travel modelling group

Changing Travel Behaviour in the GGH: Analysis of TTS 2022

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Contents

List of Figures

List of Tables

1. Introduction

Travel behaviour was relatively stable prior to the COVID-19 pandemic. The pandemic appears to be establishing a 'new normal' in terms of how people behave going forward. The 2022/23 Transport Tomorrow Survey (TTS), which captures the travel behaviour of people within households in post-pandemic periods, was released at the end of 2024. While travel behaviour may not have fully stabilized, the 2022/23 TTS should provide clear indications of the general nature of regional post-pandemic travel behaviour.

This report investigates changes in travel behaviour by comparing data from the large-sample TTS conducted in the Greater Golden Horseshoe (GGH). The last pre-pandemic TTS was in 2016 and was mainly compared to the 2022/23 TTS. However, the previous 1996-2011 TTS was also used for longitudinal comparison. The sample comparison for 1996-2022 TTS was shown in **Table 1.1**.

Table 1.1 TTS Sample Totals

Cycle	Households		Persons		Trips	
	Records	Expanded Total	Records	Expanded Total	Records	Expanded Total
2022 TTS	158,662	3,673,865	366,172	9,550,539	759,736	19,470,493
2016 TTS	162,708	3,335,987	395,885	8,822,799	798,093	17,522,726
2011 TTS	159,157	3,117,511	410,404	8,520,307	858,848	17,924,326
2006 TTS	149,631	2,871,245	401,653	7,705,341	864,348	16,541,740
2001 TTS	136,379	2,417,513	374,182	6,529,617	817,744	14,200,615
1996 TTS	115,193	2,317,185	312,781	6,285,143	657,971	13,185,489

Note: 1996-2016 The minimum age for trip collection was 11 years old between 1996 and 2016 TTS, but it was lowered to 5 years old in 2022/23 TTS.

The analysis compares a range of metrics, including out-of-home activity generation by purpose, trip mode choices, activity start times, and tour characteristics. Hypotheses tested include whether changes have occurred in work-from-home (WFH) rates, auto, transit and active (walk/bike) mode shares, peak demand and off-peak travel patterns, and household distributions in the region. Transit boardings were also compared using reported transit usage information and ridership data collected from transit operating agencies, due to concerns about under-reporting of transit usage.

Key findings from this analysis include the following.

(1) The 2022 TTS reported the lowest total trip rates over the entire TTS survey period, at least in part due to increased WFH rates.
(2) Comparing the 2022 TTS with previous years, the market trip rate increased substantially, even controlling for trips not captured in the 2016 TTS and previous years.
(3) The modal share of autos, cycling, and paid ridesharing increased, while the public transit shares significantly declined, likely due to decreased commuting needs and health concerns.

(4) The morning and afternoon peaks remained stable. However, shifts in the distribution of trip start times occurred, with fewer early trips and a more even temporal distribution of work trips. This reflects the adoption of flexible schedules and changed daily routines in the post-pandemic era.
(5) WFH workers make more non-work tours than workers working outside the home. Work and school tours have declined, whereas non-work tours have increased.
(6) Transit boardings calculated from reported routes are lower than the actual boardings for most of the transit operators. When using the transit boardings information, one should account for potential underreporting issues.

The results were expected to reveal changes in travel behaviour post-pandemic and provide insights into how the 2022/23 TTS could be used to upgrade travel demand models.

2. Trip Generation

2.1 Daily Trip Rate

As shown in **Table 2.1**, daily trips per person show a decreasing trend since 2001, dropping from 2.54 trips daily to 2.02 trips daily. This is possibly due to new flexible working patterns and the development of online services for personal activities.

Table 2.1 Daily Trips Per Person

Cycle	Persons (Age 11+)		Trips (Age 11+)		Daily Trips per Person (Age 11+)	
	Records	Expanded Total	Records	Expanded Total	Records	Expanded Total
2022/23 TTS	338,889	8,485,965	723,298	18,087,803 17,183,861*	2.13	2.13 2.02*
2016 TTS	354,392	7,745,780	798,093	17,522,726	2.25	2.26
2011 TTS	361,897	7,464,530	858,848	17,924,326	2.37	2.40
2006 TTS	349,907	6,708,647	864,348	16,541,740	2.47	2.47
2001 TTS	320,600	5,588,083	817,744	14,200,615	2.55	2.54
1996 TTS	264,540	5,315,395	657,971	13,185,489	2.49	2.48

Note: * is for excluding 2022 TTS trips that were not captured in the 2016 TTS.

2.2 Daily Trip Rate for Different Purposes

2.2.1 Daily Work Trips Per Worker

Table 2.2 compares the work trip generation rate among different TTS years. The number of daily work trips per worker has remained relatively stable pre-pandemic, decreasing only slightly between 1996 and 2016. However, in the 2022/23 TTS, the number of daily work trips per worker significantly reduced from 0.74 in 2016 to 0.55 in 2022/23. The drop in work trip generation is expected due to higher engagement in WFH persisting post-pandemic.

Table 2.2 Daily Work Trips Per Worker

Cycle	Worker		Primary Work Trips		Daily Work Trips per Worker	
	Records	Expanded Total	Records	Expanded Total	Records	Expanded Total
2022/23 TTS	182,068	5,051,641	98,990	2,761,579	0.54	0.55
2016 TTS	195,512	4,573,251	146,014	3,389,795	0.75	0.74
2011 TTS	190,247	4,211,943	140,491	3,114,077	0.74	0.74
2006 TTS	197,712	3,796,360	150,629	2,896,434	0.76	0.76
2001 TTS	189,907	3,309,005	148,148	2,578,621	0.78	0.78
1996 TTS	151,996	3,052,119	119,434	2,397,609	0.79	0.79

Table 2.3 further compares the work trip rates by employment status. The table only includes first work trips, meaning that subsequent work trips are not included. It is shown that the work generation rate decreased for all employment statuses. The most significant decrease in 2022/23 TTS was seen among full-time outside workers (0.85 to 0.67) compared to part-time outside workers (0.49 to 0.44).

Table 2.3 Daily Work Trips Per Worker by Employment Status

Cycle	% of Workers Total	% of Workers Expanded Total	Full-time Outside Worker		Work Trips for Full-time Outside Workers		Daily Work Trips per Worker	
			Records	Expanded Total	Records	Expanded Total	Records	Expanded Total
2022/23 TTS	70.1%	70.0%	127,560	3,533,680	85,740	2,384,535	0.67	0.67
2016 TTS	76.0%	75.4%	148,632	3,446,185	127,411	2,940,613	0.86	0.85
2011 TTS	73.1%	73.0%	139,071	3,076,807	118,277	2,619,032	0.85	0.85
2006 TTS	74.8%	75.0%	147,977	2,847,558	127,650	2,456,636	0.86	0.86
2001 TTS	77.9%	77.9%	147,925	2,578,183	127,946	2,227,222	0.86	0.86
1996 TTS	78.1%	78.1%	118,652	2,382,959	102,568	2,058,962	0.86	0.86
Cycle	**% of Workers Total**	**% of Workers Expanded Total**	**Part-time Outside Worker**		**Work Trips for Part-time Outside Workers**		**Daily Work Trips per Worker**	
			Records	**Expanded Total**	**Records**	**Expanded Total**	**Records**	**Expanded Total**
2022/23 TTS	13.4%	14.6%	24,477	739,300	10,968	325,074	0.45	0.44
2016 TTS	15.8%	17.3%	30,873	789,022	15,531	385,235	0.50	0.49
2011 TTS	17.4%	18.3%	33,156	772,161	17,587	402,263	0.53	0.52
2006 TTS	17.0%	16.9%	33,541	643,300	17,708	340,049	0.53	0.53
2001 TTS	16.8%	16.8%	31,819	554,702	16,703	291,403	0.52	0.53
1996 TTS	17.5%	17.5%	26,645	533,745	14,458	290,156	0.54	0.54
Cycle	**% of Workers Total**	**% of Workers Expanded Total**	**WFH Worker**		**Work Trips for WFH Workers**		**Daily Work Trips per Worker**	
			Records	**Expanded Total**	**Records**	**Expanded Total**	**Records**	**Expanded Total**
2022/23 TTS	16.5%	15.4%	30,031	778,661	2,282	51,970	0.08	0.07
2016 TTS	8.2%	7.4%	16,007	338,044	3,072	63,947	0.19	0.19
2011 TTS	9.5%	8.6%	18,020	362,975	4,627	92,782	0.26	0.26
2006 TTS	8.2%	8.0%	16,194	305,502	5,271	99,749	0.33	0.33
2001 TTS	5.4%	5.3%	10,163	176,120	3,499	59,996	0.34	0.34
1996 TTS	4.4%	4.4%	6,699	135,415	2,408	48,491	0.36	0.36

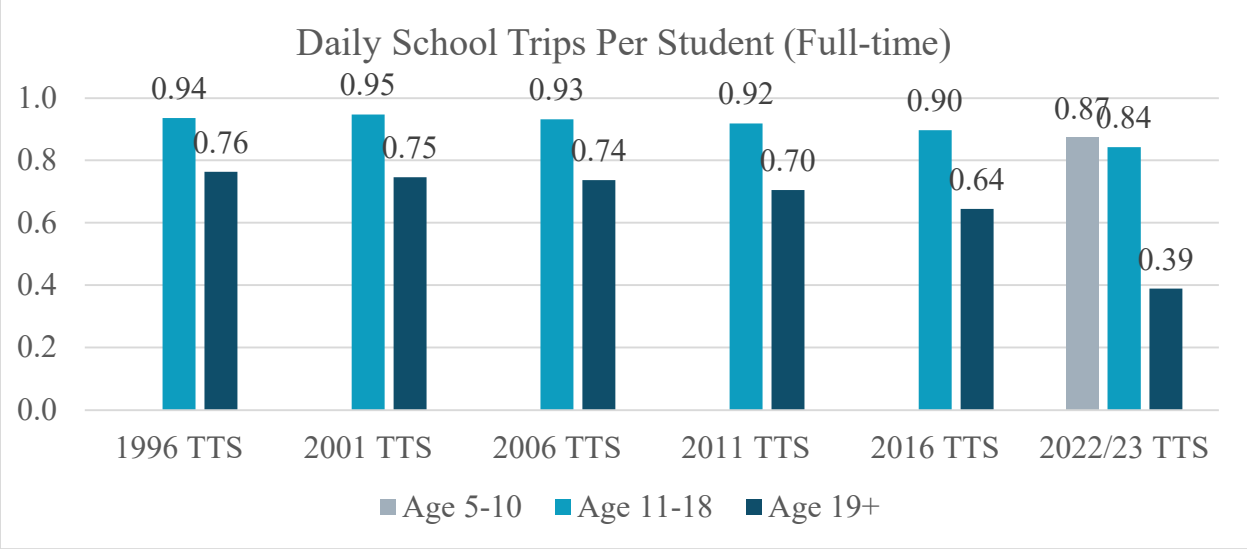
The work trip rate by occupation type is shown in **Table 2.4**. The reduction in work trip rate is more pronounced in professional and general occupations, from 0.78 in 2016 to 0.51 in 2022/23 and from 0.77 in 2016 to 0.54 in 2022/23, respectively. Compared to professional and general workers, manufacturing and service workers show relatively smaller reductions in the work trip rates from 2016 to 2022/23.

Table 2.4 Daily Work Trips Per Worker by Occupation Type

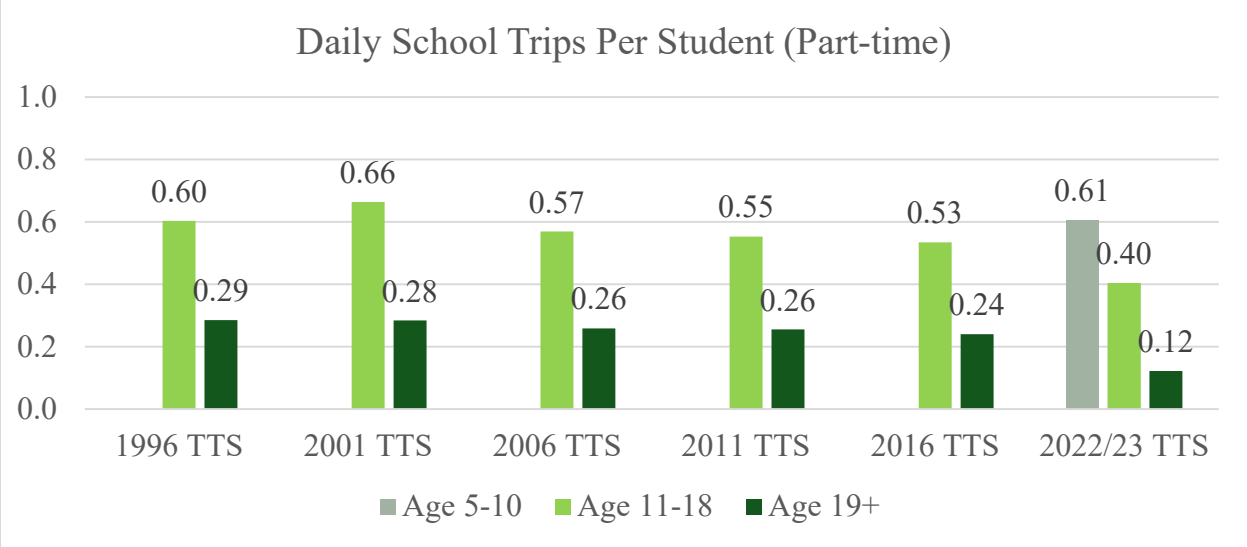
Cycle	% of Workers Total	% of Workers Expanded Total	General		Work Trips for General Workers		Daily Work Trips per Worker	
			Records	Expanded Total	Records	Expanded Total	Records	Expanded Total
2022/23 TTS	7.7%	7.4%	13,936	374,443	7,559	203,218	0.54	0.54
2016 TTS	13.6%	13.2%	26,553	604,246	20,497	464,600	0.77	0.77
2011 TTS	15.5%	15.5%	29,583	651,803	23,085	510,547	0.78	0.78
2006 TTS	13.7%	13.7%	27,057	519,817	21,821	419,857	0.81	0.81
2001 TTS	12.2%	12.2%	23,149	404,890	18,355	320,914	0.79	0.79
1996 TTS	13.4%	13.4%	20,345	408,779	16,309	327,743	0.80	0.80
Cycle	**% of Workers Total**	**% of Workers Expanded Total**	**Manufacturing**		**Work Trips for Manufacturing Workers**		**Daily Work Trips per Worker**	
			Records	**Expanded Total**	**Records**	**Expanded Total**	**Records**	**Expanded Total**
2022/23 TTS	12.7%	14.4%	23,128	725,987	17,276	542,299	0.75	0.75
2016 TTS	13.4%	14.6%	26,159	667,034	20,673	528,437	0.79	0.79
2011 TTS	14.6%	14.4%	27,788	608,022	22,464	492,744	0.81	0.81
2006 TTS	17.0%	17.1%	33,673	650,729	27,605	534,319	0.82	0.82
2001 TTS	22.5%	22.9%	42,758	756,343	35,068	618,419	0.82	0.82
1996 TTS	22.9%	23.1%	34,862	706,409	28,558	578,289	0.82	0.82
Cycle	**% of Workers Total**	**% of Workers Expanded Total**	**Professional**		**Work Trips for Professional Workers**		**Daily Work Trips per Worker**	
			Records	**Expanded Total**	**Records**	**Expanded Total**	**Records**	**Expanded Total**
2022/23 TTS	64.8%	61.6%	117,933	3,113,748	60,081	1,582,559	0.51	0.51
2016 TTS	47.5%	44.7%	92,816	2,042,143	72,407	1,592,259	0.78	0.78
2011 TTS	32.6%	31.9%	62,057	1,342,845	46,942	1,026,112	0.76	0.76
2006 TTS	35.0%	34.8%	69,231	1,320,867	54,330	1,038,023	0.78	0.79
2001 TTS	44.1%	43.6%	83,726	1,441,222	67,003	1,153,434	0.80	0.80
1996 TTS	39.5%	39.3%	60,095	1,199,712	48,599	969,707	0.81	0.81
Cycle	**% of Workers Total**	**% of Workers Expanded Total**	**Service**		**Work Trips for Service Workers**		**Daily Work Trips per Worker**	
			Records	**Expanded Total**	**Records**	**Expanded Total**	**Records**	**Expanded Total**
2022/23 TTS	13.2%	14.6%	24,036	737,697	12,773	391,608	0.53	0.53
2016 TTS	24.9%	26.8%	48,669	1,227,431	31,579	784,081	0.65	0.64
2011 TTS	36.9%	37.9%	70,275	1,597,815	47,628	1,076,752	0.68	0.67
2006 TTS	34.1%	34.3%	67,516	1,300,456	46,707	901,053	0.69	0.69
2001 TTS	21.0%	21.1%	39,794	698,131	27,397	480,193	0.69	0.69
1996 TTS	23.8%	23.8%	36,191	727,153	25,629	515,069	0.71	0.71

2.2.2 Daily School Trips Per Student

A declining trend in daily school trips per student has also been observed, as shown in **Figure 2.1**. Full-time students in Figure 2.1 (a) show a sharp decrease in school trips by 2022/23, especially for the Age 19+ group. Part-time students in Figure 2.2 (b) show a similar downward trend, with the school trip rate for students aged 19+ in the 2022/23 TTS only half that of the previous 2016 TTS. The substantial decline in the 19+ age group reflects more flexible arrangements in higher education.



(a) Full-time Students



(b) Part-time Students

Figure 2.1 Daily School Trips Per Student for Full-time/Part-time Students by Age Groups

2.2.3 Daily Market & Other Trips Per Person

The daily market trips per person in **Table 2.5** show a significant increase in 2022 compared to 2016. The growing market trip rate implies a complementary relationship between online and in-store shopping. In contrast, the daily trip rate for other purposes has been decreasing since 1996 (**Table 2.6**).

Table 2.5 Daily Market Trips Per Person

Cycle	Persons (Age 11+)		Market Trips (Age 11+)		Daily Market Trips per Person (Age 11+)	
	Records	Expanded Total	Records	Expanded Total	Records	Expanded Total
2022/23 TTS	338,889	8,485,965	135,206	2,823,722 2,557,611*	0.40	0.33 0.30*
2016 TTS	354,392	7,745,780	81,858	1,541,479	0.23	0.20
2011 TTS	361,897	7,464,530	90,162	1,678,522	0.25	0.22
2006 TTS	349,907	6,708,647	78,966	1,504,689	0.23	0.22
2001 TTS	320,600	5,588,083	68,374	1,188,281	0.21	0.21
1996 TTS	264,540	5,315,395	55,574	1,113,198	0.21	0.21

Note: * is for excluding 2022 TTS non-commuting walk trips that were not captured in the 2016 TTS.

Table 2.6 Daily Other Purposes Trips Per Person

Cycle	Persons (Age 11+)		Other Trips (Age 11+)		Daily Other Trips per Person (Age 11+)	
	Records	Expanded Total	Records	Expanded Total	Records	Expanded Total
2022/23 TTS	338,889	8,485,965	93,959	2,031,437	0.28	0.24
2016 TTS	354,392	7,745,780	118,406	2,316,636	0.33	0.30
2011 TTS	361,897	7,464,530	133,574	2,577,520	0.37	0.35
2006 TTS	349,907	6,708,647	130,964	2,489,453	0.37	0.37
2001 TTS	320,600	5,588,083	123,015	2,150,974	0.38	0.38
1996 TTS	264,540	5,315,395	100,346	2,013,566	0.38	0.38

2.3 Daily Trip Rate by Municipality

2.3.1 Daily Trip Rate by Municipality

Table 2.7 shows the total daily trip rate for people aged 11 and above. Except for 1996, daily trips per person have shown a downward trend over the last 20 years for urban, rural-urban mix, and rural regions. Most rural-urban mix regions have a higher daily trip rate than urban and rural regions.

Table 2.7 Daily Trips Per Person by Municipality

Daily Trips per Person Type	Municipality	Year 2022/23	2016	2011	2006	2001	1996
Urban	Durham	2.19	2.32	2.56	2.61	2.72	2.64
	Halton	2.27	2.47	2.65	2.74	2.85	2.75
	Hamilton	2.31	2.35	2.42	2.46	2.54	2.49
	Peel	1.91	2.13	2.39	2.46	2.57	2.50
	Toronto	2.08	2.16	2.20	2.22	2.31	2.26
	Waterloo	2.35	2.53	2.59	2.76		2.93
	York	2.04	2.21	2.48	2.50	2.68	2.56
Rural-urban mix	Barrie	2.25	2.41	2.50	2.71	2.77	2.74
	Brantford	2.33	2.31	2.51	2.73		
	Guelph	2.42	2.56	2.64	2.77	2.88	2.71
	Niagara	2.29	2.41	2.54	2.77	2.84	2.63
	Orangeville	2.21	2.38	2.67	2.72	2.71	2.69
	Orillia	2.23	2.41	2.60	2.61	2.88	
	Peterborough City	2.30	2.39	2.54	2.70	2.88	2.73
Rural	Blue Mountains	2.04					
	Brant	2.28	2.46	2.58	2.54		
	Different Areas						2.41
	Dufferin	2.04	2.14	2.41	2.41		
	Grey	2.14					
	Kawartha Lakes	2.11	2.15	2.28	2.39	2.38	2.45
	Northumberland	2.09					2.37
	Peterborough	2.26	2.36	2.41	2.56	2.63	2.59
	Simcoe	2.18	2.26	2.42	2.52	2.60	
	Wellington	2.34	2.49	2.57	2.60	2.84	2.57
Total		**2.13**	**2.26**	**2.40**	**2.47**	**2.54**	**2.48**

2.3.2 Daily Work Trips Per Worker by Municipality

In 1996, only 4% of workers were homeworkers, but this proportion increased to 8% in 2016 and more than doubled to 16% in 2022. **Table 2.8** compares the daily work trips per worker across different municipalities. Consequently, the daily work trip per worker decreases over the years. Another interesting finding is that between 1996 and 2016, urban and rural-urban mix regions have a higher daily work trip rate than rural regions. However, in the TTS 2022/23, we observe a lower daily work trip rate in urban regions than in rural-urban mix or rural regions.

Table 2.8 Daily Trips Per Worker by Municipality

Daily Work Trip per Worker Type	Municipality	Year 2022	2016	2011	2006	2001	1996
Urban	Durham	0.53	0.72	0.74	0.76	0.77	0.78
	Halton	0.50	0.73	0.74	0.76	0.76	0.78
	Hamilton	0.58	0.73	0.72	0.75	0.76	0.76
	Peel	0.54	0.75	0.76	0.79	0.80	0.81
	Toronto	0.53	0.76	0.74	0.77	0.79	0.80
	Waterloo	0.57	0.75	0.74	0.76		0.77
	York	0.52	0.74	0.75	0.77	0.79	0.79
Rural-urban mix	Barrie	0.58	0.72	0.71	0.74	0.76	0.77
	Brantford	0.66	0.73	0.74	0.78		
	Guelph	0.60	0.74	0.75	0.77	0.77	0.78
	Niagara	0.60	0.70	0.70	0.73	0.73	0.73
	Orangeville	0.60	0.72	0.75	0.77	0.75	0.76
	Orillia	0.60	0.70	0.70	0.67	0.72	
	Peterborough City	0.59	0.69	0.70	0.71	0.74	0.72
Rural	Blue Mountains	0.47					
	Brant	0.63	0.71	0.73	0.69		
	Different Areas						0.74
	Dufferin	0.55	0.69	0.66	0.67		
	Grey	0.61					
	Kawartha Lakes	0.66	0.67	0.66	0.68	0.73	0.70
	Northumberland	0.60					0.69
	Peterborough	0.62	0.71	0.68	0.71	0.70	0.72
	Simcoe	0.60	0.71	0.70	0.71	0.75	
	Wellington	0.62	0.71	0.71	0.70	0.73	0.73
Total		**0.55**	**0.74**	**0.74**	**0.76**	**0.78**	**0.79**

2.3.3 Daily Market Trips Per Person by Municipality

Contrary to the downward trend in work trips, daily market trips per person have been rising modestly since 2001 and dramatically between 2016 and 2022 (**Table 2.9**). The dramatic increase in market trips is partly attributed to the inclusion of all walking trips in 2022/23 TTS[1]. Rural and rural-urban mix regions generally have a higher market trip rate than urban regions.

Table 2.9 Daily Market Trips Per Person by Municipality

Daily Market Trips Per Person Type	Municipality	Year 2022	2016	2011	2006	2001	1996
Urban	Durham	0.34	0.22	0.25	0.23	0.23	0.23
	Halton	0.36	0.22	0.27	0.27	0.26	0.24
	Hamilton	0.38	0.22	0.25	0.25	0.24	0.23
	Peel	0.25	0.16	0.20	0.20	0.19	0.19
	Toronto	0.33	0.18	0.19	0.19	0.18	0.17
	Waterloo	0.36	0.24	0.25	0.25		0.28
	York	0.29	0.18	0.21	0.20	0.20	0.20
Rural-urban mix	Barrie	0.36	0.25	0.28	0.29	0.26	0.27
	Brantford	0.37	0.23	0.27	0.29		
	Guelph	0.36	0.24	0.28	0.25	0.24	0.22
	Niagara	0.41	0.26	0.30	0.30	0.30	0.29
	Orangeville	0.30	0.24	0.28	0.26	0.26	0.22
	Orillia	0.44	0.29	0.36	0.32	0.31	
	Peterborough City	0.41	0.27	0.32	0.31	0.31	0.31
Rural	Blue Mountains	0.44					
	Brant	0.34	0.25	0.23	0.28		
	Different Areas						0.19
	Dufferin	0.35	0.21	0.26	0.24		
	Grey	0.39					
	Kawartha Lakes	0.42	0.28	0.28	0.30	0.25	0.25
	Northumberland	0.41					0.25
	Peterborough	0.43	0.25	0.31	0.32	0.29	0.28
	Simcoe	0.37	0.26	0.28	0.27	0.25	
	Wellington	0.36	0.24	0.25	0.23	0.24	0.23
Total		**0.33**	**0.20**	**0.22**	**0.22**	**0.21**	**0.21**

[1] 2016 and earlier TTS only captures walking trips related to work or school, or serving as connections between different modes of transportation. Walking trips, for example to the supermarket and then back home, and walking trips from work to the café and then back to work are not captured. Those trips are included in the 2022/23 TTS.

2.3.4 Daily Other Purpose Trips Per Person by Municipality

The trip rate for other purposes[1] has also decreased over the two decades (**Table 2.10**). Urban regions have a lower trip rate per person for other purposes than most rural and rural-urban mixed regions.

Table 2.10 Daily Other Trips Per Person by Municipality

Daily Other Trips Per Person Type	Municipality	Year 2022	2016	2011	2006	2001	1996
Urban	Durham	0.24	0.31	0.38	0.41	0.41	0.40
	Halton	0.25	0.33	0.39	0.44	0.47	0.43
	Hamilton	0.29	0.35	0.39	0.40	0.43	0.43
	Peel	0.18	0.22	0.28	0.30	0.32	0.31
	Toronto	0.24	0.28	0.30	0.32	0.32	0.33
	Waterloo	0.27	0.37	0.40	0.44		0.50
	York	0.21	0.26	0.33	0.34	0.38	0.36
Rural-urban mix	Barrie	0.23	0.33	0.36	0.42	0.44	0.46
	Brantford	0.24	0.34	0.41	0.48		
	Guelph	0.28	0.37	0.40	0.44	0.48	0.44
	Niagara	0.29	0.40	0.45	0.52	0.55	0.46
	Orangeville	0.27	0.32	0.37	0.38	0.43	0.38
	Orillia	0.27	0.41	0.45	0.49	0.58	
	Peterborough City	0.29	0.41	0.45	0.50	0.55	0.52
Rural	Blue Mountains	0.35					
	Brant	0.25	0.41	0.46	0.49		
	Different Areas						0.40
	Dufferin	0.21	0.29	0.43	0.42		
	Grey	0.27					
	Kawartha Lakes	0.25	0.39	0.42	0.48	0.44	0.51
	Northumberland	0.27					0.50
	Peterborough	0.27	0.44	0.44	0.52	0.54	0.51
	Simcoe	0.26	0.35	0.42	0.45	0.46	
	Wellington	0.28	0.43	0.47	0.49	0.59	0.48
Total		**0.24**	**0.30**	**0.35**	**0.37**	**0.38**	**0.38**

[1] Other purposes include health and personal care, visiting friends and family, recreation and leisure, and worship or religious activity, etc.

3. Trip Generation by Individual and Household Attributes

This section compares the daily trip rate by individual and household attributes. The following tables of TTS 2022/23 include individuals aged 5 and above, and tables of TTS 2016 include individuals aged 11 and above based on the minimum age of the sample.

3.1 Daily Trip Rate by Survey Methods

Table 3.1 compares the daily trip rate of individuals surveyed using different methods in TTS 2022/23. Respondents using the mixed-mode method have a higher daily trip rate than those surveyed online. Respondents who were surveyed by telephone or mobile had the lowest daily trip rate. The difference in daily trip rates between respondents surveyed by telephone and online was relatively small in the 2016 TTS (**Table 3.2**).

Table 3.1 Daily Trip Rate by Survey Methods in TTS 2022/23

Survey Methods	% of Persons		Persons		Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
Telephone	6%	5%	22,736	475,867	41,785	863,822	1.84	1.82
Online	74%	72%	272,093	6,899,578	572,391	14,292,447	2.10	2.07
Mobile	16%	19%	57,565	1,841,166	115,491	3,614,630	2.01	1.96
Mixed Mode (Online/Phone)	3%	2%	9,345	198,569	20,744	423,750	2.22	2.13
Mixed Mode (Mobile/Phone)	0%	1%	1,753	49,994	3,743	101,820	2.14	2.04
Mixed Mode (Online/Mobile)	1%	1%	2,680	85,365	5,582	174,023	2.08	2.04
Total	100%	100%	366,172	9,550,539	759,736	19,470,492	2.07	2.04

Table 3.2 Daily Trip Rate by Survey Methods in TTS 2016

Survey Methods	% of Persons		Persons		Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
Telephone	34%	32%	133,321	2,853,593	273,607	5,797,992	2.05	2.03
Online	66%	68%	262,564	5,969,206	524,486	11,724,733	2.00	1.96

3.2 Daily Trip Rate by Survey Cycles

Respondents surveyed in Spring 2023 report a slightly higher daily trip rate than those surveyed in Fall 2022, reflecting a dynamic post-pandemic recovery (**Table 3.3**).

