# ASSIGNMENT 2

GIORDANO VITALE

ID: 14310A

SLIDE 2

Comment:

- all the series span from the 1947Q4 to 2023Q1. This means each series contains 306 observations (quarters).

- Series **GDP** shows an increasing trend, as well as seasonality. Two significant troughs are visible: the one in 2008 and the one in 2020. One huge increase is visible after 2020, and considering it is nominal data, this may be due to inflation. In fact, the deflator increased in the same time period.

- Series **Pop** shows an increasing trend. It doesn't seem to show cycles or seasonality. Moreover, the pattern is smooth and linear. The data are in thousands.

- series **Defl** is increasing, even though not linearly. We can spot a significant increase after 2020, probably as a consequence of inflation. Base year is 2012=100

SLIDE 3

Real GDP per capita, thousands of dollars
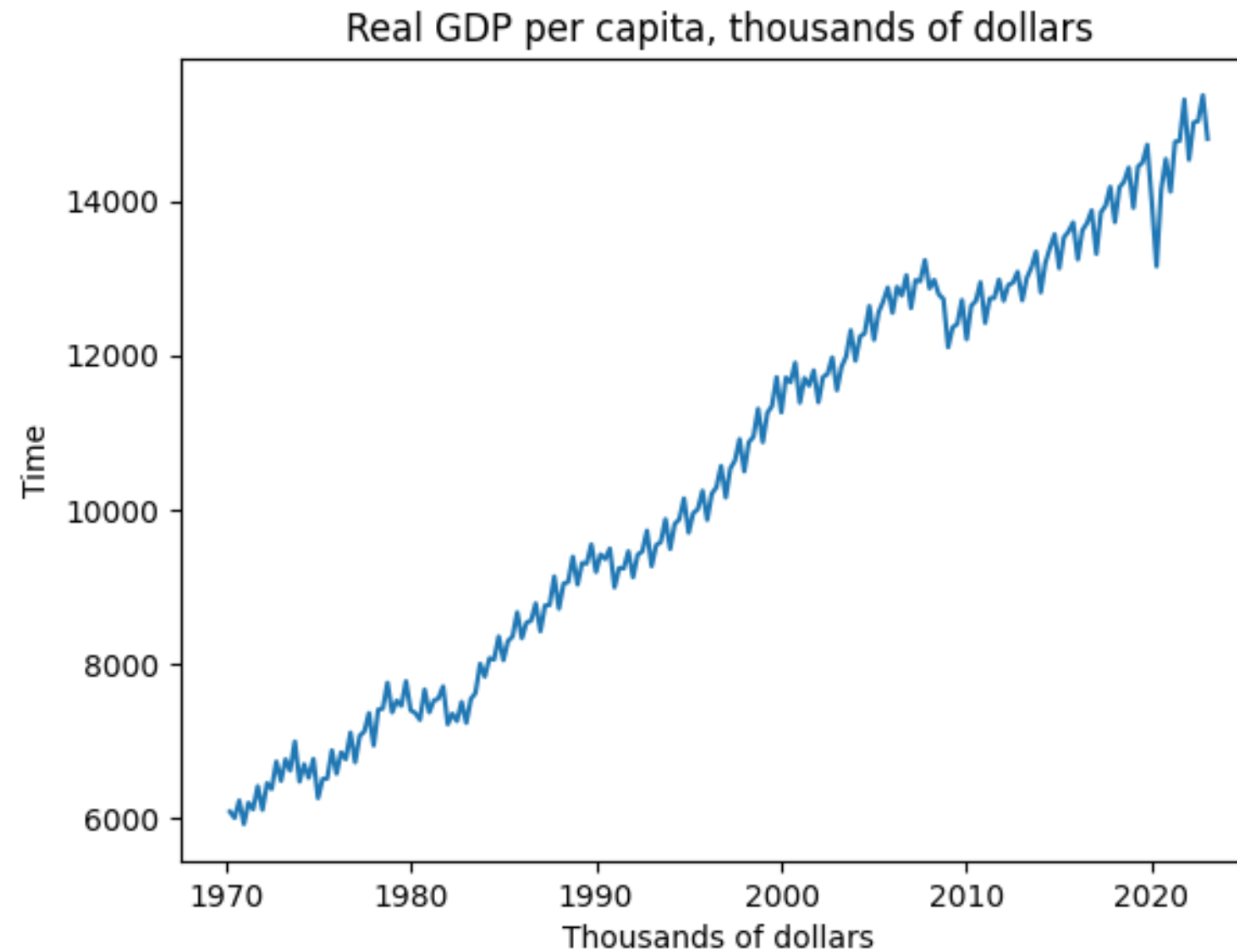
- visible long term increasing trend,
- as well as cycles that last 5 years, 10 years sometimes. For instance, 1992-2003 roughly it's an expansion, while 2007-2009 is negative cycle
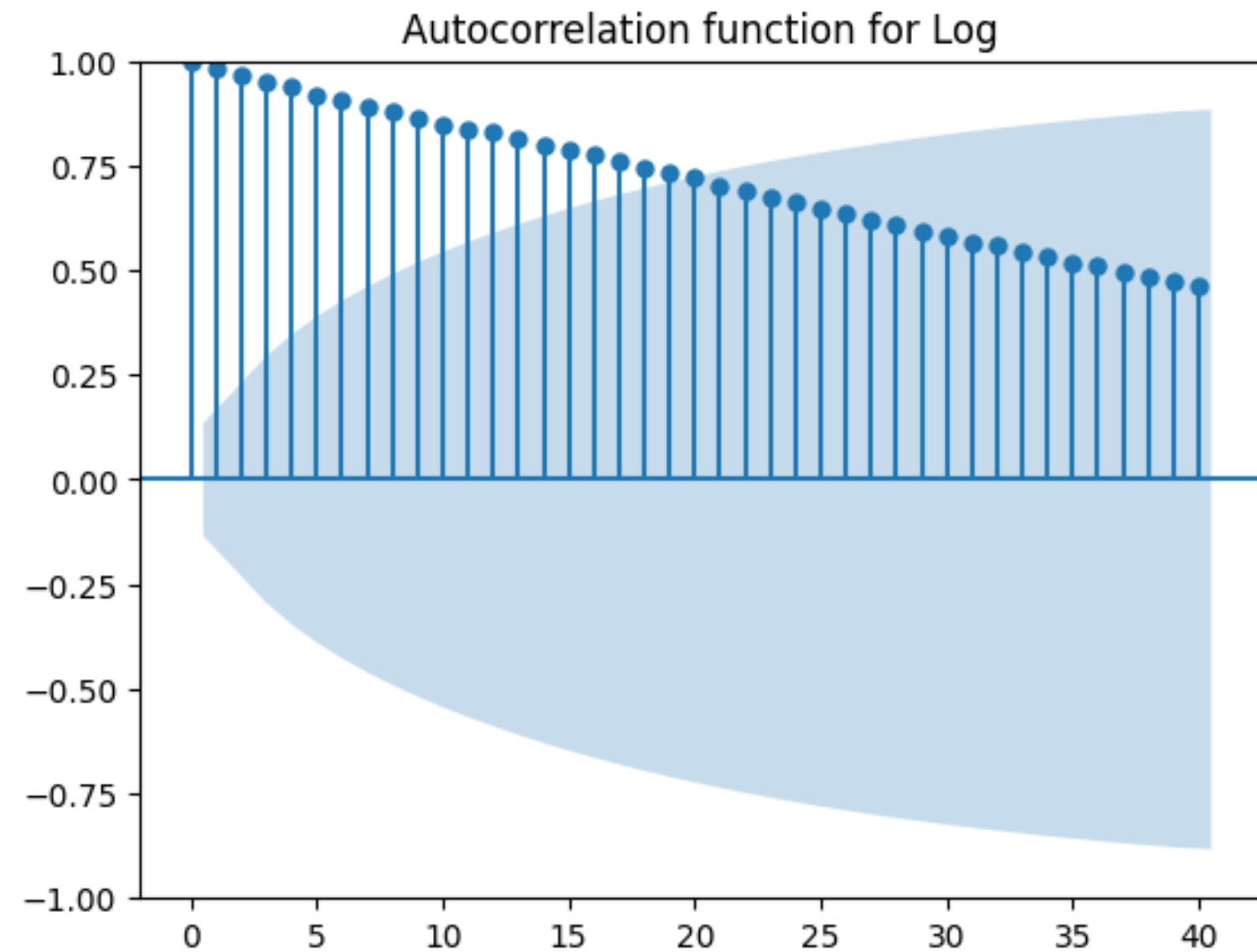- also seasonality is pretty visible

