SOUVENIR SHOP MONTHLY SALES FORECASTING

RUTGERS BUSINESS SCHOOL - BUSINESS FORECASTING

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CONTENT

Dataset Description

Exploratory Data Analysis (Approach)

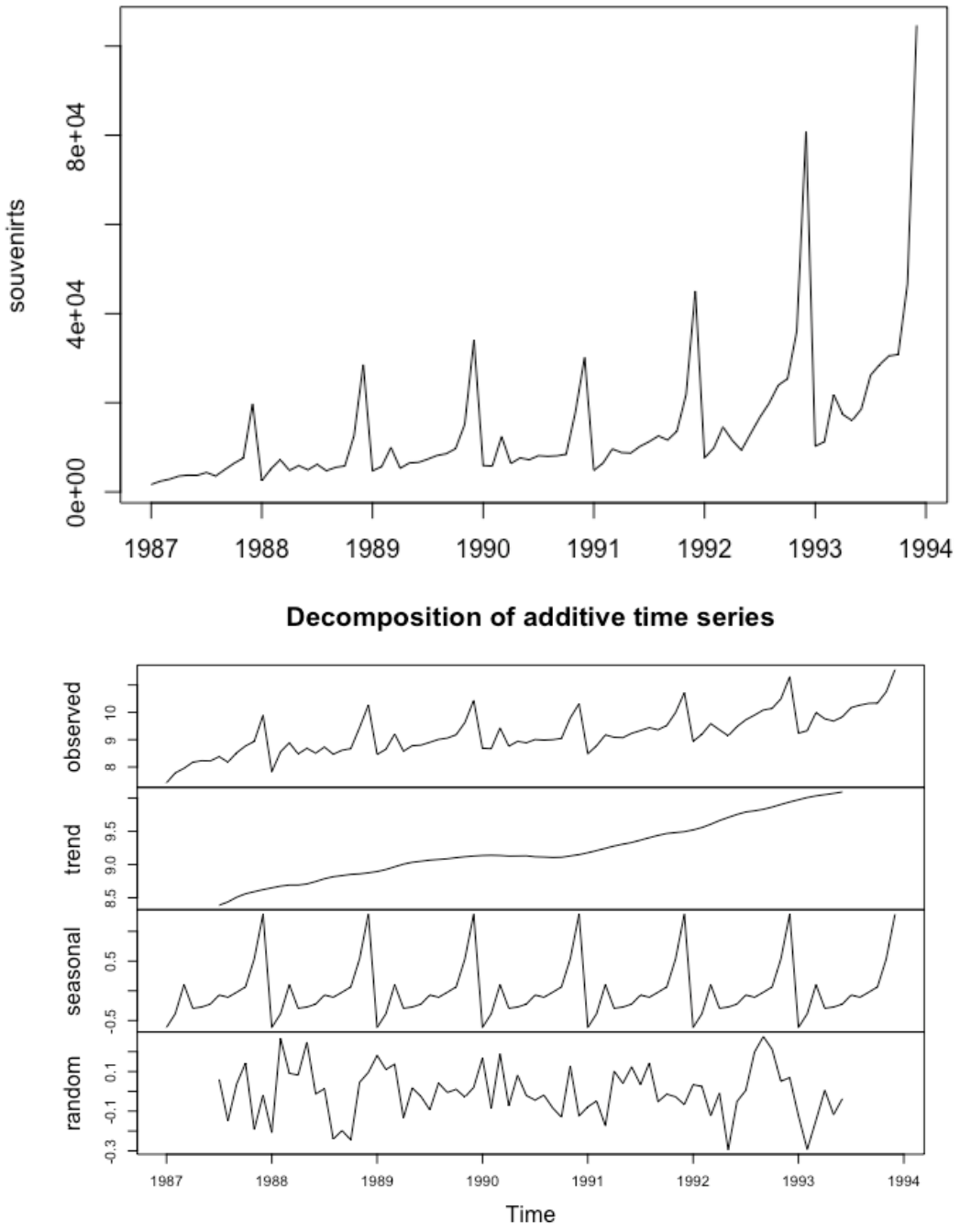
Forecasting/Prediction

Conclusion

DATASET

Monthly sales for a souvenir shop at a beach resort town in Queensland, Australia, for January 1987-December 1993.

The original data from Wheelwright and Hyndman, 1998.