Table 3.3 Daily Trip Rate for Different Survey Periods in TTS 2022/23

Survey Methods	% of Persons		Persons		Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
Fall 2022	70%	71%	255,702	6,738,365	527,325	13,650,484	2.06	2.03
Spring 2023	30%	29%	110,470	2,812,175	232,411	5,820,008	2.10	2.07

3.3 Daily Trip Rate by Individual Attributes

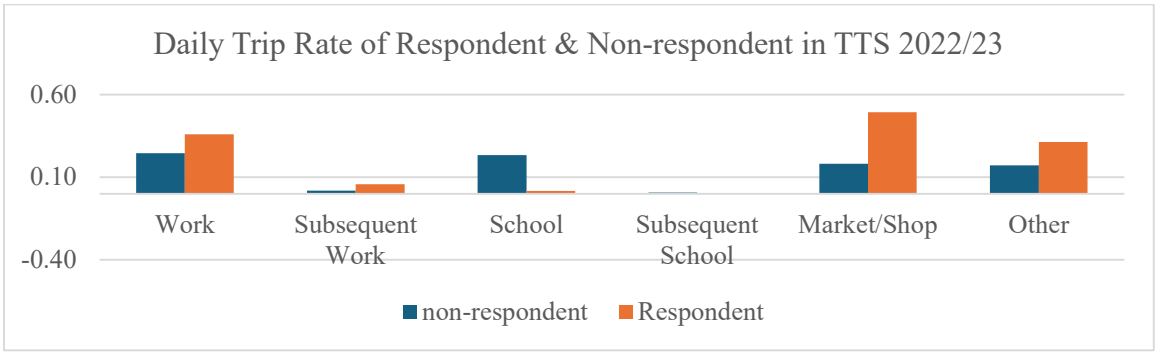
3.3.1 Daily Trip Rate by Respondent Status

Another important dimension to check is the proxy bias. People typically underreport trips for other household members when they are responding on their behalf. Therefore, main respondents exhibit higher daily trip rates than non-respondents (**Table 3.4**). This disparity may stem from socio-economic differences between respondents and non-respondents and potential response bias in trip reporting.

Table 3.4 Daily Trip Rate by Respondent Status

Respondent status	Number of Persons		% of Persons		Number of Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
Respondent	158625	3672592	43.32%	38.45%	390465	9163257	2.46	2.50
Not a respondent	207547	5877948	56.68%	61.55%	369271	10307236	1.78	1.75

The main respondents show a higher daily trip rate per person for work, subsequent work, market, and other travel purposes, while a lower school trip rate in both 2016 and 2022/2023 TTS (Figure 3.1). Examining the personal profiles of the main respondents and non-respondents (**Table 3.5**) revealed that the respondents tended to be slightly older, employed, and working outside the home, with professional jobs. They were also less likely to be students. The different profiles of respondents & non-respondents also partly explain the trip rate discrepancy.



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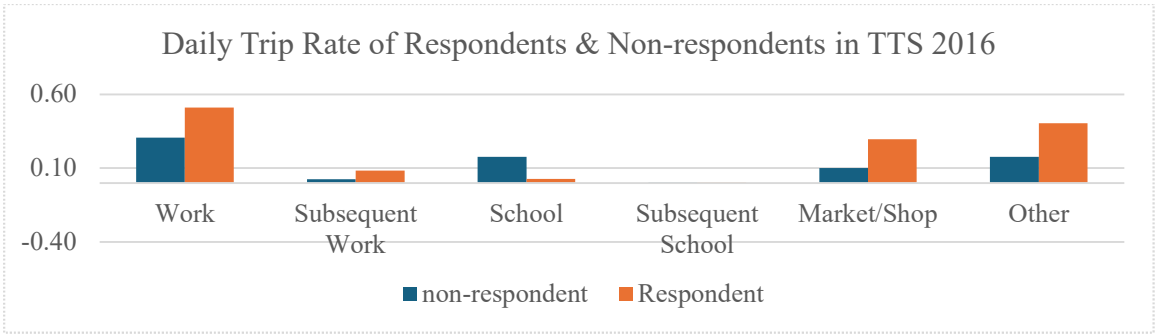


(b)

Figure 3.1 Daily Trip Rate of Respondent & Non-respondent by Trip Destination Purpose

Table 3.5 Respondent and Non-Respondent Personal Profiles Comparaison

	2016 TTS		2022/23 TTS	
	Non-respondent	Respondent	Non-respondent	Respondent
Age Group				
Age 0-4	8%	0%	8%	0%
Age 5-10	11%	0%	10%	0%
Age 11-20	19%	1%	18%	1%
Age 21-30	15%	11%	16%	11%
Age 31-40	11%	18%	12%	19%
Age 41-50	11%	20%	10%	18%
Age 51-60	11%	21%	11%	20%
Age 61-70	8%	15%	8%	17%
Age 71-80	4%	8%	5%	11%
Age 81-90	2%	4%	2%	4%
Age 91-99	0%	1%	0%	1%
Gender				
Female	51%	51%	54%	46%
Male	49%	49%	46%	54%
Student Status				
Full time	30%	3%	30%	3%
Part time	2%	2%	2%	2%
Not a student	68%	95%	67%	94%
Unknown	0%	0%	1%	1%
Employment Status				
Full-time Outside Home	31%	52%	29%	49%
Part-time Outside Home	10%	8%	9%	6%
WFH	3%	6%	7%	11%
Unemployed/Unknown	57%	34%	55%	34%
Occupation Type				
G	5%	9%	3%	5%
M	8%	7%	8%	7%
P	16%	35%	24%	47%
S	14%	14%	9%	6%
Unemployed/Unknown	57%	35%	57%	35%

3.3.2 Daily Trip Rate by Age Range

Table 3.6 compares the trip rate by age groups in 2022 TTS. It shows that the trip rate peaks among individuals aged 40–49, with a gradual decline among elderly groups. Children aged 5–14 show a relatively higher trip rate than young people aged 15–29, likely due to WFH arrangements.

Table 3.6 Daily Trip Rate by Age Range

Age_range	Number of Persons		% of Persons		Number of Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
00 to 04 years	11720	456774	3.20%	4.78%	0	null	0.00	null
05 to 09 years	12775	506603	3.49%	5.30%	29771	1148793	2.33	2.27
10 to 14 years	15080	537989	4.12%	5.63%	35813	1243041	2.37	2.31
15 to 19 years	14902	542248	4.07%	5.68%	32151	1120702	2.16	2.07

20 to 24 years	13956	609319	3.81%	6.38%	23267	1014170	1.67	1.66
25 to 29 years	17752	679461	4.85%	7.11%	32994	1265606	1.86	1.86
30 to 34 years	21836	695823	5.96%	7.29%	46193	1486782	2.12	2.14
35 to 39 years	21916	652069	5.99%	6.83%	52646	1604957	2.40	2.46
40 to 44 years	20922	651770	5.71%	6.82%	54308	1722139	2.60	2.64
45 to 49 years	21584	603297	5.89%	6.32%	55457	1561339	2.57	2.59
50 to 54 years	25209	687138	6.88%	7.19%	59168	1619064	2.35	2.36
55 to 59 years	29043	665880	7.93%	6.97%	63761	1449905	2.20	2.18
60 to 64 years	33738	650258	9.21%	6.81%	72550	1363865	2.15	2.10
65 to 69 years	33507	517019	9.15%	5.41%	71127	1037788	2.12	2.01
70 to 74 years	28988	427943	7.92%	4.48%	58870	818550	2.03	1.91
75 to 79 years	21591	306938	5.90%	3.21%	40906	545788	1.89	1.78
80 to 84 years	12331	184381	3.37%	1.93%	20197	276963	1.64	1.50
85 to 89 years	6299	117858	1.72%	1.23%	8121	146429	1.29	1.24
90 to 94 years	2506	48053	0.68%	0.50%	2135	39170	0.85	0.82
95+ years	517	9717	0.14%	0.10%	301	5443	0.58	0.56

3.3.3 Daily Trip Rate by Gender

The trip rate by gender is shown in **Table 3.7**. For the gender distribution, females slightly outnumber males (51.03% vs. 48.97% in expanded data). Despite fewer males in total numbers, they made slightly more trips than females in absolute numbers. Therefore, the daily trips per person of males are higher than those of females.

Table 3.7 Daily Trip Rate by Gender

Gender of person	Number of Persons		% of Persons		Number of Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
Female	186928	4873527	51.05%	51.03%	377119	9724885	2.02	2.00
Male	179244	4677013	48.95%	48.97%	382617	9745608	2.13	2.08

3.3.4 Daily Trip Rate by Possession of Driver's License

Table 3.8 compares the trip rate by possession of a driver's license. The reported trip rate of licensed individuals (2.25) exceeds the other two groups, indicating that licensed drivers make more trips than those without a driving licence. Those without a driving licence show a slightly lower trip rate than those who are not eligible for one.

Table 3.8 Daily Trip Rate by Possession of Driver's License

Possess driver's license	Number of Persons		% of Persons		Number of Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
Yes	284033	6791368	77.57%	71.11%	635177	15293711	2.24	2.25
No	39290	1149923	10.73%	12.04%	51236	1536077	1.30	1.34
Too young	42849	1609249	11.70%	16.85%	73323	2640705	1.71	1.64

3.3.5 Daily Trip Rate by Possession of Transit Pass

Table 3.9 shows that non-transit pass holders have higher daily trip rates (2.17 for non-pass holders vs. 1.88 for pass holders), suggesting transit passes may serve infrequent users (e.g., occasional commuters).

Table 3.9 Daily Trip Rate by Possession of Transit Pass

Possess a transit pass	Number of Persons		% of Persons		Number of Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
Yes	26600	759063	7.26%	7.95%	51603	1426367	1.94	1.88
None	323840	8183845	88.44%	85.69%	700773	17765206	2.16	2.17
Not ask (under 6)	14161	555818	3.87%	5.82%	5429	215723	0.38	0.39
Unknown	1571	51814	0.43%	0.54%	1931	63197	1.23	1.22

3.4 Daily Trip Rate by Household Attributes

3.4.1 Daily Trip Rate by Household Size

Households of 2-4 persons are the most prevalent household type. **Table 3.10** shows that small households (1–2 persons) dominate in records (47.63% combined) but drop in expanded data (33.5%), indicating potential underrepresentation of larger households in raw samples. Single-person households have the highest daily trips per person (2.22), likely due to independent routines. Larger households (6+ persons) show declining trip rates (e.g., 1.80 for 6-person households vs. 1.28 for 9-person households), possibly due to shared responsibilities or limited mobility. 4-person households buck the trend with higher trip rates (2.12) than smaller households, possibly linked to family activities or commuting needs.

Table 3.10 Daily Trip Rate by Number of Persons in Household

Household Person Number	Number of Persons		% of Persons		Number of Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
1	40766	928976	11.13%	9.73%	92364	2061588	2.27	2.22
2	133652	2269759	36.50%	23.77%	275915	4647531	2.06	2.05
3	72729	1865154	19.86%	19.53%	143350	3634435	1.97	1.95
4	74280	2446995	20.29%	25.62%	160711	5178423	2.16	2.12
5	29035	1330938	7.93%	13.94%	59507	2698361	2.05	2.03
6	10602	471980	2.90%	4.94%	19240	851006	1.81	1.80
7	3269	154992	0.89%	1.62%	5784	276331	1.77	1.78
8	1152	49757	0.31%	0.52%	1893	80475	1.64	1.62
9	405	17673	0.11%	0.19%	568	22579	1.40	1.28
10	150	7177	0.04%	0.08%	218	10061	1.45	1.40
11	132	7137	0.04%	0.07%	186	9704	1.41	1.36

3.4.2 Daily Trip Rate by Income Range of Household

Table 3.11 displays the trip rate by household income. Trip rates rise with income, from 1.65 daily trips (lowest bracket: $0-$14,999) to 2.27 (highest bracket: $200,000+). Higher-income groups likely have more work, social, or discretionary travel.

Table 3.11 Daily Trip Rate by Income Range of Household

Household Income	Number of Persons		% of Persons		Number of Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
$0-$14,999	4123	157779	1.13%	1.65%	6697	259580	1.62	1.65
$15,000-$39,999	21777	607177	5.95%	6.36%	38381	1091044	1.76	1.80
$40,000-$59,999	28400	733442	7.76%	7.68%	54752	1381049	1.93	1.88
$60,000-$79,999	31928	807989	8.72%	8.46%	65569	1626756	2.05	2.01
$80,000-$99,999	34627	920743	9.46%	9.64%	72535	1885546	2.09	2.05
$100,000-$124,999	42129	1140430	11.51%	11.94%	89667	2385923	2.13	2.09
$125,000-$149,999	31768	862948	8.68%	9.04%	69412	1852844	2.18	2.15
$150,000-$199,999	43208	1173949	11.80%	12.29%	95935	2585800	2.22	2.20
$200,000 and above	59212	1499206	16.17%	15.70%	136166	3401337	2.30	2.27
Decline/Unknown	69000	1646875	18.84%	17.24%	130622	3000614	1.89	1.82

3.4.3 Daily Trip Rate by Type of Dwelling

As shown in **Table 3.12**, households living in houses have the highest trip rates (2.08), possibly due to the need to make multiple trips to fulfil daily needs in suburban areas, or reflecting the fact that higher income groups make more trips. In contrast, apartment dwellers make fewer trips (1.94 daily), likely reflecting urban accessibility.

Table 3.12 Daily Trip Rate by Type of Dwelling

Type of dwelling	Number of Persons		% of Persons		Number of Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
House	263215	6205412	71.88%	64.97%	552957	12925575	2.10	2.08
Apartment	66547	2390225	18.17%	25.03%	132598	4642218	1.99	1.94
Townhouse	36410	954903	9.94%	10.00%	74181	1902700	2.04	1.99

3.4.4 Daily Trip Rate by Household Structure

For trip rate by household structures shown in **Table 3.13**, single parents with children (1 adult, 1+ children) have the highest trip rates (2.55), likely due to childcare-related travel. Multi-adult households (3+ adults), either with or without children, show the lower trip rates (1.90 and 1.75, respectively), possibly due to shared responsibilities or carpooling.

Also, the trip rate of households with children (e.g., 2 adults + children: 2.26 trips) outpaces that of childless households (e.g., 2 adults no children: 2.02). Single-person households (2.22 trips) rank second-highest trip rate, emphasizing independence-driven mobility.

Table 3.13 Daily Trip Rate by Household Structure

Household Structure	Number of Persons		% of Persons		Number of Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
Single person	40766	928976	11.13%	9.73%	92364	2061588	2.27	2.22
2 adults, no children	131312	2185300	35.86%	22.88%	269479	4420279	2.05	2.02
3+ adults, no children	75044	2117193	20.49%	22.17%	131562	3697453	1.75	1.75
1 adult, 1+ children	4752	184695	1.30%	1.93%	12760	471112	2.69	2.55
2 adults, 1+ children	79014	2689035	21.58%	28.16%	185287	6073654	2.34	2.26
3+ adults, 1+ children	35284	1445341	9.64%	15.13%	68284	2746407	1.94	1.90

3.4.5 Daily Trip Rate by Household Vehicle Ownership

The trip rate by household vehicle ownership is exhibited in **Table 3.14**. Individuals from zero-vehicle households have the lowest trip rate. Individuals from households with 1–4 vehicles show stable trip rates, suggesting vehicle access supports consistent mobility. Individuals from high-vehicle-ownership households have high trip rates, but their tiny sample sizes limit generalizability.

Table 3.14 Daily Trip Rate by Number of Vehicles in Household

No. of vehicles in household	Number of Persons		% of Persons		Number of Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
0	24955	782305	6.82%	8.19%	43513	1333552	1.74	1.70
1	133023	3215440	36.33%	33.67%	272271	6443351	2.05	2.00
2	150122	3802360	41.00%	39.81%	322090	8107212	2.15	2.13
3	41067	1184155	11.22%	12.40%	86284	2429242	2.10	2.05
4	12279	397840	3.35%	4.17%	25421	806774	2.07	2.03
5	3212	115210	0.88%	1.21%	6767	235737	2.11	2.05
6	1004	35325	0.27%	0.37%	2132	70436	2.12	1.99
7	251	9982	0.07%	0.10%	578	23081	2.30	2.31
8	104	3524	0.03%	0.04%	255	7918	2.45	2.25
9	76	2724	0.02%	0.03%	210	8228	2.76	3.02
10	34	571	0.01%	0.01%	102	1832	3.00	3.21
11	22	441	0.01%	0.00%	48	1001	2.18	2.27

12	23	663	0.01%	0.01%	65	2131	2.83	3.21

3.4.6 Daily Trip Rate by Whether the Household Was Born in Canada

The comparison of the trip rate according to whether the household was born in Canada or not is presented in **Table 3.15**. The results indicate that individuals from Canadian-born households demonstrate higher daily trip rates (2.22 trips/person) than those from non-Canadian-born households (1.90 trips/person).

Table 3.15 Daily Trip Rate by Whether the Household Was Born in Canada

Household born in Canada	Number of Persons		% of Persons		Number of Trips		Daily Trips per Person	
	Records	Expanded	Records	Expanded	Records	Expanded	Records	Expanded
Yes	180303	4496655	49.24%	47.08%	403130	9990661	2.24	2.22
No	175636	4759022	47.97%	49.83%	340345	9040071	1.94	1.90
Decline/Unknown	10233	294863	2.79%	3.09%	16261	439760	1.59	1.49

4. Trip Mode

This section examines changes in trip mode and mode share for different trip purposes in 2016 and 2022 TTS. 2016 and earlier TTS only captures walking trips related to work or school, or serving as connections between different modes of transportation. Walking trips—for example, to the supermarket and back home, or from work to a café and back to work—are not captured. Those trips are included in the 2022 TTS. For our analysis, trips not captured by the 2016 criteria are excluded when making comparisons.

4.1 Mode Distribution for All Trips (2022 vs. 2016)

Table 4.1 Mode Choice Count and Mode Share of All Trips

Mode	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Driver	11179474	11349195	63.80%	66.05%
Auto passenger	2318190	2480479	13.23%	14.43%
Local Transit	1943297	1369187	11.09%	7.97%
Walk	1150262	1086438	6.56%	6.32%
School bus	356076	331633	2.03%	1.93%
Cycle	238927	295107	1.36%	1.72%
GO rail	212701	112937	1.21%	0.66%
Taxi passenger	62305	37775	0.36%	0.22%
Paid rideshare	44983	89788	0.26%	0.52%
Other	16511	31323	0.09%	0.18%
Total	17522726	17183862	100.00%	100.00%

Note: The 2022 counts exclude 2022 TTS non-commuting walking trips and trips made by 5–10-year-olds that were not captured in the 2016 TTS.

In terms of all trips, **Table 4.1** shows the counts and share of different modes for 2016 and 2022/23 TTS. The number of trips and shares for the 'Driver' and 'Auto Passenger' modes increased in 2022/23 compared to 2016. In contrast, both 'Local Transit' and 'Go Rail' modes of transport experienced significant decreases in 2022/23. Even controlling for trips not captured in 2016, walking trips and their share show a moderate decrease. School bus trips and share also slightly decreased. However, cycling trips and share slightly increased. While taxi trips and share decreased, paid rideshare mode trips and share increased. The increase in the 'Other' mode and its share could be attributed to scooter trips captured in the 2022/23 TTS and merged into the 'Other' category for comparison.

Figure 4.1 illustrates the relative change in both the number of trips and the mode share for all-purpose trips between 2016 and 2022. Significant declines are observed in the use of taxi, walking, and GO rail, while notable increases are seen for auto driver and paid rideshare modes.

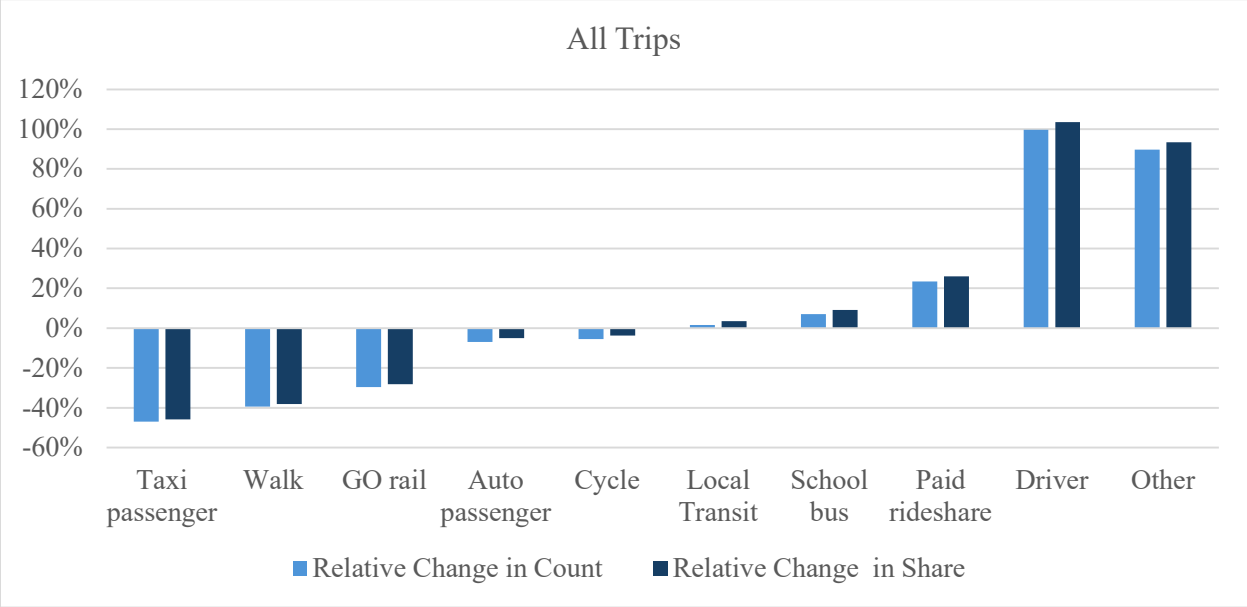


Figure 4.1 Relative Change in Mode Count and Share for All Trips (2022 vs. 2016)

4.2 Mode Distribution by Trip Purpose (2022 vs. 2016)

4.2.1 Work Trip Mode

Table 4.2 displays the mode-specific trip numbers and share for first work trips and second/ subsequent work trips. Driving trips remained dominant with an increasing dependence for both first and second/ subsequent work trips. Meanwhile, transit ridership and taxi passenger mode trips saw a noticeable drop, and alternative modes such as cycling and ridesharing was growing, though still limited. Cycling trip share of first work trips surpassed GO rail mode share in 2022.

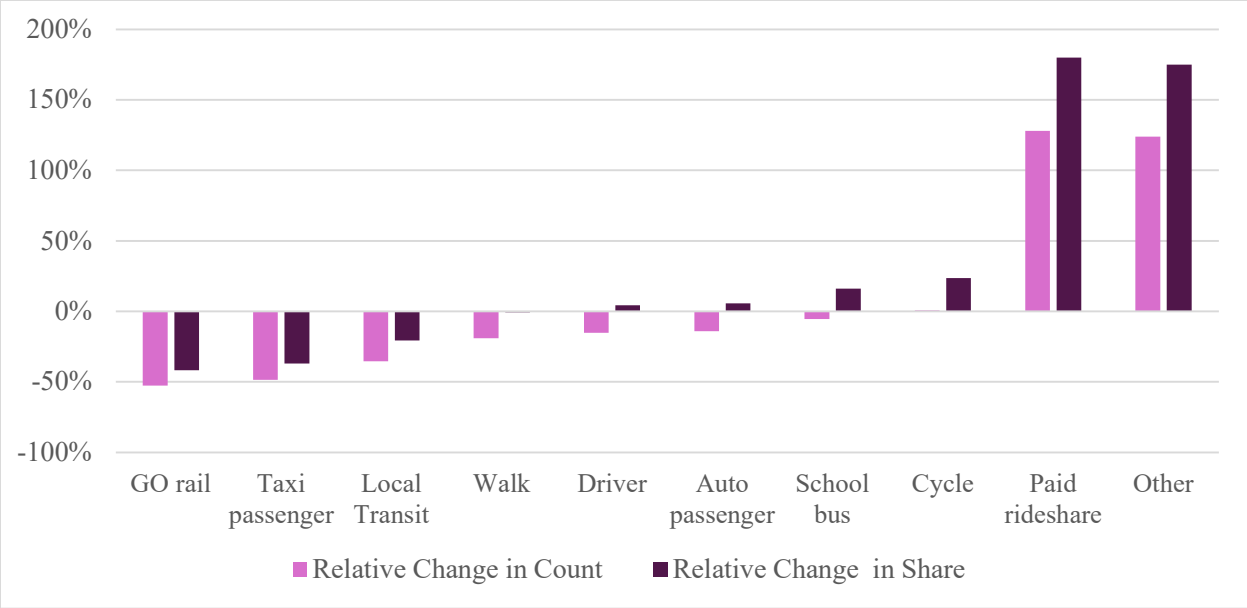
Table 4.2 Mode Count and Share for Work Trips

Mode (First Work Trip)	Count (2016)	Count (2022)	Share (2016)	Share (2022)

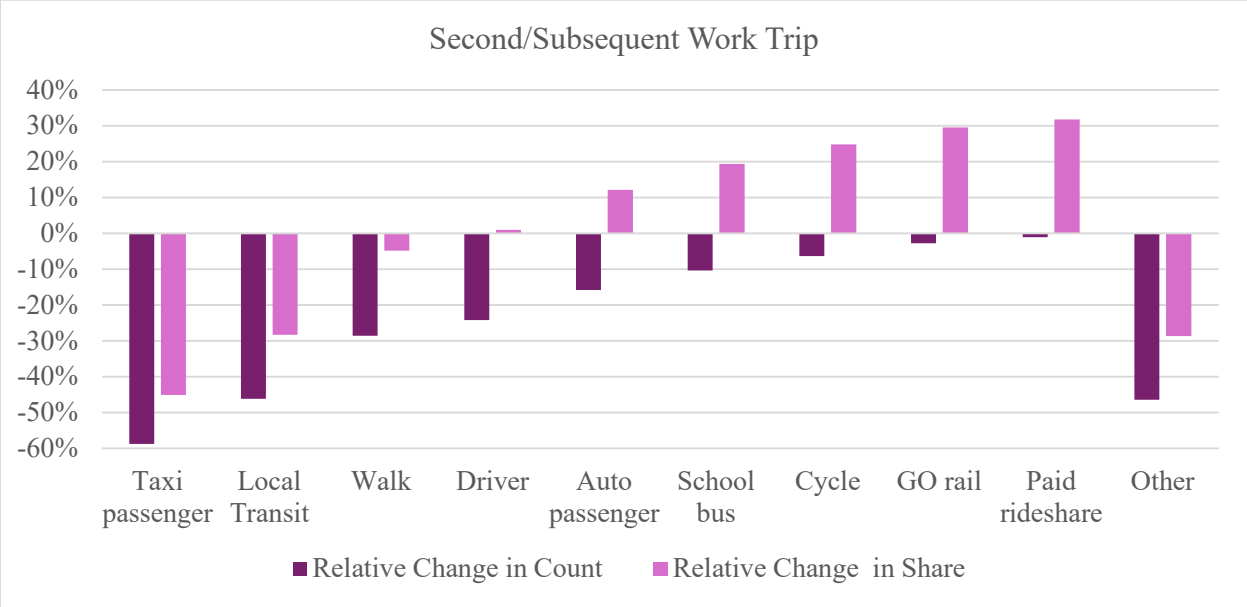
Driver	2409326	2045153	71.07%	74.06%
Local Transit	479736	309726	14.15%	11.22%
Auto passenger	196125	168669	5.79%	6.11%
Walk	144452	116843	4.26%	4.23%
GO rail	89574	42419	2.64%	1.54%
Cycle	53575	53929	1.58%	1.95%
Paid rideshare	7331	16719	0.22%	0.61%
Taxi passenger	6935	3563	0.20%	0.13%
School bus	1239	1172	0.04%	0.04%
Other	1549	3469	0.05%	0.13%

Mode (Second/Subsequent Work Trip)	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Driver	336842	255273	82.60%	83.39%
Auto passenger	20123	16940	4.93%	5.53%
Walk	19610	14000	4.81%	4.57%
Local Transit	19531	10510	4.79%	3.43%
Cycle	4166	3902	1.02%	1.27%
School bus	2303	2063	0.56%	0.67%
Taxi passenger	2023	833	0.50%	0.27%
Paid rideshare	1178	1165	0.29%	0.38%
GO rail	784	762	0.19%	0.25%
Other	1252	670	0.31%	0.22%

Figure 4.2 (a-b) further shows the relative changes in trip counts and mode shares for work trips. For First Work Trips in Figure 4.2 (a), GO rail mode trips experienced the largest decline. Taxi passenger mode trips also declined significantly, whereas paid rideshare mode category saw substantial increases, though from relatively small base values. In Figure 4.2 (b), the number of second/ subsequent work trips decreased for all mode. But some modes exhibited increases in share, indicating limited modal substitution.



