal systems.

This combined literature review highlights the complex relationships between accessibility, income, built environment, and public transit use, as well as the significant impact of the COVID-19 pandemic on transit systems and the ongoing recovery process.

METHODOLOGY

The papers employ different quantitative methodologies to collect data for public transport in Canada focussing on different aspects:

1. Data Sources:

- [1] uses data from 11 Canadian metropolitan regions, including job data from Statistics Canada and public transport travel time data from transit agencies' GTFS feeds.
- [2] analyzes time series data on public transit ridership and revenues collected by Statistics Canada, covering at least 75% of urban transit operations in Canada.

2. Accessibility Measurement [1]:

- Uses cumulative-opportunity measures to evaluate accessibility
- Calculates accessibility as a percentage of total jobs reachable within median travel times for each income group

3. Statistical Analysis:

- [1] develops regression models for each income group in each metropolitan region, using public transport mode share as the dependent variable and accessibility measures as independent variables.

- [2] employs time series algorithms to address temporal autocorrelation and uses Interrupted Time Series Analysis (ITSA) to capture immediate changes in transit ridership and post-intervention rates of change.

4. Comparative Analysis:

- [1] examines the relationship between accessibility and mode share across income groups and regions.
- [2] compares national-level impact of the pandemic on transit ridership and revenues with subnational trends.

5. Additional Data:

- [1] incorporates data on employed labor force and population changes, and uses ridership data from the American Public Transportation Association for city-level comparisons.

Both studies use visualization techniques to illustrate their findings, such as scatter plots, charts, and graphs.

KEY FINDINGS

- Accessibility to jobs by public transit has a stronger influence on public transit mode share for low-income groups compared to higher-income groups in most studied Canadian metropolitan areas.
- The relationship between accessibility and public transit mode share is often non-linear, especially for low-income groups in larger metropolitan areas.
- Public transit ridership in Canada experienced a significant decline due to the COVID-19 pandemic, with an 84% drop in ridership and farebox revenues between February and April 2020.
- As of January 2024, transit ridership in Canada was still 29% below pre-pandemic levels, while revenues were 20% lower in nominal terms.

- Recovery rates vary across different cities, with larger metropolitan areas experiencing slower recovery compared to some smaller municipal systems.
- The impact of improved accessibility on transit uptake is generally stronger for low-income groups, especially in larger metropolitan areas.
- Public transit mode share is highest in cities with developed mass transit systems like Toronto-Hamilton, Montreal, and Vancouver.
- Despite recent population growth and labor market recovery, transit ridership and revenues remain below pre-pandemic levels, partly due to the shift to telework.
- Urban transit ridership in Canada is expected to reach pre-pandemic levels by 2026, based on current recovery trends.
- The pandemic's impact on transit use varies across different urban areas, with downtown-centric cities and those with underground rail systems generally experiencing slower recovery rates.

TRENDS

Based on the findings from both papers, here are the key trends related to public transit in Canada:

1. **Accessibility and Mode Share**:
   - Accessibility to jobs by public transit has a stronger influence on public transit mode share for low-income groups compared to higher-income groups in most Canadian metropolitan areas.
   - The relationship between accessibility and public transit mode share is often non-linear, especially for low-income groups in larger metropolitan areas.
   - Public transit mode share is highest in cities with developed mass transit systems like Toronto-Hamilton, Montreal, and Vancouver.

2. **Pandemic Impact and Recovery**:

- Canadian public transit ridership experienced an 84% drop in ridership and farebox revenues between February and April 2020 due to the COVID-19 pandemic.
- As of January 2024, transit ridership in Canada was still 29% below pre-pandemic levels, while revenues were 20% lower in nominal terms.
- Recovery rates vary across different cities, with larger metropolitan areas experiencing slower recovery compared to some smaller municipal systems.

3. **Income and Transit Use**:
   - Low-income groups generally exhibit higher public transit use than higher-income groups across most studied regions.
   - The impact of improved accessibility on transit uptake is generally stronger for low-income groups, especially in larger metropolitan areas.

4. **Regional Variations**:
   - The impact of accessibility on public transport mode share is stronger and more non-linear for low-income groups in the largest metropolitan areas.
   - Cities with downtown-centric mobility patterns and underground rail-based transit are experiencing slower recovery rates post-pandemic.

