



# CHANGES IN AIR TRAFFIC PATTERNS DURING COVID-19 AND AFTER

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- GITHUB URL-[https://github.com/silas-ph/Group\\_6\\_EDA](https://github.com/silas-ph/Group_6_EDA)

# QUESTIONS

**\*\*We are only making inferences based on our data\*\***

Covid time periods for analysis

Pre-Covid 1-2018 to 2-2020

During Covid 3-2020 to 7-2021

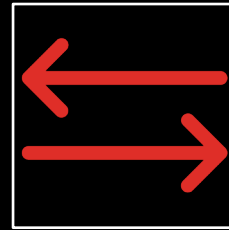
Post Covid 8-2021 to 12-23



How did air  
passenger traffic  
change?



When did passenger  
volume normalize?



How did the airfare  
change?



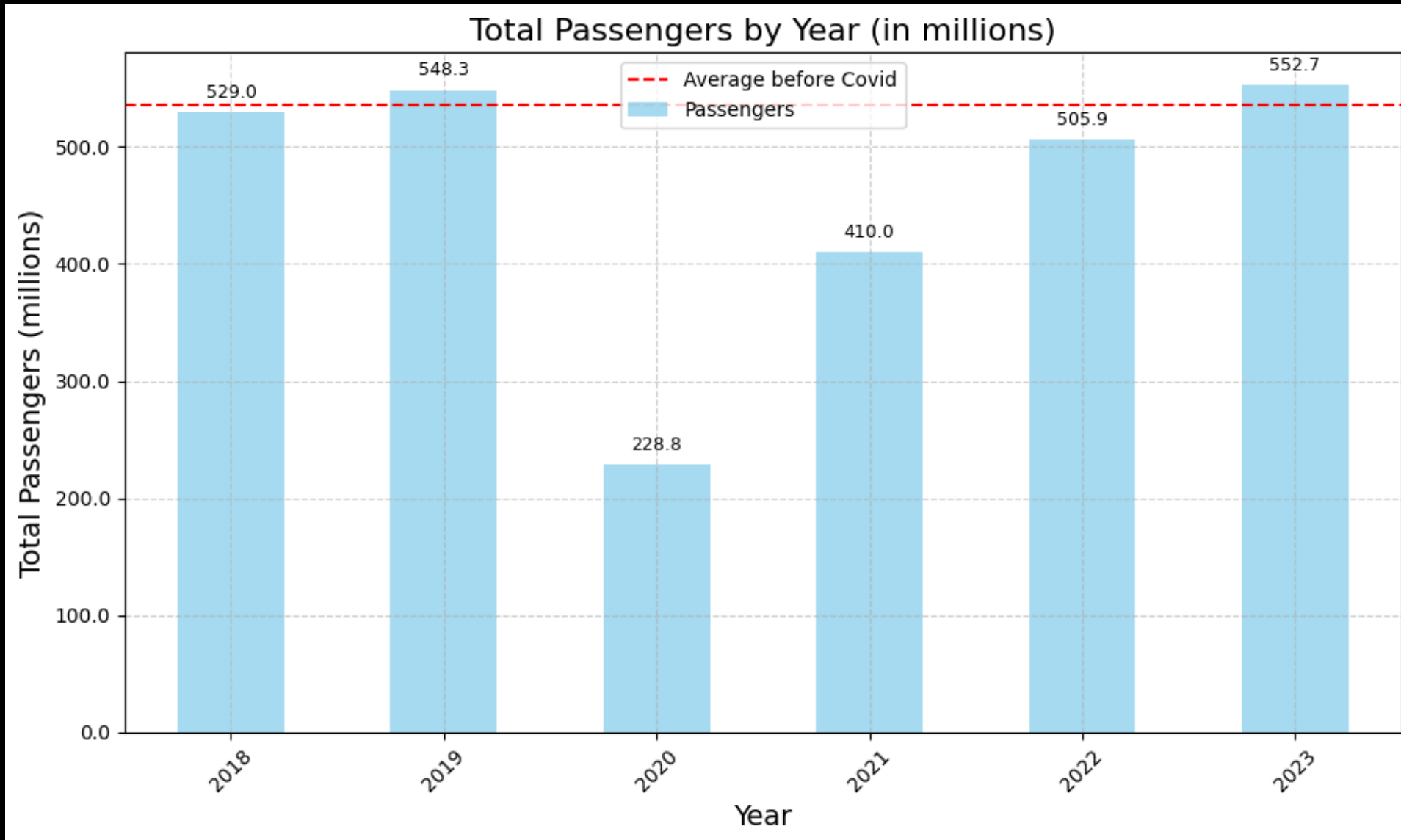
What are the  
changes before and  
after Covid-19?