(a) First Work Trips



(b) Second/Subsequent Work Trips

Figure 4.2 Relative Change in Mode Count and Share for Work Trips (2022 vs. 2016)

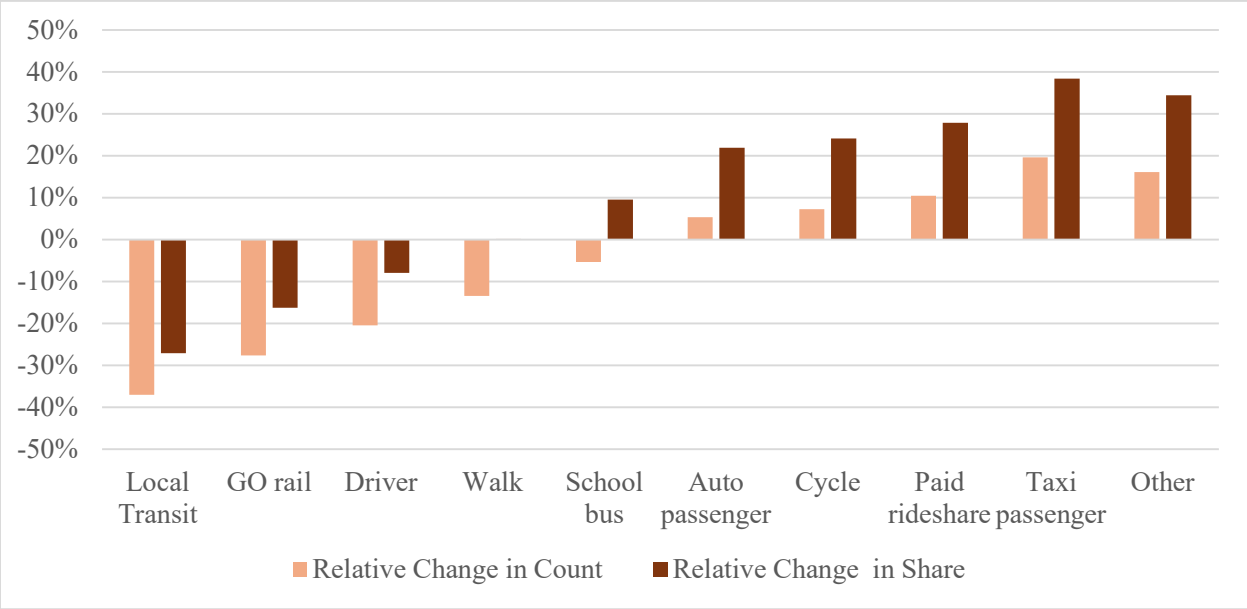
4.2.2 School Trip Mode

Table 4.3 provides the counts and shares of school trip modes in 2016 and 2022 TTS. For the first school trip, 'Local Transit' shows a substantial drop in both the number of transit trips and its share of total trips in 2022. Conversely, the number of trips and share of 'Auto Passenger' mode notably increased. A similar trend was observed for second and subsequent school trips, with decreased usage of 'Local Transit' and increased usage of 'Auto Passenger'. For the first school trip, cycling trips rose from 20,112 to 21,572, and its mode share also increased, indicating more usage of cycle for school trips.

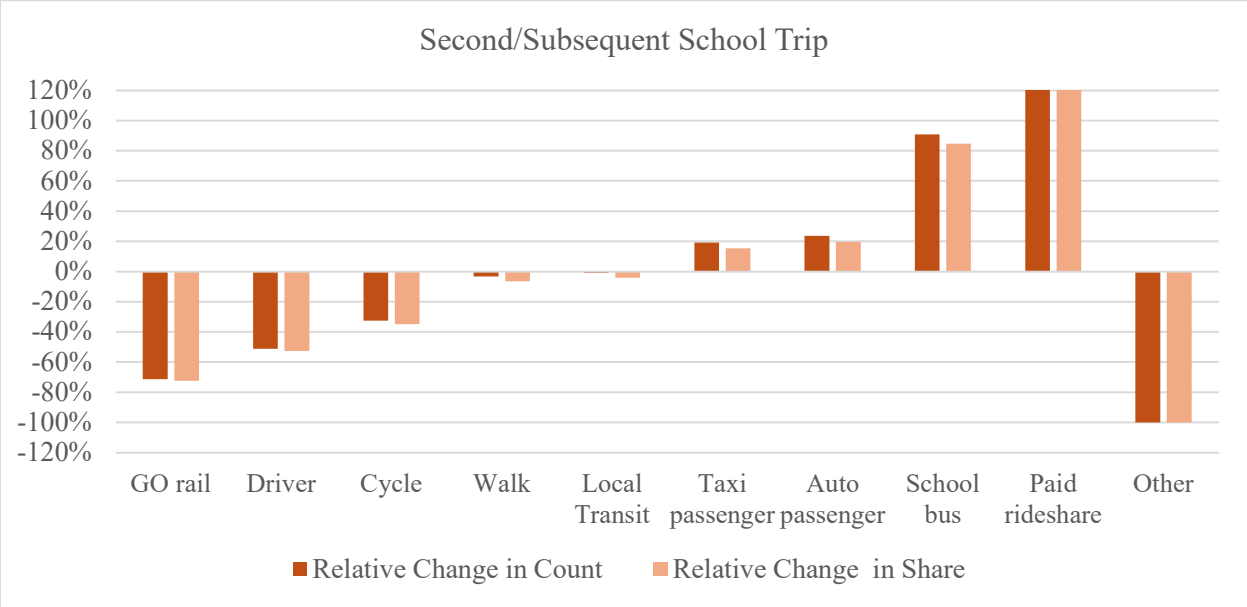
Table 4.3 Mode Count and Share for School Trips

Mode (First School Trip)	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Auto passenger	254857	268486	24.25%	29.56%
Local Transit	249212	156986	23.71%	17.29%
Walk	225769	195469	21.48%	21.52%
School bus	168756	159696	16.06%	17.58%
Driver	116878	92988	11.12%	10.24%
Cycle	20112	21572	1.91%	2.38%
GO rail	10693	7737	1.02%	0.85%
Paid rideshare	2623	2898	0.25%	0.32%
Taxi passenger	1238	1481	0.12%	0.16%
Other	781	907	0.07%	0.10%
Mode (Second/Subsequent School Trip)	**Count (2016)**	**Count (2022)**	**Share (2016)**	**Share (2022)**
Walk	6327	6116	29.70%	27.79%
Auto passenger	4679	5785	21.96%	26.28%
Driver	3856	1883	18.10%	8.56%
Local Transit	3089	3060	14.50%	13.90%
School bus	2241	4277	10.52%	19.43%
Cycle	812	547	3.81%	2.49%
Taxi passenger	220	262	1.03%	1.19%
Paid rideshare	16	76	0.08%	0.35%
GO rail	14	4	0.07%	0.02%
Other	51	0	0.24%	0.00%

Figure 4.3 (a-b) shows the relative changes in both the number of school trips and their mode shares. For the first school trips, the most significant decline occurred in public transit modes, including local transit and GO rail modes. Trip and mode share increases were observed in Auto Passenger, Cycling, Paid Share, and Taxi modes. Shifts away from public transit modes were also observed in Second/subsequent school trips. Unlike work trips, where Paid Rideshare increased while Taxi Passenger decreased, both the two modes increased for school trips.



(a) First School Trip



(b) Second/Subsequent School Trip

Figure 4.3 Relative Change in Mode Count and Share for School Trips (2022 vs. 2016)

4.2.3 Home Trip Mode

Table 4.4 shows counts and shares by mode for return-home trips. Driver and auto-passenger modes remained dominant, with slight increases in both count and share. In contrast, public transit and taxi both fell sharply in count and share, and walking trips declined modestly. Meanwhile, paid rideshare more than doubled in both count and share, highlights its growing role in mandatory travel patterns.

Figure 4.4 further illustrates the relative changes in counts and shares for return-home trip modes: GO Rail, Taxi, and Local Transit all declined substantially in both count and share, while Other, Paid Rideshare, and Cycling experienced the largest increases.

Table 4.4 Mode Count and Share for Home Trips

Mode	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Driver	4617293	4734565	62.14%	64.75%
Auto passenger	961743	1046508	12.94%	14.31%
Local Transit	880608	613538	11.85%	8.39%
Walk	538660	497096	7.25%	6.80%
School bus	170664	158492	2.30%	2.17%
Cycle	104651	129979	1.41%	1.78%
GO rail	98126	51622	1.32%	0.71%
Taxi passenger	31508	20185	0.42%	0.28%
Paid rideshare	20916	44603	0.28%	0.61%
Other	6402	15072	0.09%	0.21%

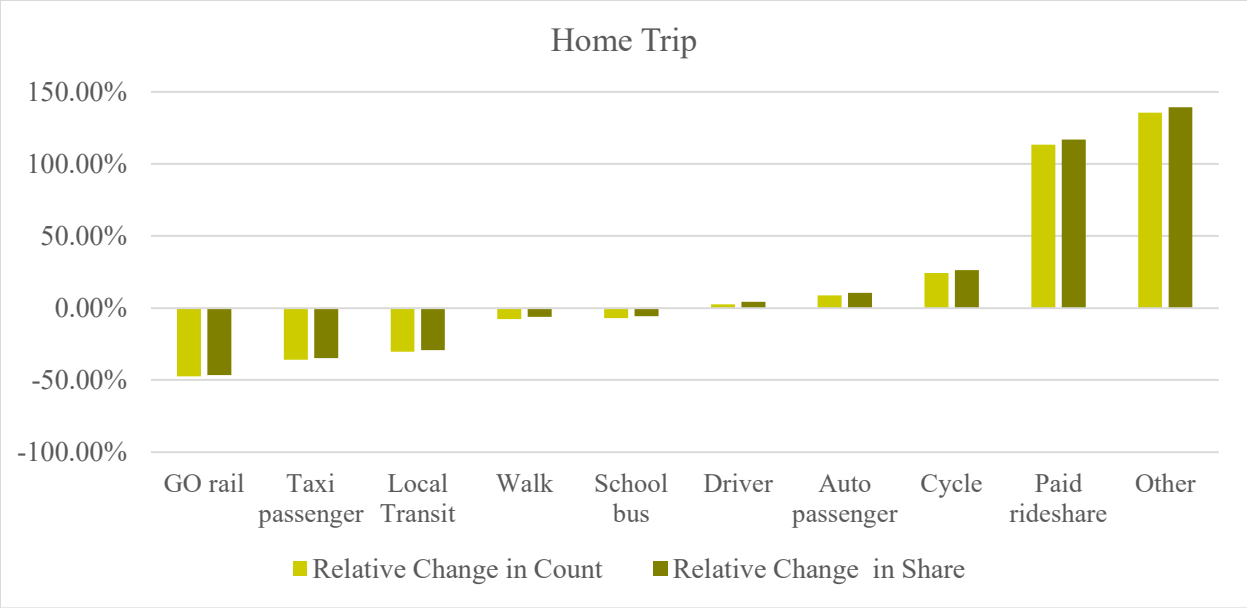


Figure 4.4 Relative Change in Mode Count and Share for Home Trips (2022 vs. 2016)

4.2.4 Market Trip Mode

Table 4.5 provides the counts and shares of trip modes for market trips. In market trips, auto driver and passenger modes remained dominant, showing increases in both trip counts and shares. Cycling trips also increased, with a modest rise in share. Notably, Paid Rideshare also showed a significant rise in both count and share, while Local Transit and Walking saw increases in trip counts but declines in share.

Table 4.5 Mode Count and Share for Market/Shopping Trips

Mode	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Driver	1092324	1841410	70.86%	72.00%
Auto passenger	275250	457982	17.86%	17.91%
Local Transit	95295	125564	6.18%	4.91%
Walk	52232	75060	3.39%	2.93%
Cycle	17185	35181	1.11%	1.38%
Taxi passenger	3235	4146	0.21%	0.16%
GO rail	2039	2692	0.13%	0.11%
Paid rideshare	1618	10668	0.10%	0.42%
School bus	73	443	0.00%	0.02%
Other	2227	4466	0.14%	0.17%

Figure 4.5 shows relative changes in trip counts and mode shares for market/shopping trips. While all modes saw higher trip counts for market purpose, shares declined for Taxi, Local Transit, GO Rail, and walking. Paid Rideshare had the largest relative increase. Although School Bus showed the second-largest relative growth, its low absolute count and share suggest the relative change may be inflated by the small sample size.

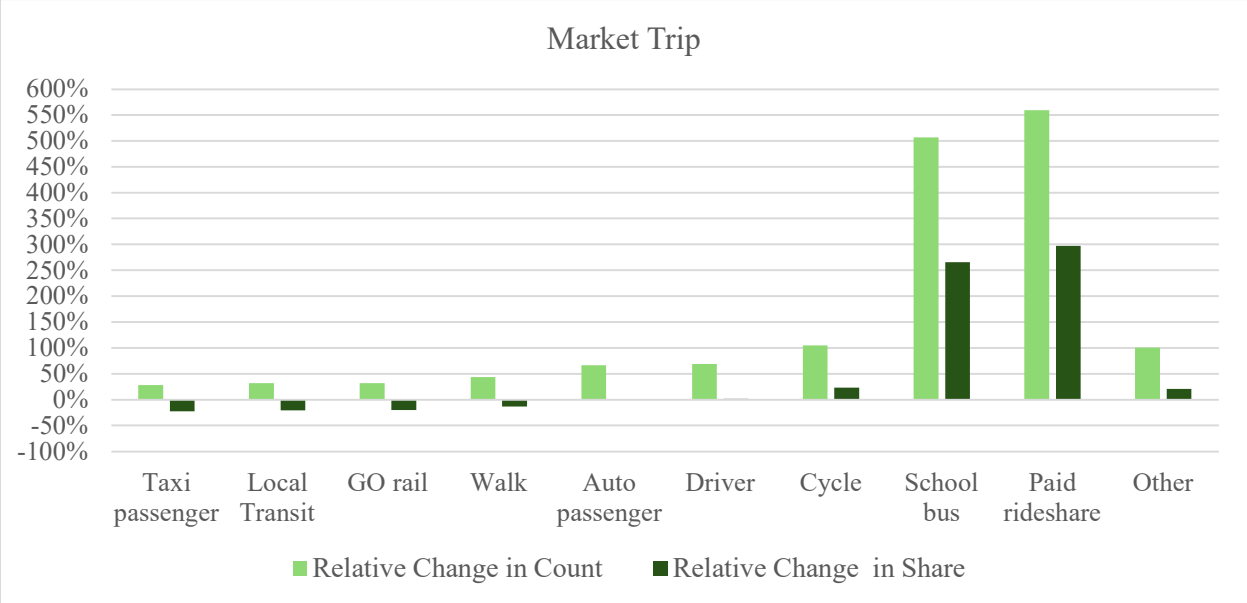


Figure 4.5 Relative Change in Mode Count and Share for Market Trips (2022 vs. 2016)

4.2.5 Daycare Trip Mode

Table 4.6 provides shows counts and shares by mode for daycare trips. Auto driver mode remained the dominant mode and increased, while auto passenger trips also grew. Although starting from a small base, taxi passenger trips and share roughly halved, whereas paid rideshare

usage more than doubled in both count and share. These changes suggest growing diversity in trip-making strategies for daycare activities.

Table 4.6 Mode Count and Share for Daycare Trips

Mode	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Driver	160884	185152	74.75%	82.00%
Walk	27115	15529	12.60%	6.88%
Auto passenger	12290	14811	5.71%	6.56%
Local Transit	10081	5463	4.68%	2.42%
Cycle	2078	3004	0.97%	1.33%
GO rail	1821	457	0.85%	0.20%
School bus	568	582	0.26%	0.26%
Taxi passenger	242	125	0.11%	0.06%
Paid rideshare	155	416	0.07%	0.18%
Other	0	250	0.00%	0.11%

Figure 4.6 shows relative changes in daycare trip modes and mode shares: Public transit (GO Rail and Local Transit), taxi mode and share declined sharply, while paid rideshare trips grew substantially. Among active modes, walking trips and share fell while cycling trips and share rose. School bus usage remained relatively stable.

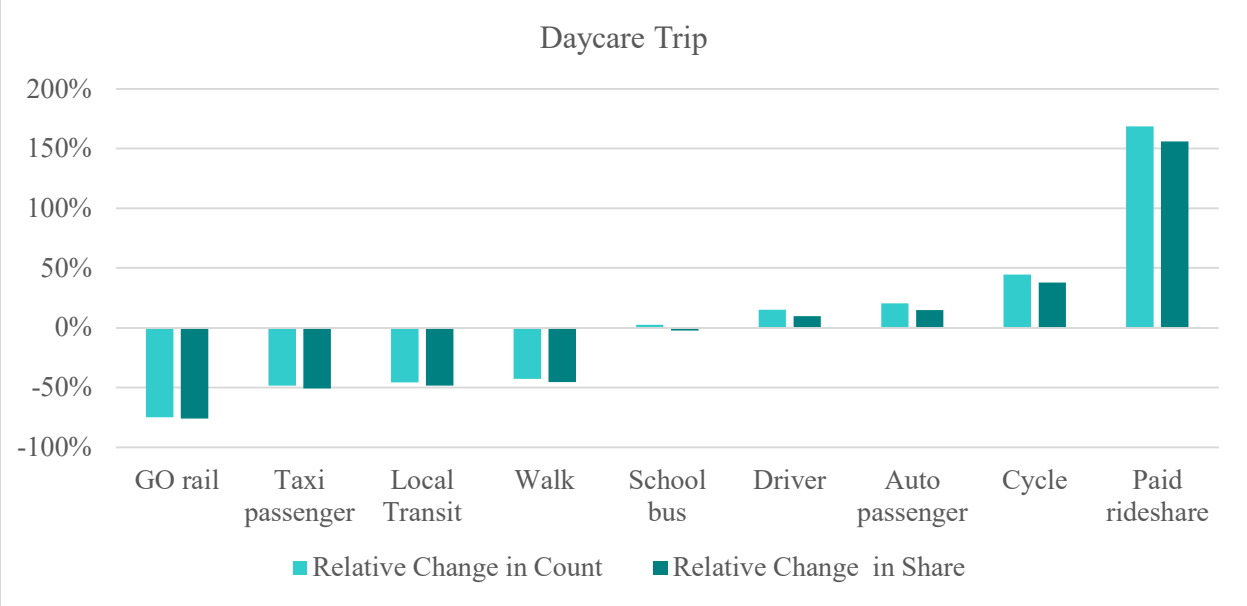


Figure 4.6 Relative Change in Mode Count and Share for Daycare Trips (2022 vs. 2016)

4.2.6 Facilitate Passenger Trip Mode

Table 4.7 shows counts and shares by mode for facilitate-passenger trips. As with daycare trips, auto-driver remained the dominant mode and saw an increase. Walking and cycling trips and share grew substantially, with walk and cycle shares in 2022 TTS tripled the shares in 2016 TTS.

Taxi and paid-rideshare trips grew slightly, hinting at shifting preferences despite their small absolute changes.

Table 4.7 Mode Count and Share for Facilitate Passenger Trips

Mode	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Driver	1014478	1008917	88.87%	81.32%
Auto passenger	75235	93893	6.59%	7.57%
Walk	36272	117319	3.18%	9.46%
Local Transit	7734	10110	0.68%	0.81%
School bus	2882	966	0.25%	0.08%
Cycle	1800	6209	0.16%	0.50%
GO rail	1492	704	0.13%	0.06%
Paid rideshare	880	935	0.08%	0.08%
Taxi passenger	617	758	0.05%	0.06%
Other	169	829	0.01%	0.07%

Figure 4.7 illustrates the relative changes in counts and shares for facilitate-passenger trip modes. Active modes including walking and cycling show trips tripled in count and share. GO Rail trips declined, while local-transit trips increased. Paid rideshare usage grew in count but declined slightly in share, and taxi-passenger trips rose modestly in both count and share.

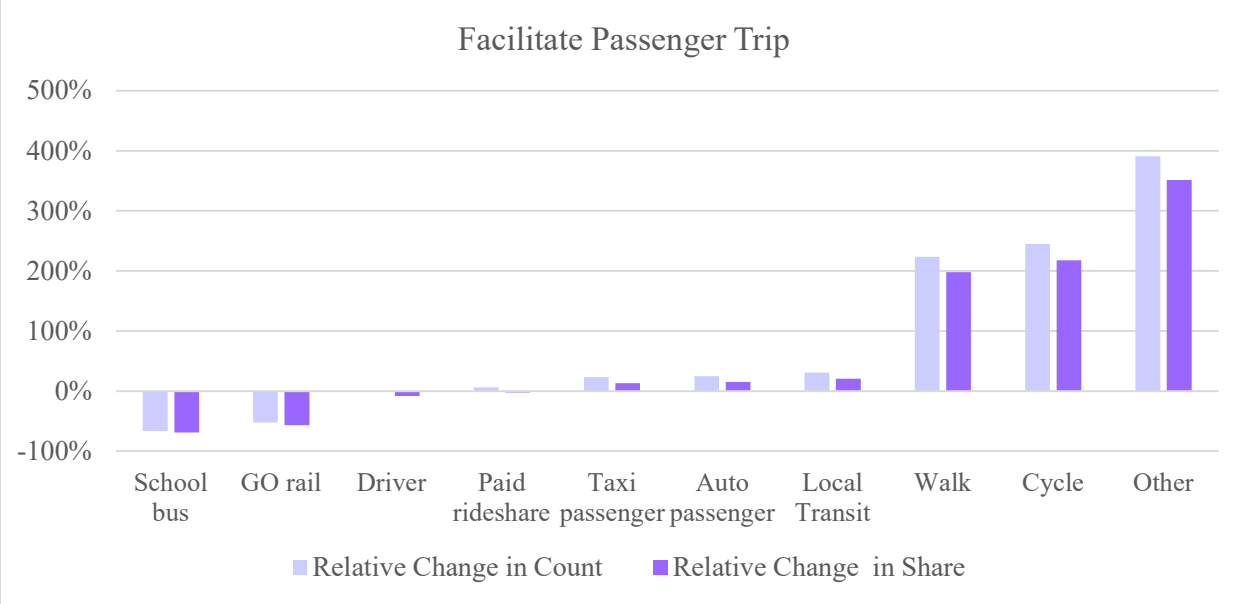


Figure 4.7 Relative Change in Mode Count and Share for Facilitate Passenger Trips (2022 vs. 2016)

4.3 Public Transit Mode Count and Share by Municipality

This section compares public transit trip counts and mode-share changes across municipalities between 2016 and 2022. It examines both local transit (excluding GO Rail) and GO Rail trips (GO only and combined GO & local transit) by trip-origin municipality. Public transit share is defined as the number of public transit trips divided by the total number of trips (all modes) in each municipality. Municipalities are grouped into urban, rural-urban-mix, and rural categories for the analysis.

4.3.1 Public Transit Mode Count and Share by Municipality in Urban Regions

Figure 4.8 shows the relative changes in both the count and share of local transit trips across different urban municipalities, with trip and share values for 2016 and 2022 shown in **Table 4.8**. Compared to 2016, all urban municipalities experienced declines in both the number and share of local transit trips in 2022. York had the largest relative decrease in local transit trips, while Waterloo had the smallest decline.

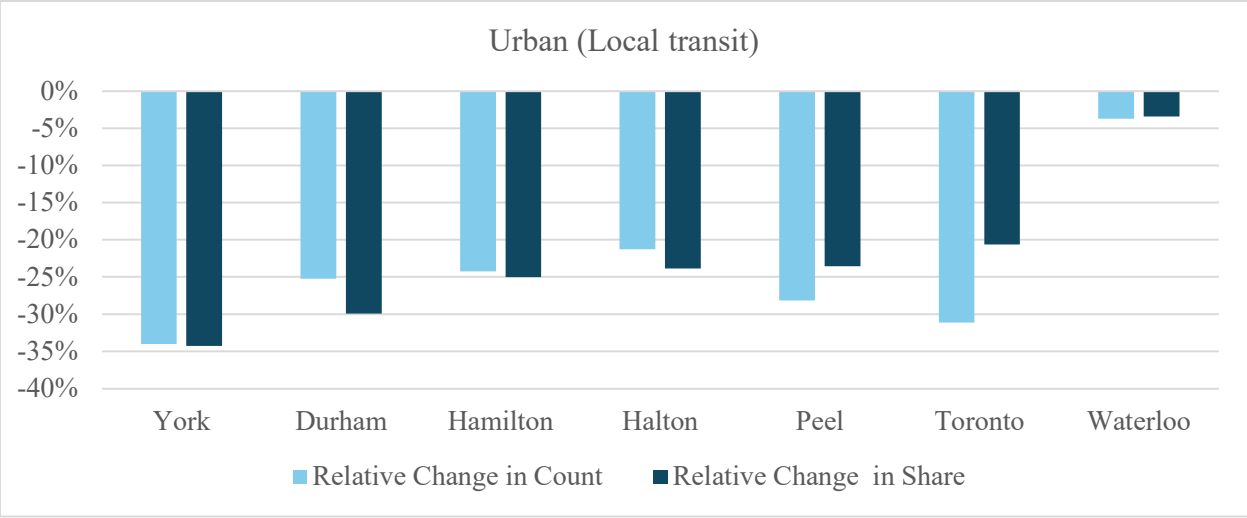


Figure 4.8 Relative Change in Local Transit Trips in Urban Regions (2022 vs. 2016)

Table 4.8 Trip Count and Share for Local Transit Trips in Urban Regions

Region Type	Municipality	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Urban	Toronto	1441318	992314	26.08%	20.70%
	Peel	167207	120119	6.76%	5.17%
	York	96874	63930	4.69%	3.08%
	Hamilton	74133	56152	7.08%	5.31%
	Waterloo	48802	46976	4.31%	4.16%
	Durham	38276	28622	3.35%	2.34%
	Halton	20119	15838	1.81%	1.38%

The relative changes in terms of Go rail trips and Go rail share across municipalities in urban areas was shown in **Figure 4.9**. **Table 4.9** further provides the corresponding trips counts and shares in the two years of TTS. All municipalities except Waterloo saw a decline regarding GO

rail trips and shares. Consistent with the local-transit trend, York showed the largest relative decrease, although the variation in declines across municipalities was small.

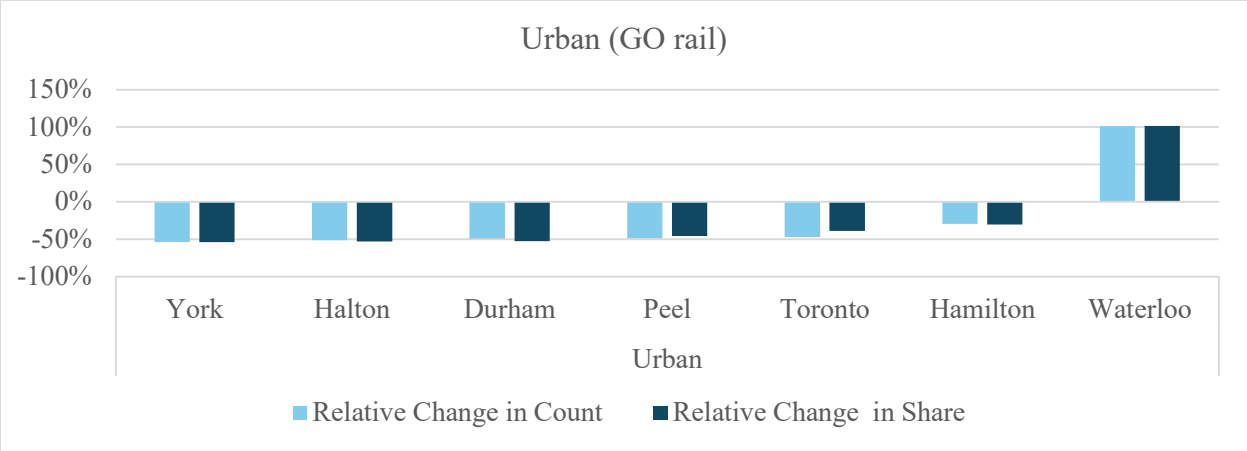


Figure 4.9 Relative Change in GO Rail Trips in Urban Regions (2022 vs. 2016)

Table 4.9 Trip Count and Share for GO Rail Trips in Urban Regions

Region Type	Municipality	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Urban	Toronto	114735	60696	2.08%	1.27%
	Peel	29892	15242	1.21%	0.66%
	York	20529	9441	0.99%	0.46%
	Durham	19982	10092	1.75%	0.83%
	Halton	19319	9339	1.74%	0.81%
	Hamilton	4500	3159	0.43%	0.30%
	Waterloo	515	1035	0.05%	0.09%

4.3.2 Public Transit Mode Count and Share by Municipality in Rural-Urban Mix Regions

Figure 4.10 shows the relative changes in local transit trip counts and shares across rural-urban-mix municipalities (see **Table 4.10** for exact values in 2016 and 2022 TTS). As in urban areas, every municipality in the rural-urban-mix category saw declines in both the number and share of local transit trips in 2022 versus 2016. Guelph—formerly the leader in local transit ridership in 2016—exhibited the largest drop, while Niagara experienced the smallest decrease and overtook Guelph in total local transit trips by 2022.

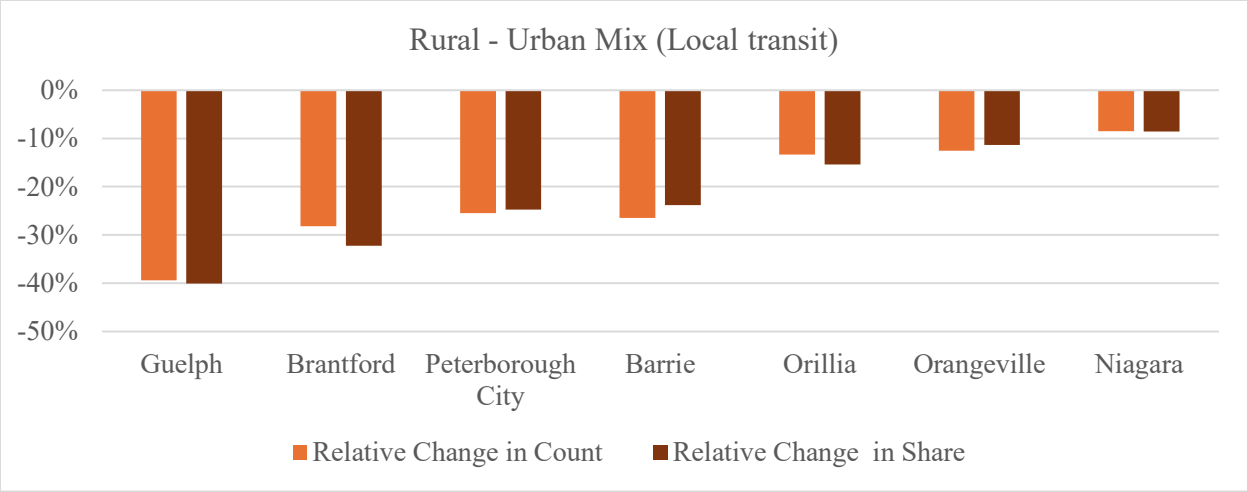


Figure 4.10 Relative Change in Local Transit Trips in Rural-Urban Mix Regions (2022 vs. 2016)

Table 4.10 Trip Count and Share for Local Transit Trips in Rural-Urban Mix Regions

Region Type	Municipality	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Rural-urban mix	Guelph	17000	10298	5.53%	3.31%
	Niagara	16246	14860	1.79%	1.64%
	Peterborough City	7131	5315	3.66%	2.76%
	Barrie	5013	3687	1.57%	1.20%
	Brantford	4280	3073	2.28%	1.54%
	Orillia	1607	1393	2.01%	1.70%
	Orangeville	724	633	1.16%	1.03%

Figure 4.11 illustrates the relative changes in the number and share of GO rail trips across municipalities in the Rural-Urban Mix area, with detailed count and share figures shown in **Table 4.11**. GO rail usage in these regions remained relatively low overall. Between 2016 and 2022, Brantford, Peterborough, Niagara and Guelph saw increases in GO rail trips while Orangeville, Barrie, Orillia experienced decline.

