

# Intro to Time Series

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## Intro to Time Series

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# LEARNING OBJECTIVES

- Understand what time series analysis is and what it is used for
- Use Pandas to model and manipulate a Time Series
- Explain the functionality afforded to the DateTime object

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# OPENING

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# **What is Time Series Analysis?**

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# **What is a time series?**

- Statistical modeling of time ordered data observations

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# What is a time series?

- Statistical modeling of time ordered data observations
- Examining multiple time series to model dynamic relationships
- Two main goals:
  - Identifying the underlying mechanisms represented by the sequence of observations
  - Forecasting: predicting the future values of a variable described in the time series



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# What is a time series?

- Time series models are models that will be used to predict a future value in the time-series.
- Like other predictive models, we will use prior history to predict the future! Unlike previous models, we will use the outcome variables from earlier in time as the inputs for prediction.

# Time Series Stationarity

Many models make an assumption of stationarity, which means assuming the mean and variance of our values is the same throughout.

# Time Series Stationarity

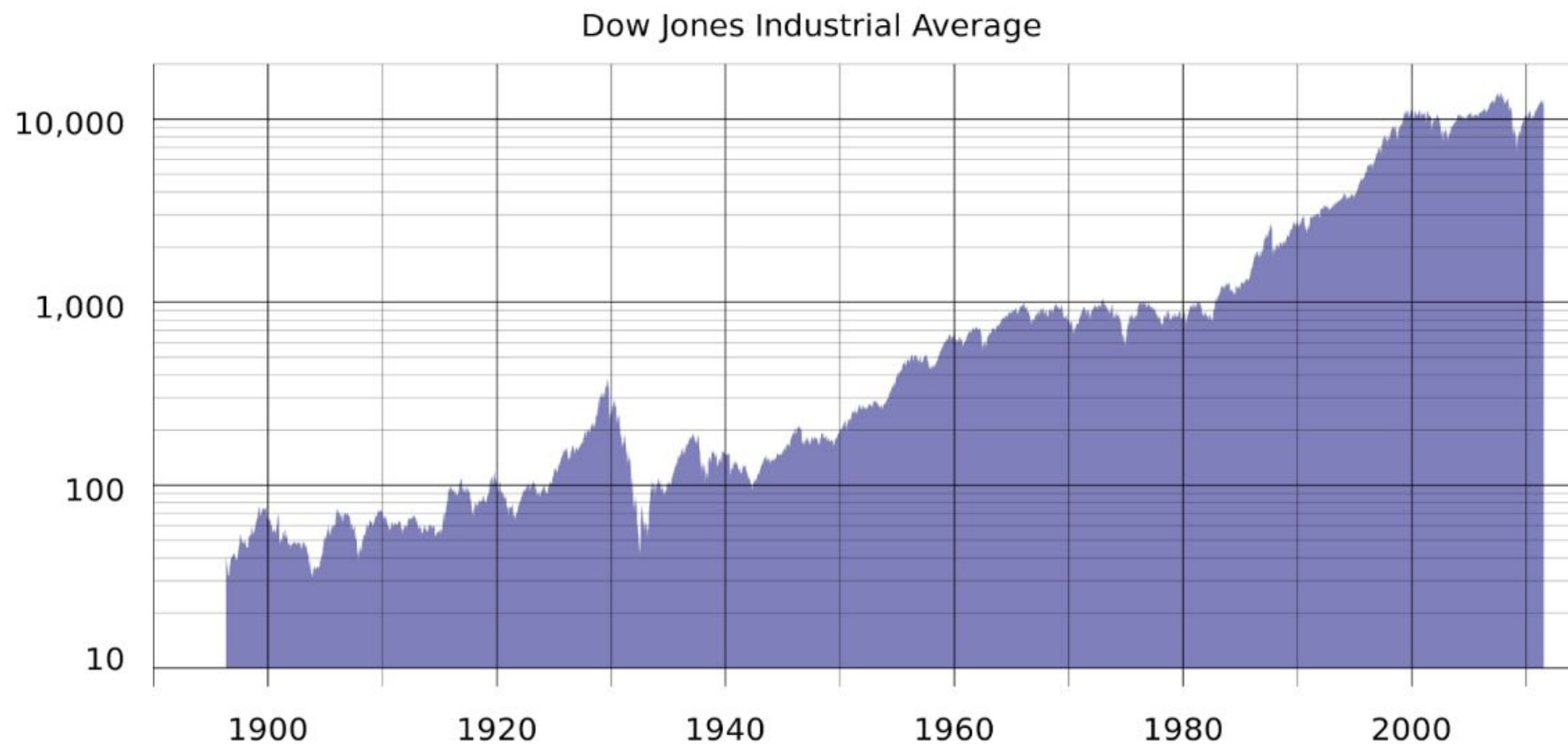
This means that while the values (of sales, for example) may shift up and down over time, the mean value of sales is constant, as well as the variance (i.e. there aren't many dramatic swings up or down).