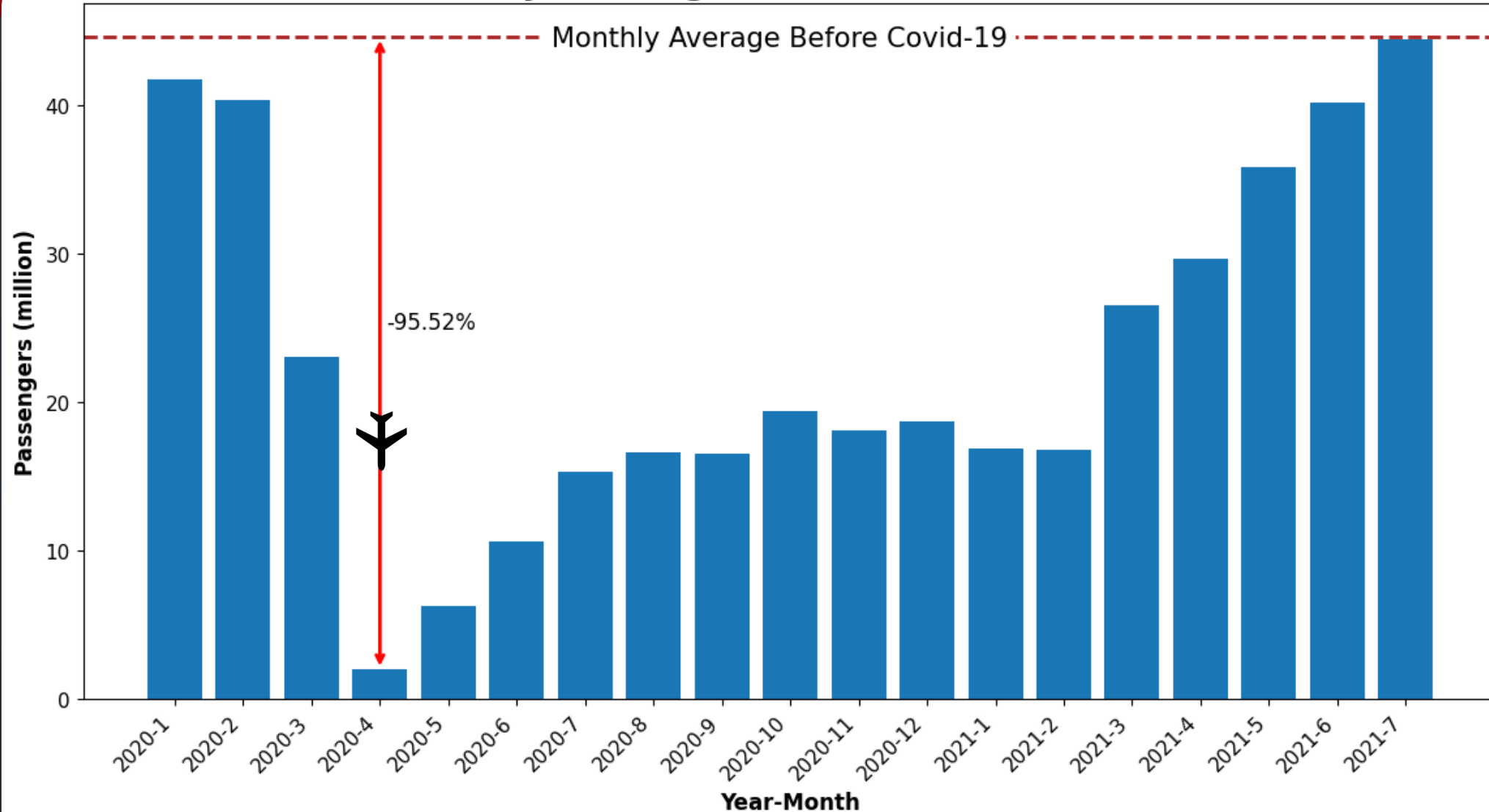
**RESULTS OF OUR ANALYSIS**

# QUESTION 1: HOW DID U.S. AIR PASSENGER TRAFFIC CHANGE?