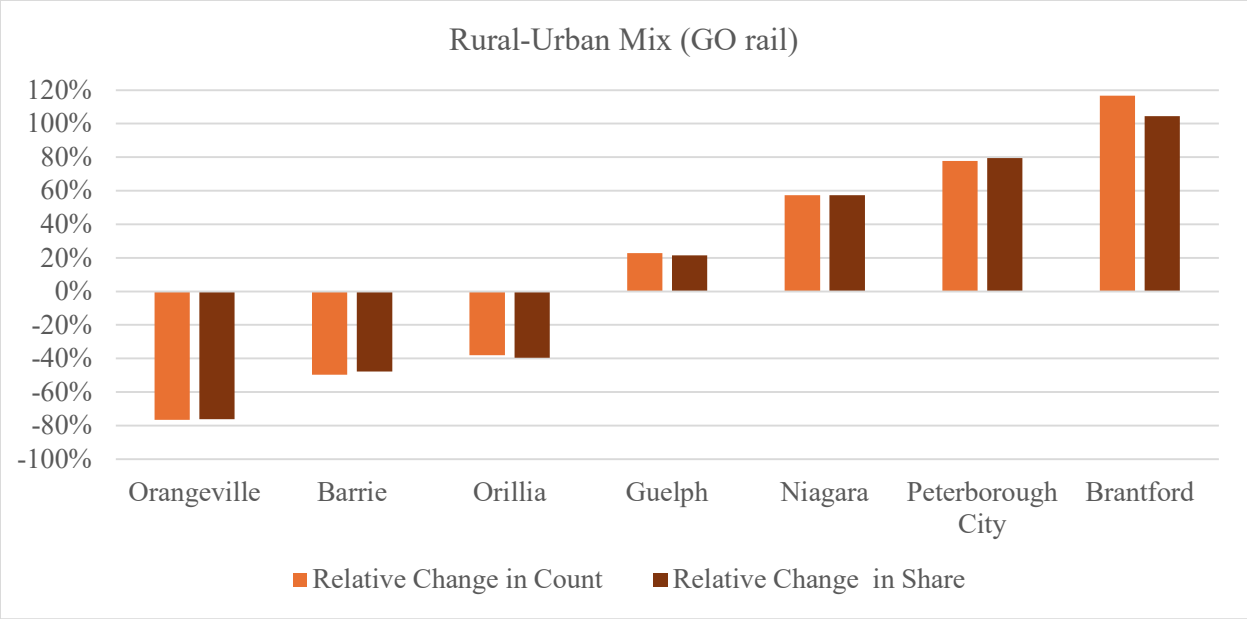


Figure 4.11 Relative Change in GO Rail Trips in Rural-Urban Regions (2022 vs. 2016)

Table 4.11 Trip Count and Share for GO Rail Trips in Rural-Urban Regions

Region Type	Municipality	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Rural-urban mix	Barrie	875	441	0.27%	0.14%
	Niagara	640	1007	0.07%	0.11%
	Guelph	316	388	0.10%	0.12%
	Brantford	120	260	0.06%	0.13%
	Orangeville	77	18	0.12%	0.03%
	Peterborough City	63	112	0.03%	0.06%
	Orillia	50	31	0.06%	0.04%

4.3.3 Public Transit Mode Count and Share by Municipality in Rural Region

Table 4.12 summarizes the number, share, and relative changes in local transit trips for rural municipalities, while Table 4.13 presents the same metrics for GO Rail trips. Public transit usage in rural municipalities remained low. Simcoe recorded the highest number of both local transit and GO Rail trips, with relatively small changes over time. Note that the 2016 TTS did not include the County of Grey, the County of Northumberland, or the Town of the Blue Mountains; these areas appear only in the 2022 TTS.

Table 4.12 Local Transit Trip Count, Share, and Relative Change in Rural Regions (2022 vs. 2016)

Region Type	Municipality	Count (2016)	Count (2022)	Share (2016)	Share (2022)	Relative Change in Count	Relative Change in Share
Rural	Simcoe	2490	2305	0.50%	0.42%	-7.43%	-17.46%
	Kawartha Lakes	560	383	0.46%	0.30%	-31.61%	-34.22%
	Wellington	265	43	0.27%	0.04%	-83.77%	-85.39%

	Brant	117	195	0.19%	0.30%	66.67%	55.67%
	Dufferin	59	2	0.15%	0.00%	-96.61%	-97.17%
	Peterborough	0	0	0.00%	0.00%	0.00%	0.00%
	Grey	-	1025	-	0.69%	-	-
	Northumberland	-	1169	-	0.80%	-	-
	Blue Mountains	-	61	-	0.36%	-	-

Table 4.13 GO Rail Trip Count, Share, and Relative Change in Rural Regions (2022 vs. 2016)

Region Type	Municipality	Count (2016)	Count (2022)	Share (2016)	Share (2022)	Relative Change in Count	Relative Change in Share
Rural	Simcoe	622	709	0.13%	0.13%	13.99%	1.64%
	Wellington	248	94	0.25%	0.08%	-62.10%	-65.88%
	Kawartha Lakes	53	100	0.04%	0.08%	88.68%	81.47%
	Brant	51	0	0.08%	0.00%	-100.00%	-100.00%
	Dufferin	41	10	0.10%	0.02%	-75.61%	-79.64%
	Peterborough	19	0	0.03%	0.00%	-100.00%	-100.00%
	Grey	-	13	-	0.01%	-	-
	Northumberland	-	542	-	0.37%	-	-
	Blue Mountains	-	0	-	0.00%	-	-

4.4 Active Mode Share by Municipality (2022 vs. 2016)

This section displays the share of active modes (walking and cycling) across different municipalities and how these proportions have changed between 2016 and 2022.

4.4.1 Active Trip Count and Share by Municipality in Urban Regions

Figure 4.12 shows changes in walking trip counts and shares across urban municipalities (see **Table 4.14** for details). From 2016 to 2022, Peel experienced a notable decline in walking trips, followed by York. Toronto exhibits a substantial decline in walking trips but a moderate increase in walking share. Waterloo saw a clear increase in both walking counts and share, while walking remained largely stable elsewhere.

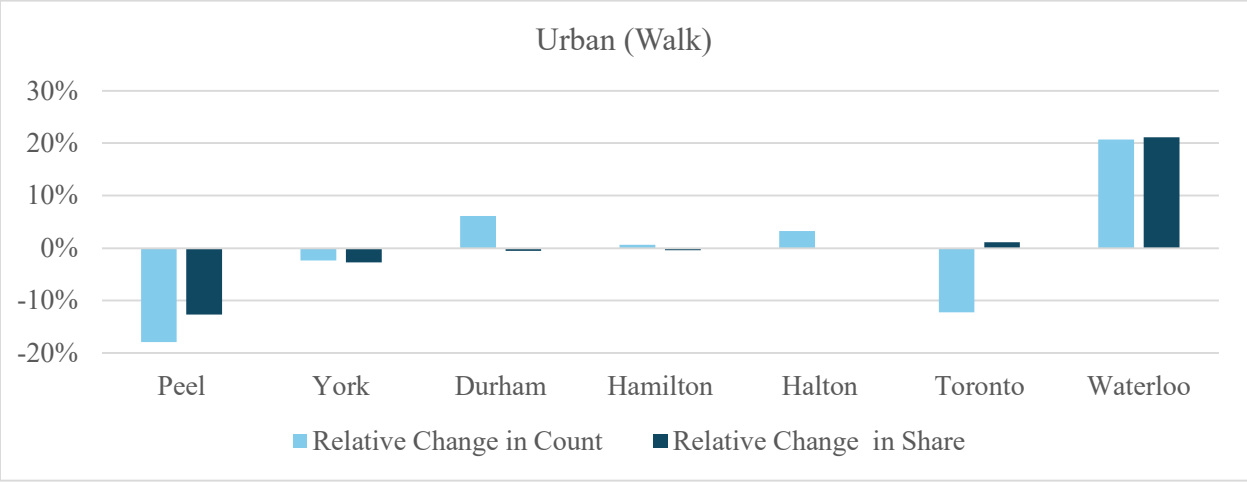


Figure 4.12 Relative Change in Walking Trips in Urban Regions (2022 vs. 2016)

Table 4.14 Trip Count and Share for Walking Trips in Urban Regions

Region Type	Municipality	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Urban	Toronto	555171	487031	10.05%	10.16%
	Peel	133080	109228	5.38%	4.70%
	York	96635	94354	4.67%	4.55%
	Waterloo	63071	76126	5.56%	6.74%
	Durham	62478	66311	5.46%	5.43%
	Hamilton	60814	61189	5.81%	5.78%
	Halton	58436	60328	5.27%	5.26%

Figure 4.13 shows how cycling trips and share evolved across urban municipalities, with supporting data in Table 4.15. Unlike the downward trend in local transit, cycling increased across all municipalities in both absolute counts and share. Durham saw the largest rise—where walking was least common in 2016—while Halton had the smallest increase.

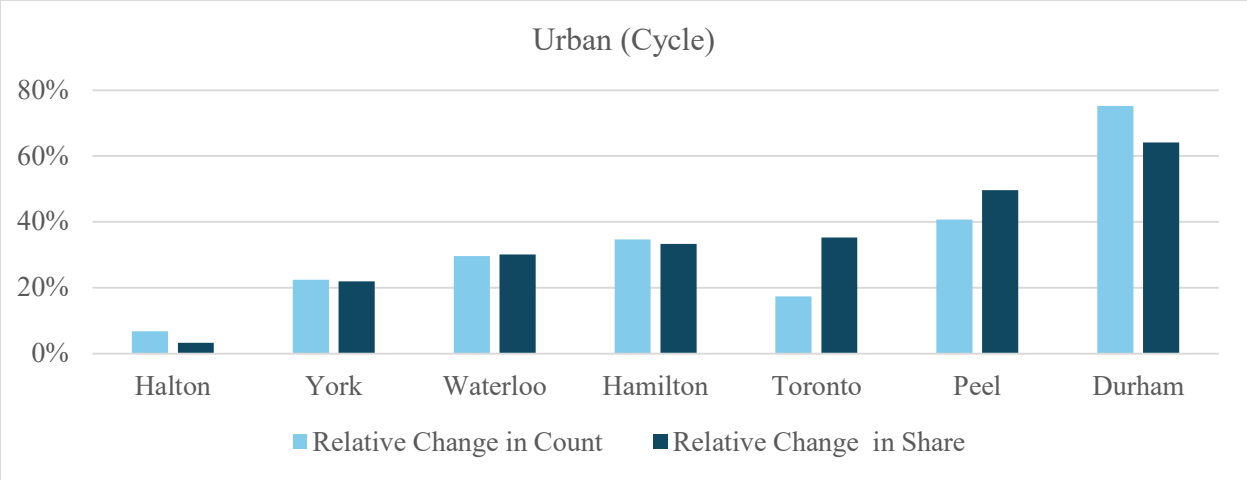


Figure 4.13 Relative Change in Cycling Trips in Urban Regions (2022 vs. 2016)

Table 4.15 Trip Count and Share for Cycling Trips in Urban Regions

Region Type	Municipality	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Urban	Toronto	140904	165267	2.55%	3.45%
	Waterloo	16206	21006	1.43%	1.86%
	Hamilton	13893	18704	1.33%	1.77%
	Peel	12456	17521	0.50%	0.75%
	York	11694	14307	0.57%	0.69%
	Halton	11122	11869	1.00%	1.03%
	Durham	4569	8001	0.40%	0.66%

4.4.2 Active Mode Count and Share by Municipality in Rural-Urban Regions

Figure 4.14 presents the walking mode trips and shares changes in rural-urban mix municipalities, with corresponding count and share values in Table 4.17. Orangeville experienced the largest relative drop, with walking trip share decreasing by 20.55%. Walking share also declined in Brantford, Peterborough, Niagara, and Orillia. Conversely, Barrie and Guelph saw increases in walking share in 2022.

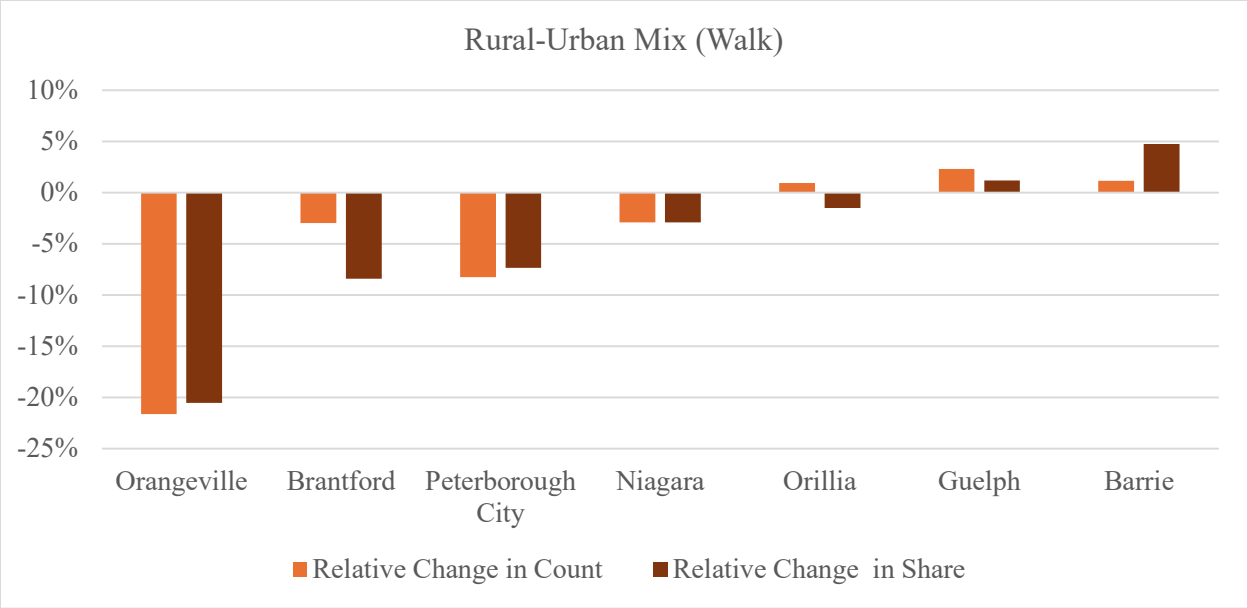


Figure 4.14 Relative Change in Walking Trips in Rual-Urban Mix Regions (2022 vs. 2016)

Table 4.16 Trip Count and Share for Walking Trips in Rual-Urban Mix Regions

Region Type	Municipality	Count (2016)	Count (2022)	Share (2016)	Share (2022)
Rural-urban mix	Niagara	28246	27426	3.11%	3.02%
	Guelph	19460	19907	6.33%	6.40%
	Barrie	16416	16602	5.14%	5.39%
	Peterborough City	11241	10312	5.77%	5.35%
	Brantford	9828	9534	5.23%	4.79%
	Orangeville	4403	3451	7.08%	5.62%
	Orillia	3294	3325	4.13%	4.07%

Table 4.17 summarizes cycling trips and share changes in rural-urban regions. Due to the large variation in trip counts among municipalities, no figure is presented for the relative changes. Orangeville, previously the lowest in cycling trips, saw the largest relative growth, even as its walking trips declined. Niagara followed with a substantial increase despite already having the highest cycling counts among rural–urban municipalities. Peterborough City and Brantford also recorded notable gains in cycling. In Guelph and Orillia, walking and cycling shifts appear inversely related.

Table 4.17 Cycling Trip Count, Share, and Relative Change in Rual-Urban Mix Regions (2022 vs. 2016)

Region Type	Municipality	Count (2016)	Count (2022)	Share (2016)	Share (2022)	Relative Change in Count	Relative Change in Share
Rural-urban mix	Niagara	7027	9352	0.77%	1.03%	33.09%	33.06%
	Guelph	6442	6206	2.10%	2.00%	-3.66%	-4.71%

	Peterborough City	5804	7541	2.98%	3.91%	29.93%	31.23%
	Barrie	1931	1949	0.60%	0.63%	0.93%	4.52%
	Brantford	1151	1428	0.61%	0.72%	24.07%	17.11%
	Orillia	787	700	0.99%	0.86%	-11.05%	-13.21%
	Orangeville	53	495	0.09%	0.81%	833.96%	846.76%

4.4.3 Active Mode Count and Share by Municipality in Rural Regions

Tables 4.18 -4.19 present the walking and cycling trip counts and shares across rural municipalities. Simcoe had the highest number of both walking and cycling trips among rural municipalities, and both modes increased between 2016 and 2022, with cycling trips showing a particularly notable rise. Brant, Dufferin, and Peterborough displayed opposite trends between the two active modes, with Peterborough showing the highest relative increase in cycling trips.

Table 4.18 Walking Trip Count, Share, and Relative Change in Rual Regions (2022 vs. 2016)

Region Type	Municipality	Count (2016)	Count (2022)	Share (2016)	Share (2022)	Relative Change in Count	Relative Change in Share
Rural	Simcoe	17027	19135	3.44%	3.45%	12.38%	0.20%
	Kawartha Lakes	3184	2946	2.63%	2.34%	-7.47%	-11.01%
	Wellington	2674	3305	2.68%	2.98%	23.60%	11.27%
	Brant	2117	1486	3.49%	2.29%	-29.81%	-34.44%
	Dufferin	1652	2286	4.11%	4.75%	38.38%	15.52%
	Peterborough	791	592	1.30%	0.86%	-25.16%	-33.71%
	Grey	-	5366	-	3.61%	-	-
	Northumberland	-	6088	-	4.16%	-	-
	Blue Mountains	-	69	-	0.41%	-	-

Table 4.19 Cycling Trip Count, Share, and Relative Change in Rual Regions (2022 vs. 2016)

Region Type	Municipality	Count (2016)	Count (2022)	Share (2016)	Share (2022)	Relative Change in Count	Relative Change in Share
Rural	Simcoe	3081	6438	0.62%	1.16%	108.96%	86.32%
	Kawartha Lakes	706	230	0.58%	0.18%	-67.42%	-68.67%
	Wellington	517	788	0.52%	0.71%	52.42%	37.22%
	Brant	222	323	0.37%	0.50%	45.50%	35.89%
	Peterborough	140	601	0.23%	0.87%	329.29%	280.23%
	Dufferin	44	28	0.11%	0.06%	-36.36%	-46.87%
	Grey	-	425	-	0.29%	-	-
	Northumberland	-	1383	-	0.94%	-	-
	Blue Mountains	-	443	-	2.64%	-	-

4.5 Trip Mode Comparison between Fall 2022 and Spring 2023

Since the 2022 TTS spans two cycles: Fall 2022 and Spring 2023. we also examined whether there are any structural differences between those periods. 70% of the overall trips occurred in Fall 2022, while 30% occurred in Spring 2023. Table 4.20 summarizes the absolute mode-share differences between the two cycles for each trip purpose.

Table 4.20 Absolute Differences in Mode Shares by Trip Purpose (Spring 2023 vs. Fall 2022)

Mode	Home	Work	Market/Shop	Other	Facilitate passenger	School	Subsequent Work	Daycare	Subsequent School
Driver	0.43%	1.35%	-0.66%	-1.15%	2.01%	-2.55%	-1.53%	1.44%	0.72%
Auto passenger	1.11%	0.33%	1.73%	0.98%	0.34%	3.30%	1.00%	0.87%	-4.23%
Local Transit	-0.78%	-1.10%	-0.44%	0.03%	-0.21%	-4.28%	0.16%	-1.56%	-10.18%
Walk	-1.00%	-0.68%	-0.62%	-0.52%	-2.23%	1.24%	0.24%	-1.57%	2.45%
School bus	0.08%	-0.02%	0.00%	0.12%	0.15%	2.43%	0.24%	-0.10%	12.27%
Cycle	0.12%	-0.10%	0.10%	0.60%	0.01%	0.12%	0.23%	0.17%	-2.75%
GO Rail	0.06%	0.14%	0.04%	-0.05%	-0.04%	-0.29%	-0.08%	0.10%	-0.02%
Paid rideshare	-0.11%	0.05%	-0.23%	-0.12%	-0.03%	0.02%	-0.20%	0.22%	-0.47%
Taxi passenger	0.02%	0.01%	0.02%	0.00%	-0.04%	0.09%	-0.06%	0.18%	2.21%
Other	0.08%	0.03%	0.06%	0.12%	0.04%	-0.08%	0.00%	0.25%	0.00%

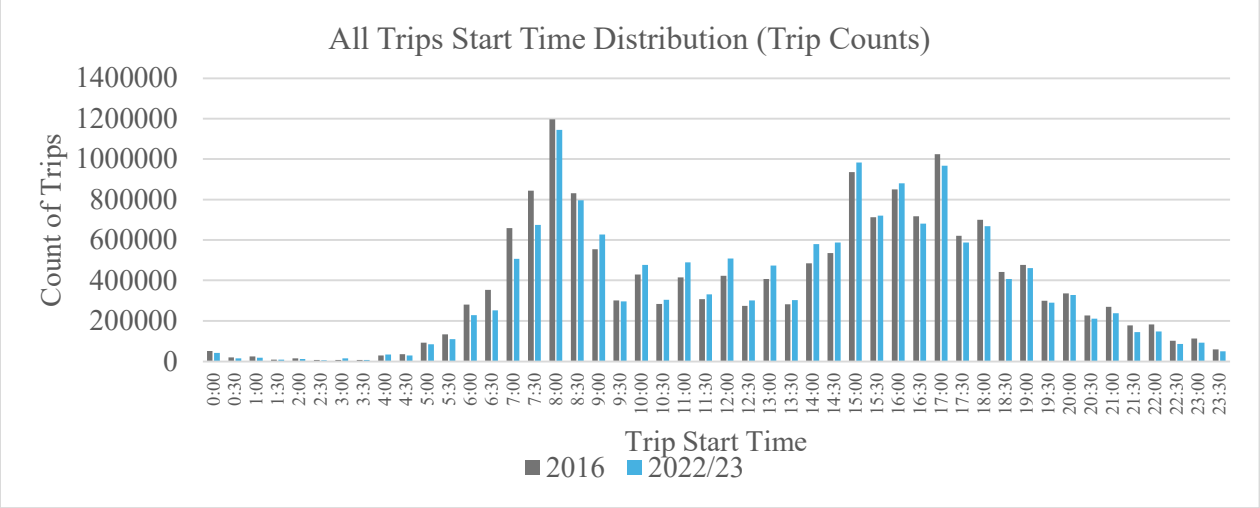
Overall mode-choice patterns remained similar between Fall 2022 and Spring 2023, but some notable shifts appeared: School-related trips saw the largest changes between the two cycles. In Spring 2023, local transit share for first school purpose dropped, while school bus and walking shares grew. Follow-up school trips also show a pronounced increase in school bus share and decline in both local transit and auto-passenger use, suggesting a seasonal or behavioral switch toward active and school bus options. Facilitate-passenger trips shifted away from walking and toward private vehicles in Spring 2023.Cycling shares rose slightly across most trip purposes in Spring 2023 except for work and subsequent school purposes, indicating a seasonal boost. Local transit fell across nearly all purposes, pointing to a broader seasonal decline in public-transit reliance.

These patterns—especially the shift away from transit and toward walking, school bus, and private vehicles for education trips—underscore the importance of accounting for seasonal effects and survey timing when interpreting travel behavior.

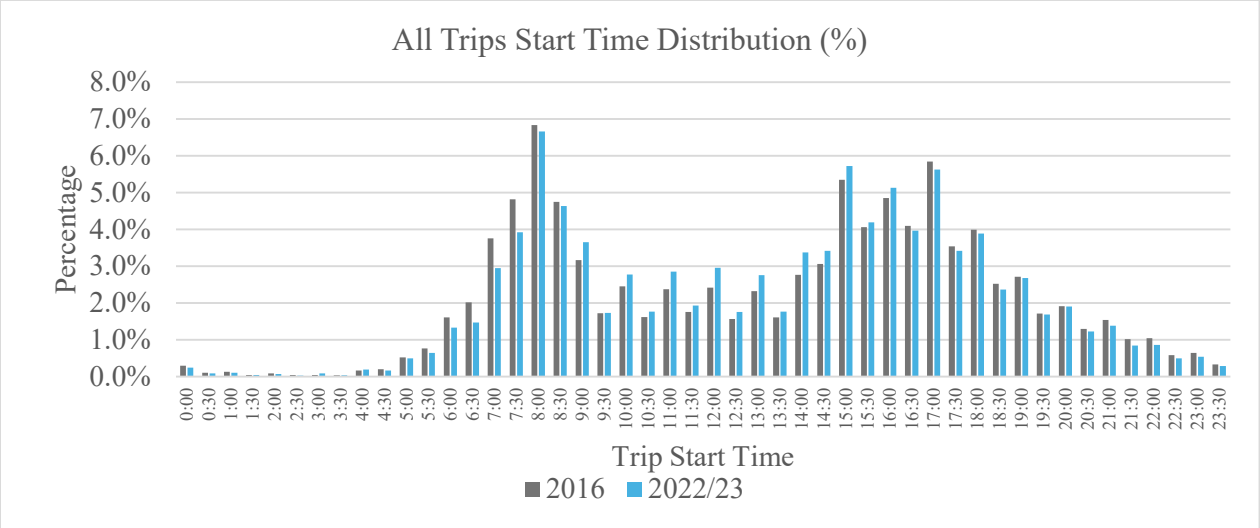
5. Trip Start Time

This section examines the post-pandemic changes in the temporal distribution in one day of trip start times for all trips, commute to/from work trips, commute to/from school trips, market, other, and return home trips.

5.1 Overall Trip Start Time Distribution



(a)



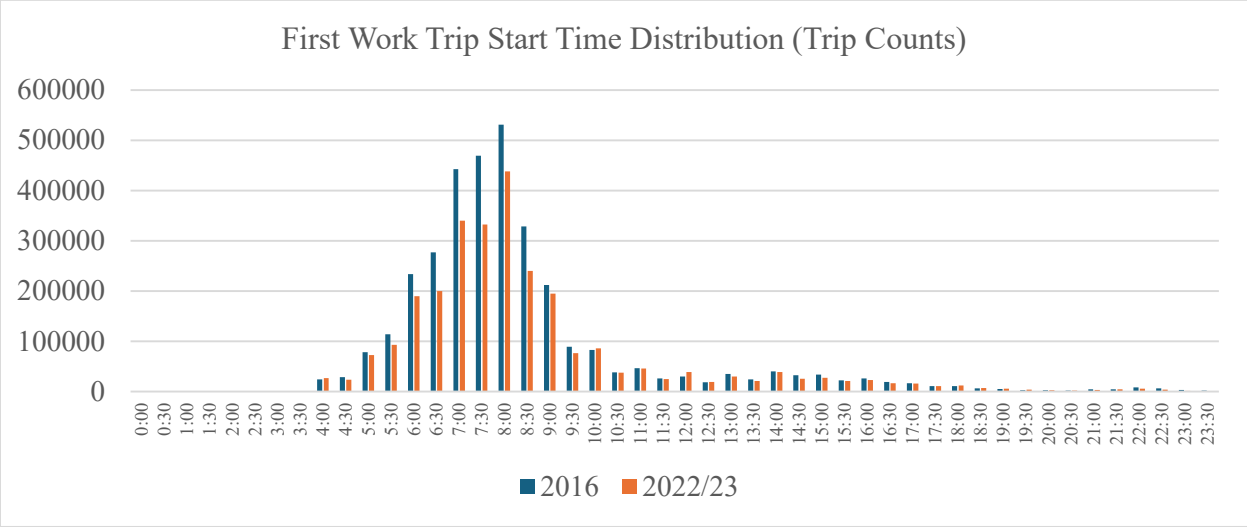
(b)

Figure 5.1 Distribution of Overall Trip Start Time

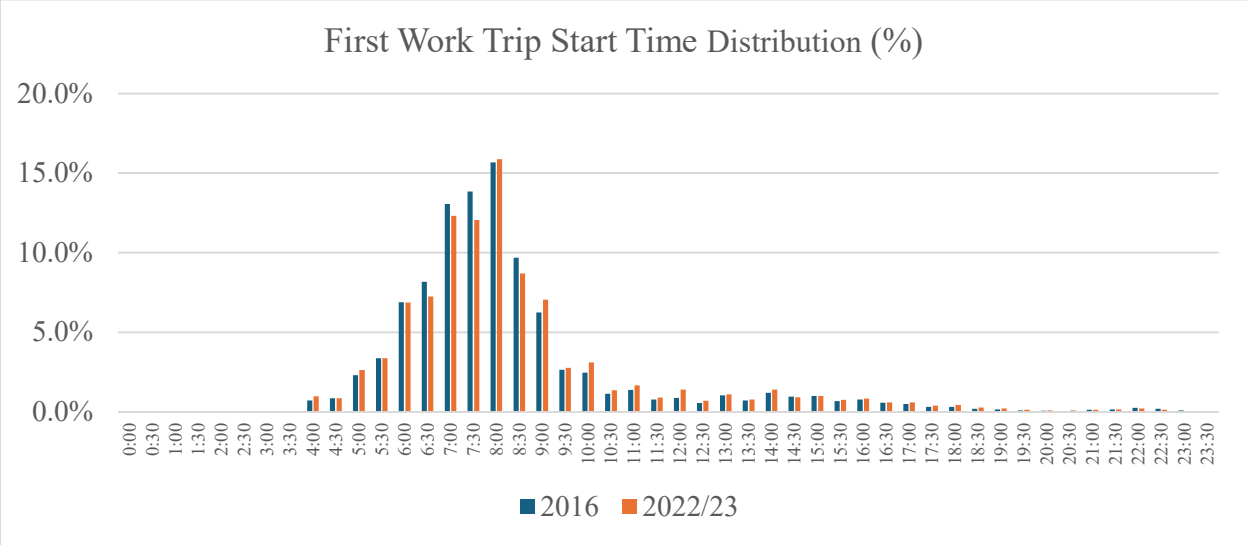
Figure 5.1 (a-b) depicts the counts and shares of the overall trip start time distribution in 2016 and 2022/23 TTS without distinguishing purposes. The overall temporal pattern has remained relatively stable. The results indicate that in both 2016 and 2022/23, the morning peak occurred at approximately 8 a.m., while the afternoon peaks occurred at 3 and 5 p.m. Although the morning and evening peak periods remained stable, both the number of trips and their share before 9:00 a.m. had declined, while off-peak travel between these two peaks had increased. These shifts may reflect adjustments in individuals' daily schedules in response to the post-pandemic, as well as changes in social routines that reduce the need for early travel.

