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Data collection, methodological development and harmonization of transport statistics: Tram and metro statistics

The impact of COVID-19 pandemic on tram and metro passenger numbers in ECE region cities

Note by the secretariat

Summary

This document presents the latest update to the city-level tram and metro passenger statistics collected by UNECE, and briefly analyses the impacts of COVID-19 related lockdowns on passenger volumes in selected cities of the region.

I. Background

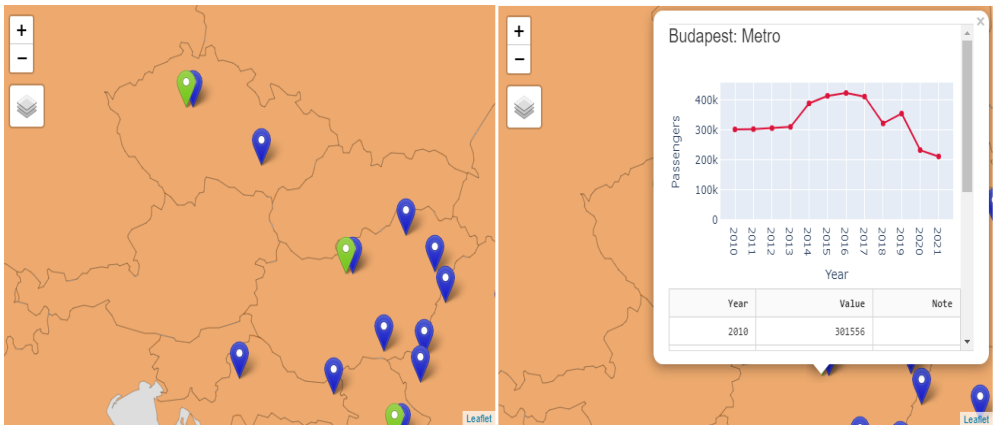
1. Since 2019, the secretariat has collected UNECE tram and metro statistics on a city-level basis. Data are published in a simple CSV format, and data availability and key trends are presented in an interactive map (Figure 1)[1], which also distinguishes between different types of system (e.g. tram or metro). The data are collected and disseminated on both an annual and quarterly level.

[1] https://unece.org/tram-and-metro-data.

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Figure 1

Interactive tram and metro map, showing data availability, system type and passenger trends over time



2. Due to the COVID-19 pandemic authorities in many countries and territories around the world introduced restrictions on citizens' movements, so-called lockdowns, in many cases on more than one occasion and for extended periods of time, with the intention to reduce the spread of SARS-CoV-2, the virus that causes COVID-19. By April 2020, about half of the world's population was under some form of lockdown, with more than 3.9 billion people in more than 90 countries or territories having been ordered by national/regional authorities to stay at home[2]. In most cases, only persons whose occupations were deemed essential for the running of society and social services were exempt from such measures. Although in the past similar disease control measures have been used on a local scale to handle plagues and pandemics, the lockdowns implemented by governments during the COVID-19 pandemic are thought to be unprecedented.

3. This document introduces a series of charts, plotting trends in several cities' public transport networks. They show how local COVID-19 related lockdowns impacted the use of those networks by citizens, namely the changes in the number of passengers traveling on the networks[3], per quarter of the year.

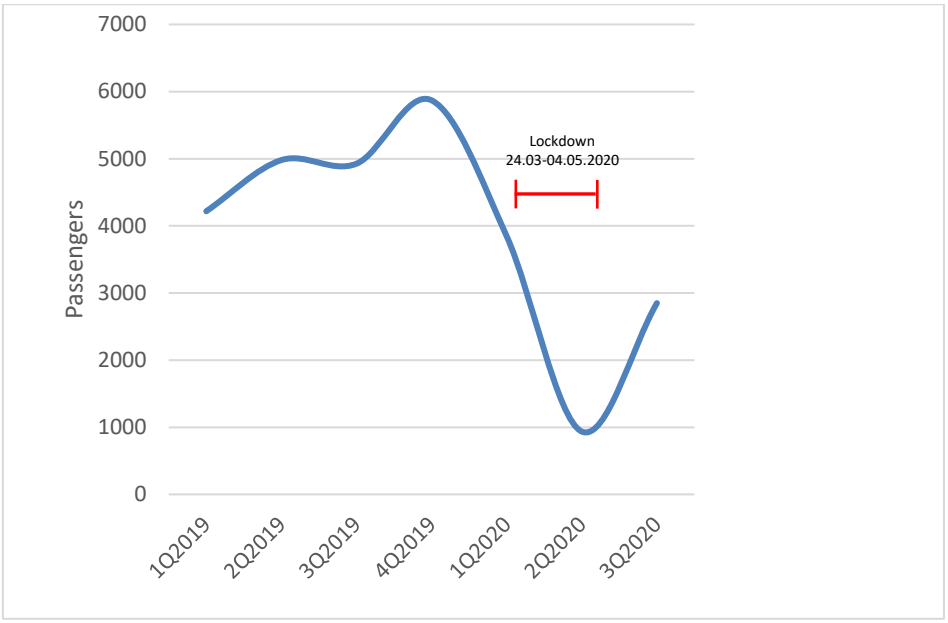
[2] https://en.wikipedia.org/wiki/COVID-19_lockdowns.