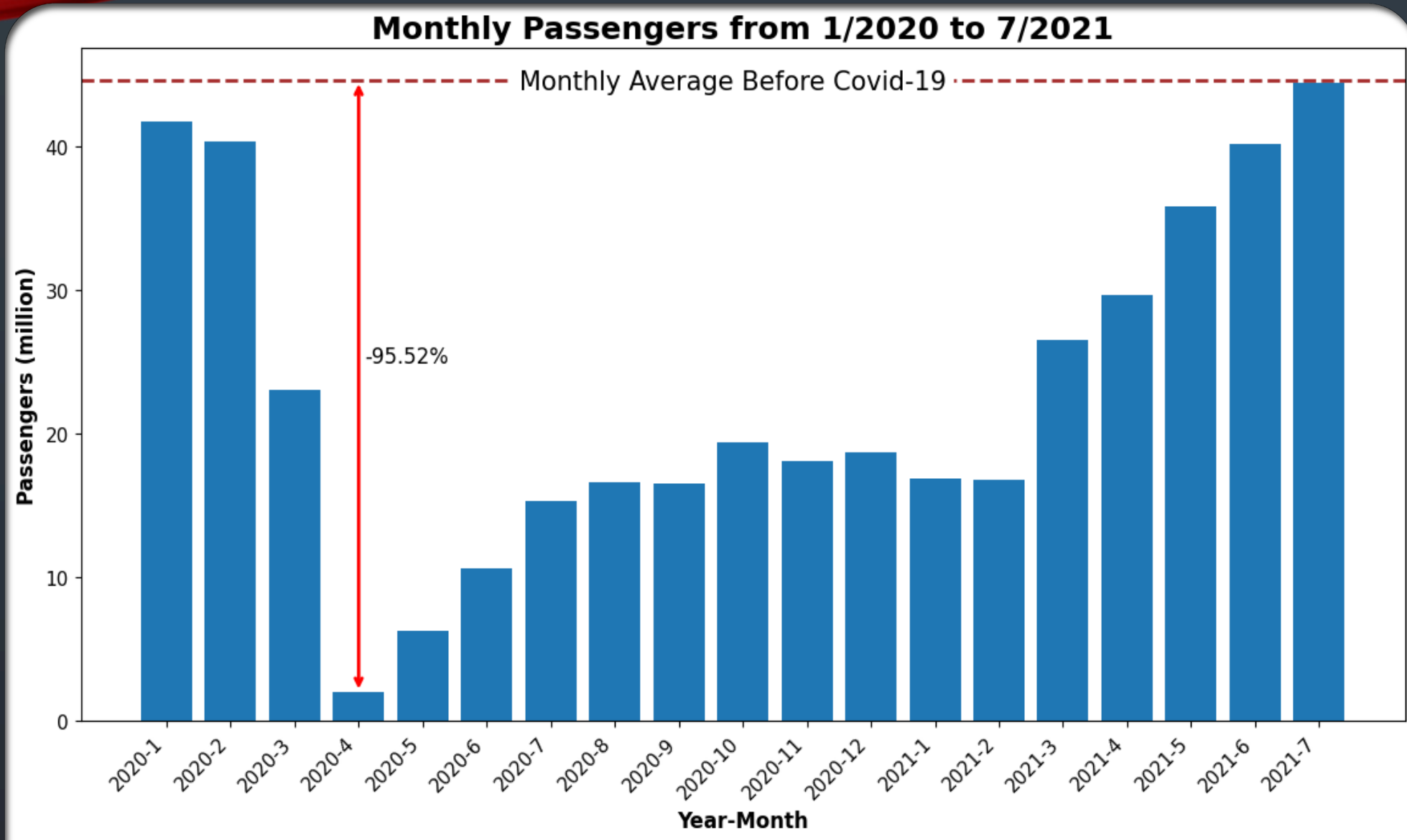


# QUESTION 1: CONTINUED

**Monthly Passengers from 1/2020 to 7/2021**

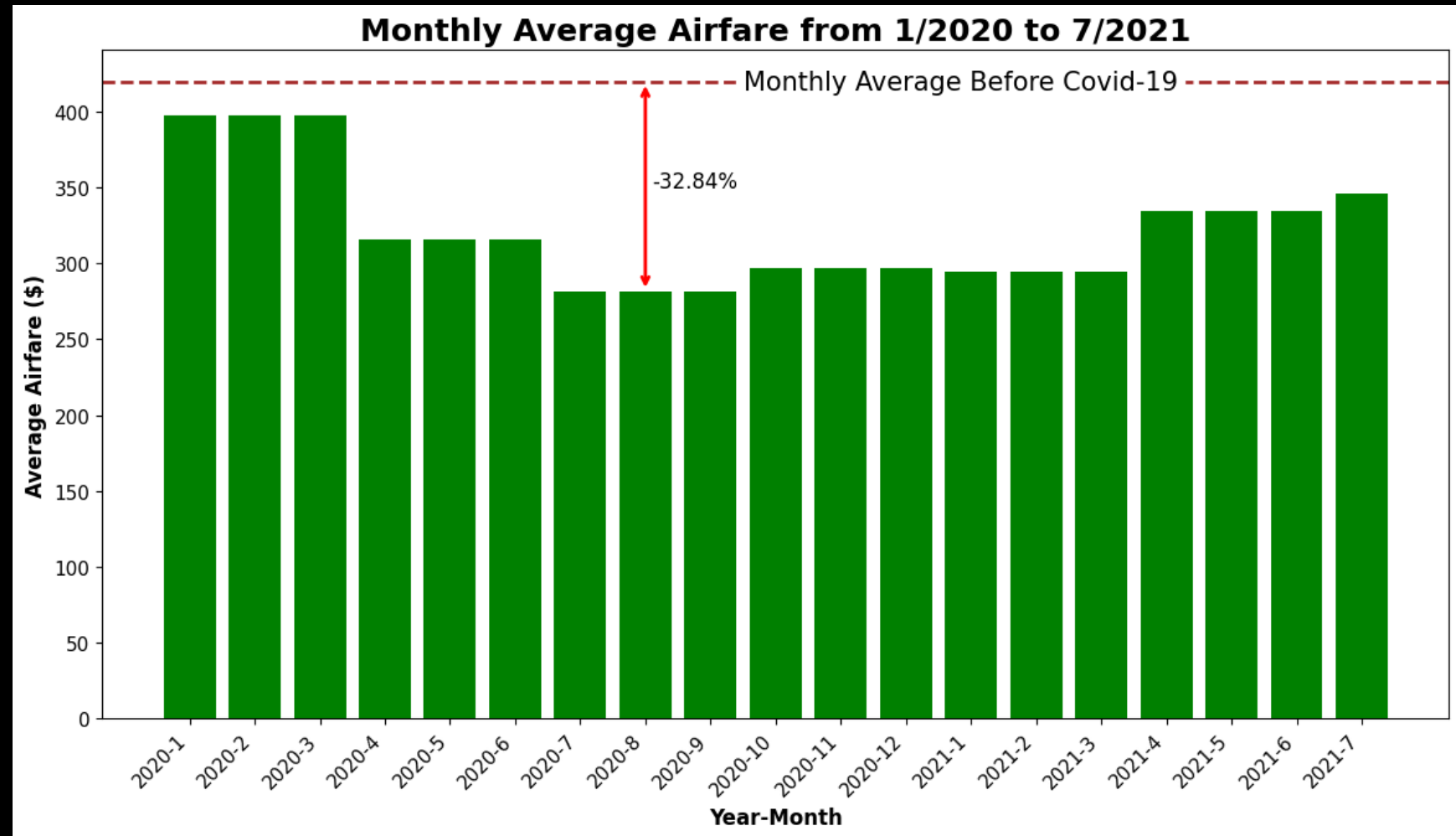