5.2 Commute to Work Trip Start Time Distribution

5.2.1 First Work Trip Start Time



(a)

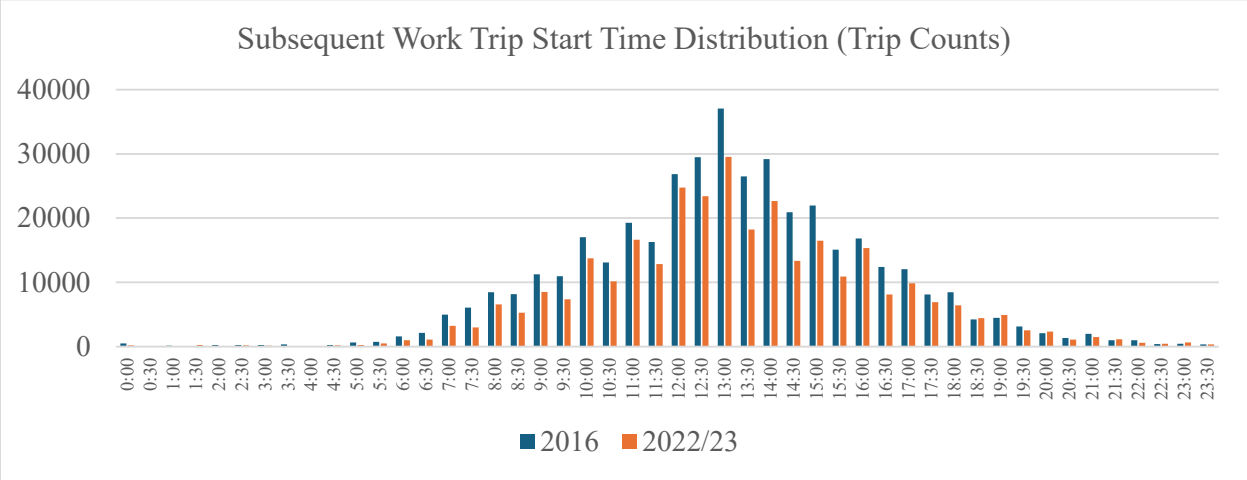


(b)

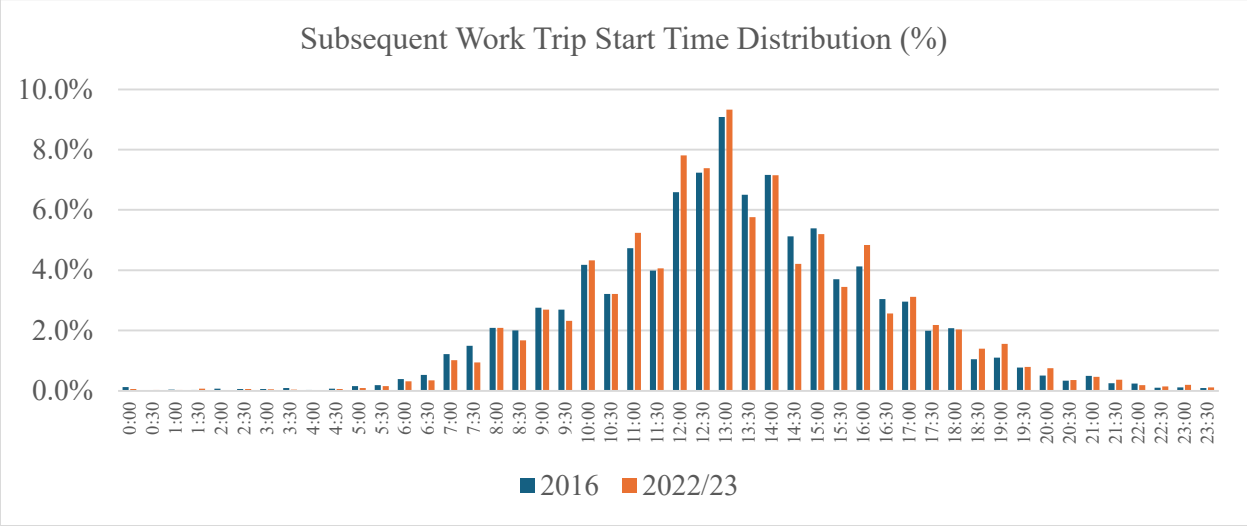
Figure 5.2 Distribution of First Work Trip Start Time

Figure 5.2 (a-b) shows the counts and shares distribution of start times for first work trips. The peak period of work trips still occurs between 7:00 and 9:00 a.m., but there was a slight delay with a notable decrease in trip counts and shares before 8 a.m. While an overall reduction in work trips throughout the day, the temporal distribution had become more uniform. The increasing prevalence of flexible work hours and telecommuting may have led employees to stagger their start times, reducing the intensity of the peak while contributing to a more balanced distribution of travel demand.

5.2.2 Subsequent Work Trip Start Time



(a)



(b)

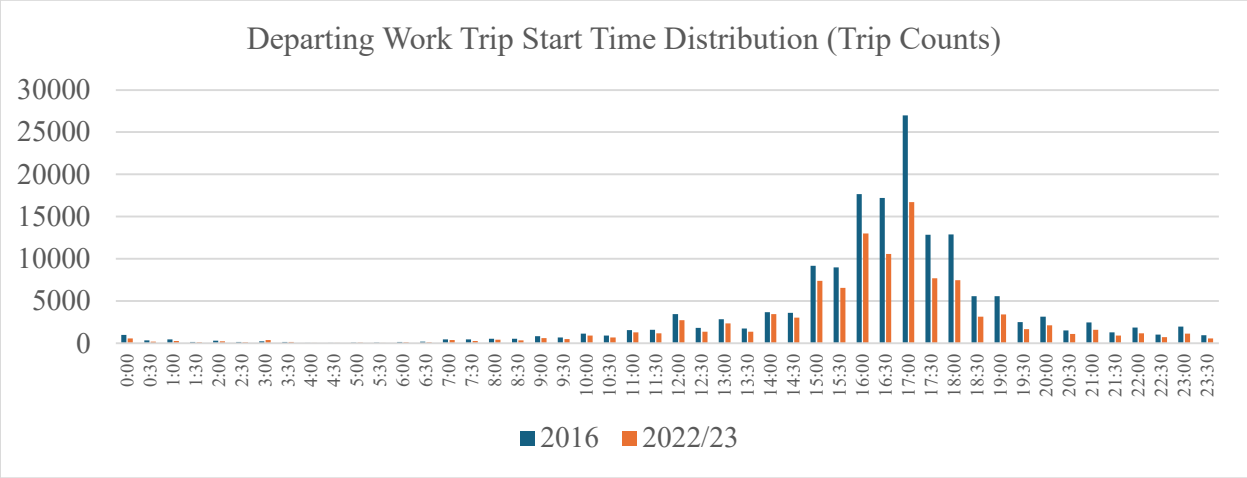
Figure 5.3 Distribution of Second/Subsequent Work Trip Start Time

Figure 5.3 (a-b) depicts the counts and shares distribution of start times for subsequent work trips. Subsequent work trips tend to be more randomly distributed throughout the midday and afternoon periods, peaking at 1 p.m. in 2016 and 2022/23 TTS. In 2022/23, fewer subsequent work trips started in the morning before 9:30 am; however, slightly more such trips occurred at noon. Subsequent work trips in the afternoon also show a shift towards the later hours of 4 p.m. and after.

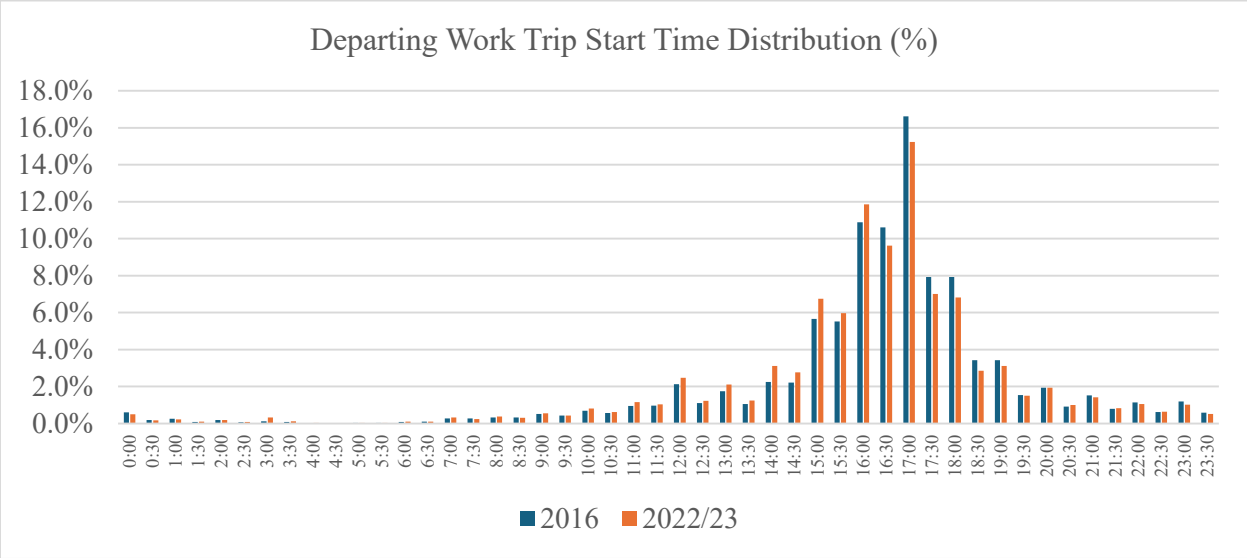
5.3 Commute from Work Trip Start Time Distribution

Figure 5.4 (a-b) shows the counts and shares distribution of trips originating from workplaces. The peak commuting from work trips remains between 4-6 p.m.; however, trip counts have

decreased mostly at all times—most markedly during the peak—while the share distribution across different periods has also become more evenly spread.



(a)



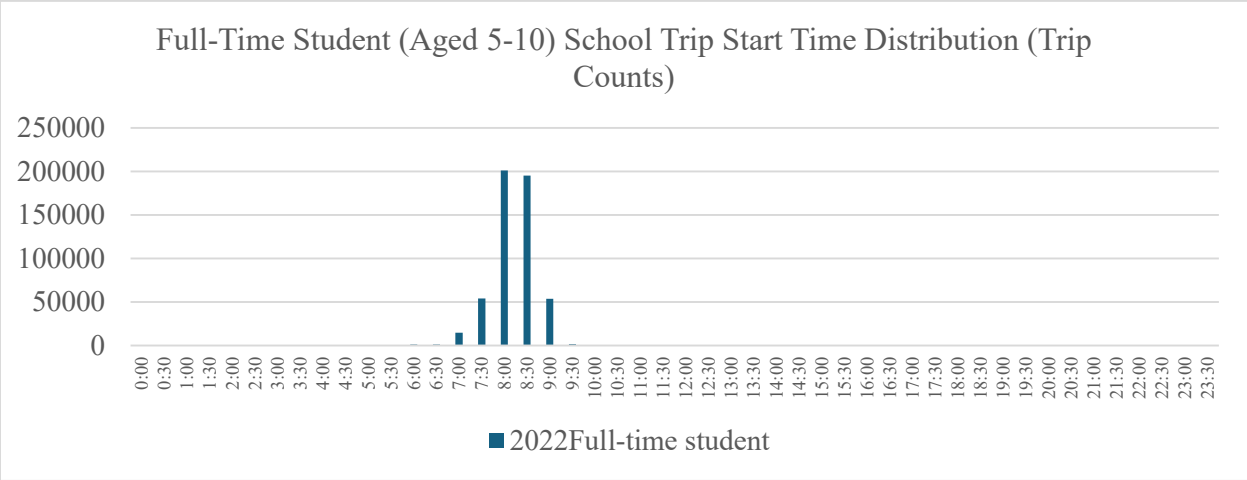
(b)

Figure 5.4 Distribution of Departing Work Trip Start Time

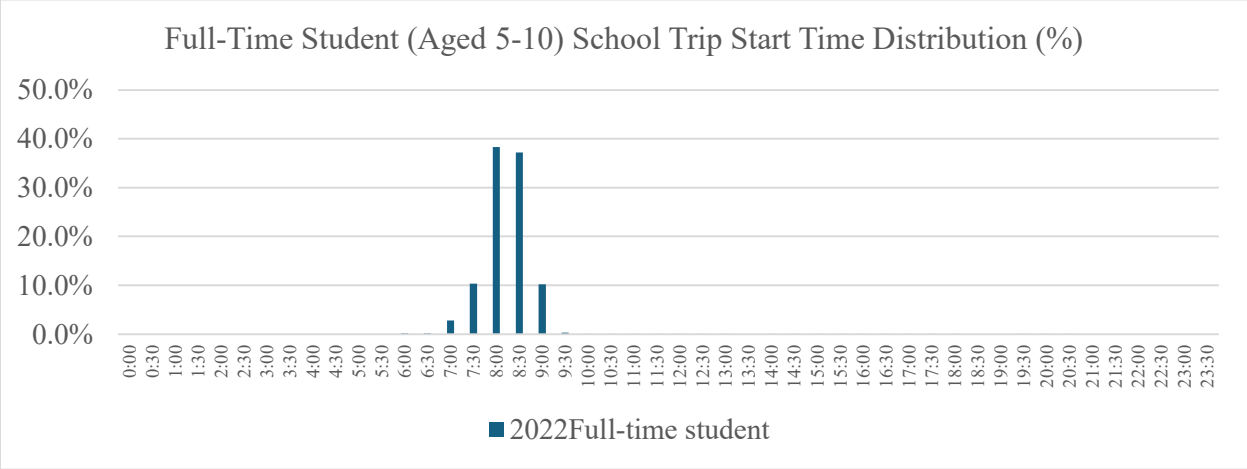
5.4 Commute to School Trip Start Time

This section provides the counts and shares distribution of the first/subsequent school trip start time for full-time students by different age groups and for part-time students of all ages.

5.4.1 First School Trip Start Time



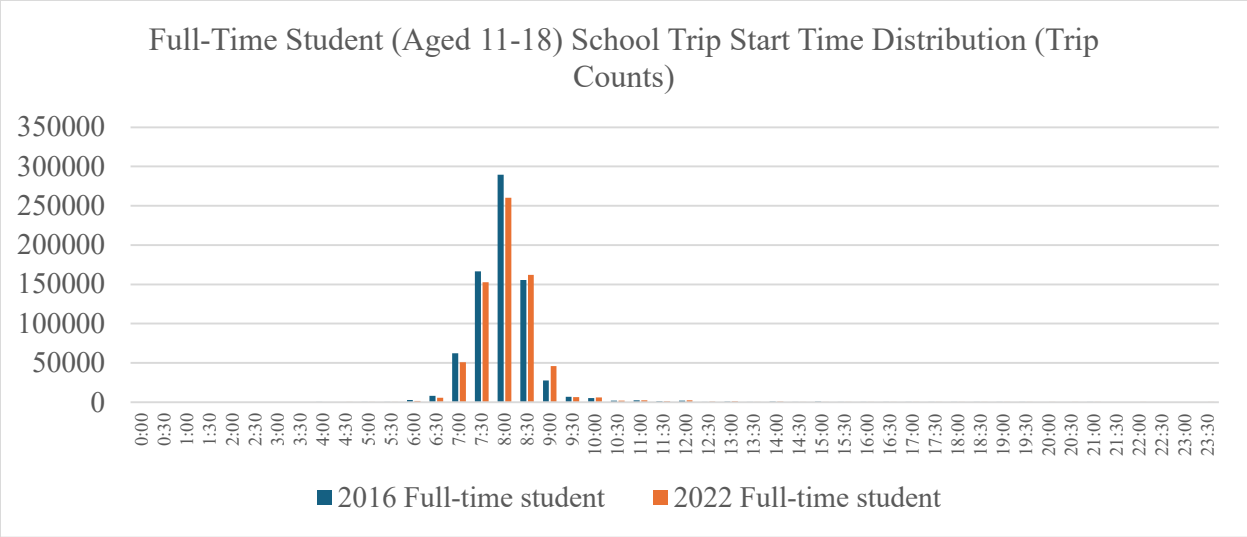
(a)



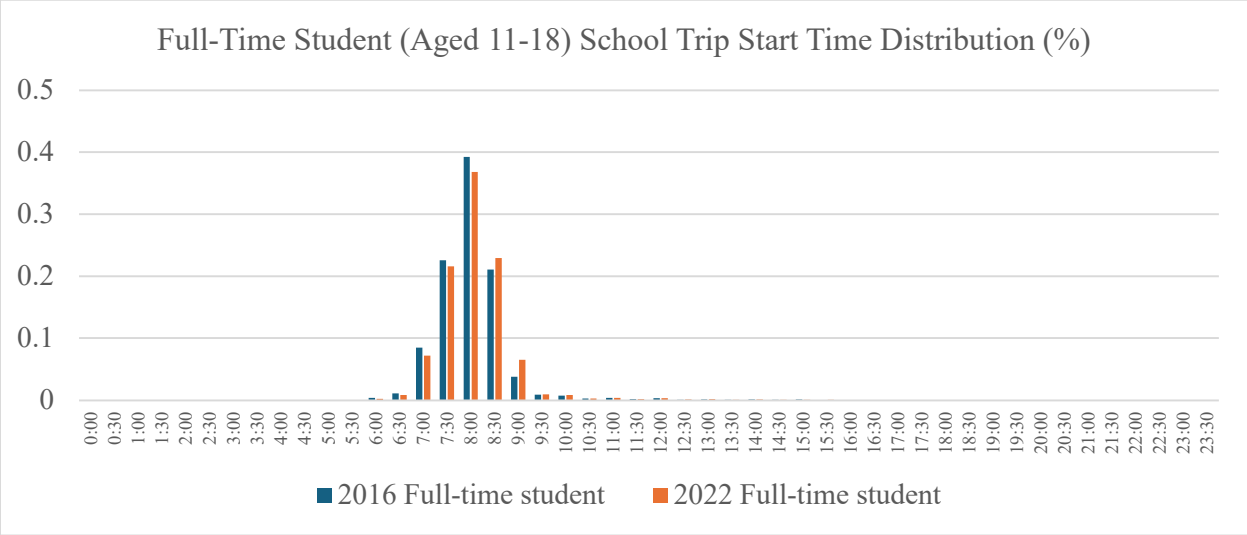
(b)

Figure 5.5 Distribution of School Trip Start Time for Full-Time Students (Aged 5-10)

The minimum age of the trip-making population captured in 2022/23 TTS is 5 years old. Figure 5.5 (a-b) displays the start time distribution for the first school trips for full-time students aged 5-10 in 2022/23 TTS. The peak of first school trips for young kids occurs at 8:00-8:30 a.m., with a peak period between 7:00-9:00 a.m.



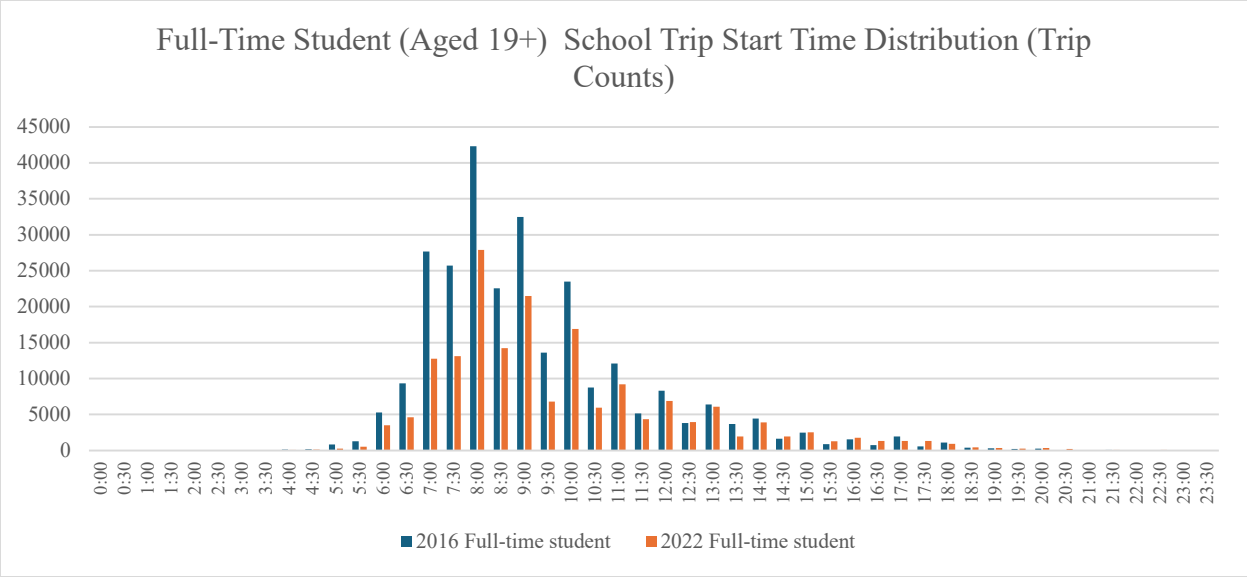
(a)



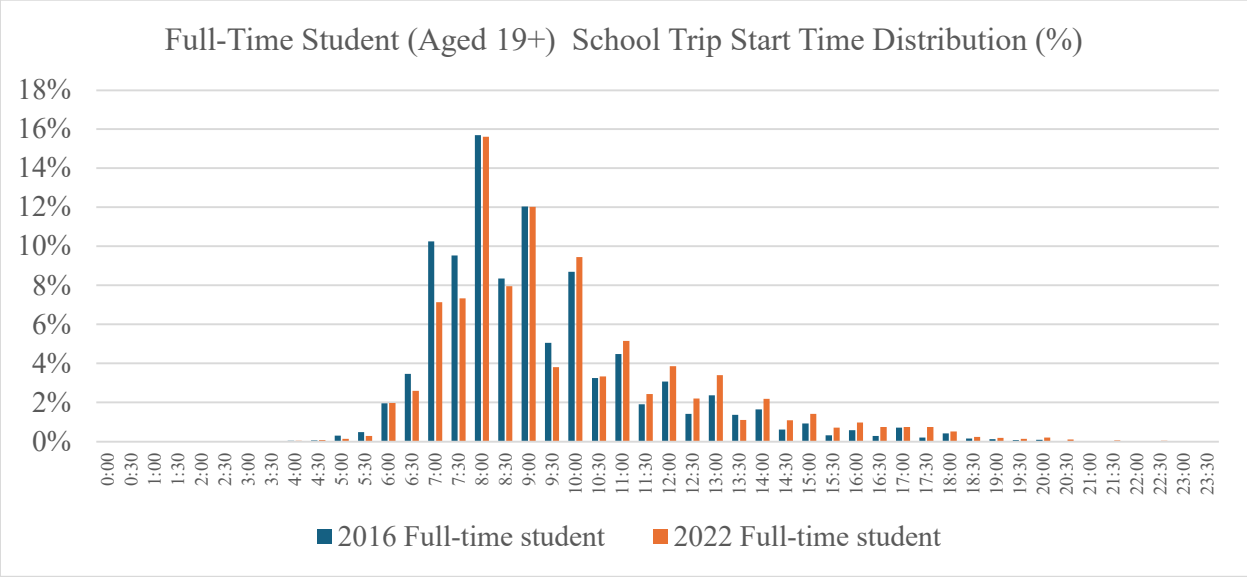
(b)

Figure 5.6 Distribution of School Trip Start Time for Full-Time Students (Aged 11-18)

Figure 5.5 (a-b) shows the start time distribution for the first school trips for full-time students aged 11-18. The youth full-time students aged 11-18 show a peak period between 7:30 a.m. and 8:30 a.m., with a peak at 8 a.m. for both years of TTS. The number of trips and shares later than 8:30 a.m. increased slightly, while the number of trips and shares between 6:30 and 8:30 a.m. dropped slightly in the 2022/23 TTS.



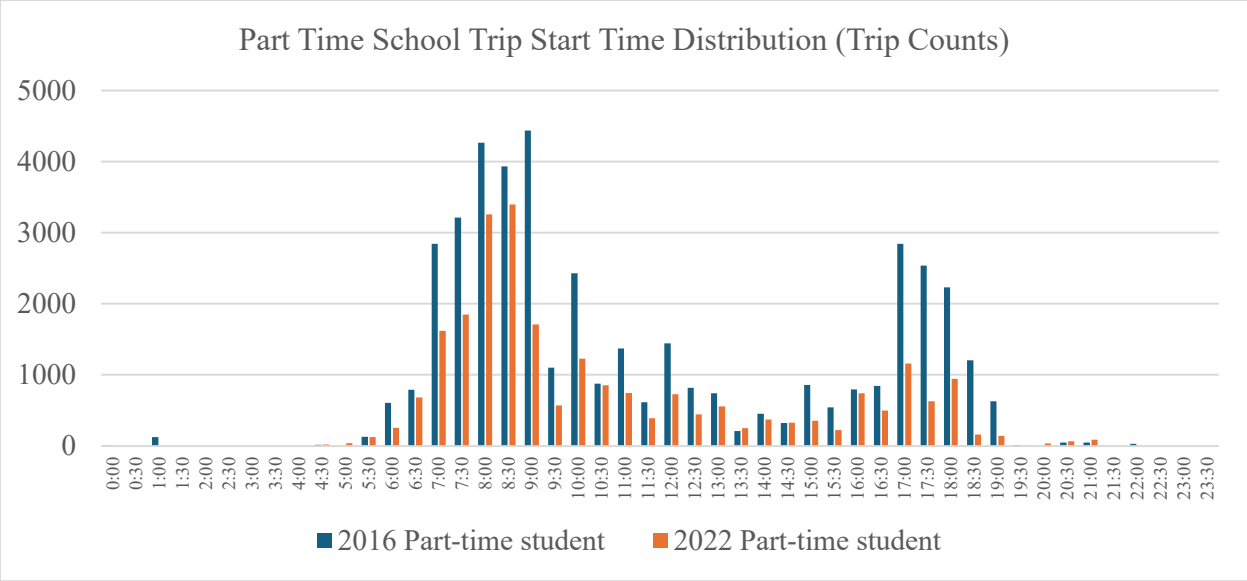
(a)



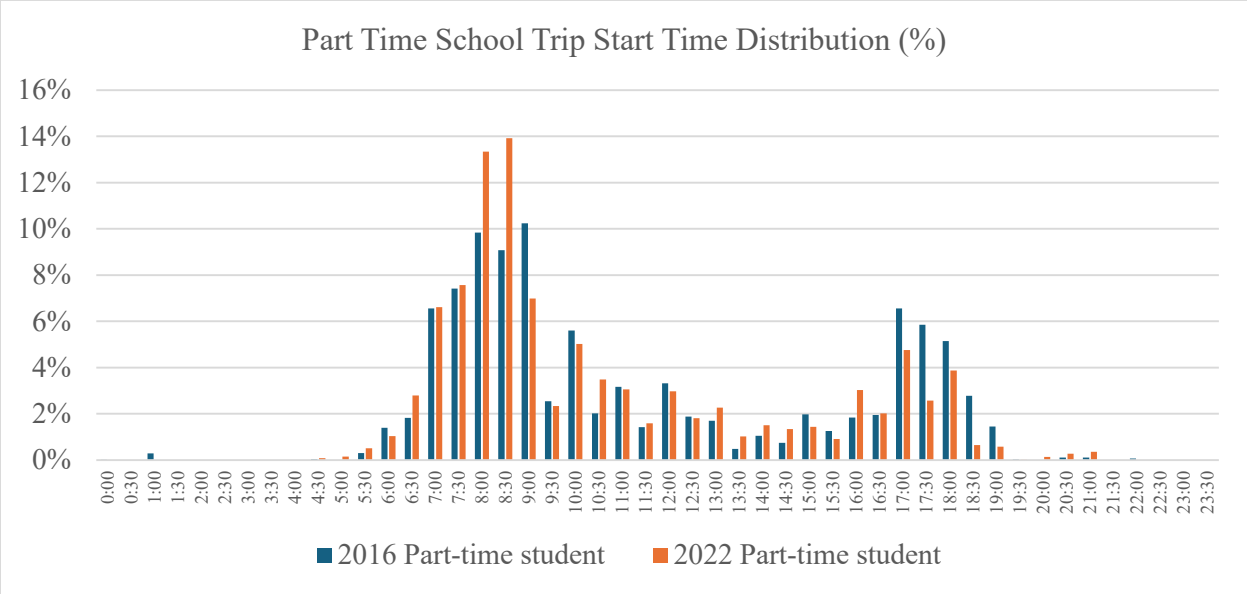
(b)

Figure 5.7 Distribution of School Trip Start Time for Full-Time Students (Aged 19+)

The first school trips for full-time students aged 19 and over in the 2022/23 TTS are skewed to the right compared to the 2016 TTS, as shown in Figure 5.7 (a-b). The peak periods remain between 7:30 and 9:00 a.m., peaking at 8:00 a.m. However, fewer trips and shares are observed before 8:00 a.m., with more trips occurring during the midday and afternoon periods. The trip counts in 2022/23 shown in Figure 5.7(a) also declined substantially compared to 2016, particularly during the morning peak period. This indicates a reduction in peak-time school travel demand among students aged 19+ and a shift in off-peak travel demand.