[3] While the data collection covers both passenger numbers and passenger-km, the trends in the two indicators closely matched each other therefore passenger numbers were concentrated on.

II. Lockdown impacts on tram and metro passenger transport trends

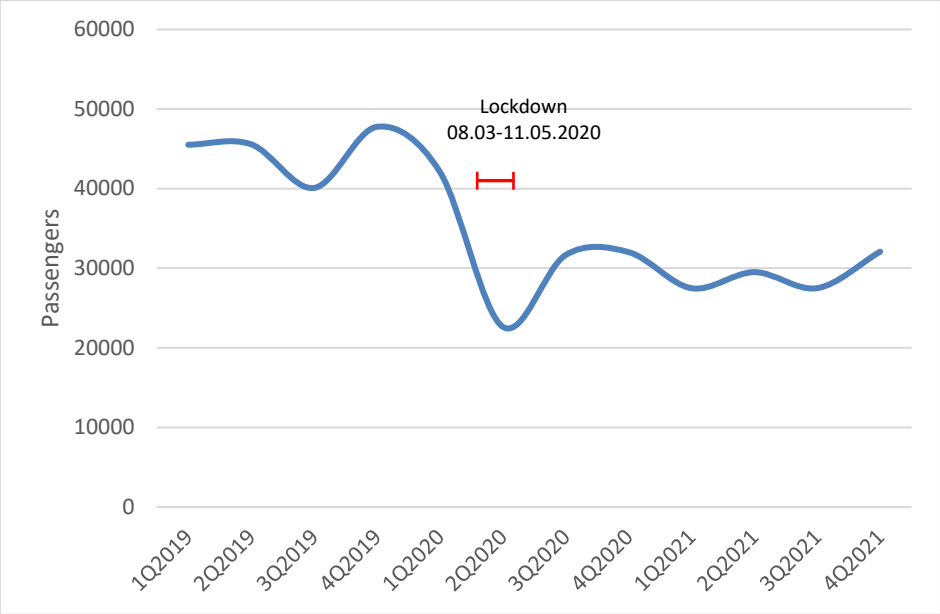
4. Several countries of the ECE region experienced multiple lockdowns that included stay-at-home orders. Others had such lockdowns only once, during the first months of the pandemic. As most countries did not start to lockdown until mid-March 2020, effects on transport systems' passenger volumes were obvious from the second quarter of 2020 onwards. The following city examples are annotated using lockdown information taken from the Wikipedia linked to previously. Note that all graphs show passenger numbers in thousands per quarter (except for Paris, which uses the thousand passenger-km unit).