# QUESTION 2: WHEN DID PASSENGER VOLUME NORMALIZE?



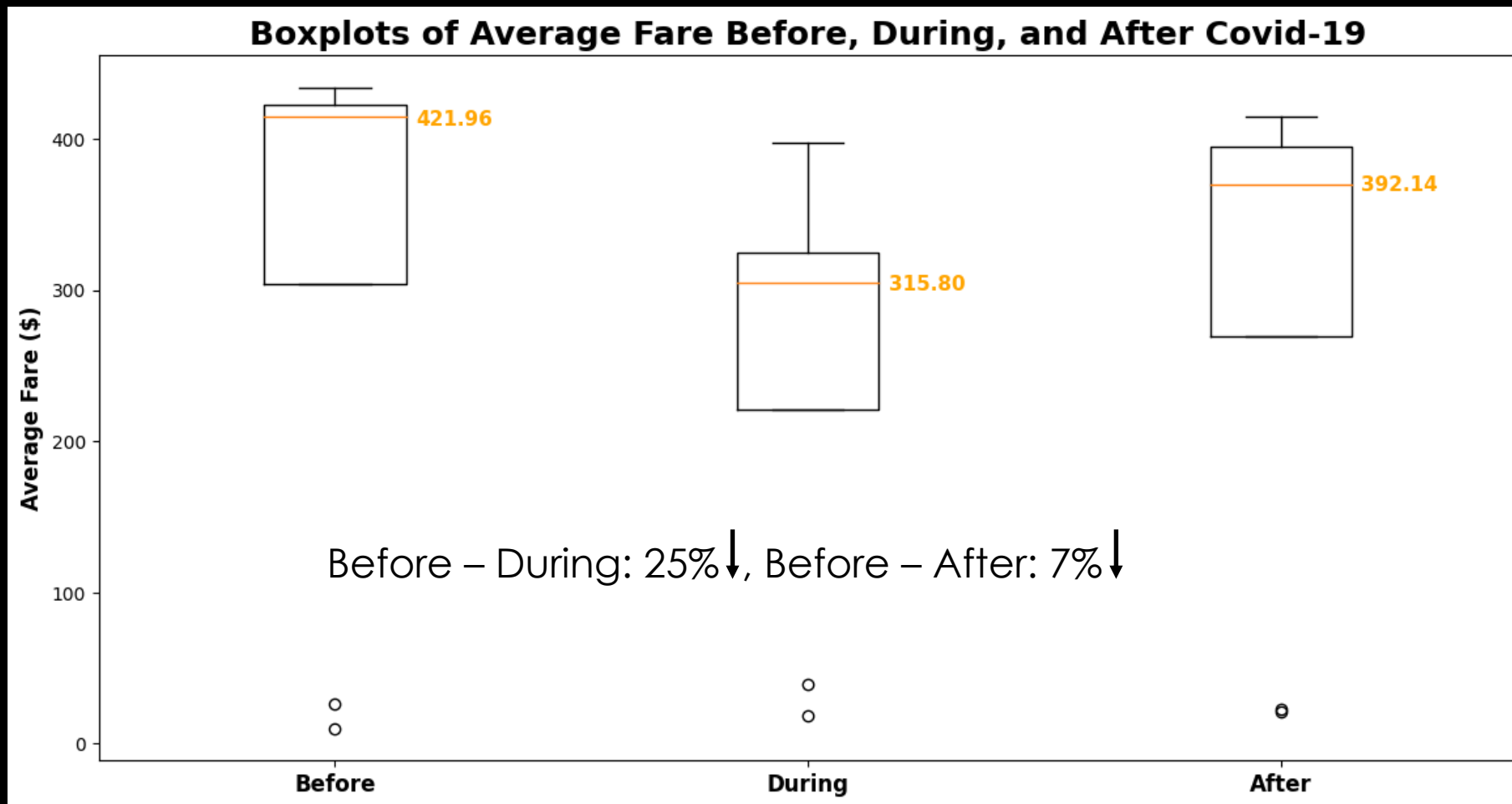
# QUESTION 3: HOW DID THE AIRFARE CHANGE?