(a)

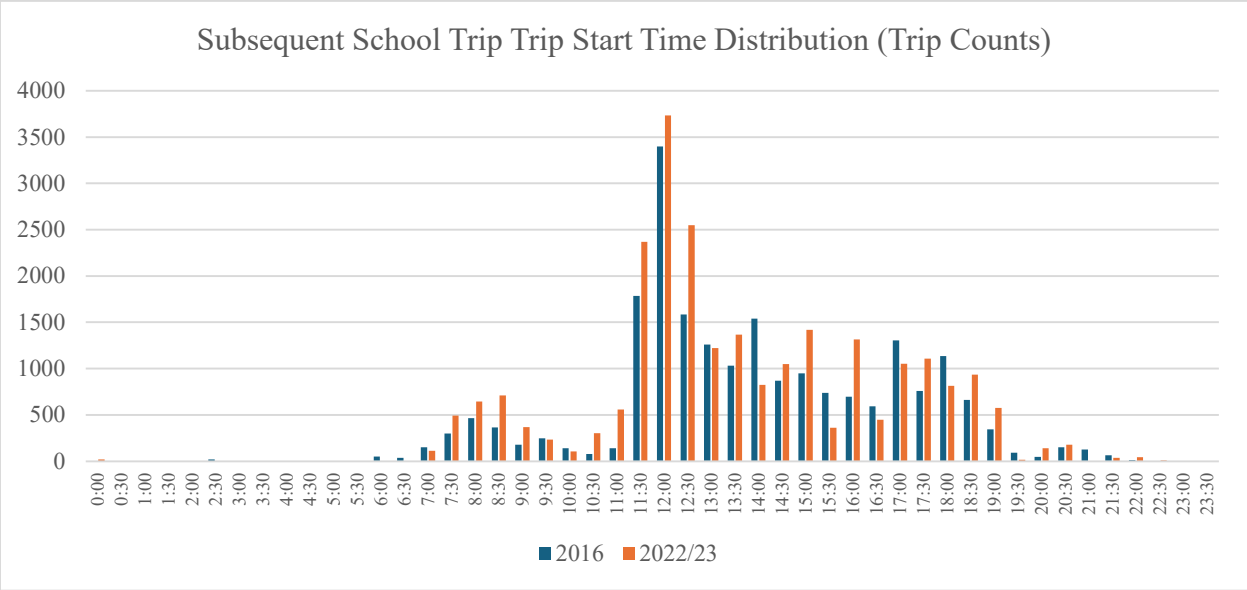


(b)

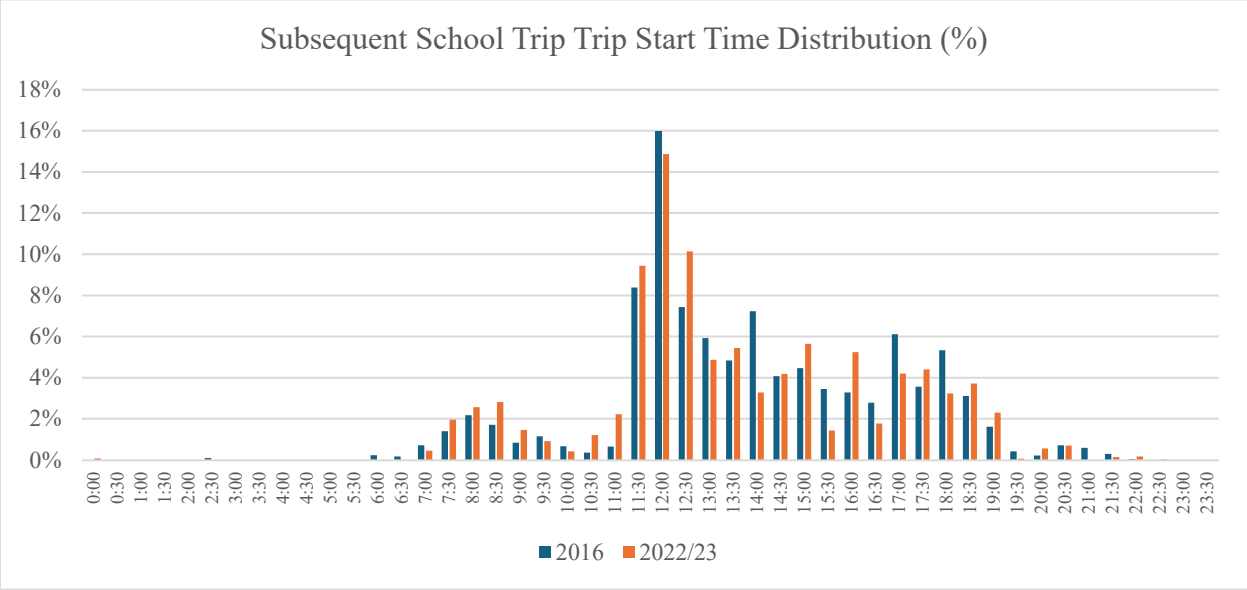
Figure 5.8 Distribution of School Trip Start Time for Part-Time Students (All Ages)

The start time distribution of the first school trips for part-time students was shown in Figure 5.8 (a-b). The distribution shows two peaks: a higher one between 08:00 and 09:00 and a lower one between 17:00 and 18:00. School trip demand dropped in almost all periods, especially the morning and afternoon peaks. Compared to 2016, the share of the morning peak increased while the share of the afternoon peak declined in the 2022/23 TTS. Also, a slightly higher proportion of trips start at midday in 2022/23 TTS. The findings show a decline in demand for part-time schooling, as well as a switch in the start time of part-time school trips to morning peak after 8:00-8:30 a.m. and midday post-pandemic.

5.4.2 Second/Subsequent School Trip Start Time



(a)

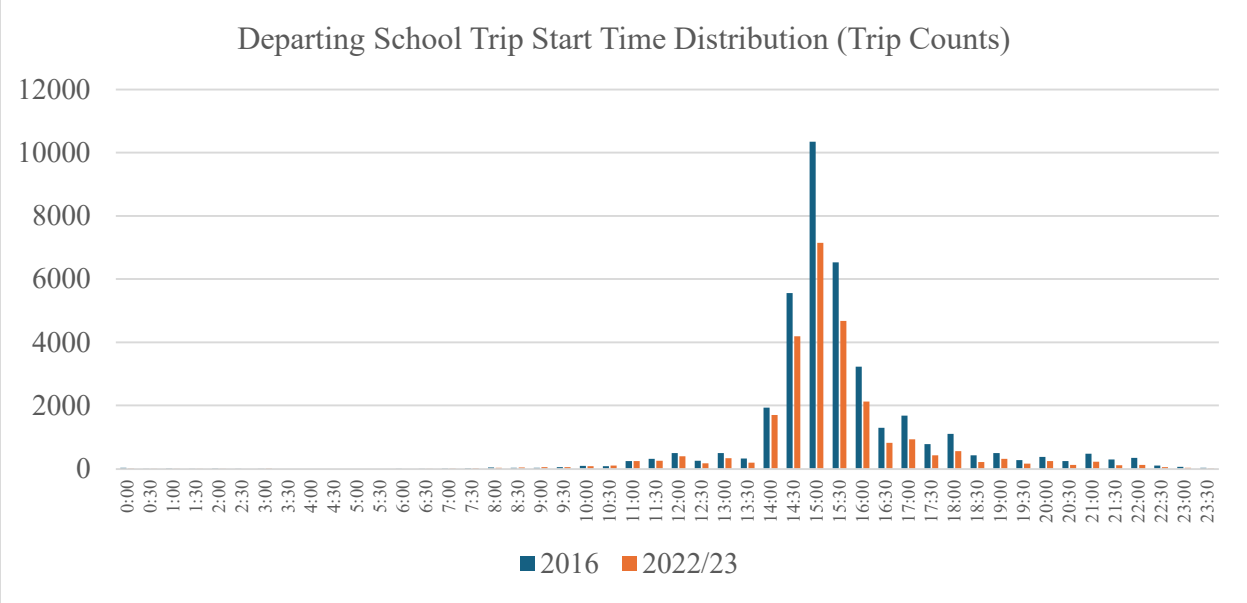


(b)

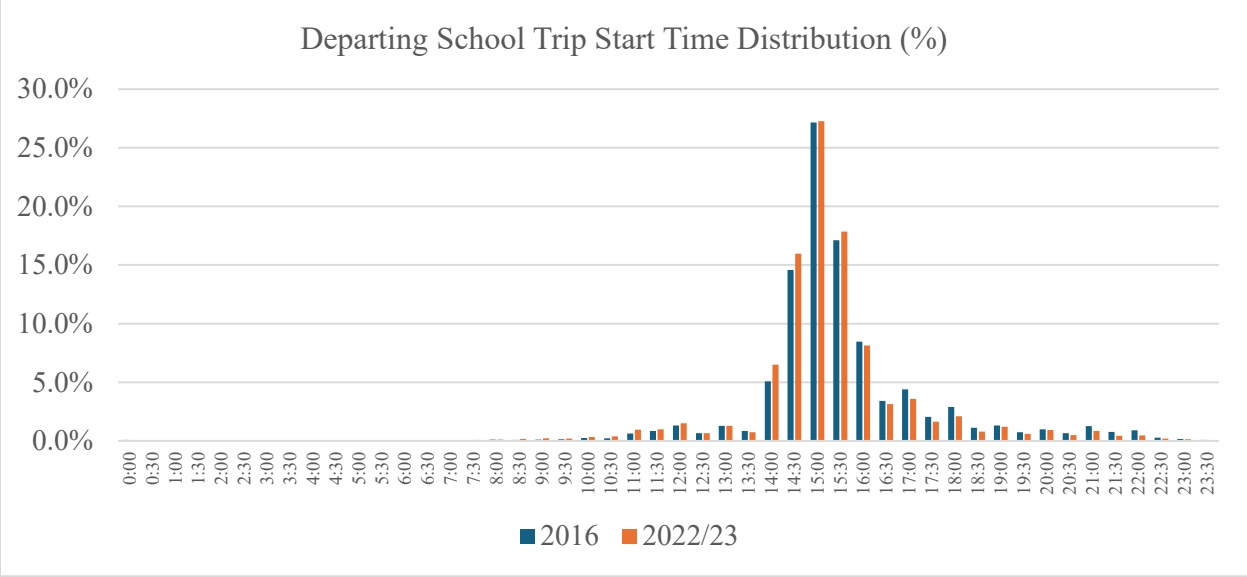
Figure 5.9 Distribution of Subsequent School Trip Start Time for Students (11+)

Figure 5.9 (a-b) illustrates the distribution of start times for subsequent school trips for all students aged 11 and over. As there are few subsequent trips, the analysis does not distinguish between age groups or full-time and part-time students. Subsequent school trips peak at noon (12:00). The number of trips and shares at noon and in the afternoon peak in TTS 2022/23 is lower than in TTS 2016, while the number of off-peak trips is generally higher. The subsequent school demand is slightly higher in 2022/23 than in 2016, probably because there are more students in the TTS in 2022/23 than in 2016.

5.5 Commute from School Trip Start Time



(a)

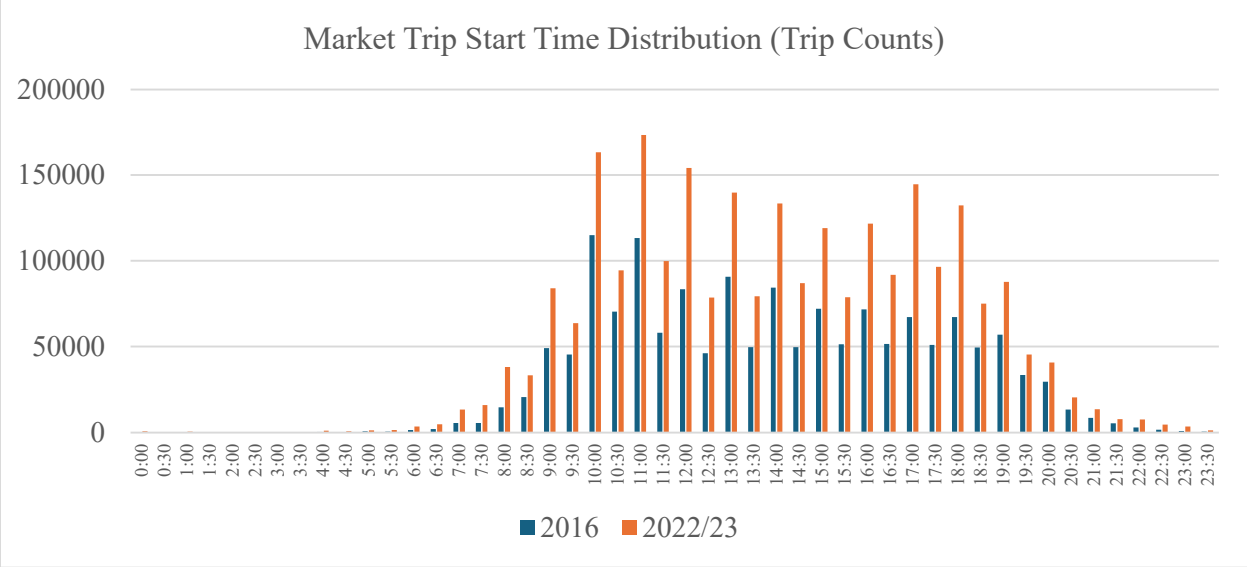


(b)

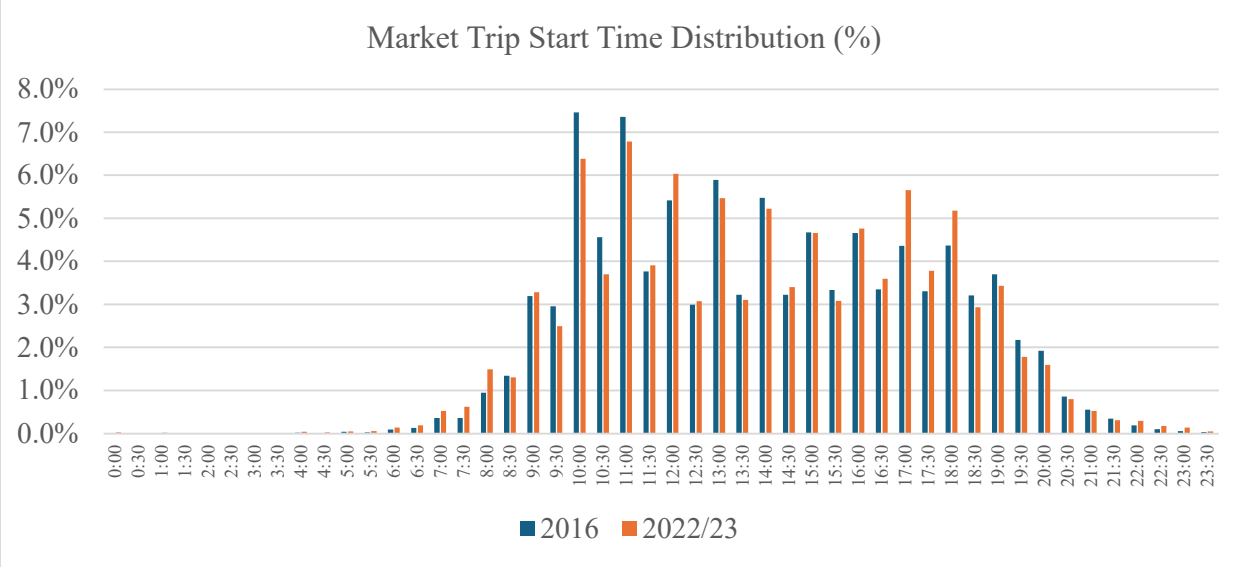
Figure 5.10 Distribution of Departing School Trip Start Time

Figure 5.10 (a-b) presents trips originating from schools. The distribution reveals a stable peak between 14:30 and 16:00 p.m., which is earlier than the evening peak observed for work trips. The number of trips starting from schools during peak periods had declined. Unlike commute to/from work trip start times, which tended to be more evenly distributed throughout the day, the share of commute to/from school trips in the core morning and evening peaks has instead increased. These patterns may be explained by schools adjusting their class times and teaching modes after the pandemic.

5.6 Market Trip Start Time



(a)

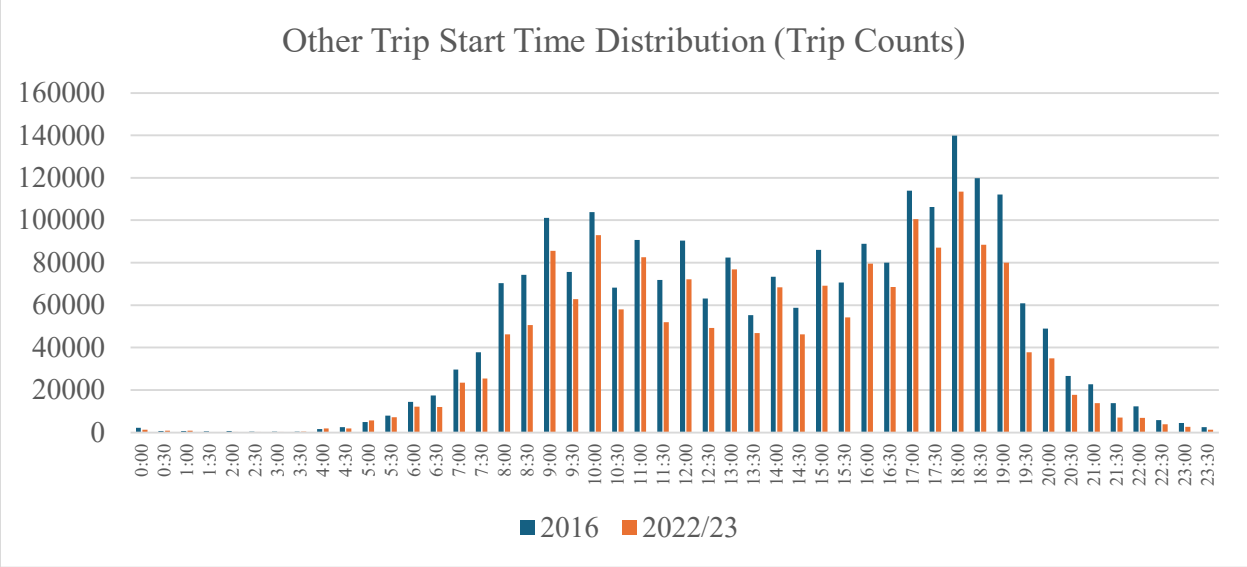


(b)

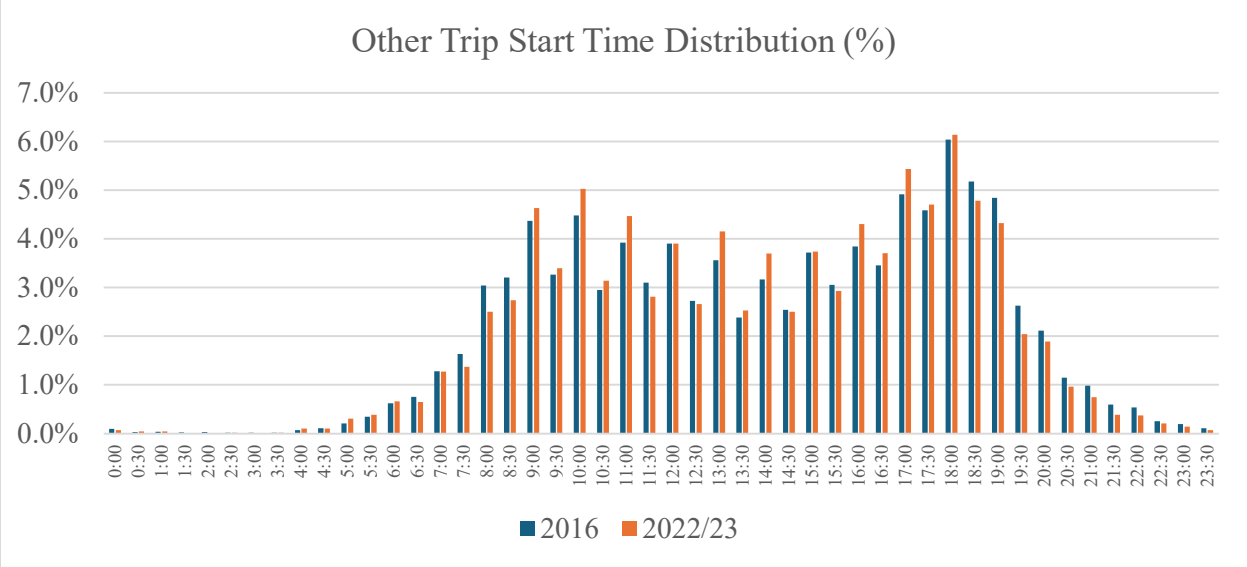
Figure 5.11 Distribution of Market Trip Start Time

The trip start time distribution of market trips is shown in Figure 5.11 (a-b). Market trips increased substantially in 2022/23 TTS in all periods in Figure 5.11 (a). The highest concentrations of market trips occur around 10:00 and 11:00 a.m., with a smaller peak occurring between 5:00 and 6:00 p.m.. The 2016 TTS shows a slightly higher percentage of trips in the early morning (9:30 to 11:00 a.m.), while the 2022/23 TTS shows a more balanced distribution across the morning hours, but a higher percentage of trips occur in the post-peak period between 5:00 and 6:00 p.m.

5.7 Other Trip Start Time



(a)

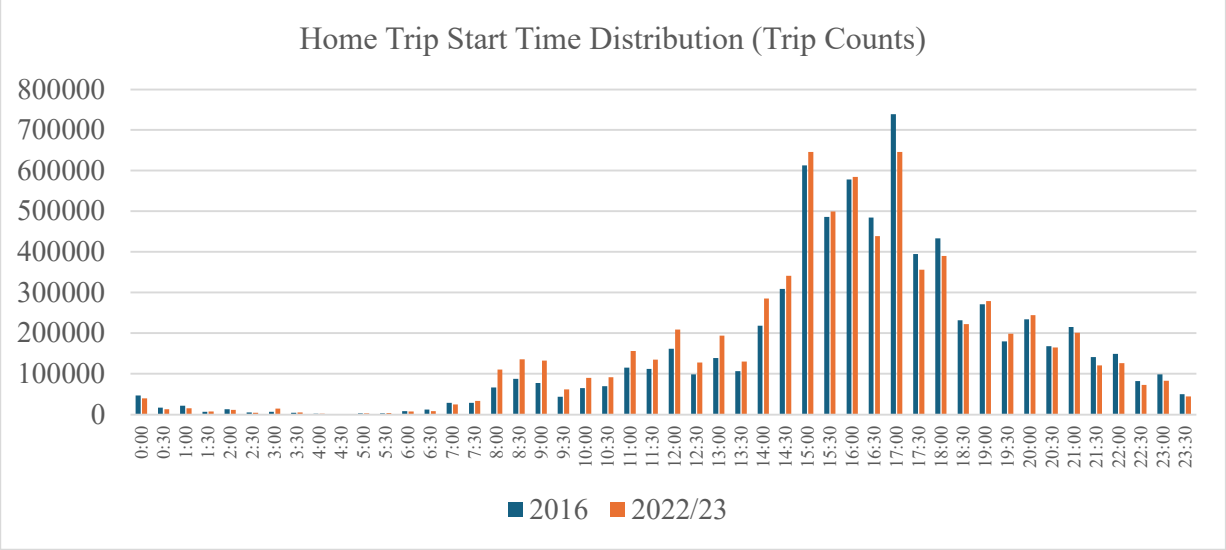


(b)

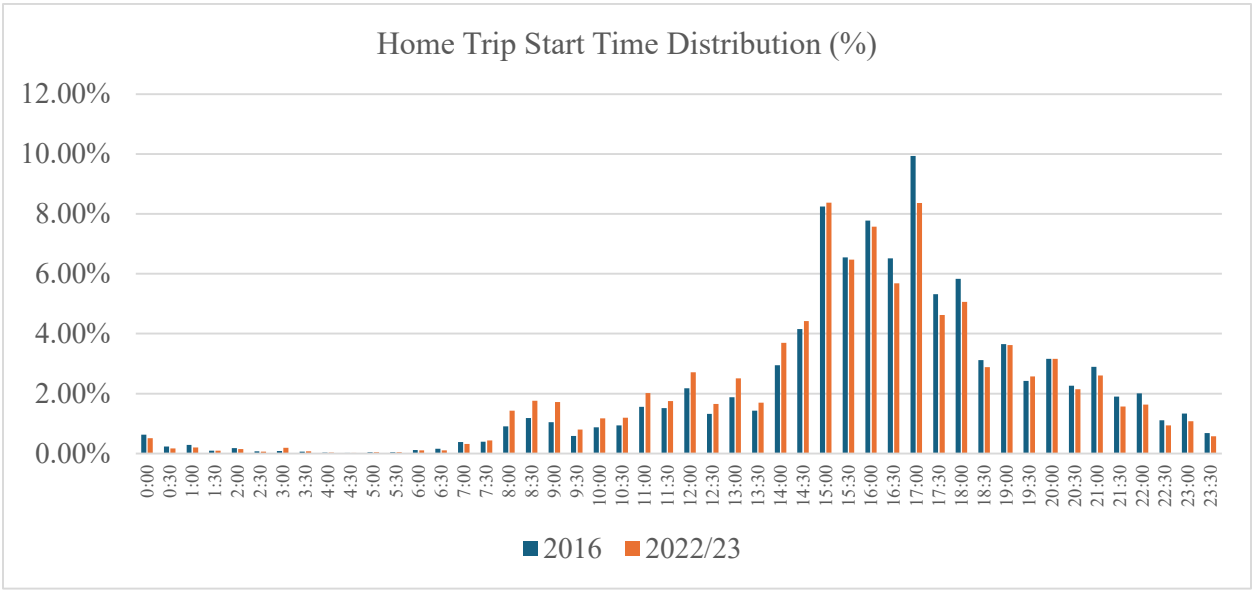
Figure 5.12 Distribution of Other Trip Start Time

Figure 5.12 (a-b) shows the distribution of start times for other purpose trips. There is a modest decrease in the travel demand for ‘Other’ purpose in 2022/23 TTS. Different from ‘Market’ trips, the highest concentrations of other trips occur around 5:00 and 7:00 p.m., with a second peak occurring between 9:00 and 11:00 a.m.. In 2022/23, a higher proportion of 'Other' trips occurred between 9:00 a.m. and 6:00 p.m. than in 2016. This is likely due to the increased flexibility of arranging other activities for work-from-home workers.

5.8 Return Home Trip Start Time



(a)



(b)

Figure 5.13 Distribution of Return Home Trip Start Time

Figure 5.13 (a–b) illustrates the distribution of start times for 'return home' trips. Return home trips peak in the afternoon, between 3:00 and 5:00 p.m. The peak at around 3 p.m. shows an increase in both the number of trips and their share, possibly due to more students. The reduced number of trips and share at the 5:00 p.m. peak indicates reduced demand for returning home due to WfH. In 2022/23, more return-home trips occurred before 15:00, while fewer occurred after 16:30.

6. Tour-based (Trip Chain) Analysis

This section examines changes in the characteristics of home-based tours between 2016 and 2022/23, with a focus on tour complexity, tour type, tour intervening activities, tour mode choice, and tour length.

6.1 Home-based Tour

A home-based tour involves a sequence of trips that begin and end at home. Table 6.1 shows the number of tours by individuals. In both years of the TTS survey, the majority of the population undertook only one tour on the survey day: 78.26% in 2022/23 and 77.50% in 2016. In 2022/23, a slightly higher proportion of the population undertook one tour on the survey day (+0.76%), while the percentage making two tours declined by 1.16%. Although the proportion of the population taking three or more tours increased modestly, this was still marginal compared to the entire population (3.28% in 2022/23 and 3.19% in 2016).

Table 6.1 Number of Tours Comparison

Number of tours	2022/23 TTS (Age 11+)				2016TTS				Diff. (2022/23-2016)		Example
	Person Count	Person Expand	Count%	Expand%	Person Count	Person Expand	Count%	Expand%	Count%	Expand%	
0	9274	232953	3.65%	3.64%	9106	201182	3.32%	3.31%	0.33%	0.33%	H-O
1	199125	5007522	78.38%	78.26%	212187	4715540	77.28%	77.50%	1.10%	0.76%	H-W-H
2	37579	949146	14.79%	14.83%	44429	973300	16.18%	16.00%	-1.39%	-1.16%	H-W-H-O-H
3	6466	163575	2.55%	2.56%	7094	154086	2.58%	2.53%	-0.04%	0.02%	H-F-H-W-H-M-H
4	1275	35562	0.50%	0.56%	1364	31053	0.50%	0.51%	0.01%	0.05%	H-F-H-W-H-M-H-F-H
5+	322	10085	0.13%	0.16%	388	9428	0.14%	0.15%	-0.01%	0.00%	
Total	254041	6398843	100%	100%	274568	6084589	100%	100%			

6.1.1 Tour Complexity

In the following analysis, each home-based tour was treated as a separate entity. Therefore, the total number of tours does not equal the population number. Tour complexity has been studied in the literature using two different approaches: one is a categorical classification that distinguishes between simple and complex tours (Ye et al., 2007; Hensher & Reyes, 2000):

- **Simple**: tour/chain with a single stop/activity outside the home location.
- **Complex**: tour/chain with more than one stop/activity outside the home location.