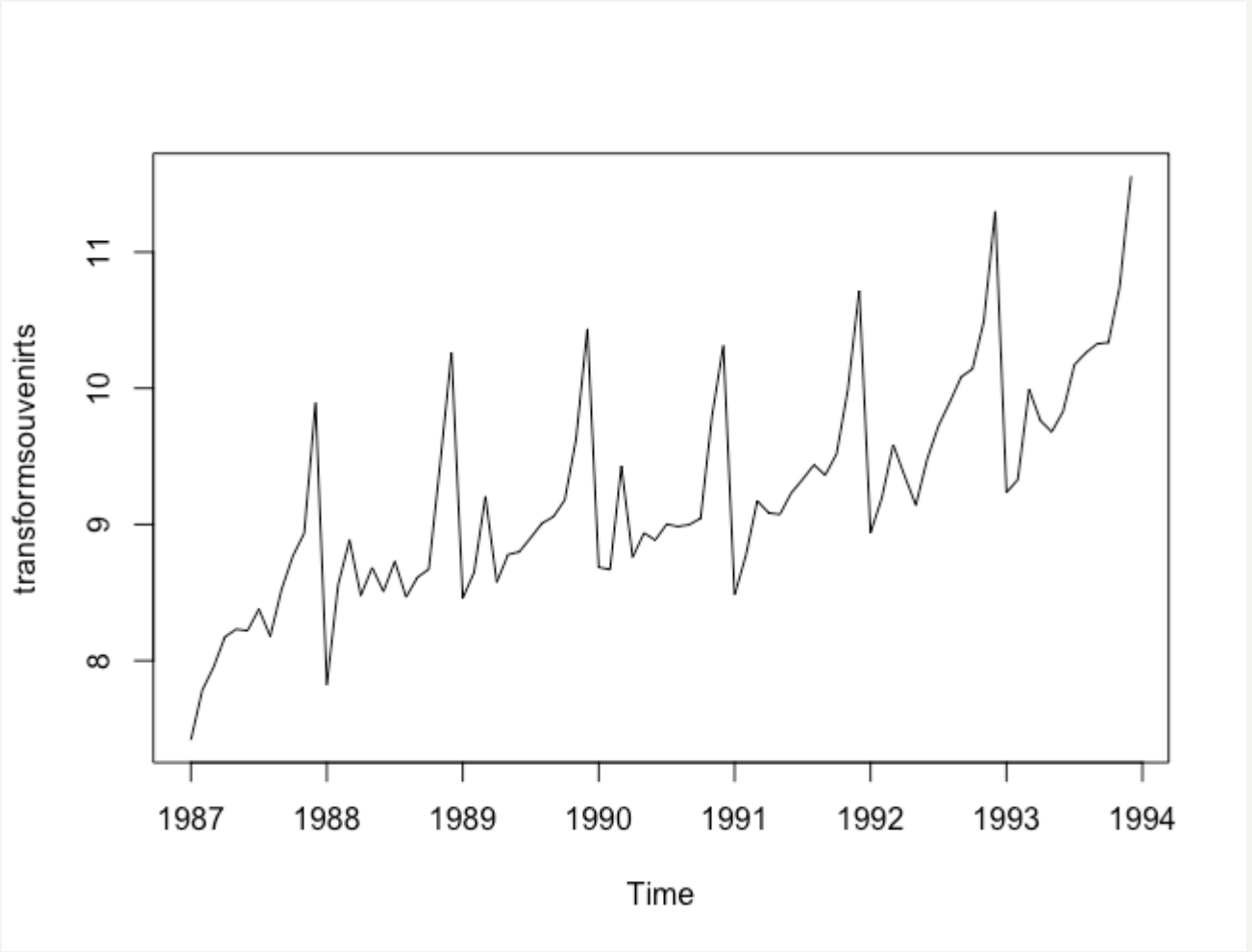


LOOKING AT THE DATA

- Size of the seasonal fluctuations seem to increase with the level of the time series.
- Transformation using log

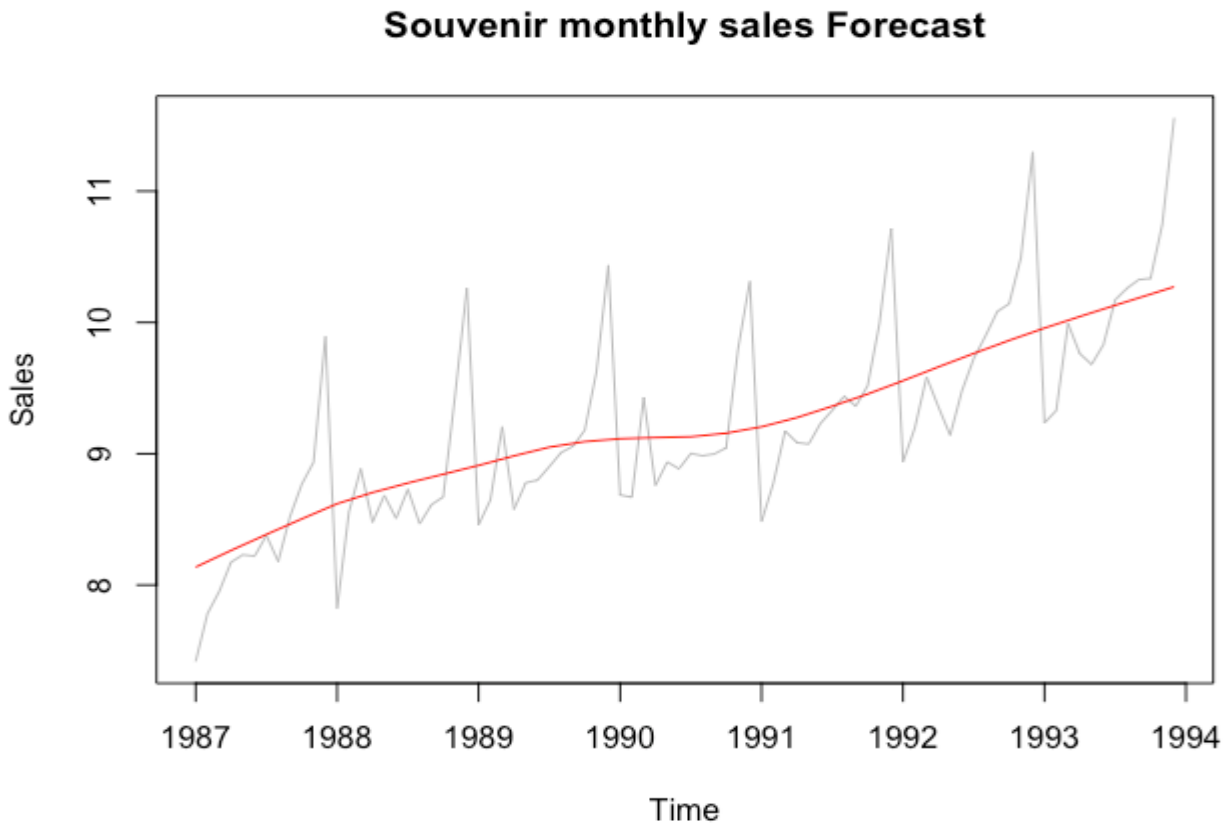
LOG TRANSFORMATION

- Roughly constant over time, and do not depend on the level of the time series.
- Can probably be described using an additive model.