Figure 2
Quarterly passenger volume in the Yerevan metro



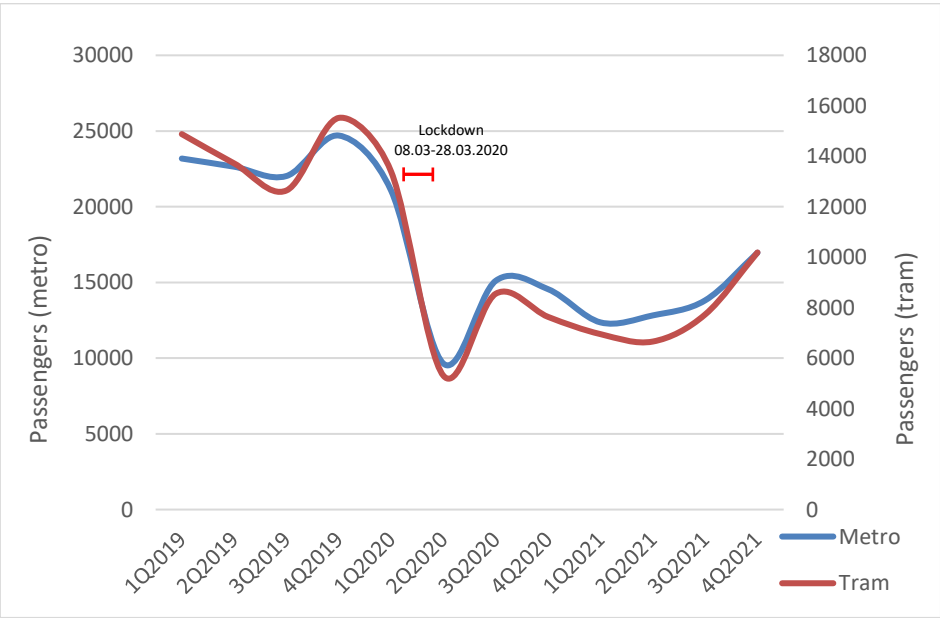
5. The lockdown in Armenia lasted forty-one days, between the end of March and beginning of May 2020. Available data indicates a sharp drop of passenger volume in the Yerevan metro system (see Figure 2). Between the last quarter of 2019 and the second quarter of 2020 passenger volume was reduced by a factor of six, before rebounding during the third quarter of the year to half of pre-pandemic values.

Figure 3
Quarterly passenger volume on the Zagreb tram system



6. In Croatia the first nationwide lockdown was introduced from 8 March to 11 May 2020. The Zagreb tram network passenger volume during the second quarter of 2020 was half that of the final quarter of 2019 (Figure 3). There was also a second seven-day lockdown during the week of Christmas 2020, which did not impact passenger volumes to a noticeable degree. By the end of 2021, passenger volumes reached 67 per cent of the pre-pandemic level.

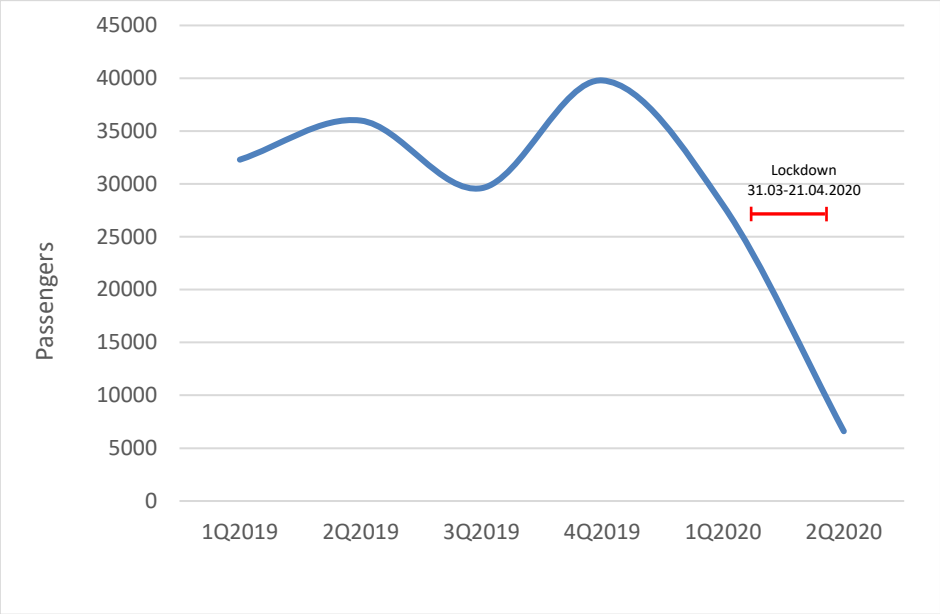
Figure 4
Quarterly passenger volume on the Helsinki metro and tram systems



7. The lockdown introduced in Finland at the start of the COVID-19 pandemic lasted twenty days during March 2020. Passenger volumes during the second quarter of 2020 on the Helsinki metro and tram systems dropped to 43 per cent and 37 per cent, respectively, of passenger volumes in the second quarter of 2019 (Figure 4). By the end of 2021, the metro system passenger volume had rebounded to 69 per cent of the pre-pandemic level, while it was 66 per cent of the Q4 2019 level on the tram system.