Table 6.2 shows the changes in tour complexity between 2022/23 and 2016 TTS. The proportion of overall simple tours remains almost the same for both 2022 and 2016. There is a noticeable decrease in the proportion of simple work tours by 7.58%, while the proportion of simple market tours increased by 7.20%. Complex work tours also declined by 2.42%, whereas the complex non-work school tours increased by 2.44%. These findings suggest a decrease in work- and

school-related tours, while an increase in non-work/school-related tours, in consistent with the trip purpose analysis.

Table 6.2 Tour Complexity Comparison

Tour Complexity	Tour Type	2022 Count	2016 Count	2022 Count %	2016 Count %	%Diff.(2022-2016)	2022 Expand	2016 Expand	2022 Expand %	2016 Expand %	%Diff.(2022-2016)
Simple Tour	H-W-H	73419	108063	24.43%	32.76%	-8.33%	2043406.51	2517493.66	26.91%	34.50%	-7.58%
	H-S-H	21929	32547	7.30%	9.87%	-2.57%	781812.39	909230.03	10.30%	12.46%	-2.16%
	H-D-H	3768	2706	1.25%	0.82%	0.43%	115221.87	64356.81	1.52%	0.88%	0.64%
	H-F-H	20938	19531	6.97%	5.92%	1.05%	634181.86	460034.93	8.35%	6.30%	2.05%
	H-M-H	57622	33902	19.18%	10.28%	8.90%	1210677.14	638436.74	15.95%	8.75%	7.20%
	H-O-H	53038	56711	17.65%	17.19%	0.46%	1147478.19	1092380.46	15.11%	14.97%	0.15%
	Sub Total	230714	253460	76.78%	76.85%	-0.07%	5932777.96	5681932.63	78.14%	77.85%	0.29%
Complex Tour	W-related	24218	36225	8.06%	10.98%	-2.92%	669113.72	820093.03	8.81%	11.24%	-2.42%
	S-related	2818	3669	0.94%	1.11%	-0.17%	92929.3	103440.35	1.22%	1.42%	-0.19%
	W&S-related	593	980	0.20%	0.30%	-0.10%	21772.17	29349.35	0.29%	0.40%	-0.12%
	NWNS	42148	35488	14.03%	10.76%	3.27%	875663.17	663322.53	11.53%	9.09%	2.44%
	Sub Total	69777	76362	23.22%	23.15%	0.07%	1659478.37	1616205.26	21.86%	22.15%	-0.29%
Grand Total		300491	329822	100%	100%		7592256.32	7298137.89	100%	100%	

Note: W-work S-school D-daycare F-facilitate M-market O-other NWNS-non-work/school

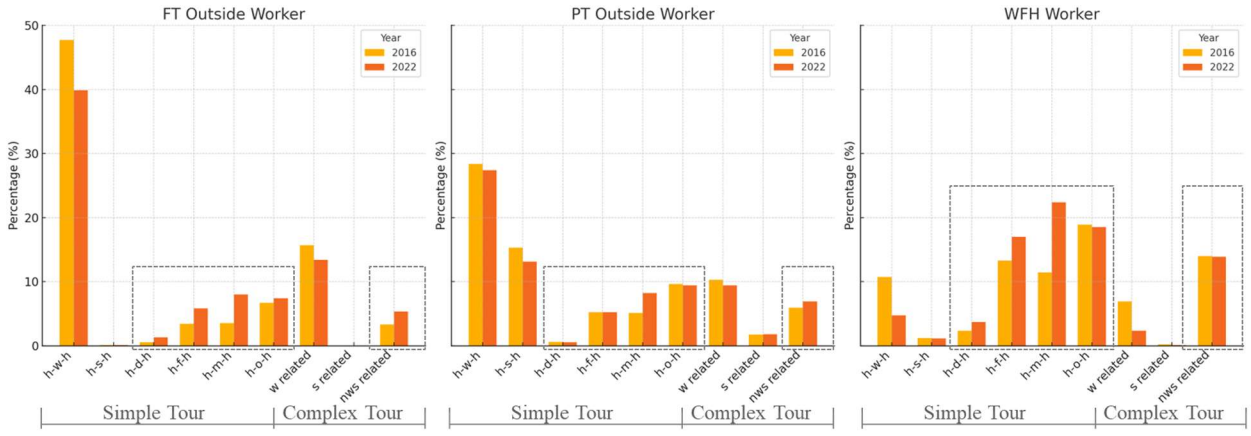


Figure 6.1 Tour Complexity Comparison for Workers of Different Employment Status

Figure 6.1 compares the tour complexity for workers of different employment statuses. In 2022/23, all types of workers undertook fewer work-related tours than in 2016, with WFH workers experiencing a more substantial reduction than full-time and part-time workers. WFH workers made more simple and complex non-work/school-related tours (e.g. daycare, shopping, other purposes) than full-time/part-time workers. This suggests that although WFH workers reduced their work-related travel, their other travel demands could be higher.

Tour complexity can also be measured using the number of activities or trip legs[1] within a tour (Ho & Molley, 2013; Paleti et al., 2011; Maat & Timmermans, 2006). Table 6.3 compares the number of trip legs of tours in 2022/23 and 2016 TTS. The result is consistent with Table 6.2, which shows that the proportion of tours with two or three legs has increased, while the proportion of tours with four or more legs has dropped. Tours are becoming simpler post-pandemic.

Table 6.3 The Number of Trip Legs in Tours

Trip Legs	2022 Count	2016 Count	2022 Count %	2016 Count %	2022 Expand	2016 Expand	2022 Expand %	2016 Expand %	Count % Diff.	Expand % Diff.
2	232664	256349	77.4%	77.7%	5987170	5750145	78.9%	78.8%	-0.3%	0.1%
3	43580	45017	14.5%	13.6%	1045033	954774	13.8%	13.1%	0.9%	0.7%
4	15882	18764	5.3%	5.7%	367766	395565	4.8%	5.4%	-0.4%	-0.6%
5	5100	5544	1.7%	1.7%	117919	114140	1.6%	1.6%	0.0%	0.0%
6	1968	2482	0.7%	0.8%	45160	50024	0.6%	0.7%	-0.1%	-0.1%
7+	1297	1672	0.4%	0.5%	29207	33619	0.4%	0.5%	-0.1%	-0.1%
Total	300491	329828	100%	100%	7592255	7298267	100%	100%		

Note: A reported tour of H-W-H is treated as 2 trip legs in the table.

6.1.2 Work Tour Type

Any tour that includes a work stop is a work-based tour. Based on the definition of Rafiq & McNally (2022), we categorized the work tours into the following five types (Figure 6.2):

- **Simple work tour**: A home-based work tour is called a simple work tour if it contains exactly one work activity and no non-work activity, e.g., H-W-H.
- **Complex to work tour**: A complex work tour contains non-work locations accessed on the way to work, e.g., H-F-W-H.
- **Complex from work tour**: A complex work tour contains non-work locations accessed on the way to home from work, e.g., H-W-M-H.
- **Complex to & from work tour**: A complex work tour contains non-work locations accessed n the way to work & on the way to home from work, e.g., H-O-W-M-H.
- **Complex at work tour**: A complex work tour with work-based sub-tours is a work tour that involves visiting non-work locations during work (e.g., during a lunch break) and returning to the work location.

[1] Individual segments of a tour are referred to as trip legs. A trip leg involves an intervening activity (e.g., education or shopping) but can also involve returning home. Thus, a home-based tour contains at least two trip legs and one intervening activity.

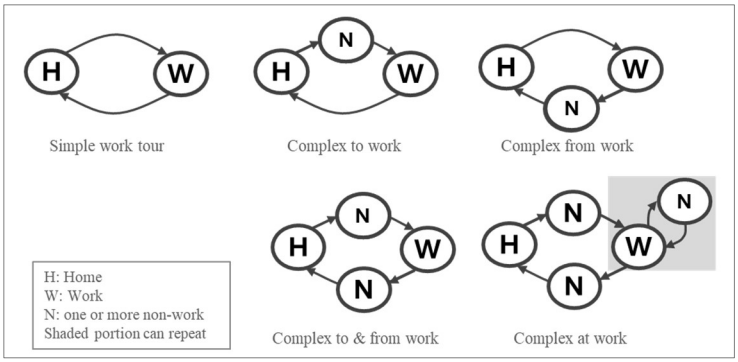


Figure 6.2 Work Tour Type

Table 6.4 displays the work share of different work tour types in 2022/23 and 2016 TTS. Most work tours were simple and remained largely unchanged over the period. However, the proportion of complex from work tours—the second most common type—increased by 0.8% in 2022 compared to 2016. 'Complex to work' tours dropped by 0.6%, and work tours with non-work stops on both legs declined by 0.2%. The proportion of complex work tours remained stable pre- and post-pandemic, while there was a slight increase in work tours involving non-work activities after work.

Table 6.4 Work Tour Type Comparison

Work Tour	Sequence	2022 Count	2016 Count	2022 Count %	2016 Count %	2022 Expand	2016 Expand	2022 Expand %	2016 Expand %	Count % Diff.	Expand % Diff.
Simple work	h-w-h	73419	108063	74.7%	74.4%	2043407	2517494	74.7%	74.8%	0.4%	0.0%
Complex to work	h-nw-(-nw-)-w-h	6363	10063	6.5%	6.9%	187575	237737	6.9%	7.1%	-0.4%	-0.2%
Complex from work	h-w-nw-(-nw-)-h	10925	14957	11.1%	10.3%	295700	337710	10.8%	10.0%	0.8%	0.8%
Complex to & from work	h-nw-(-nw-)-w-nw-(-nw-)-h	3080	5801	3.1%	4.0%	92951	133062	3.4%	4.0%	-0.9%	-0.6%
Complex at work	h-w-nw-w-h	4443	6384	4.5%	4.4%	114660	140934	4.2%	4.2%	0.1%	0.0%
Total		98230	145268	100%	100%	2734293	3366937	100%	100%		

6.1.3 Work Tour Intervening Activities

Table 6.5 displays the frequencies and proportions of various intervening activities for work tours. As a work tour may involve multiple activities other than work, the sum of the proportions is not 100%. Market activity is most frequently chained with work trips, followed by ‘Facilitate’ and ‘Other’ activities. From 2016 to 2022, the percentage of work tours chained with market activity increased by 16%, while the percentage chained with other activities decreased by 13%. This aligns with the observation of more trips for ‘Market’ purpose and fewer trips for ‘Other’ purpose.

Table 6.5 Work Tour Intervening Activity

Intervening Activity	2022 Count	2016 Count	2022 Count%	2016 Count%	%Diff.(2022-2016)	2022 Expand	2016 Expand	2022 Expand%	2016 Expand%	%Diff.(2022-2016)
Market	9717	8222	39%	22%	17%	253884	182184	37%	21%	16%
Other	5104	12141	21%	33%	-12%	131641	270144	19%	32%	-13%
Facilitate	5690	9805	23%	26%	-3%	180900	230677	26%	27%	-1%
School	593	980	2%	3%	-1%	21772	29349	3%	3%	0%
Daycare	1747	3630	7%	10%	-3%	57542	81258	8%	10%	-2%

Table 6.6 Work Tour with Market Activity

Work Tour	Sequence	2022 Count	2016 Count	2022 Count %	2016 Count %	2022 Expand	2016 Expand	2022 Expand %	2016 Expand %	Count % Diff.	Expand % Diff.
Simple work	**h-w-h**	**73419**	**108063**	**75%**	**74%**	**2043407**	**2517494**	**75%**	**75%**	**0.40%**	**-0.04%**
Complex to work	**h-nw-(-nw-)-w-h**	**6363**	**10063**	**6%**	**7%**	**187575**	**237737**	**7%**	**7%**	**-0.40%**	**-0.20%**
	Market Y	994	663	16%	7%	26644	15005	14%	6%	9.00%	7.90%
	N	5369	9400	84%	93%	160931	222733	86%	94%	-9.00%	-7.90%
Complex from work	**h-w-nw-(-nw-)-h**	**10925**	**14957**	**11%**	**10%**	**295700**	**337710**	**11%**	**10%**	**0.80%**	**0.80%**
	Market Y	6641	5779	61%	39%	172712	128270	6%	4%	22.10%	20.43%
	N	4284	9178	39%	61%	122987	209440	4%	6%	-22.10%	-20.43%
Complex to & from work	**h-nw-(-nw-)-w-nw-(-nw-)-h**	**3080**	**5801**	**3%**	**4%**	**92951**	**133062**	**3%**	**4%**	**-0.90%**	**-0.60%**
	Market Y	1097	1117	36%	19%	30367	25170	33%	19%	16.40%	13.80%
	N	1983	4684	64%	81%	62584	107891	67%	81%	-16.40%	-13.80%
Complex at work	**h-w-nw-w-h**	**4443**	**6384**	**5%**	**4%**	**114660**	**140934**	**4%**	**4%**	**0.10%**	**0.01%**
	Market Y	985	663	22%	10%	24160	13740	21%	10%	11.80%	11.30%
	N	3458	5721	78%	90%	90499	127194	79%	90%	-11.80%	-11.30%
Total		98230	145268	100%	100%	2734291	3366937	100%	100%		

Table 6.7 Work Tour with Other Activity

Work Tour	Sequence	2022 Count	2016 Count	2022 Count %	2016 Count %	2022 Expand	2016 Expand	2022 Expand %	2016 Expand %	Count % Diff.	Expand % Diff.
Simple work	**h-w-h**	**73419**	**108063**	**75%**	**74%**	**2043407**	**2517494**	**75%**	**75%**	**0.4%**	**-0.04%**
Complex to work	**h-nw-(-nw-)-w-h**	**6363**	**10063**	**6%**	**7%**	**187575**	**237737**	**7%**	**7%**	**-0.4%**	**-0.2%**
	Other Y	799	1818	13%	18%	18984	41023	10%	17%	-5.5%	-7.1%
	N	5564	8245	87%	82%	168591	196715	90%	83%	5.5%	7.1%
Complex from work	**h-w-nw-(-nw-)-h**	**10925**	**14957**	**11%**	**10%**	**295700**	**337710**	**11%**	**10%**	**0.8%**	**0.8%**
	Other Y	3435	7473	31%	50%	90386	166696	31%	49%	-18.5%	-18.8%
	N	7490	7484	69%	50%	205314	171013	69%	51%	18.5%	18.8%
Complex to & from work	**h-nw-(-nw-)-w-nw-(-nw-)-h**	**3080**	**5801**	**3%**	**4%**	**92951**	**133062**	**3%**	**4%**	**-0.9%**	**-0.6%**
	Other Y	603	1721	20%	30%	16210	38477	17%	29%	-10.1%	-11.5%
	N	2477	4080	80%	70%	76741	94585	83%	71%	10.1%	11.5%
Complex at work	**h-w-nw-w-h**	**4443**	**6384**	**5%**	**4%**	**114660**	**140934**	**4%**	**4%**	**0.1%**	**0.01%**
	Other Y	267	1129	6%	18%	6060	23948	5%	17%	-11.7%	-11.7%
	N	4176	5255	94%	82%	108599	116986	95%	83%	11.7%	11.7%
Total		98230	145268	100%	100%	2734292	3366937	100%	100%		

Table 6.8 Work Tour with Facilitate Activity

Work Tour	Sequence	2022 Count	2016 Count	2022 Count %	2016 Count %	2022 Expand	2016 Expand	2022 Expand %	2016 Expand %	Count % Diff.	Expand % Diff.
Simple work	**h-w-h**	**73419**	**108063**	**75%**	**74%**	**2043407**	**2517494**	**75%**	**75%**	**0.4%**	**-0.04%**
Complex to work	**h-nw-(-nw-)-w-h**	**6363**	**10063**	**6%**	**7%**	**187575**	**237737**	**7%**	**7%**	**-0.4%**	**-0.2%**
	Facilitate Y	2268	3806	36%	38%	73856	90928	39%	38%	-2.2%	1.1%
	N	4095	6257	64%	62%	113719	146809	61%	62%	2.2%	-1.1%
Complex from work	**h-w-nw-(-nw-)-h**	**10925**	**14957**	**11%**	**10%**	**295700**	**337710**	**11%**	**10%**	**0.8%**	**0.8%**
	Facilitate Y	1612	2429	15%	16%	50476	57229	17%	17%	-1.5%	0.1%
	N	9313	12528	85%	84%	245224	280481	83%	83%	1.5%	-0.1%
Complex to & from work	**h-nw-(-nw-)-w-nw-(-nw-)-h**	**3080**	**5801**	**3%**	**4%**	**92951**	**133062**	**3%**	**4%**	**-0.9%**	**-0.6%**
	Facilitate Y	1774	3481	58%	60%	55546	80343	60%	60%	-2.4%	-0.6%
	N	1306	2320	42%	40%	37405	52718	40%	40%	2.4%	0.6%
Complex at work	**h-w-nw-w-h**	**4443**	**6384**	**5%**	**4%**	**114660**	**140934**	**4%**	**4%**	**0.1%**	**0.01%**
	Facilitate Y	36	89	1%	1%	1021	2176	1%	2%	-0.6%	-0.7%
	N	4407	6295	99%	99%	113638	138758	99%	98%	0.6%	0.7%
Total		98230	145268	100%	100%	2734292	3366936	100%	100%		

Table 6.6-6.8 further compares the chained activities (market, other, and facilitate activities) for different work tour types. A larger share of the market activity is chained on the way from work than at work or to work. Also, there is a more substantial decline in the share of other activity chained on the way from work than at work or to work. For facilitate activity, an increase in facilitate activity chained with both on the way 'to work' or 'from work' is observed.

6.2 Tour Mode Choice

There are various ways to determine the main modes of a tour. For example, based on the longest trips, the modes with the longest travel time, or a self-defined ranking. In our analysis, the mode with the longest trip distance (measured in metres using the Manhattan trip distance) was designated as the primary mode for the tour.

Table 6.9-6.1 show the proportion of primary modes for three types of tours: work-related, school-related, and non-work/non-school-related. Auto-share is higher for work tours than for non-work/school-related tours and school-related tours. Complex tours are relatively more auto-oriented than simple tours for all types of tours. Complex work tours are less transit-oriented than simple work tours. Despite a general decrease in shares and counts for most modes, Uber's share and counts for both simple and complex work tours increased in the 2022/23 TTS. The increase was higher for simple work tours. Another noticeable increase occurs in cycling: an increase in cycling counts and share is observed for complex work tours. However, only an increase in the cycling share for simple work tours is shown. The increase in walking trips and share for complex work tours can be attributed to the non-commuting walking trips captured in 2022/23. Some of those trips are intervening activities with work.

For school tours, auto passenger trips and share have the most substantial increase in 2022/23. Conversely, the trips and shares of transit modes decreased. Despite decrease in school bus trips

In 2022/23, the school bus share modestly increased for simple and complex school tours. Walking trips and share increased in complex school tours but decreased in simple school tours.

For non-work or school tours, walking, cycling, and Uber shares were all raised. An increase in auto driver and auto passenger trips in NWNS tours was observed, while the shares decreased, presumably due to more walking trips being recorded.

Table 6.9 Work-Related Tour Mode Choice

Tour Type & Tour Mode Choice	2022	2016	Relative Change in %	2022%	2016%	2022%-2016%
Simple Tour	**2043407**	**2517494**	**-18.83%**	**100.00%**	**100.00%**	
Auto Driver	1482481	1725080	-14.06%	72.55%	68.52%	4.03%
Auto Passenger	146550	172861	-15.22%	7.17%	6.87%	0.31%
Local Transit	243404	388562	-37.36%	11.91%	15.43%	-3.52%
School Bus	2735	2509	9.01%	0.13%	0.10%	0.03%
Go Rail	23883	56936	-58.05%	1.17%	2.26%	-1.09%
Go Rail+local transit	11151	19982	-44.19%	0.55%	0.79%	-0.25%
Walk	75796	98007	-22.66%	3.71%	3.89%	-0.18%
Cycle	36200	36608	-1.11%	1.77%	1.45%	0.32%
Taxi	2711	4762	-43.07%	0.13%	0.19%	-0.06%
Uber	14054	7404	89.82%	0.69%	0.29%	0.39%
Motorcycle	1926	3488	-44.78%	0.09%	0.14%	-0.04%
E-scooter	1887			0.09%	0.00%	0.09%
Other	628	1295	-51.51%	0.03%	0.05%	-0.02%
Complex Tour	**690886**	**849442**	**-18.67%**	**100.00%**	**100.00%**	
Auto Driver	545288	667704	-18.33%	78.93%	78.61%	0.32%
Auto Passenger	40690	48560	-16.21%	5.89%	5.72%	0.17%
Local Transit	57005	85941	-33.67%	8.25%	10.12%	-1.87%
School Bus	2236	2102	6.37%	0.32%	0.25%	0.08%
Go Rail	3993	9437	-57.69%	0.58%	1.11%	-0.53%
Go Rail+local transit	3203	3357	-4.59%	0.46%	0.40%	0.07%
Walk	18654	14332	30.16%	2.70%	1.69%	1.01%
Cycle	13439	12167	10.45%	1.95%	1.43%	0.51%
Taxi	977	2493	-60.81%	0.14%	0.29%	-0.15%
Uber	4103	2345	74.97%	0.59%	0.28%	0.32%
Motorcycle	704	668	5.39%	0.10%	0.08%	0.02%
E-scooter	316			0.05%	0.00%	0.05%
Other	278	336	-17.26%	0.04%	0.04%	0.00%
Grand Total	**2734292**	**3366936**	**-18.79%**			

Table 6.10 School-Related Tour Mode Choice

Tour Type & Tour Mode Choice	2022	2016	Change in %	2022%	2016%	Change in %
Simple Tour	**781812**	**909230**	**-14.01%**	**100.00%**	**100.00%**	
Auto Driver	72205	92332	-21.80%	9.24%	10.15%	-0.92%
Auto Passenger	268635	252372	6.44%	34.36%	27.76%	6.60%
Local Transit	131725	214358	-38.55%	16.85%	23.58%	-6.73%
School Bus	130398	139398	-6.46%	16.68%	15.33%	1.35%
Go Rail	1670	3317	-49.65%	0.21%	0.36%	-0.15%
Go Rail+local transit	5151	6528	-21.09%	0.66%	0.72%	-0.06%
Walk	149469	179407	-16.69%	19.12%	19.73%	-0.61%
Cycle	17556	16618	5.64%	2.25%	1.83%	0.42%

Taxi	1320	1211	9.00%	0.17%	0.13%	0.04%
Uber	2599	2719	-4.41%	0.33%	0.30%	0.03%
Motorcycle	157	352	-55.40%	0.02%	0.04%	-0.02%
E-scooter	408			0.05%	0.00%	0.05%
Other	518	616	-15.91%	0.07%	0.07%	0.00%
Complex Tour	**92929**	**103440**	**-10.16%**	**100.00%**	**100.00%**	
Auto Driver	12644	15563	-18.76%	13.61%	15.05%	-1.44%
Auto Passenger	47218	48524	-2.69%	50.81%	46.91%	3.90%
Local Transit	14647	21070	-30.48%	15.76%	20.37%	-4.61%
School Bus	6907	7196	-4.02%	7.43%	6.96%	0.48%
Go Rail	60	369	-83.74%	0.06%	0.36%	-0.29%
Go Rail+local transit	421	339	24.19%	0.45%	0.33%	0.13%
Walk	8784	8152	7.75%	9.45%	7.88%	1.57%
Cycle	1424	1466	-2.86%	1.53%	1.42%	0.12%
Taxi	412	226	82.30%	0.44%	0.22%	0.22%
Uber	294	172	70.93%	0.32%	0.17%	0.15%
Motorcycle		201	-100.00%	0.00%	0.19%	-0.19%
E-scooter	33			0.04%	0.00%	0.04%
Other	86	162	-46.91%	0.09%	0.16%	-0.06%
Grand Total	**874742**	**1012670**	**-13.62%**			

Table 6.11 Non-Work/School-Related Tour Mode Choice

Tour Type & Tour Mode Choice	2022	2016	Change in %	2022%	2016%	Change in %
Simple Tour	**3107559**	**2255338**	**37.79%**	**100.00%**	**100.00%**	
Auto Driver	2015719	1535265	31.29%	64.87%	68.07%	-3.21%
Auto Passenger	473898	382034	24.05%	15.25%	16.94%	-1.69%
Local Transit	180710	190103	-4.94%	5.82%	8.43%	-2.61%
School Bus	11712	10412	12.49%	0.38%	0.46%	-0.08%
Go Rail	5530	12271	-54.93%	0.18%	0.54%	-0.37%
Go Rail+local transit	3453	5019	-31.20%	0.11%	0.22%	-0.11%
Walk	334437	73486	355.10%	10.76%	3.26%	7.50%
Cycle	50122	24294	106.31%	1.61%	1.08%	0.54%
Taxi	7395	11497	-35.68%	0.24%	0.51%	-0.27%
Uber	15367	5333	188.15%	0.49%	0.24%	0.26%
Motorcycle	3022	2615	15.56%	0.10%	0.12%	-0.02%
E-scooter	3377			0.11%	0.00%	0.11%
Other	2818	3009	-6.35%	0.09%	0.13%	-0.04%
Complex Tour	**875663**	**663323**	**32.01%**	**100.00%**	**100.00%**	
Auto Driver	616918	480518	28.39%	70.45%	72.44%	-1.99%
Auto Passenger	146668	123950	18.33%	16.75%	18.69%	-1.94%
Local Transit	42846	38153	12.30%	4.89%	5.75%	-0.86%
School Bus	1053	1603	-34.31%	0.12%	0.24%	-0.12%
Go Rail	1482	1920	-22.81%	0.17%	0.29%	-0.12%
Go Rail+local transit	1092	1090	0.18%	0.12%	0.16%	-0.04%
Walk	45437	5859	675.51%	5.19%	0.88%	4.31%
Cycle	12184	4956	145.84%	1.39%	0.75%	0.64%
Taxi	1456	2681	-45.69%	0.17%	0.40%	-0.24%
Uber	4407	1315	235.13%	0.50%	0.20%	0.31%
Motorcycle	674	494	36.44%	0.08%	0.07%	0.00%
E-scooter	572			0.07%	0.00%	0.07%
Other	875	785	11.46%	0.10%	0.12%	-0.02%
Grand Total	**3983222**	**2918660**	**36.47%**			

6.3 Tour Length

Tour length is used to capture distances travelled in reaching one or more destinations on a tour. The total tour length is a continuous variable of great interest because it represents vehicle miles travelled (VMT), an outcome of travel models that is used to quantify total travel and assess the impact on energy and emissions estimates.

Table 12-15 exhibit the tour length for overall tours, work-related tours, school-related tours, and NWNS tours. Complex tour lengths are longer than simple tour lengths in both years of TTS. The length of tours has decreased, with a higher proportion of tours being less than 15 km in 2022 compared to 2016 (Table 6.12). In Table 6.13, the proportion of work tours of less than 15 km and of more than 100 km both increased in 2022/23. This suggests that both decoupling and close coupling of home and work relationships exist post-pandemic.