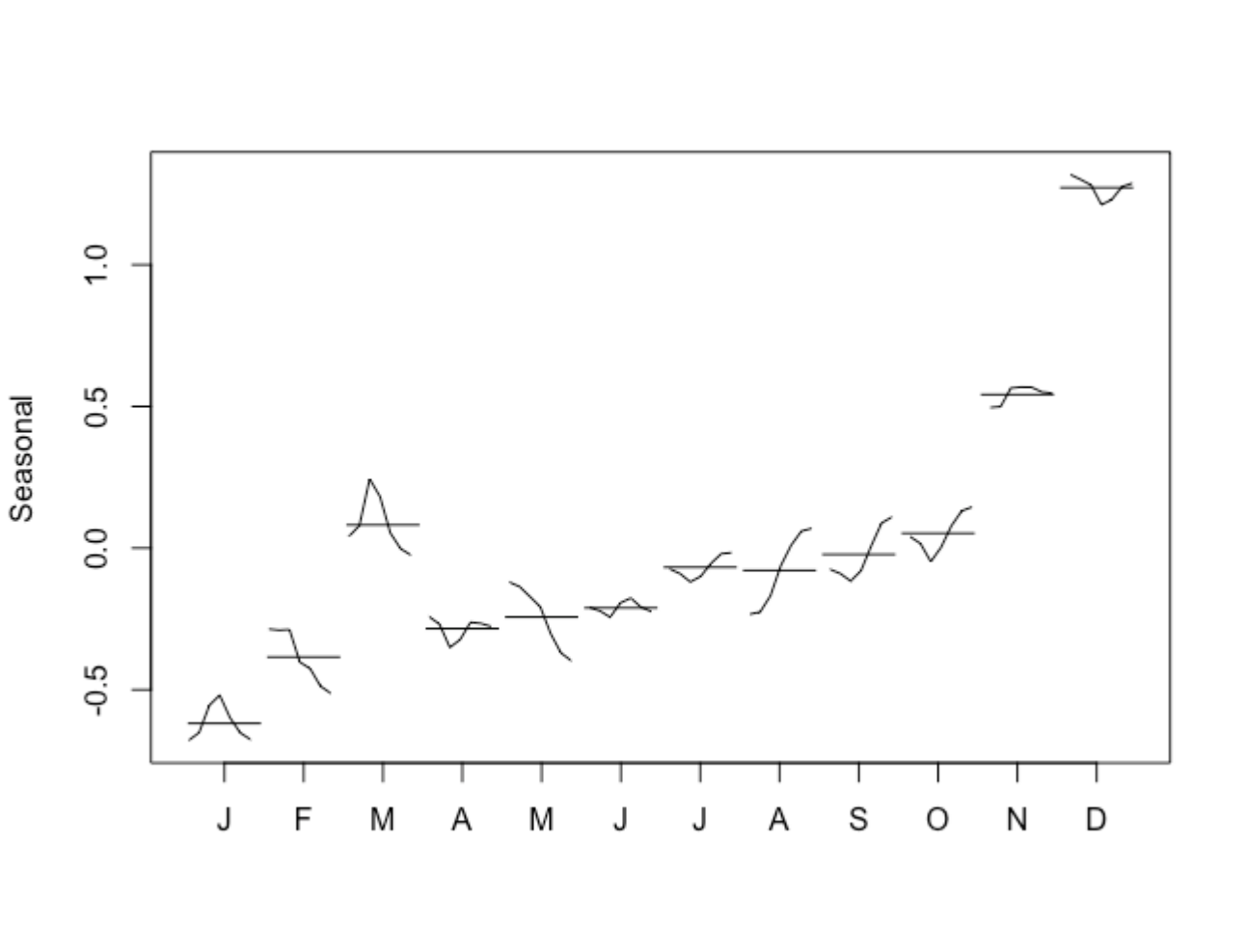


Trend on the Monthly forecasting

- The red line shows the trend

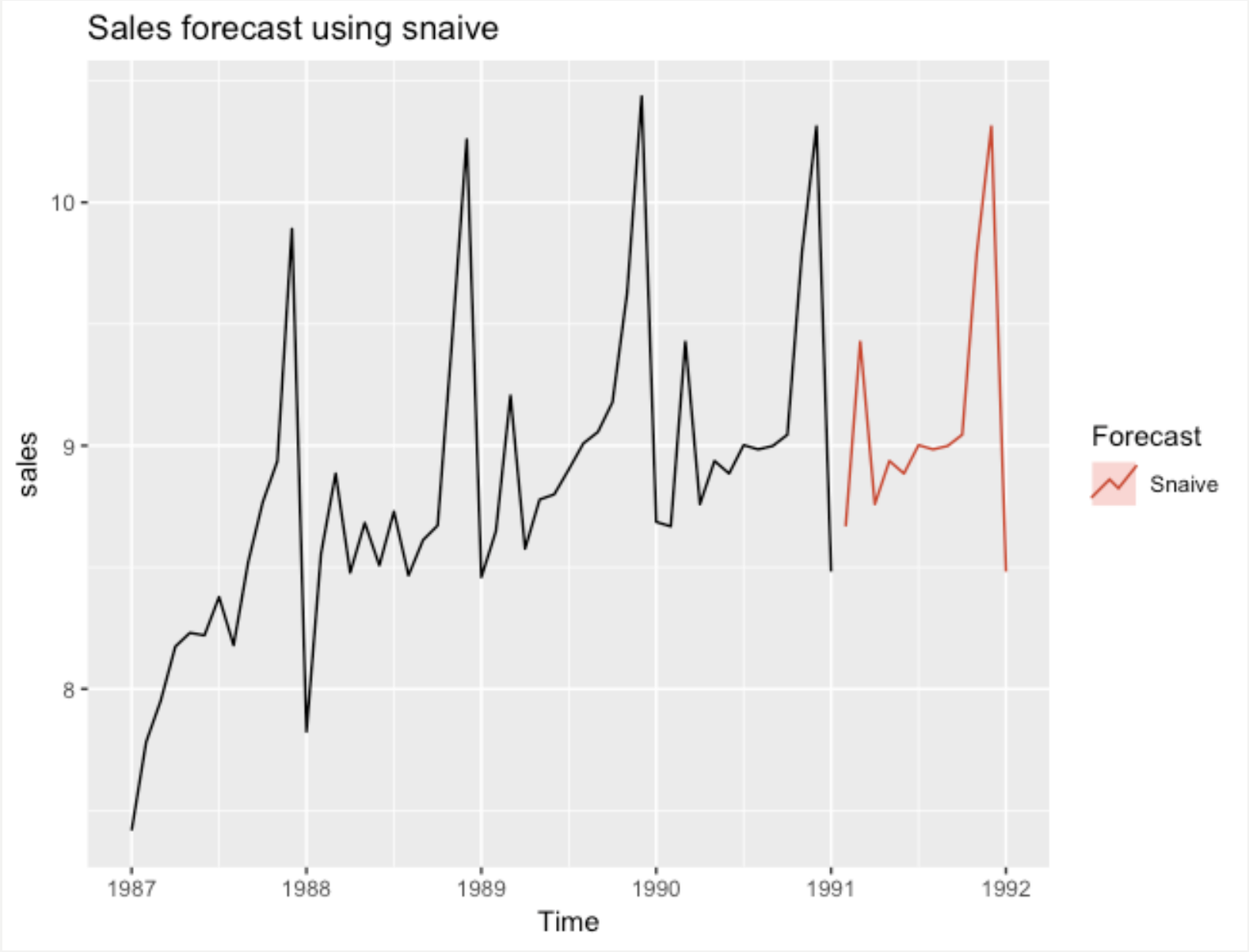


MONTHLY SEASONALITY