Figure 5

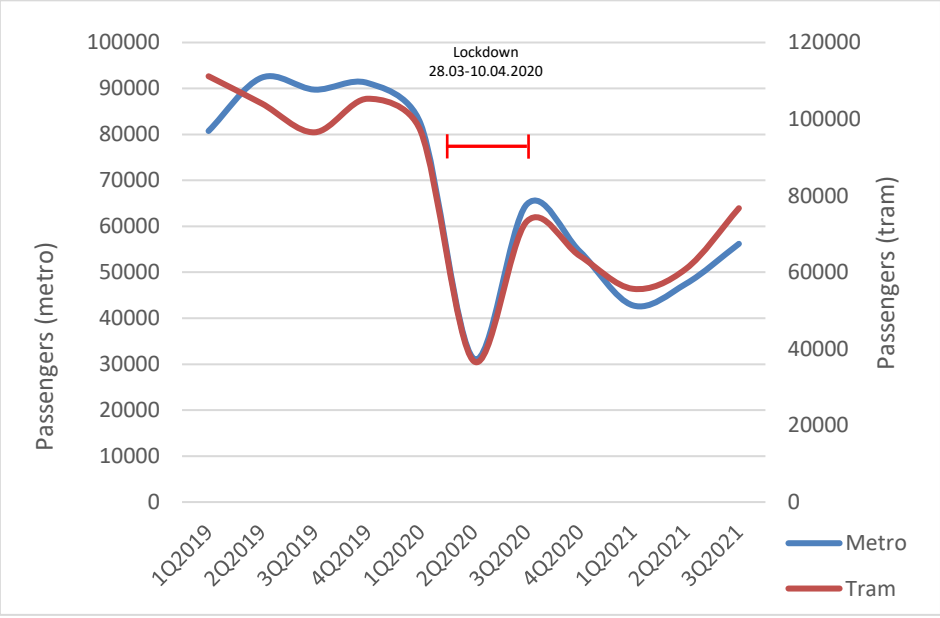
Quarterly passenger volume on Tbilisi metro



8. The national lockdown in Georgia lasted for three weeks at the start of April 2020. The passenger volumes measured during the second quarter of 2020 dropped to a fifth of the levels compared to the same time period in 2019 (Figure 5).