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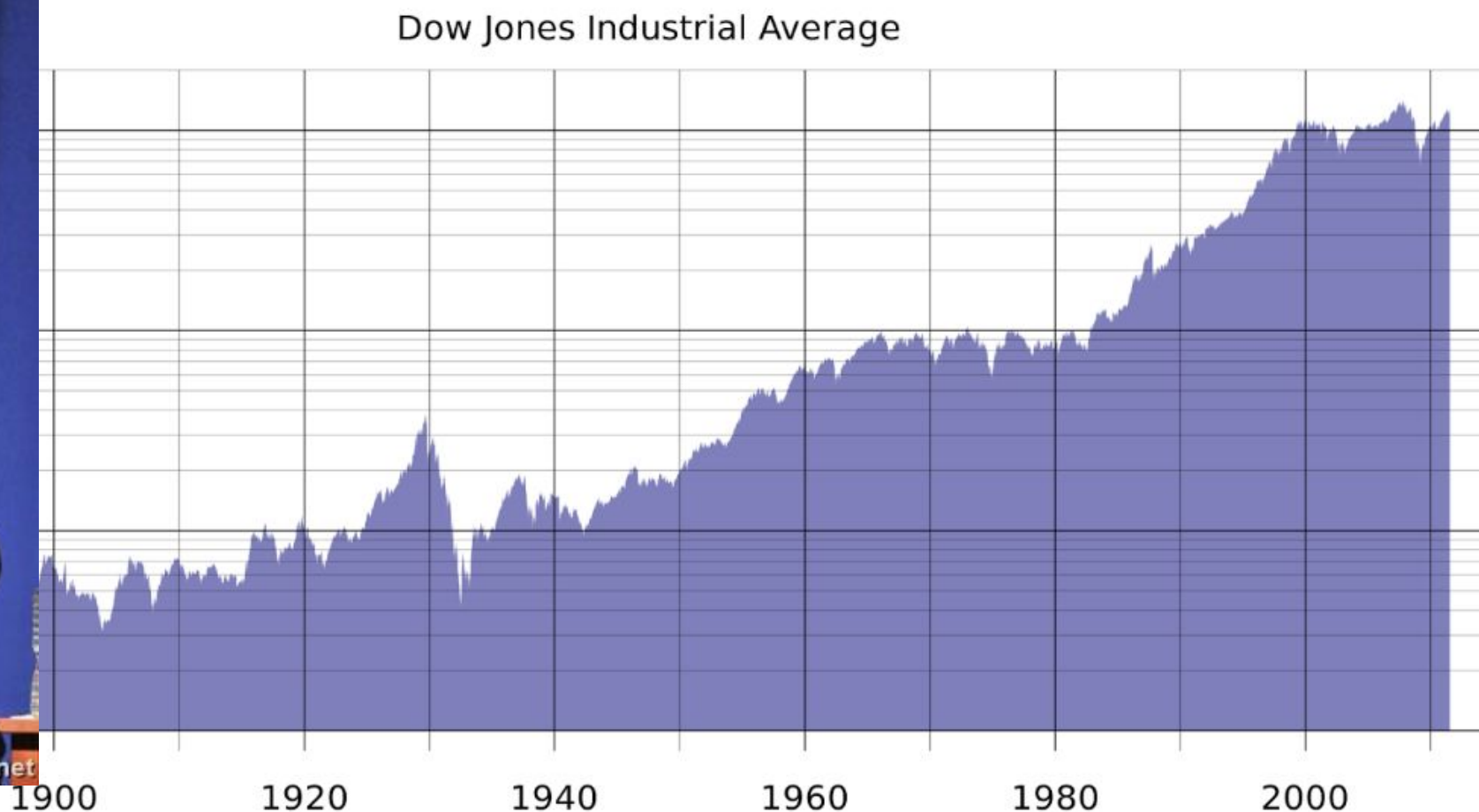
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# Time Series Stationarity



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# The DateTime Object

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- As our data will be ordered by time, we will need a powerful library for dealing with timestamps.
- Luckily, Python provides a module that gives us both simple and complex methods of manipulating dates and times.
- The cornerstone of the datetime module is the DateTime object, a container representing a time that is either aware or naive.
- Aware DateTimes have information regarding time zone and daylight savings time, a naive DateTime does not.



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# The DateTime Object

We can also use a timedelta object to shift a DateTime object.

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# **Times Series Practice - The DateTime Object**

# Time Series Practice - Date Ranges and Frequencies

# Independent Practice: Manipulating a Time Series

# Conclusion

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# Q & A