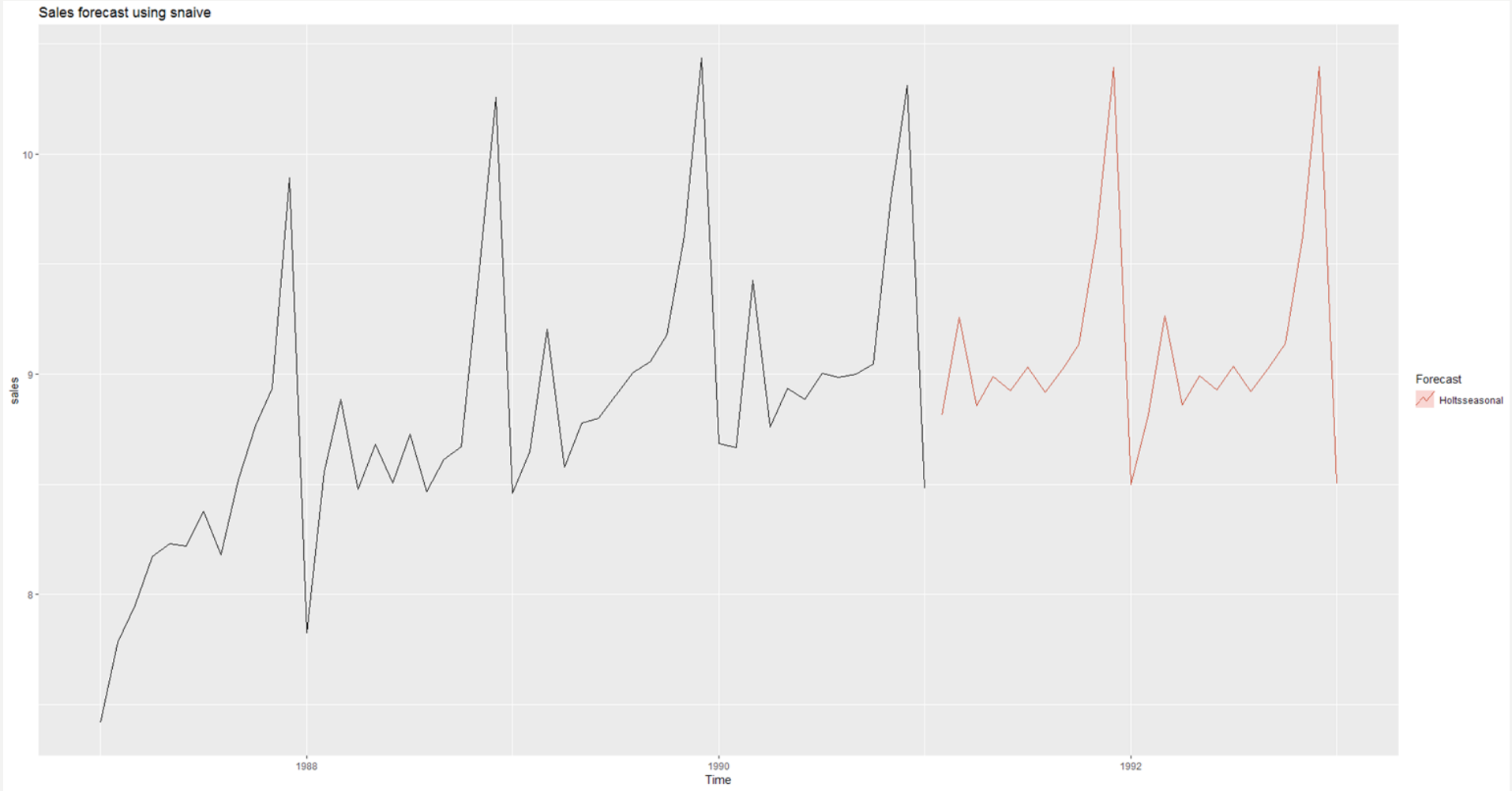


- It has varying seasonality we can have seasonal subseries plots of the seasonal component
- Helps to visualize the variation in the seasonal component over time