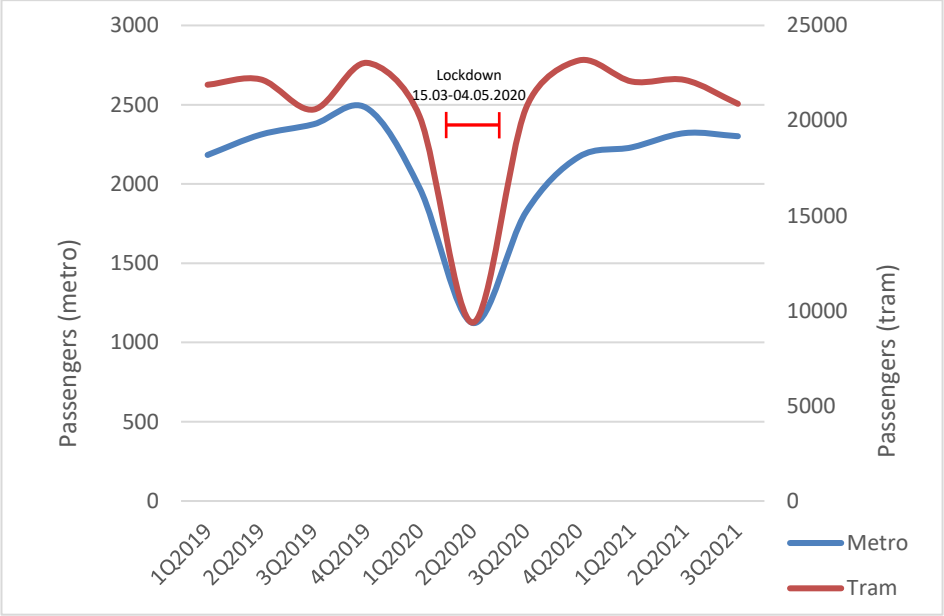
Figure 6

Quarterly passenger volume in the Budapest metro and tram systems



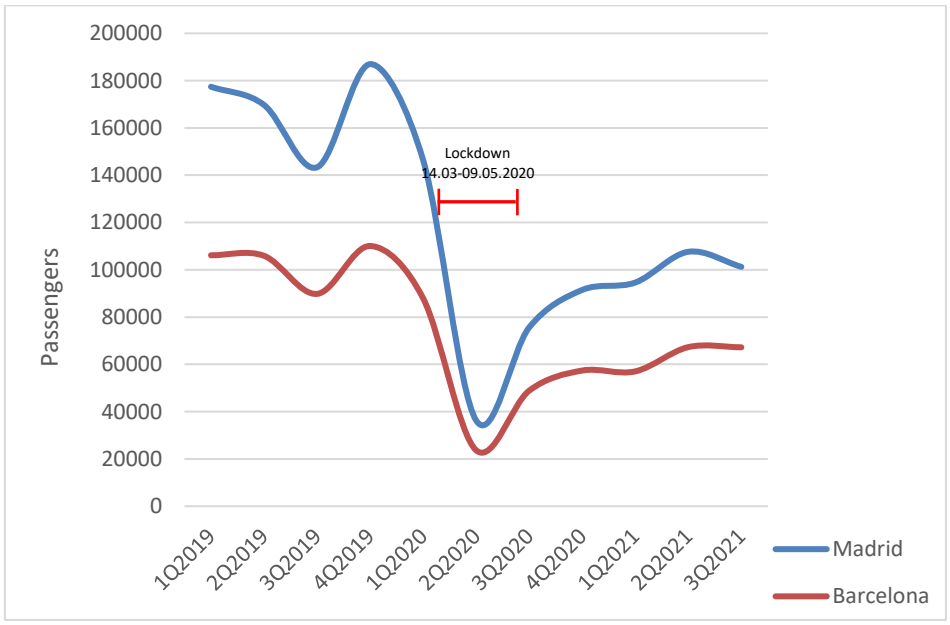
9. Hungary introduced a nationwide lockdown on 28 March, which lasted until 10 April 2020. In the second quarter of 2020 metro and tram passenger volumes dropped to 34 and 35 per cent of Q2 2019 volumes respectively (Figure 6). The latest available data shows that in Q3 2021 passenger volumes in the Budapest metro and tram systems reverted to 63 and 73 per cent of their pre-pandemic levels at Q3 2019.

Figure 7
Quarterly passenger volume on the Belgrade metro and tram systems



10. The Serbian COVID-19 national lockdown was introduced in mid-March 2020, lasting almost a full two months. Stay-at-home orders included weekday nights as well as full weekend curfews lasting from Friday evening to Monday morning. The number of public transport vehicles on the streets was reduced significantly, to levels that would only meet the need for transporting essential workers to their places of work. As a result, the public transport passenger volume fell sharply during the second quarter of 2020, to less than 50 per cent of pre-pandemic levels (Figure 7). By the third quarter of 2021, passenger volumes in the tram and metro system of Belgrade had recovered to pre-pandemic levels.