\*\*Airfares by quarter adjusted for inflation\*\*



# QUESTION 4: CHANGES BEFORE AND AFTER COVID-19?

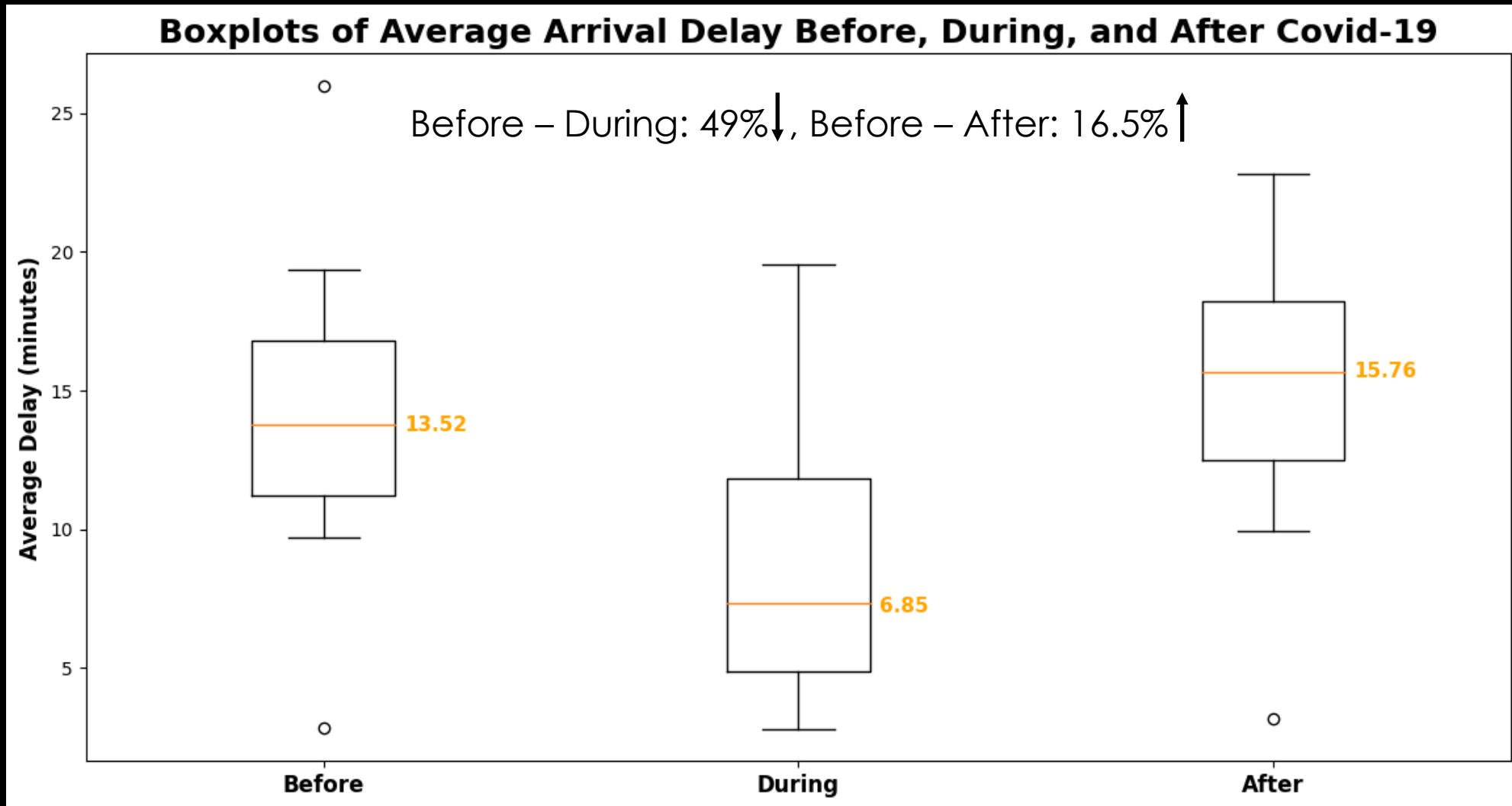