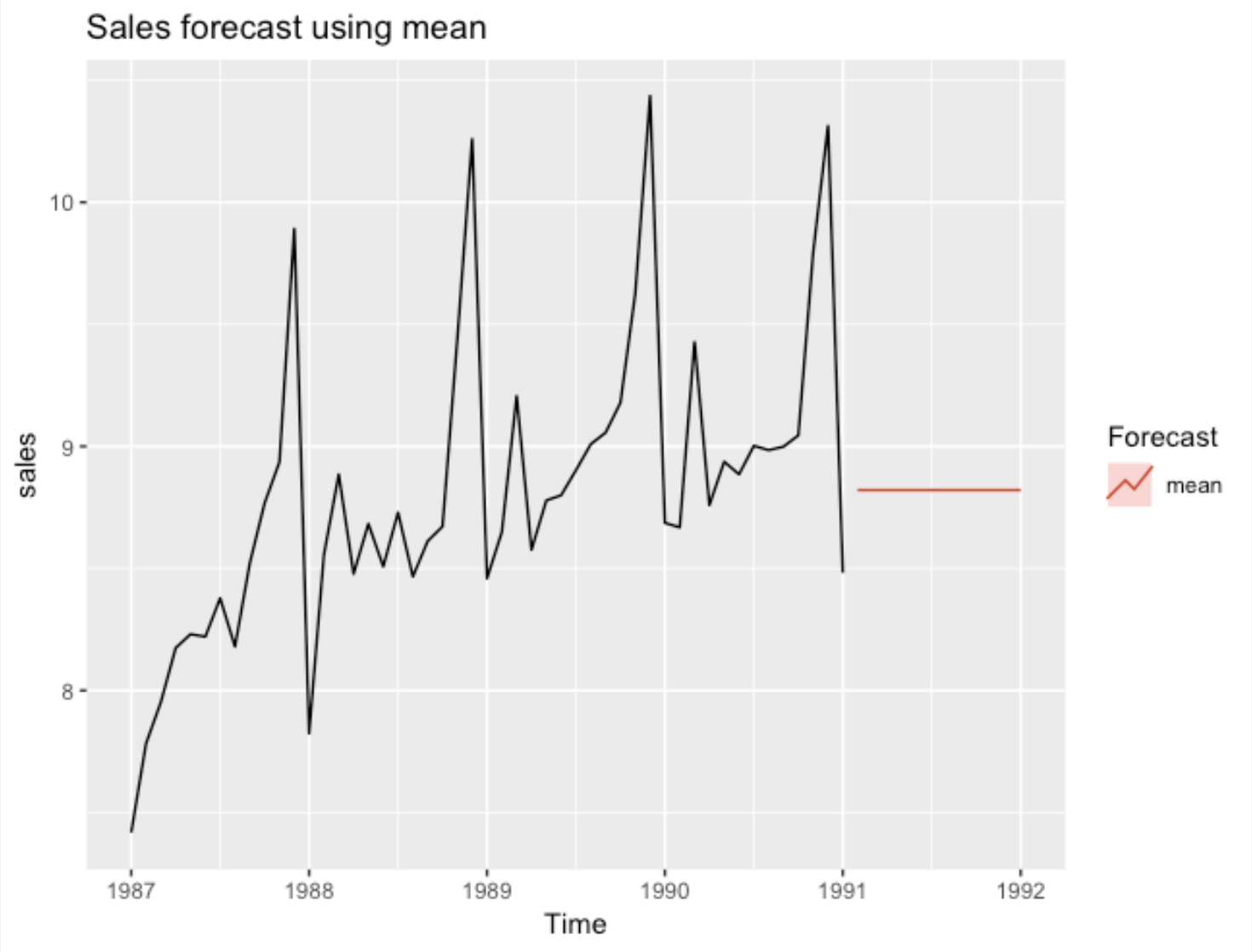
SEASONAL NAIVE



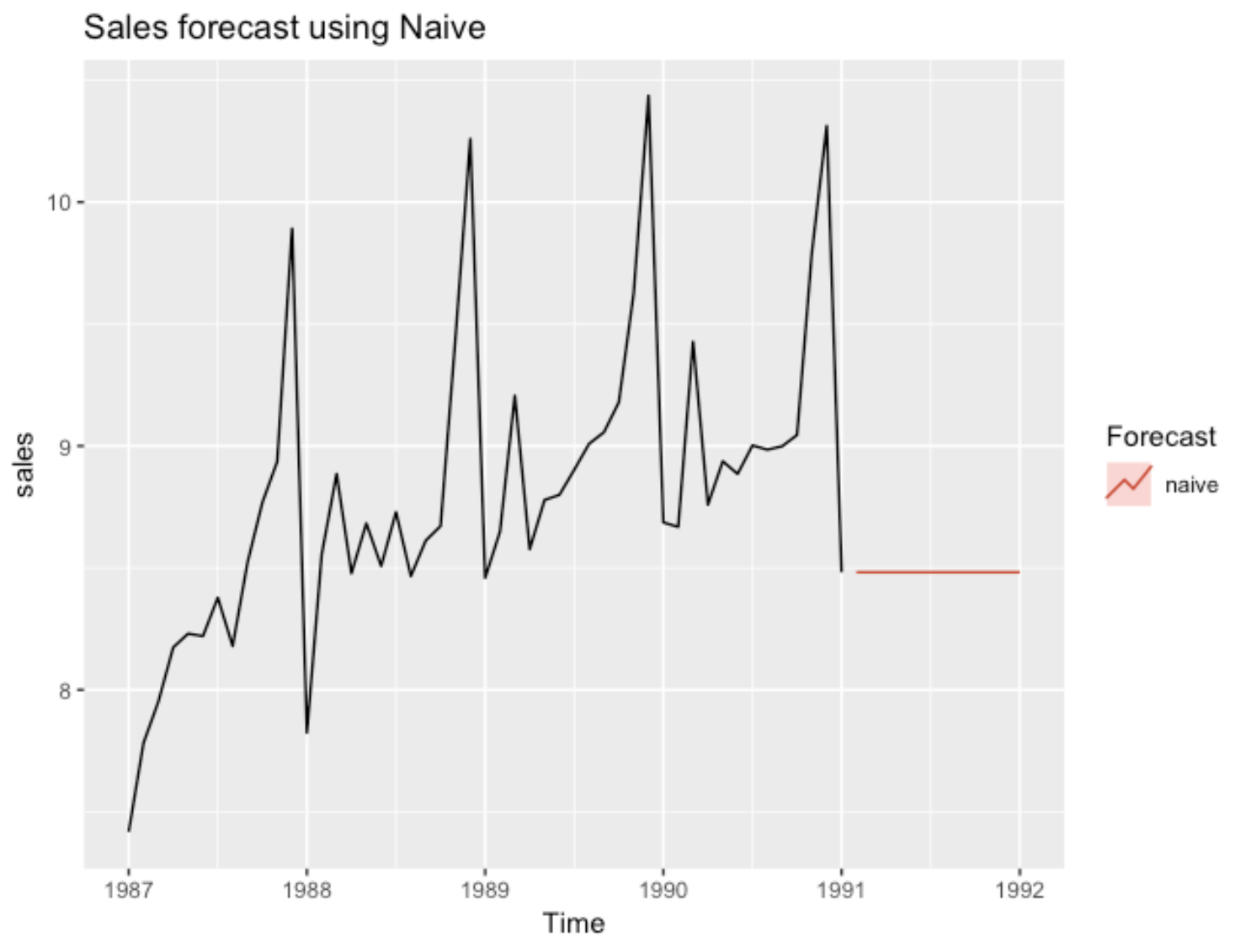
Holts-Winters' Seasonal Method



Mean model to predict the values

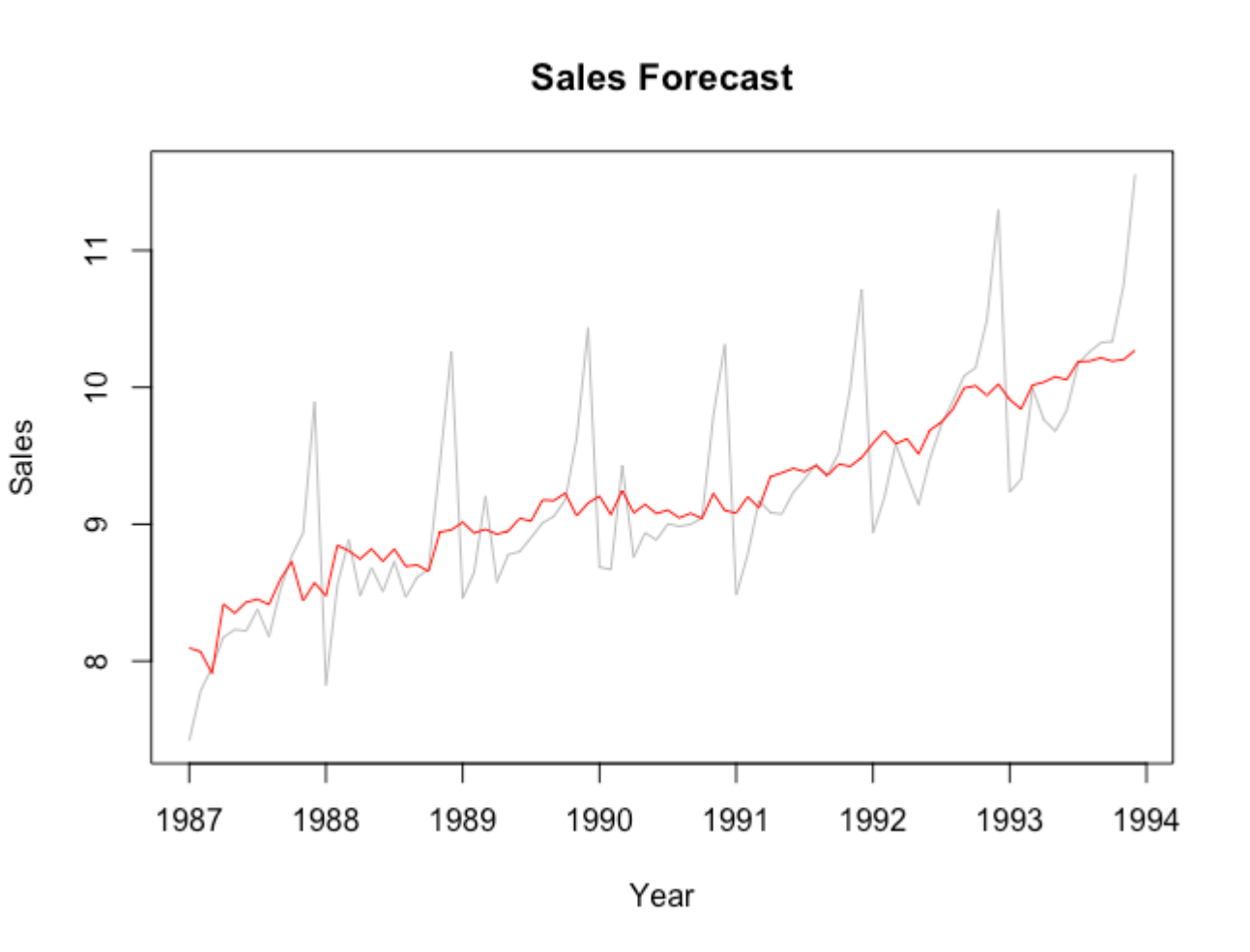


Naive model to predict the values



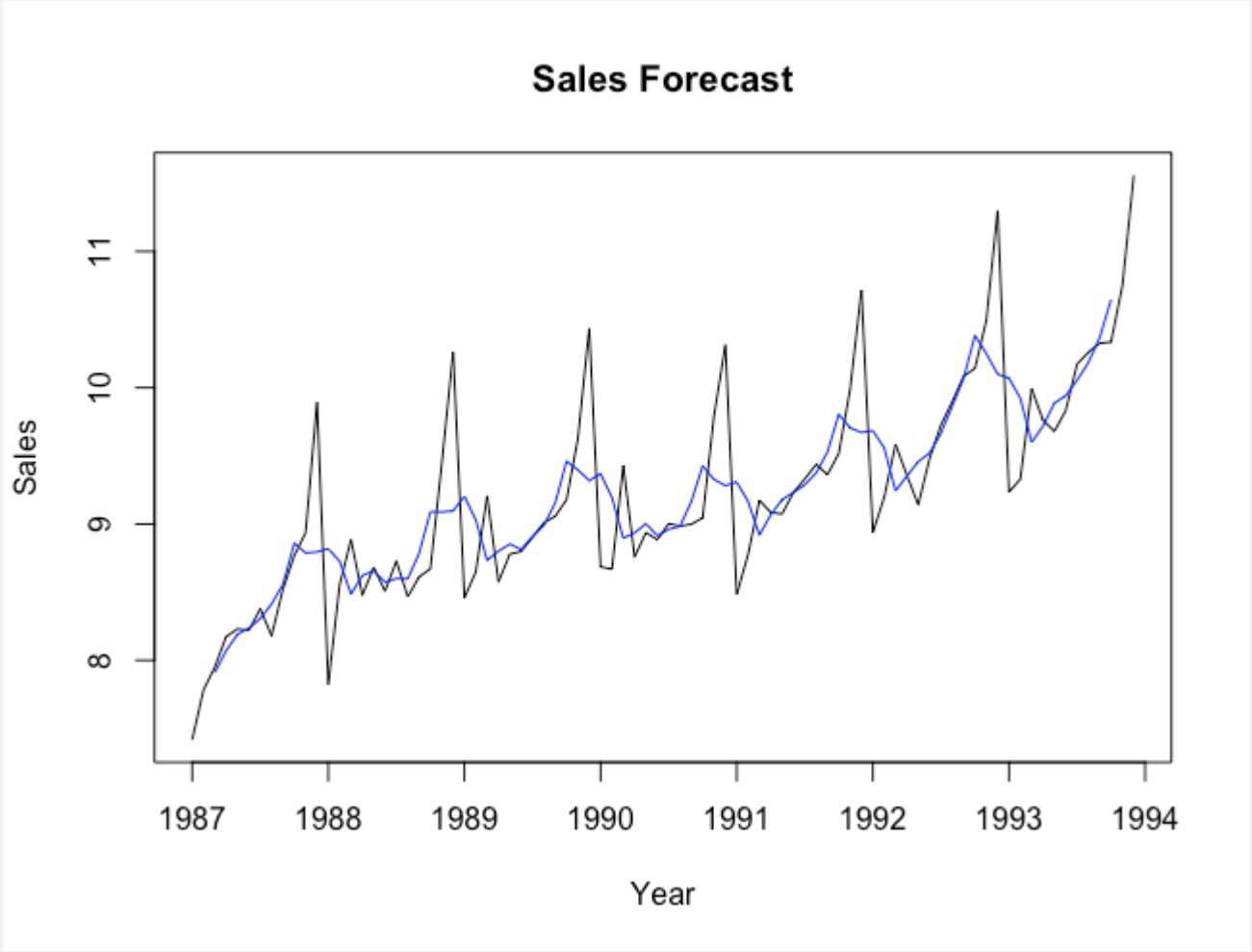
Seasonally adjusted

- Seasonally adjusted data when we remove the seasonality from the original data

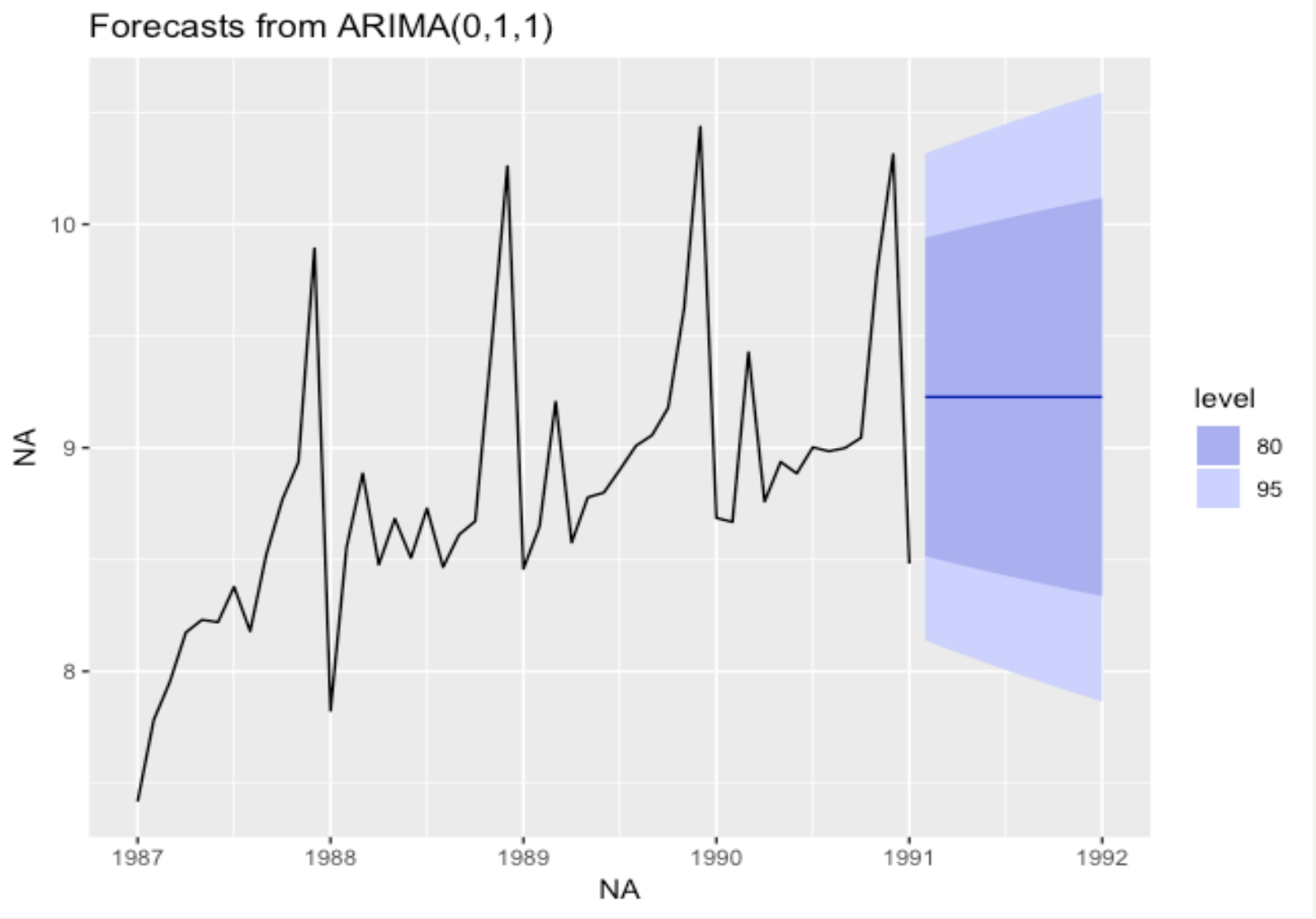


Moving average

- Estimating trend using moving average



ARIMA model