Figure 8
Quarterly passenger volume on the Madrid and Barcelona metro systems

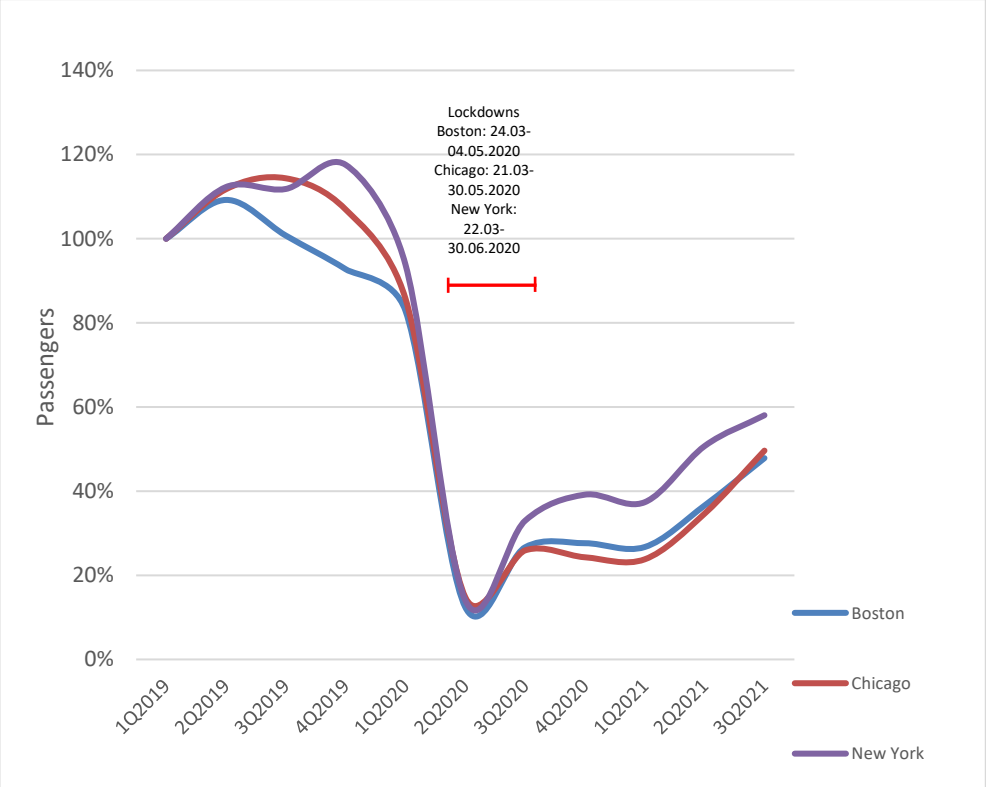


11. The first pandemic lockdown in Spain with mandated stay-at-home orders lasted for 56 days between mid-March and early May of 2020. Second quarter of 2020 metro passenger volumes in both Madrid and Barcelona fell to just over 20 per cent of their pre-pandemic levels of Q2 2019 (Figure 8). By the third quarter of 2021, Barcelona metro had achieved 75 percent of pre-pandemic passenger volume, while in Madrid the system reached slightly more than 70 per cent of business-as-usual operations.

12. In the United States of America, COVID-19 lockdowns were not uniform across the country, with decisions taken at the state level. Nevertheless, many U.S. States introduced such measures in the spring of 2020, impacting passenger volumes in public transport. For example, the lockdown in the state of Massachusetts was for 41 days, in Illinois it lasted 70 days, while stay-at-home measures in New York were in force for 83 days.

Figure 9

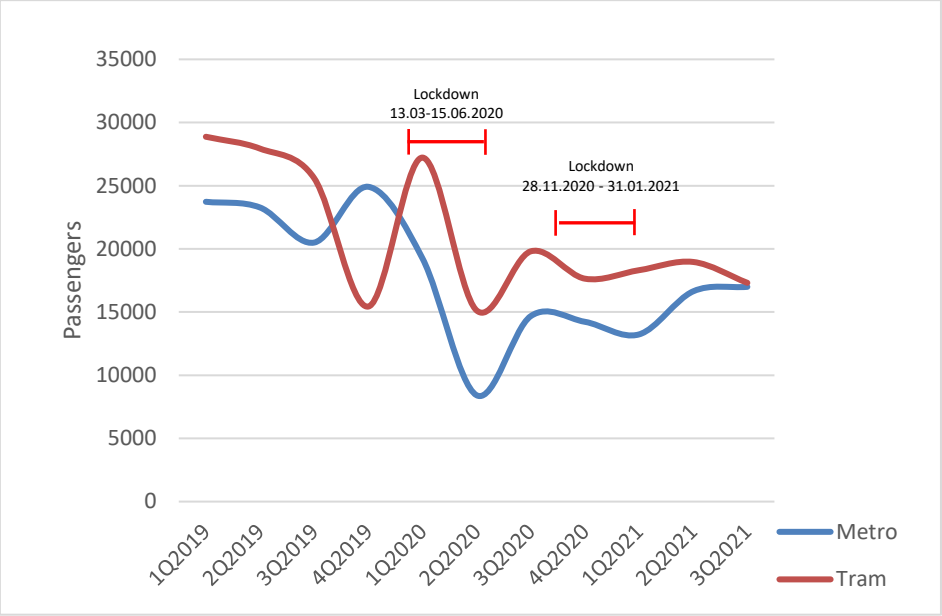
Quarterly passenger volume in selected U.S. cities' metro systems (1Q2019=100)



13. Traffic volumes in cities of the United States of America seem to have, as a result of the lockdowns, dropped more than in cities across Europe. Second quarter 2020 metro traffic volumes in Boston were only 11 per cent of Q2 2019 levels, while in Chicago and New York they amounted to 13 per cent of Q2 2019 levels (Figure 9). They were also reverting slower to pre-pandemic levels that those in European cities. Boston and Chicago metros reached slightly more than 47 and 43 per cent of pre-pandemic passenger volumes by the third quarter of 2021 respectively, while passenger volumes on the New York subway amounted to 52 per cent of the Q3 2019 figure.

14. Several European countries went through a series of COVID-19 pandemic lockdowns that entailed stay-at-home orders, resulting in multiple dips in passenger transport volumes of their cities public transport systems. Sofia and Prague went through two of such periods, while Paris and Dublin had three.