Change of airfare





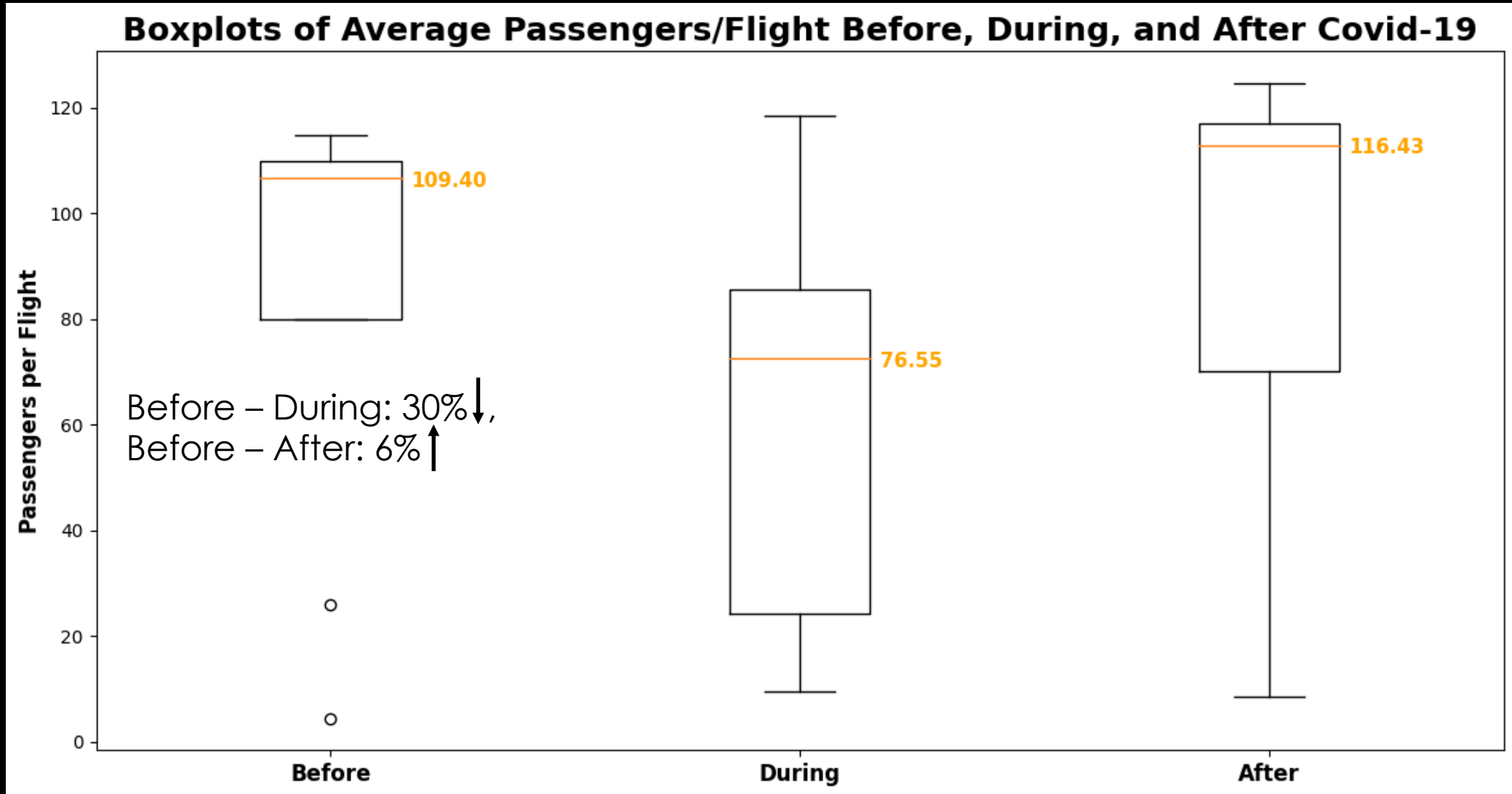
# QUESTION 4: CHANGES BEFORE AND AFTER COVID-19?