Forecasts from ARIMA(0,1,1)
10
9
8
NA
1987
1988
1989
1990
1991
1992
NA
level
80
95

Conclusion

Seasonal Naïve Model						
	ME	RMSE	MAE	MPE	MAPE	MASE
Training set	0.2390895	0.3439217	0.273656	2.694315	3.078284	1
Test set	0.4559734	0.4559734	0.4559734	5.101583	5.101583	1.666228
Average	**0.34753145**	**0.39994755**	**0.3648147**	**3.897949**	**4.0899335**	**1.333114**
Holts Winter Seasonal Model						
	ME	RMSE	MAE	MPE	MAPE	MASE
Training set	-0.02811555	0.1479274	0.1161646	-0.3432058	1.336876	0.4244914
Test set	0.65847559	0.7157262	0.6584756	6.6623135	6.662313	2.4062166
Average	**0.31518002**	**0.4318268**	**0.3873201**	**3.15955385**	**3.9995945**	**1.415354**
Mean Model						
	ME	RMSE	MAE	MPE	MAPE	MASE
Training set	8.33728E-16	0.6137839	0.4480297	-0.4719426	5.047942	1.6372005
Test set	5.65E-01	0.753941	0.5727271	5.7724141	5.859515	2.092872
Average	**0.282542**	**0.68386245**	**0.5103784**	**2.65023575**	**5.4537285**	**1.86503625**
Naïve Model						
	ME	RMSE	MAE	MPE	MAPE	MASE
Training	0.02217582	0.6644965	0.4341601	0.006315961	4.919325	1.586518
Test	0.90400339	1.0326321	0.9040034	9.392886294	9.392886	3.30343
Average	**0.463089605**	**0.8485643**	**0.66908175**	**4.699601128**	**7.1561055**	**2.444974**
ARIMA Model						
	ME	RMSE	MAE	MPE	MAPE	MASE
Training	0.1398034	0.5439085	0.3902025	1.348817	4.303069	1.425887
Test	-0.2895385	0.2895385	0.2895385	-3.239454	3.239454	1.058038
Average	**-0.07486755**	**0.4167235**	**0.3398705**	**-0.9453185**	**3.7712615**	**1.2419625**

Q&A:

THANK
YOU
SO
MUCH