Figure 10
Quarterly passenger volumes in Sofia



15. Two lockdowns were mandated by Bulgarian authorities during the first year of the pandemic. The first, three months long, lockdown during spring 2020 reduced passenger volumes of the Sofia metro and tram systems by 64 and 46 per cent, respectively. As passenger volumes were recovering during summer and autumn, a second lockdown was introduced as of late November 2020, lasting until the end of January 2021. Passenger volumes dipped slightly as a result, however not as drastically as during the first lockdown. By Q3 2021, Sofia metro and tram passenger volumes had reached 83 and 68 per cent of Q3 2019 values.

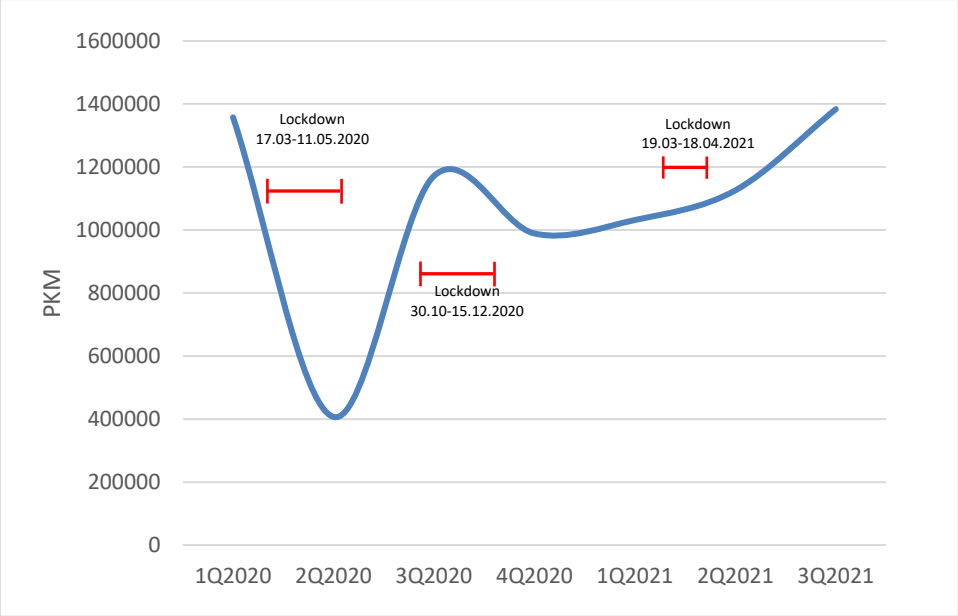
Figure 11
Quarterly passenger volumes in Prague



16. As in Bulgaria, two lockdowns impacted passenger volumes of public transport systems in Czechia. The first, month long lockdown during spring 2020 resulted in a drop of passenger volume in the Prague metro and tram systems by 57 and 49 per cent respectively. The second 174-day lockdown between October 2020 and March 2021 drove metro and tram passenger volumes even further down by Q1 2021, reducing them to 36 and 39 per cent of

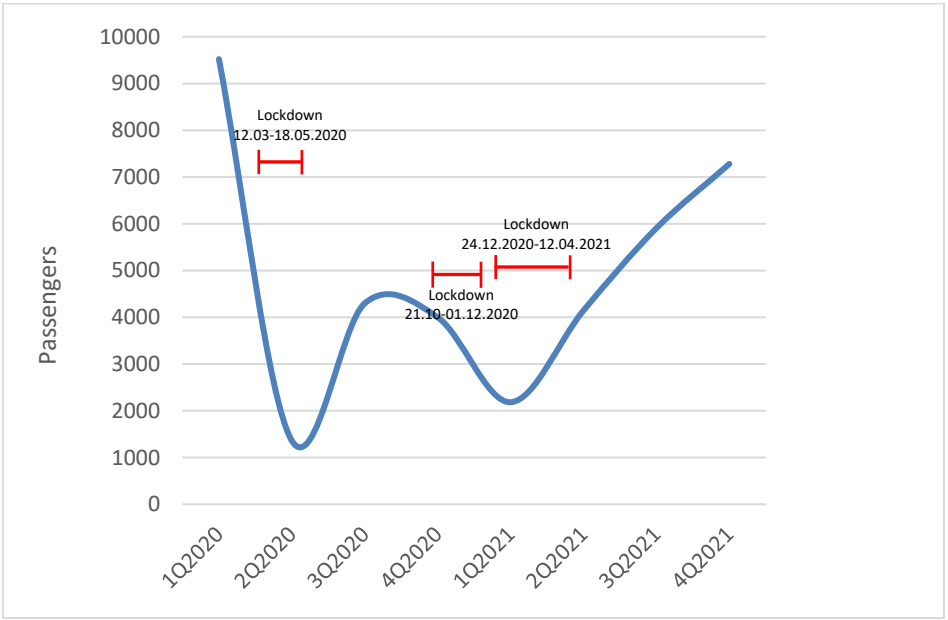
Q1 2019 levels. By the end of 2021 passenger volumes of both systems were still more than 30 per cent below pre pandemic levels.