## Change of arrival delays



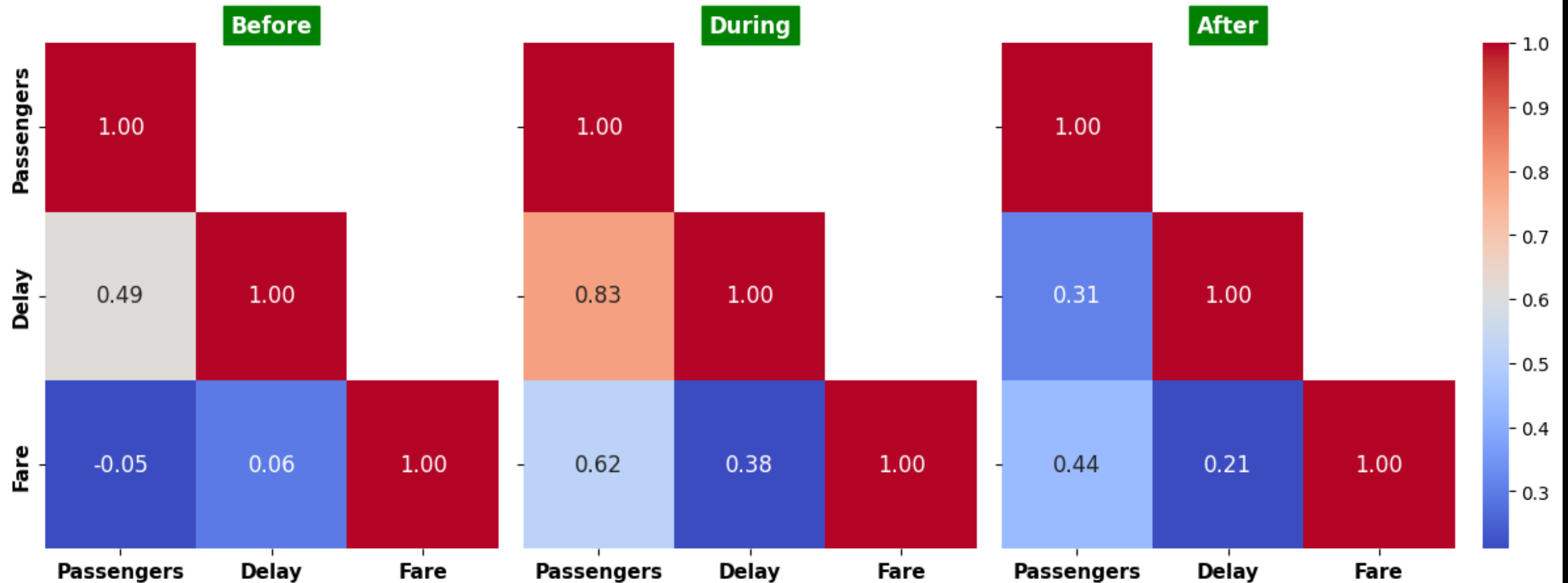
# QUESTION 4: CHANGES BEFORE AND AFTER COVID-19?