5. **Future Projections**:
   - Urban transit ridership in Canada is expected to reach pre-pandemic levels by 2026, based on current recovery trends.
   - Despite recent population growth and labor market recovery, transit ridership and revenues remain below pre-pandemic levels, partly due to the shift to telework.

6. **Socioeconomic Factors**:

- Social deprivation index and proximity to rapid public transport stations are significant predictors of public transit use across income groups.

These trends highlight the complex relationship between accessibility, income, transit use, and the significant impact of the COVID-19 pandemic on public transit systems in Canada.

RESULTS:

1. **Accessibility and Transit Use:**
   - Accessibility to jobs by public transit has a stronger influence on public transit mode share for low-income groups compared to higher-income groups in most Canadian metropolitan areas.
   - The relationship between accessibility and public transit mode share is often non-linear, especially for low-income groups in larger metropolitan areas.
   - Improving accessibility generally leads to increased public transit use, but the effect is stronger for low-income groups.

2. **Pandemic Impact:**
   - Canadian public transit ridership experienced an 84% drop in ridership and farebox revenues between February and April 2020 due to the COVID-19 pandemic.
   - As of January 2024, transit ridership in Canada was still 29% below pre-pandemic levels, while revenues were 20% lower in nominal terms.

3. **Recovery Trends:**
   - Recovery rates vary across different cities, with larger metropolitan areas experiencing slower recovery compared to some smaller municipal systems.
   - Cities with downtown-centric mobility patterns and underground rail-based transit are experiencing slower recovery rates.

- Urban transit ridership in Canada is expected to reach pre-pandemic levels by 2026, based on current recovery trends.

4. **Income and Transit Use:**
   - Low-income groups generally exhibit higher public transit use than higher-income groups across most studied regions.
   - The impact of improved accessibility on transit uptake is generally stronger for low-income groups, especially in larger metropolitan areas.

5. **Regional Variations:**
   - Public transit mode share is highest in cities with developed mass transit systems like Toronto-Hamilton, Montreal, and Vancouver.
   - The impact of accessibility on public transport mode share is stronger and more non-linear for low-income groups in the largest metropolitan areas.

6. **Socioeconomic Factors:**
   - Social deprivation index and proximity to rapid public transport stations are significant predictors of public transit use across income groups.
   - Despite recent population growth and labor market recovery, transit ridership and revenues remain below pre-pandemic levels, partly due to the shift to telework.

These combined results highlight the complex relationship between accessibility, income, transit use, and the significant impact of the COVID-19 pandemic on public transit systems in Canada.

CONCLUSION:

The studies highlight the complex relationship between accessibility, income, transit use, and the significant impact of the COVID-19 pandemic on public transit systems in Canada. Accessibility to jobs by public transit significantly influences public transit mode share, with a stronger impact on low-income groups compared to higher-income groups in most Canadian metropolitan areas. The relationship between accessibility and public transit mode share is often non-linear, especially for low-income groups in larger metropolitan areas. Improving accessibility generally leads to increased public transit use, but the effect is stronger for low-income groups. The COVID-19 pandemic caused an 84% drop in Canadian public transit ridership and farebox revenues between February and April 2020. As of January 2024, transit ridership in Canada was still 29% below pre-pandemic levels, while revenues were 20% lower in nominal terms. Recovery rates vary across different cities, with larger metropolitan areas experiencing slower recovery compared to some smaller municipal systems. Despite recent population growth and labor market recovery, transit ridership and revenues remain below pre-pandemic levels, partly due to the shift to telework. Urban transit ridership in Canada is expected to reach pre-pandemic levels by 2026, based on current recovery trends. These conclusions underscore the importance of considering equity and accessibility in transit planning, especially in the context of post-pandemic recovery efforts. Planning for accessibility can be an effective strategy to increase public transit use, particularly for low-income groups, while transit agencies may need to adapt to changing travel patterns and consider targeted improvements to serve areas with high concentrations of low-income residents.

Citations:

[1] Cui, B., Boisjoly, G., Miranda-Moreno, L., & El-Geneidy, A. (2020). Accessibility matters: Exploring the determinants of public transport mode share across income groups in Canadian cities. Transportation Research Part D: Transport and Environment, 80, 102276.

[2] Haider, M. (2024). Post-pandemic Recovery of Transit Ridership and Revenue in Canada. Transport Findings. https://doi.org/10.32866/001c.118435