Table 6.12 Total Tour Length

	Simple Tour		Complex Tour		Simple Tour		Complex Tour	
Total	2022	2016	2022	2016	2022	2016	2022	2016
Tour Length	Expansion	Expansion	Expansion	Expansion	Expansion %	Expansion %	Expansion %	Expansion %
[0,5000)	1129423	800606	105100	57718	19.0%	14.1%	6.3%	3.6%
[5000,10000)	834866	693121	170537	131186	14.1%	12.2%	10.3%	8.1%
[10000,15000)	627619	576521	172694	147806	10.6%	10.1%	10.4%	9.1%
[15000,20000)	491842	476182	147441	143060	8.3%	8.4%	8.9%	8.9%
[20000,25000)	398626	396726	131474	119730	6.7%	7.0%	7.9%	7.4%
[25000,30000)	318381	342312	105559	110555	5.4%	6.0%	6.4%	6.8%
[30000,35000)	269850	295933	93543	97106	4.5%	5.2%	5.6%	6.0%
[35000,40000)	222184	251264	79311	88041	3.7%	4.4%	4.8%	5.4%
[40000,45000)	190492	217943	70395	76765	3.2%	3.8%	4.2%	4.7%
[45000,50000)	156690	182656	60684	69572	2.6%	3.2%	3.7%	4.3%
[50000,55000)	142807	165681	53587	55554	2.4%	2.9%	3.2%	3.4%
[55000,60000)	121176	138091	46598	52642	2.0%	2.4%	2.8%	3.3%
[60000,65000)	99677	123218	38896	48298	1.7%	2.2%	2.3%	3.0%
[65000,70000)	91635	111512	35986	39915	1.5%	2.0%	2.2%	2.5%
[70000,75000)	79980	94302	31515	37372	1.3%	1.7%	1.9%	2.3%
[75000,80000)	72387	82681	27031	31527	1.2%	1.5%	1.6%	2.0%
[80000,85000)	61511	69280	24819	27210	1.0%	1.2%	1.5%	1.7%
[85000,90000)	55254	62132	21537	24139	0.9%	1.1%	1.3%	1.5%
[90000,95000)	48329	54871	18212	21292	0.8%	1.0%	1.1%	1.3%
[95000,100000)	42266	52342	17493	19563	0.7%	0.9%	1.1%	1.2%
[100000,max)	477783	494687	207065	217156	8.1%	8.7%	12.5%	13.4%
Total	5932778	5682062	1659478	1616205	100%	100%	100%	100%

Table 6.13 Work Tour Length

	Simple Tour		Complex Tour		Simple Tour		Complex Tour	
Work	2022	2016	2022	2016	2022	2016	2022	2016
Tour Length	Expansion	Expansion	Expansion	Expansion	Expansion %	Expansion %	Expansion %	Expansion %
[0,5000)	168941	199776	23810	20747	8.3%	7.9%	3.4%	2.4%
[5000,10000)	212483	248572	48123	49862	10.4%	9.9%	7.0%	5.9%
[10000,15000)	197241	243769	54559	64671	9.7%	9.7%	7.9%	7.6%
[15000,20000)	176772	216402	51841	68861	8.7%	8.6%	7.5%	8.1%
[20000,25000)	154937	186574	50855	59769	7.6%	7.4%	7.4%	7.0%
[25000,30000)	131995	168011	43210	58238	6.5%	6.7%	6.3%	6.9%
[30000,35000)	118589	150475	39909	52480	5.8%	6.0%	5.8%	6.2%
[35000,40000)	99542	127607	35857	49126	4.9%	5.1%	5.2%	5.8%
[40000,45000)	86820	115415	32651	39918	4.2%	4.6%	4.7%	4.7%
[45000,50000)	72358	96368	28438	39472	3.5%	3.8%	4.1%	4.6%
[50000,55000)	67163	87127	27198	31478	3.3%	3.5%	3.9%	3.7%
[55000,60000)	58732	73226	24751	30169	2.9%	2.9%	3.6%	3.6%
[60000,65000)	47853	65190	20265	28961	2.3%	2.6%	2.9%	3.4%
[65000,70000)	43672	58739	18019	24619	2.1%	2.3%	2.6%	2.9%
[70000,75000)	40165	51529	17254	22763	2.0%	2.0%	2.5%	2.7%
[75000,80000)	35383	45367	13953	19706	1.7%	1.8%	2.0%	2.3%
[80000,85000)	29746	39070	12961	16297	1.5%	1.6%	1.9%	1.9%
[85000,90000)	27298	33583	11958	14243	1.3%	1.3%	1.7%	1.7%
[90000,95000)	24837	30520	9780	13560	1.2%	1.2%	1.4%	1.6%
[95000,100000)	20898	27784	9435	12060	1.0%	1.1%	1.4%	1.4%
[100000,max)	227981	252389	116062	132442	11.2%	10.0%	16.8%	15.6%
Total	2043407	2517494	690886	849442	100%	100%	100%	100%

Table 6.14 School Tour Length

	Simple Tour		Complex Tour		Simple Tour		Complex Tour	
School	2022	2016	2022	2016	2022	2016	2022	2016
Tour Length	Expansion	Expansion	Expansion	Expansion	Expansion %	Expansion %	Expansion %	Expansion %
[0,5000)	275000	308180	11743	12717	35.2%	33.9%	12.6%	12.3%
[5000,10000)	144558	152848	14387	16371	18.5%	16.8%	15.5%	15.8%
[10000,15000)	80811	94787	12849	12782	10.3%	10.4%	13.8%	12.4%
[15000,20000)	56936	62783	9884	11379	7.3%	6.9%	10.6%	11.0%
[20000,25000)	41550	48599	8010	7540	5.3%	5.3%	8.6%	7.3%
[25000,30000)	27376	38722	5548	5750	3.5%	4.3%	6.0%	5.6%
[30000,35000)	25084	29845	3765	5162	3.2%	3.3%	4.1%	5.0%
[35000,40000)	19098	25536	3612	4303	2.4%	2.8%	3.9%	4.2%
[40000,45000)	16186	21316	2867	4592	2.1%	2.3%	3.1%	4.4%
[45000,50000)	12589	17584	2362	3094	1.6%	1.9%	2.5%	3.0%
[50000,55000)	11134	14306	1794	2665	1.4%	1.6%	1.9%	2.6%
[55000,60000)	7856	12748	2078	2252	1.0%	1.4%	2.2%	2.2%
[60000,65000)	7133	11164	1407	1753	0.9%	1.2%	1.5%	1.7%
[65000,70000)	6548	11150	1752	1577	0.8%	1.2%	1.9%	1.5%
[70000,75000)	4929	6508	592	1443	0.6%	0.7%	0.6%	1.4%
[75000,80000)	4336	6314	916	897	0.6%	0.7%	1.0%	0.9%
[80000,85000)	3209	4853	1112	650	0.4%	0.5%	1.2%	0.6%
[85000,90000)	3292	3739	855	1007	0.4%	0.4%	0.9%	1.0%
[90000,95000)	3281	4102	672	680	0.4%	0.5%	0.7%	0.7%
[95000,100000)	2046	4078	750	692	0.3%	0.4%	0.8%	0.7%
[100000,max)	28859	30070	5975	6134	3.7%	3.3%	6.4%	5.9%
Total	781812	909230	92929	103440	100%	100%	100%	100%

Table 6.15 Non-Work/School Tour Length

	Simple Tour		Complex Tour		Simple Tour		Complex Tour	
NWS	2022	2016	2022	2016	2022	2016	2022	2016
Tour Length	Expansion	Expansion	Expansion	Expansion	Expansion %	Expansion %	Expansion %	Expansion %
[0,5000)	685482	292649	69547	24254	22.1%	13.0%	7.9%	3.7%
[5000,10000)	477825	291701	108028	64952	15.4%	12.9%	12.3%	9.8%
[10000,15000)	349568	237965	105287	70352	11.2%	10.6%	12.0%	10.6%
[15000,20000)	258134	196997	85716	62820	8.3%	8.7%	9.8%	9.5%
[20000,25000)	202139	161553	72608	52420	6.5%	7.2%	8.3%	7.9%
[25000,30000)	159009	135580	56802	46568	5.1%	6.0%	6.5%	7.0%
[30000,35000)	126177	115612	49868	39464	4.1%	5.1%	5.7%	5.9%
[35000,40000)	103544	98121	39842	34612	3.3%	4.4%	4.5%	5.2%
[40000,45000)	87486	81213	34877	32255	2.8%	3.6%	4.0%	4.9%
[45000,50000)	71743	68704	29884	27006	2.3%	3.0%	3.4%	4.1%
[50000,55000)	64511	64248	24594	21410	2.1%	2.8%	2.8%	3.2%
[55000,60000)	54588	52117	19770	20221	1.8%	2.3%	2.3%	3.0%
[60000,65000)	44691	46864	17224	17585	1.4%	2.1%	2.0%	2.7%
[65000,70000)	41415	41623	16215	13719	1.3%	1.8%	1.9%	2.1%
[70000,75000)	34886	36265	13670	13166	1.1%	1.6%	1.6%	2.0%
[75000,80000)	32668	31000	12162	10924	1.1%	1.4%	1.4%	1.6%
[80000,85000)	28556	25357	10747	10263	0.9%	1.1%	1.2%	1.5%
[85000,90000)	24663	24810	8724	8889	0.8%	1.1%	1.0%	1.3%
[90000,95000)	20211	20250	7760	7053	0.7%	0.9%	0.9%	1.1%
[95000,100000)	19322	20480	7309	6811	0.6%	0.9%	0.8%	1.0%
[100000,max)	220943	212229	85027	78580	7.1%	9.4%	9.7%	11.8%
Total	3107559	2255338	875663	663323	100%	100%	100%	100%

The length of school tours remained relatively stable, as shown in Table 6.14. In Table 6.15, a higher percentage of NWNS tours are shorter in 2022/23 than in 2016.

7. Transit Boardings

This section examines changes in transit boarding between 2016 and the 2022/23 TTS. For the 2022/23 TTS, transit boarding is compared with boardings collected from operators, in order to check whether reported transit usage is lower than the actual number of boardings.

7.1 Transit Boarding Change by Operator & Type

Table 7.1 Transit Boarding by Operator & Type

Route Operator	2016	2022	Diff.	% Diff
Subway	1446906.02	938314.65	-508591.37	-35%
TTC Bus	1170257.52	726042.97	-444214.55	-38%
Streetcar	241332.51	177136.26	-64196.25	-27%
GO rail	214239.58	110675.78	-103563.80	-48%
GO rail UP Express	2308.50	4722.65	2414.15	105%
GO bus	66824.35	45950.75	-20873.60	-31%
Wheel trans	11822.09	9002.93	-2819.16	-24%
Mississauga	163251.00	119787.64	-43463.36	-27%
Brampton	103146.52	83834.59	-19311.93	-19%
York	100655.33	79916.56	-20738.77	-21%
Hamilton	91501.56	69430.08	-22071.48	-24%
Durham	51881.33	45109.35	-6771.98	-13%
Guelph	19128.38	12367.05	-6761.33	-35%
Barrie	6297.23	4774.96	-1522.27	-24%
Niagara	17008.06	20548.71	3540.65	21%
Oakville	14160.69	11183.42	-2977.27	-21%
Burlington	9615.79	8664.42	-951.37	-10%
Peterborough	8021.25	5581.99	-2439.26	-30%
Bradford-West	77.46	403.73	326.27	421%
Brantford	4378.76	5155.08	776.32	18%
Collinwood	533.98	539.55	5.57	1%
Lindsay	349.46	369.97	20.51	6%
Midland-Penetanguishene	242.51	516.86	274.35	113%
Milton	1783.75	3764.89	1981.14	111%
Orillia	1689.81	2246.74	556.93	33%
Orangeville	437.01	820.13	383.12	88%
Wasaga Beach	165.48	166.17	0.69	0%
Waterloo	60310.78		-60310.78	-100%
Not Defined	29206.42	10233.52	-18972.90	-65%
Wellington		30.35		
Port Hope		298.08		
Peel		1137.85		
Simcoe		767.47		
Clearview		67.22		
Grey		1275.62		
Grand River		65896.98		
Innisfil		253.79		
Cobourg		608.28		
Grand Total	**3837533.13**	**2567597.04**	**-1269936.09**	**-33%**

Note: Operators of some route codes (e.g., XA, XB, SN) are unknown based on the information of the 2022 TTS report. They are labeled as 'Not Defined' in the above table.

Table 7.1 compares the transit boarding counts in 2016 and 2022/23 TTS using the transit routes respondents reported. The result is aggregated by different transit operators for comparison. For TTC bus, subway, and streetcar boardings, the declines were 38%, 35%, and 27%, respectively. GO rail boardings declined by 48%, more than the decline in GO bus boardings. On the contrary, UP Express boardings increased in 2022 TTS. Of all the GGH transit operators, Guelph and Mississauga saw the most significant decline in terms of relative change in percentage, followed by Hamilton, York, Barrie, and Brampton.

Table 7.2 Transit Boarding by Time Period

	AM [6-9)				MD [9-15)				PM [15-19)				EV [19-24)			
Route Type	**2016 AM**	**2022 AM**	**Diff.**	**% Diff**	**2016 MD**	**2022 MD**	**Diff.**	**% Diff**	**2016 PM**	**2022 PM**	**Diff.**	**% Diff**	**2016 EV**	**2022 EV**	**Diff.**	**% Diff**
Subway	**427734.86**	**241389.64**	**-186345.22**	**-44%**	**278591.08**	**218182.44**	**-60408.64**	**-22%**	**544109.06**	**345678.05**	**-198431.01**	**-36%**	**166801.25**	**117428.36**	**-49372.89**	**-30%**
TTC Bus	**329720.29**	**187170.47**	**-142549.82**	**-43%**	**269189.48**	**198043.80**	**-71145.68**	**-26%**	**417352.96**	**256772.24**	**-160580.72**	**-38%**	**120498.33**	**66383.40**	**-54114.93**	**-45%**
Streetcar	**60671.15**	**37785.05**	**-22886.10**	**-38%**	**60093.26**	**45277.52**	**-14815.74**	**-25%**	**85453.59**	**62431.96**	**-23021.63**	**-27%**	**30285.70**	**28361.82**	**-1923.88**	**-6%**
GO rail	**90208.59**	**41590.16**	**-48618.43**	**-54%**	**11742.90**	**11554.66**	**-188.24**	**-2%**	**94624.23**	**45321.38**	**-49302.85**	**-52%**	**10527.05**	**8191.23**	**-2335.82**	**-22%**
GO rail UP Express	**314.04**	**731.59**	**417.55**	**133%**	**497.12**	**1144.88**	**647.76**	**130%**	**1017.25**	**1544.00**	**526.75**	**52%**	**394.94**	**1004.68**	**609.74**	**154%**
GO bus	**20099.99**	**10781.41**	**-9318.58**	**-46%**	**13584.91**	**9222.45**	**-4362.46**	**-32%**	**23249.57**	**18501.80**	**-4747.77**	**-20%**	**7662.64**	**5750.67**	**-1911.97**	**-25%**
Wheel Trans	**1570.89**	**1316.68**	**-254.21**	**-16%**	**6275.96**	**5574.85**	**-701.11**	**-11%**	**3209.48**	**1861.00**	**-1348.48**	**-42%**	**757.08**	**177.87**	**-579.21**	**-77%**
Mississauga	**45273.95**	**28023.18**	**-17250.77**	**-38%**	**43931.51**	**31936.75**	**-11994.76**	**-27%**	**56064.82**	**44685.36**	**-11379.46**	**-20%**	**13371.55**	**9945.66**	**-3425.89**	**-26%**
Brampton	**27789.42**	**20113.82**	**-7675.60**	**-28%**	**29432.27**	**23490.35**	**-5941.92**	**-20%**	**33452.41**	**29410.15**	**-4042.26**	**-12%**	**8033.81**	**7401.95**	**-631.86**	**-8%**
York	**29032.41**	**18794.17**	**-10238.24**	**-35%**	**23565.96**	**20845.53**	**-2720.43**	**-12%**	**37745.71**	**31231.75**	**-6513.96**	**-17%**	**7867.10**	**7120.04**	**-747.06**	**-9%**
Hamilton	**21979.29**	**15262.72**	**-6716.57**	**-31%**	**31694.59**	**21881.42**	**-9813.17**	**-31%**	**28610.89**	**24235.50**	**-4375.39**	**-15%**	**7783.76**	**6137.91**	**-1645.85**	**-21%**
Durham	**12842.60**	**11522.97**	**-1319.63**	**-10%**	**17324.26**	**12188.60**	**-5135.66**	**-30%**	**16995.39**	**16945.89**	**-49.50**	**0%**	**3851.31**	**3962.40**	**111.09**	**3%**
Guelph	**3665.27**	**2407.73**	**-1257.54**	**-34%**	**6992.72**	**3747.73**	**-3244.99**	**-46%**	**6642.25**	**4636.31**	**-2005.94**	**-30%**	**1794.82**	**1338.30**	**-456.52**	**-25%**
Barrie	**1519.72**	**976.08**	**-543.64**	**-36%**	**2241.78**	**2145.66**	**-96.12**	**-4%**	**2140.52**	**1190.55**	**-949.97**	**-44%**	**344.74**	**347.38**	**2.64**	**1%**
Niagara	3827.97	3415.52	-412.45	-11%	6772.27	7870.60	1098.33	16%	5386.49	6670.43	1283.94	24%	975.87	2592.17	1616.30	166%
Oakville	16.54	57.60	41.06	248%	60.92	209.90	148.98			136.23	136.23					
Burlington	1099.13	699.77	-399.36	-36%	1840.60	2532.34	691.74	38%	1199.45	1283.46	84.01	7%	192.74	628.03	435.29	226%
Peterborough	2450.37	1907.49	-542.88	-22%	3230.82	2472.61	-758.21	-23%	3169.89	3078.17	-91.72	-3%	303.60	665.36	361.76	119%
Bradford-West	51.30	45.31	-5.99	-12%	342.87	330.41	-12.46	-4%	88.51	118.52	30.01	34%	25.65	45.31	19.66	77%
Brantford	118.12	11.22	-106.90	-91%	167.60	229.04	61.44	37%	63.74	129.70	65.96	103%				
Collinwood	27.28	174.43	147.15	539%	129.05	152.98	23.93	19%	86.18	189.44	103.26	120%				
Lindsay	500.65	1084.15	583.50	117%	751.44	1252.20	500.76	67%	420.28	1095.95	675.67	161%	111.38	230.31	118.93	107%
Midland-Penetanguishene	3486.73	2036.28	-1450.45	-42%	3987.79	3176.52	-811.27	-20%	5558.79	4930.29	-628.50	-11%	813.82	893.23	79.41	10%
Milton	186.29	209.79	23.50	13%	697.19	1273.70	576.51	83%	590.73	617.04	26.31	4%	215.60	146.20	-69.40	-32%
Orillia	51.92	69.46	17.54	34%	205.48	527.46	321.98	157%	162.47	201.31	38.84	24%	8.57	21.89	13.32	155%
Orangeville	1494.60	1036.81	-457.79	-31%	3541.48	2180.38	-1361.10	-38%	2221.35	1687.78	-533.57	-24%	715.88	639.43	-76.45	-11%
Wasaga Beach	29.73	0.00	-29.73	-100%	70.34	142.21	71.87	102%	65.41	12.25	-53.16	-81%		11.71	11.71	
Waterloo	15153.45		-15153.45	-100%	19776.26		-19776.26	-100%	20321.03		-20321.03	-100%	4289.89		-4289.89	-100%
(blank)	5896.40	1989.21	-3907.19	-66%	10083.19	3346.92	-6736.27	-67%	10522.16	3073.25	-7448.91	-71%	1849.68	1363.82	-485.86	-26%
Wellington		0.00				30.35				0.00				0.00		
Port Hope		19.92				278.15				0.00				0.00		
Peel		180.86				598.72				353.64				4.63		
Simcoe		56.77				398.37				305.63				6.71		
Clearview		13.99				39.24				13.99				0.00		
Grey		372.90				576.41				326.32				0.00		
Grand River		14527.87				20740.27				22187.78				7190.79		
Innisfil		61.84				101.07				68.48				0.00		
Cobourg		19.71				289.30				299.27				0.00		
Grand Total	**1106812.95**	**645856.57**	**-460956.38**	**-42%**	**846815.10**	**653985.79**	**-192829.31**	**-23%**	**1400524.61**	**931224.87**	**-469299.74**	**-34%**	**389476.76**	**277991.26**	**-111485.50**	**-29%**

Table 7.2 shows the change in transit boardings over four time periods: AM, MD, PM and EV. The time period is calculated based on the start time of the trip; a time gap between the start of the trip and boarding the transit should be noted. AM boardings show the most significant overall decrease at -42%, which is greater than in the PM and EV & MD periods. The decline in TTC subway, buses and streetcar boardings during the morning period is also significant for the operators in other municipalities. However, GO Rail shows a significant decrease in both the AM and PM periods. Additionally, the UP Express shows an upward trend in all four periods.

7.2 All-day Boardings & AM Peak Boardings

Table 7.3 compares the TTS data with the passenger boarding counts collected by transit operators. The passenger boarding counts were collected by the transit operators in September for TTC and in October or November for other operators in 2022. The TTS data appears to under-represent the total daily transit ridership, with the total number of boardings using TTS trips being 24% lower than the total number of boardings. TTC bus services are under-represented by 34%, streetcar services by 27%, and subway services by 10%. In the GTHA, Brampton, Waterloo and Mississauga are significantly under-represented, while York and Durham are relatively well represented.

Table 7.3 All-day Boardings (TTS vs. Passenger Boarding Counts)

Route Type	2022 TTS	Daily Boardings	Diff. (TTS-Boardings)	% Diff (Diff./Boardings)
Subway	938314.65	1044801.33	-106486.68	-10%
TTC Bus	726042.97	1101078.11	-375035.14	-34%
Streetcar	177136.26	241103.97	-63967.71	-27%
GO rail	110675.78	108869.05	1806.73	2%
GO rail Up Express	4722.65	8253.45	-3530.80	-43%
GO bus	45950.75	39150.65	6800.10	17%
Mississauga	119787.64	172634.00	-52846.36	-31%
Brampton	83834.59	193010.00	-109175.41	-57%
York	79916.56	83961.00	-4044.44	-5%
Hamilton	69430.08	79597.95	-10167.87	-13%
Waterloo-Grand River	65896.98	102780.00	-36883.02	-36%
Durham	45109.35	45405.41	-296.06	-1%
Niagara	20568.00	26468.97	-5900.97	-22%
Guelph	12367.05	22713.38	-10346.33	-46%
Barrie	4774.96	11695.75	-6920.79	-59%
Burlington	8664.42	10980.00	-2315.58	-21%
Peterborough	5581.99	9732.45	-4150.46	-43%
Milton	3764.89	1803.00	1961.89	109%
Orangeville	820.13	436.20	383.93	88%
Cobourg	608.28	2576.00	-1967.72	-76%
Midland-Penetanguishene	516.86	248.75	268.11	108%
Oakville	11183.42	NA	NA	NA
Brantford	5155.08	NA	NA	NA
Orillia	2246.74	NA	NA	NA
Peel	1137.85	NA	NA	NA
Grey	1275.62	99.00	1176.62	1189%
Simcoe	767.47	19744.00	NA	NA
Bradford-West	403.73	NA	NA	NA
Collinwood	539.55	NA	NA	NA
Lindsay	369.97	NA	NA	NA
Port Hope	298.08	NA	NA	NA
Innisfil	253.79	NA	NA	NA
Wasaga Beach	166.17	NA	NA	NA
Wellington	30.35	NA	NA	NA
Clearview	67.22	NA	NA	NA
Niagara Reginal		65818.00		
Wheel trans	9002.93	NA	NA	NA
Not defined	10214.23	NA	NA	NA

Grand Total	**2567597.04**	**3392960.42**	**-825363.38**	**-24%**

Table 7.4 shows the comparison of AM peak boardings for TTS trips and the number of passenger boardings collected by operators. The TTS is slightly under-represented by 4% in the AM peak. Subway is well represented in terms of AM peak subway boardings. The TTC underrepresents the AM peak by 12%, and the streetcar overrepresents it by 9%. An under-represent of AM peak is also observed for transit operators including Brampton, UP Express, Mississauga, Niagara, and Guelph transit.

Table 7.4 A.M. Peak Boardings (TTS vs. Passenger Boarding Counts)

Route Type	2022 TTS A.M. Peak (0600-0829)	2022 TTS A.M. Peak (0600-0859)	A.M. Peak Boardings (0600-0859)	Diff. (TTS-Boardings)	% Diff (Diff./Boardings)
Subway	**206870.80**	241389.64	**206483.80**	387.00*	0%
TTC Bus		187170.47	212509.70	-25339.23	-12%
Streetcar		37785.05	34553.00	3232.05	9%
GO rail		41590.16	42286.00	-695.84	-2%
GO rail Up Express		731.59	2006.30	-1274.71	-64%
GO bus		10781.41	7706.00	3075.41	40%
Mississauga		28023.18	36462.00	-8438.82	-23%
Brampton		20113.82	40579.00	-20465.18	-50%
York		18794.17	20927.00	-2132.83	-10%
Hamilton		15262.72	13013.67	2249.05	17%
Waterloo		14527.87	15882.00	-1354.13	-9%
Durham		11522.97	8832.41	2690.56	30%
Niagara		3434.81	4971.28	-1536.47	-31%
Guelph		2407.73	3972.76	-1565.03	-39%
Barrie		976.08	1932.00	-955.92	-49%
Burlington		1907.49	2414.00	-506.51	-21%
Peterborough		1036.81	1289.00	-252.19	-20%
Milton		1084.15	NA	NA	NA
Orangeville		69.46	70.50	-1.04	-1%
Cobourg		19.71	605.00	-585.29	-97%
Midland-Penetanguishene		174.43	NA	NA	NA
Oakville		2036.28	NA	NA	NA
Brantford		699.77	NA	NA	NA
Orillia		209.79	NA	NA	NA
Peel		180.86	NA	NA	NA
Grey		372.90	30.00	342.90	1143%
Simcoe		56.77	4126.60	-4069.83	-99%
Bradford-West		57.60	NA	NA	NA
Collinwood		45.31	NA	NA	NA
Lindsay		11.22	NA	NA	NA
Port Hope		19.92	NA	NA	NA
Innisfil		61.84	NA	NA	NA
Wasaga Beach		0.00	NA	NA	NA
Wellington		0.00	NA	NA	NA
Clearview		13.99	NA	NA	NA
Niagara Reginal			11841.00		
Wheel trans		1316.68	NA	NA	NA
Not defined		1969.92	NA	NA	NA
Grand Total		**645856.57**	**672493.02**	**-26636.45**	**-4%**

Note: * is for comparison with peak boardings between 6:00-8:29 a.m.

Tables 7.6-7.9 further check the boarding comparison for subway and streetcars. Most routes were under-represented, while variations in the different lines were observed.

Table 7.5 Subway All-day Boardings

Subway	2022 TTS	Daily Boardings	Diff. (TTS-Boardings)	% Diff (Diff./Boardings)
Sub 1	550219.05	606053.94	-55834.89	-9%
Sub 2	342261.28	377982.19	-35720.91	-9%
scar RT3	17198.59	23311.56	-6112.97	-26%
Sheppard Sub 4	28635.74	37453.64	-8817.90	-24%
Grand Total	**938314.66**	**1044801.33**	**-106486.67**	**-10%**

Table 7.6 Subway A.M. Peak Boardings

Subway	2022 TTS_AM (0600-0829)	A.M. Peak Boardings (0600-0859)	Diff. (TTS-Boardings)	% Diff (Diff./Boardings)
Sub 1	122296.24	112090.71	10205.53	9%
Sub 2	73076.74	80875.26	-7798.52	-10%
scar RT3	4380.41	6148.74	-1768.33	-29%
Sheppard Sub 4	7117.42	7369.10	-251.68	-3%
Grand Total	**206870.81**	**206483.81**	**387.00**	**0%**

Table 7.7 Streetcar All-day Boardings

Streetcar	2022 TTS	Daily Boardings	Diff. (TTS-Boardings)	% Diff (Diff./Boardings)
T501	35974.79	46115.99	-10141.20	-22%
T503	3697.83	9417	-5719.17	-61%
T504	41489.01	51511.99	-10022.98	-19%
T505	17186.52	23356	-6169.48	-26%
T506	15414.02	26466.99	-11052.97	-42%
T509	9667.68	10717	-1049.32	-10%
T510	20805.23	31487	-10681.77	-34%
T511	12148.57	15389	-3240.43	-21%
T512	20752.62	26643	-5890.38	-22%
Grand Total	**177136.27**	**241103.97**	**-63967.70**	**-27%**

Table 7.8 Streetcar A.M. Peak Boardings

Streetcar	2022 TTS_AM (0600-0859)	A.M. Peak Boardings (0600-0859)	Diff. (TTS-Boardings)	% Diff (Diff./Boardings)
T501	8116.76	6459	1657.76	26%
T503	1303.96	1973	-669.04	-34%
T504	10092.05	7954	2138.05	27%
T505	2771.52	2856	-84.48	-3%
T506	2765.54	3365	-599.46	-18%
T509	2586.89	1735	851.89	49%
T510	3085.03	3297	-211.97	-6%
T511	2618.49	2357	261.49	11%
T512	4444.81	4557	-112.19	-2%
Grand Total	**37785.05**	**34553.00**	**3232.05**	**9%**

8. Individual and Household Attributes Comparison

The gender distribution in 2022 remained largely unchanged compared with 2016. The male proportion slightly increased, while females still account for a slightly higher share. The average age of the population had risen, and all age groups over 60 are higher than in 2016, reflecting the expected trend as the baby boom generation continues to age.

In terms of employment status, there was a pronounced increase in work-from-home arrangements, with work-at-home full-time workers rising substantially and work-at-home part-time workers growing modestly. The proportions of full-time, part-time, and not employed individuals had declined slightly. Regarding occupation types among the employed population, the Profession category continued to be the largest and had further increased, whereas the shares of Retail and Service and General occupations declined significantly. The Manufacturing category experienced a slight increase. The proportion of those not employed had diminished modestly. These trends captured in Table 8.1 reflect shifts in labor market practices and demographic changes in the post-pandemic context.

Table 8.1 Individual Attributes

Person Attributes		2016 TTS	2022/23 TTS
Gender	Female	51.31%	51.03%
	Male	48.69%	48.97%
Age Range	0-4 years	5.26%	4.78%
	5-9 years	5.73%	5.30%
	10-14 years	5.76%	5.63%
	15-19 years	6.17%	5.68%
	20-24 years	6.82%	6.38%
	25-29 years	6.50%	7.11%
	30-34 years	7.21%	7.29%
	35-39 years	6.52%	6.83%
	40-44 years	7.02%	6.82%
	45-49 years	7.15%	6.32%
	50-54 years	8.19%	7.19%
	55-59 years	7.15%	6.97%
	60-64 years	6.07%	6.81%
	65-69 years	5.09%	5.41%
	70-74 years	3.74%	4.48%
	75-79 years	2.36%	3.21%
	80-84 years	1.76%	1.93%
	85-89 years	1.00%	1.23%
	90-94 years	0.41%	0.50%
	95 years and above	0.08%	0.10%
Employment Status	Full time	39.08%	37.00%
	Work at home full-time	2.76%	6.76%
	Work at home part-time	1.08%	1.39%
	Not employed	48.14%	47.11%
	Part time	8.95%	7.74%

Occupation Type	Professional/Management/Technical	23.23%	32.95%
	Retail Sales and Service	13.96%	7.81%
	General Office/Clerical	6.87%	3.96%
	Manufacturing/Construction/Trades	7.59%	7.68%
	Not Employed	48.34%	47.60%

For household attributes, there was a notable rise in high-income households earning over $100,000 in 2022/23 TTS. The share of households without a car had decreased slightly, while those with one car had increased, and households with four or more cars had grown, albeit still representing a minority. Additionally, the proportions of houses and apartments had experienced a modest decline. These trends mark slight changes in household structure and socio-economic characteristics after the pandemic.

Table 8.2 Household Attributes

Household Attributes		**2016 TTS**	**2022 TTS**
Household Size	1	24.65%	25.29%
	2	30.38%	30.89%
	3	17.02%	16.92%
	4	16.84%	16.65%
	5	7.59%	7.25%
	6	2.50%	2.14%
	7	0.66%	0.60%
	8	0.23%	0.17%
	9	0.08%	0.05%
	10	0.03%	0.02%
	11 and above	0.02%	0.02%
Income Range	$0 to $14999	4.76%	2.49%
	$15000 to $39999	14.82%	9.30%
	$40000 to $59999	14.29%	9.52%
	$60000 to $99999	21.45%	19.81%
	$100000 to $124999	9.97%	11.28%
	$125000 and above	16.96%	30.32%
	Decline / don't know	17.75%	17.28%
Number of Vehicles	0	13.78%	13.05%
	1	38.70%	41.17%
	2	34.71%	32.98%
	3	9.22%	8.93%
	4	2.66%	2.77%
	5	0.66%	0.74%
	6	0.16%	0.23%

	7	0.06%	0.07%
	8	0.02%	0.03%
	9	0.01%	0.02%
	10 and above	0.01%	0.02%
Type of Dwelling	House	55.10%	54.94%
	Apartment	35.38%	35.36%
	Townhouse	9.53%	9.70%

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