Change of passengers per flight



# OTHER RESULTS

Correlations between Passengers, Arrival Delay, Air Fare



# CONCLUSION

## Key Points:

- Passenger volume decreased by 95.5%, number of flights decreased by 75.5% , airfare decreased by 32.8%
- Airfares reached their minimum about three months after passenger volume reached its lowest point.
- The decline in airfares was less severe than the decline in passenger volume or the number of flights.
- Airfare is still lower, arrival delays are higher, number of passengers per flight is higher, and correlation between passenger volume and airfare still moderately strong.







## TOPICS FOR FURTHER INVESTIGATION

- What explains the difference in decline between passenger volumes, number of flights, and average airfare?
- What is the exact month when the airfare reached its minimum?

# EDA METHODS AND TECHNIQUES USED FOR THIS REPORT



Download and  
import files



Use glob, for  
loops, check &  
correct NA, drop  
duplicates



Merge &  
combine the files  
into different  
DataFrames for  
analysis



Consistency  
checks



Combine data  
into summary  
DataFrame



Data exploration

# CHALLENGES AND PROBLEM



STORAGE ISSUES WITH GITHUB



LARGE DATASETS CREATED  
STORAGE ISSUES BOTH  
LOCALLY



AIRFARE DATA WAS ONLY  
AVAILABLE BY QUARTER NOT  
BY MONTH

# SOURCES

The data used for the report falls under the Freedom of Information act. United States.  
Department of Transportation. (2022). *Managing Rights*. <https://doi.org/10.21949/1520564>

## Flight Data

Dataset Title: Marketing Carrier On-Time Performance (Beginning January 2018)  
U.S. Department of Transportation,  
Department of Transportation  
Statistics  
URL:  
[https://www.transtats.bts.gov/DL\\_SelectFields.aspx?gnoyr\\_VQ=FGK&QO\\_fu146\\_anzr=b0-gvzr](https://www.transtats.bts.gov/DL_SelectFields.aspx?gnoyr_VQ=FGK&QO_fu146_anzr=b0-gvzr)  
Dates Accessed: 4/8/2024 - 4/17/2024.  
Other Details: Data retrieved from January 2024 to December 2023 as monthly '.csv' files.

## Passenger Data

Dataset Title: Passengers All Carriers – All Airports  
U.S. Department of Transportation,  
Department of Transportation  
Statistics  
URL:  
[https://www.transtats.bts.gov/Data\\_Elements.aspx?Data=2](https://www.transtats.bts.gov/Data_Elements.aspx?Data=2)  
Dates Accessed: 4/8/2024 - 4/17/2024.  
Other Details: Select “U.S. Carriers” and each major airport from the dropdowns and retrieve a '.csv' file for every major airport. Data from October 2002 through December of 2023.

## Airfare Data

Dataset Title: Average Domestic Airline Intinerary Fares U.S.  
Department of Transportation,  
Department of Transportation  
Statistics  
URL:  
<https://www.transtats.bts.gov/AverageFare/>  
Dates Accessed: 4/10/2024 - 4/13/2024 – 4-18-2024  
Other Details: Average airfare is by quarter.



# ADDITIONAL RESOURCES USED

## Using Python glob function

<https://www.geeksforgeeks.org/how-to-use-glob-function-to-find-files-recursively-in-python/>

## Replicate columns

<https://www.statology.org/pandas-replicate-rows/>

## Visualizations

[https://matplotlib.org/stable/gallery/lines\\_bars\\_and\\_markers/bar\\_chart.html#sphx-glr-gallery-lines-bars-and-markers-barchart-py](https://matplotlib.org/stable/gallery/lines_bars_and_markers/bar_chart.html#sphx-glr-gallery-lines-bars-and-markers-barchart-py)

[https://matplotlib.org/stable/api/axes\\_api.html#module-matplotlib.axes](https://matplotlib.org/stable/api/axes_api.html#module-matplotlib.axes)

To fix correlation matrix: Seaborn heat map doesn't display annotations for all rows #14363, <https://github.com/microsoft/vscode-jupyter/issues/14363>, accessed on 4/17/2024

[https://matplotlib.org/stable/gallery/lines\\_bars\\_and\\_markers/bar\\_chart.html#sphx-glr-gallery-lines-bars-and-markers-barchart-py](https://matplotlib.org/stable/gallery/lines_bars_and_markers/bar_chart.html#sphx-glr-gallery-lines-bars-and-markers-barchart-py)

[https://matplotlib.org/stable/api/axes\\_api.html#module-matplotlib.axes](https://matplotlib.org/stable/api/axes_api.html#module-matplotlib.axes)

<https://medium.com/Stackoverflow.com>

[www.python.org](http://www.python.org)



# QUESTIONS AND ANSWERS