Figure 12
Quarterly PKM in the Paris metro



17. During 2020, two lockdowns were mandated in France. The first lasted for 55 days during March, April and May, while the second lasted another 46 days during November and December. Both impacted passenger volumes within the Paris metro, the first inducing a 70 per cent decline during the second quarter of 2020 (Figure 12, measured in passenger-km). After rising to 86 per cent of Q1 2020 levels by Q3 2020, the second lockdown reduced the passenger volume by 13 per cent at Q4 2020. In contrast a third, month long, lockdown at the start of spring 2021 did not have a negative impact on passenger volumes in the Paris metro, and by the end of 2021 the passenger volume had recovered to pre-pandemic levels.

Figure 13
Quarterly passenger volume on the Dublin tram system



18. Like in France, there were three lockdowns with stay-at-home orders in Ireland, and the Dublin tram system experienced resulting drops of passenger volumes. The first lockdown lasted slightly longer than two months, from mid-March to mid-May of 2020, and

the passenger volume in the Dublin tram system was reduced during the second quarter of 2020 to 14 per cent of pre-pandemic levels. By the end of Q3 2020 the passenger volume had increased to 45 per cent of Q1 2020 levels. However, back-to-back lockdowns, one lasting 41 days during October and November 2020, and a longer 119-day lockdown from Christmas 2020 until 12 April 2021, had driven passenger volumes during Q1 of 2021 back down to only 22 per cent of Q1 2020 levels. By the end of 2021, traffic volumes had recovered to 76 per cent of early 2020 numbers.

19. Table below summarizes lockdown impacts on passenger volumes of metro systems of the eleven selected cities presented in this document. Except in the cases of Paris and Belgrade, where they essentially reached pre-pandemic levels by the end of 2021, in European cities metro passenger volumes were by the end of 2021 recovering but still between 17 and 37 per cent below volumes measured at the end of 2019. Data from the three cities of the United States of America presented here shows that passenger volumes in those metro systems were recovering slower than in Europe, reaching only about 50 per cent of pre-pandemic levels by the end of 2021.

Table

Impact of COVID-19 pandemic curbing measures on passenger transport volumes of metro and tram systems in ECE region cities

Table	*Impact of COVID-19 pandemic curbing measures on passenger volumes of metro systems in ECE region cities*		
City	*Lockdown Period(s)*	*Q2 2019 and Q2 2020 passenger volume difference*	*Q3 2019 and Q3 2021 passenger volume difference*
Sofia	13.03 - 15.06.2020 (94 days)	- 64%	- 17%
	28.11.2020 - 31.01.2021 (56 days)		
Prague	16.03 - 14.04.2020 (27 days)	- 57	- 34
	22.10.2020 - 28.03.2021 (174 days)		
Helsinki	08.03 - 28.03.2020 (20 days)	- 57%	- 31%
Paris[4]	17.03 - 11.05.2020 (55 days)	- 70%	+ 2%
	30.10 - 15.12.2020 (46 days)		
	19.03 - 18.04.2021 (30 days)		
Budapest	28.03 - 10.04.2020 (13 days)	- 66%	- 37%
Dublin	12.03 - 18.05.2020 (67 days)	- 86%[5]	- 24%[6]
	21.10 - 01.12.2020 (41 days)		
	24.12.2020 - 24.04.2021 (119 days)		

[4] Data for 2019 was not available for Paris. Comparisons were drawn with Q1 2020 data.
[5] Q1 2020 and Q 2 2020.
[6] Q1 2020 and Q4 2021.

Table	*Impact of COVID-19 pandemic curbing measures on passenger volumes of metro systems in ECE region cities*		
Belgrade	15.03 - 04.05.2020 (50 days)	- 53%	- 3%
Madrid	14.03 - 09.05.2020 (56 days)	- 79%	- 29%
Barcelona	14.03 - 09.05.2020 (56 days)	- 78%	- 25%
Boston	24.03 - 04.05.2020 (41 days)	- 89%	- 53%
Chicago	21.03 - 30.05.2020 (70 days)	- 89%	- 57%
New York	22.03 - 13.06.2020 (83 days)	- 87%	- 48%