SLIDE 4

Sample average is

1.77

considering that I filled with 0 the first one

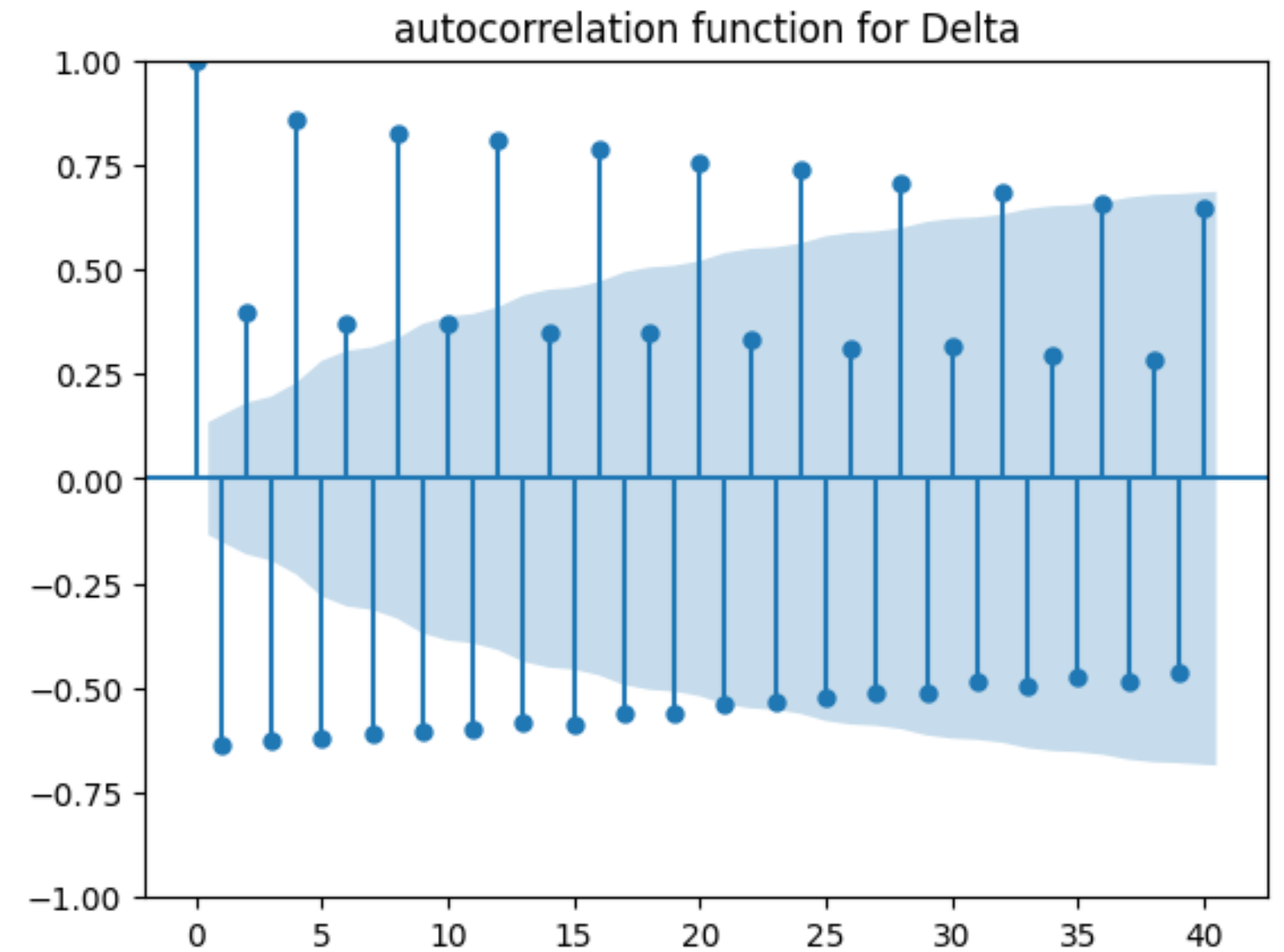Autocorrelation function for Log

autocorrelation function for Delta

Here there is a gradual decreasing in the values of the autocorrelation coefficients

The ones until lag 20 can be considered different from zero with a 95% confidence interval.

After lag 20, there's no significant relationship between the series and its lagged values.

Differently from the previous case, here the coefficients seem more erratic, they alternate positive values with negative.

Moreover, there seems to be a negative correlation within the series for high lags, >22lags

Furthermore, coefficients for positive correlation fluctuate from statistically significant to non-significant
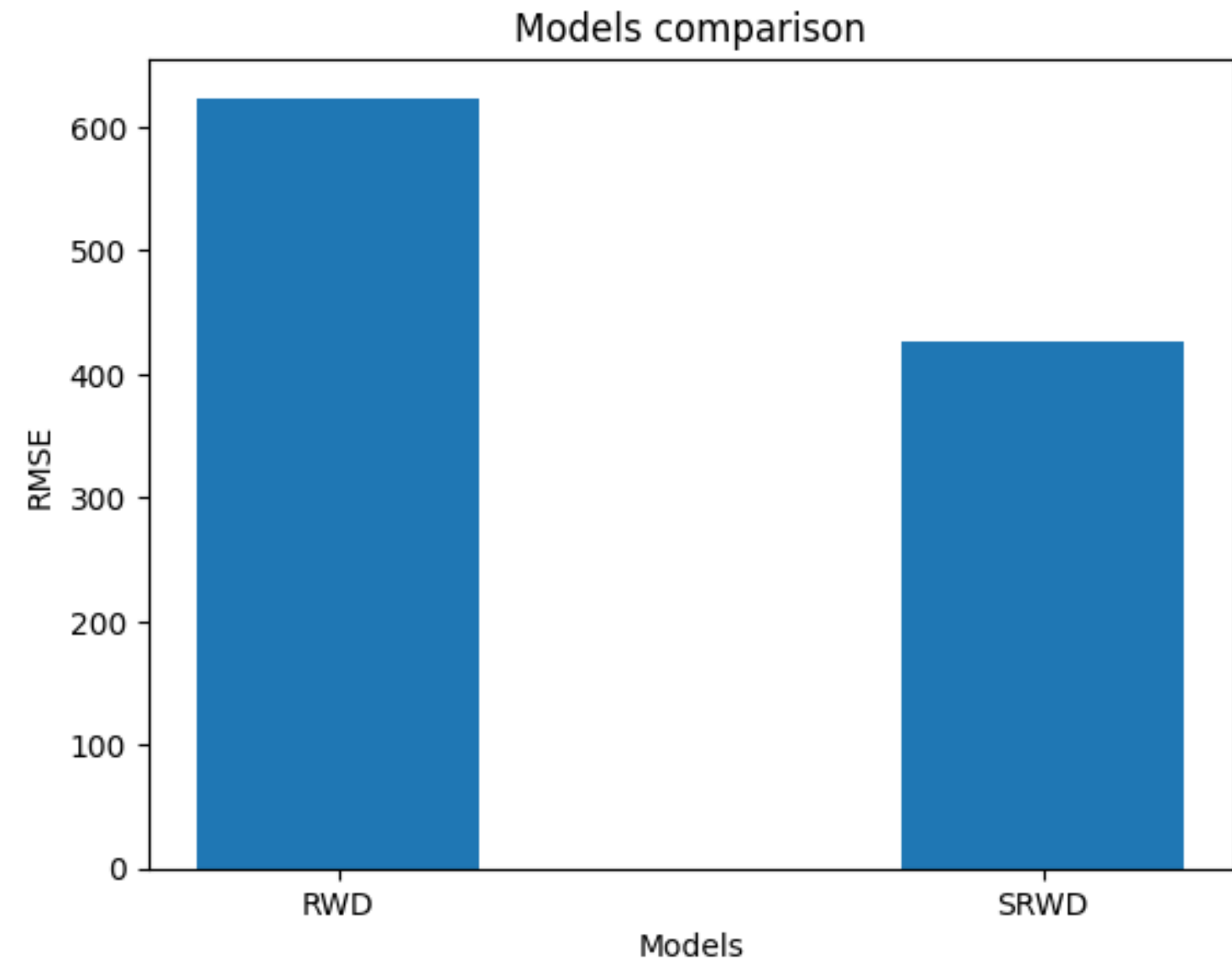
SLIDE 6
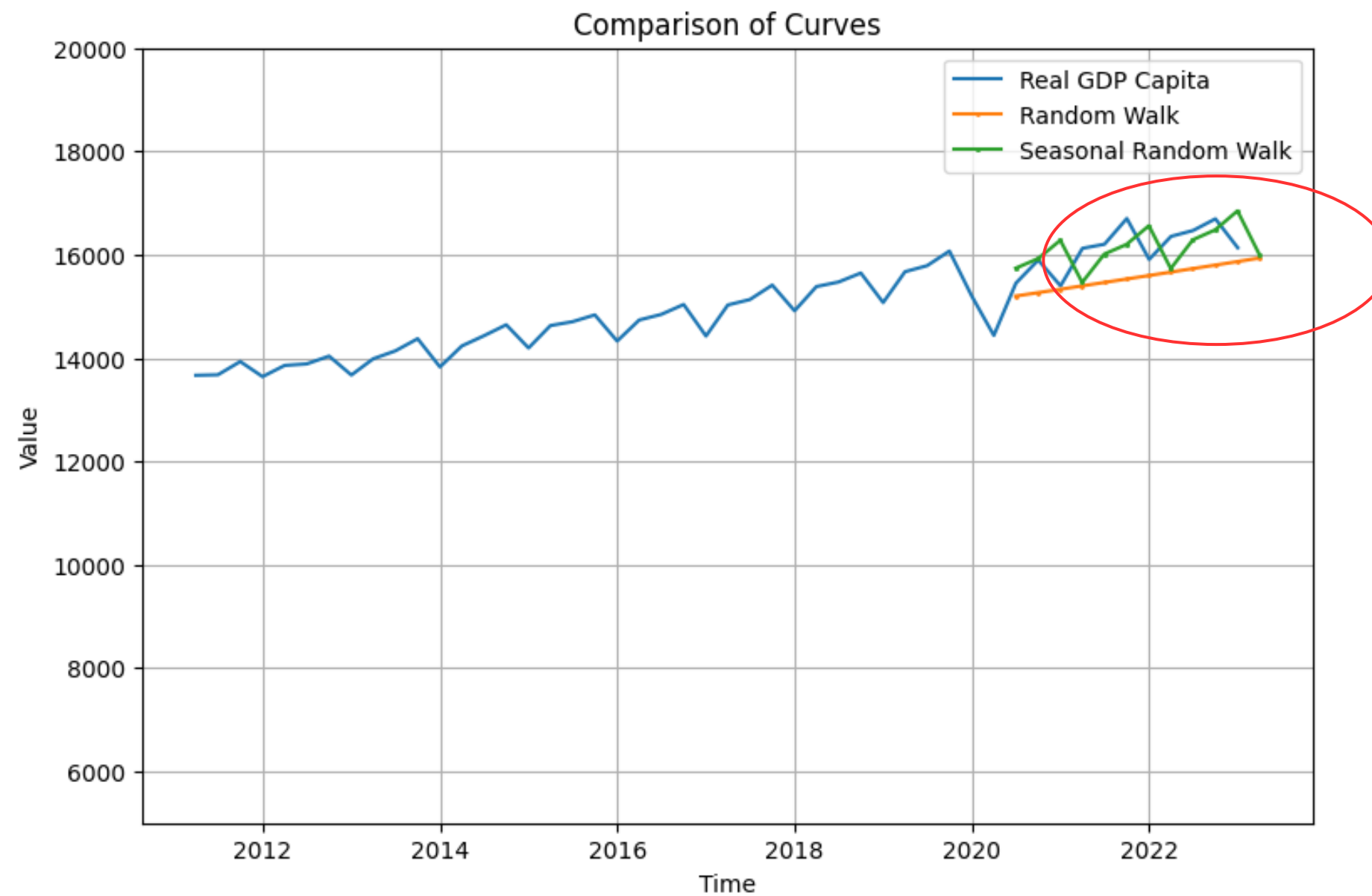
I plotted the data from 2010 (roughly) just to make the predictions more visible

SLIDE 7

RMSE for random walk with drift is
623.39

RMSE for SEASONAL RW with drift is
425.66

Models comparison

RMSE for seasonal model is lower, meaning that it performs better in predicting the out-of sample data