Forecasting

DATA ANALYSIS IN EXCEL

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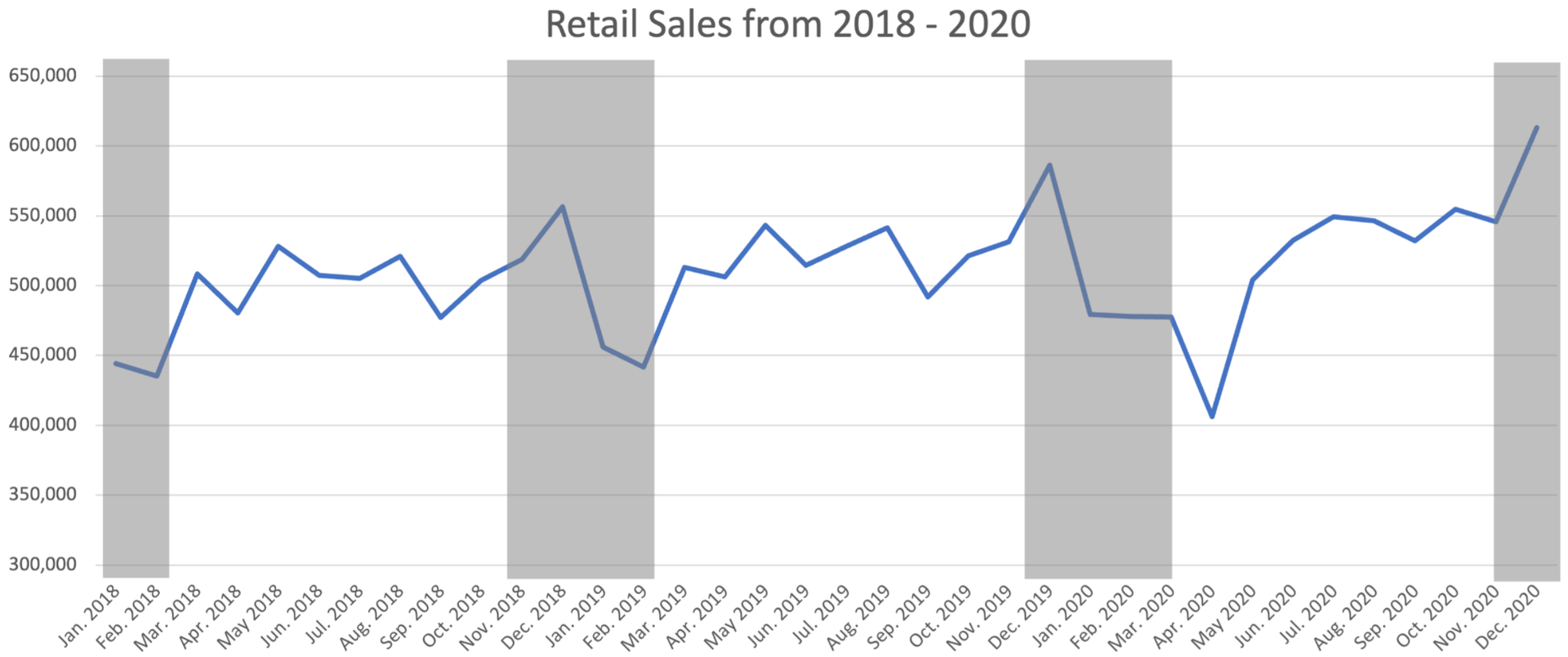
What is forecasting?

- **Forecasting** is the process of predicting future outcomes and trends based on historical data using statistical techniques.
  - Forecasts are predictions **not** actual outcomes

Seasonality

- **Seasonality** is the correlation between the time of year and performance.



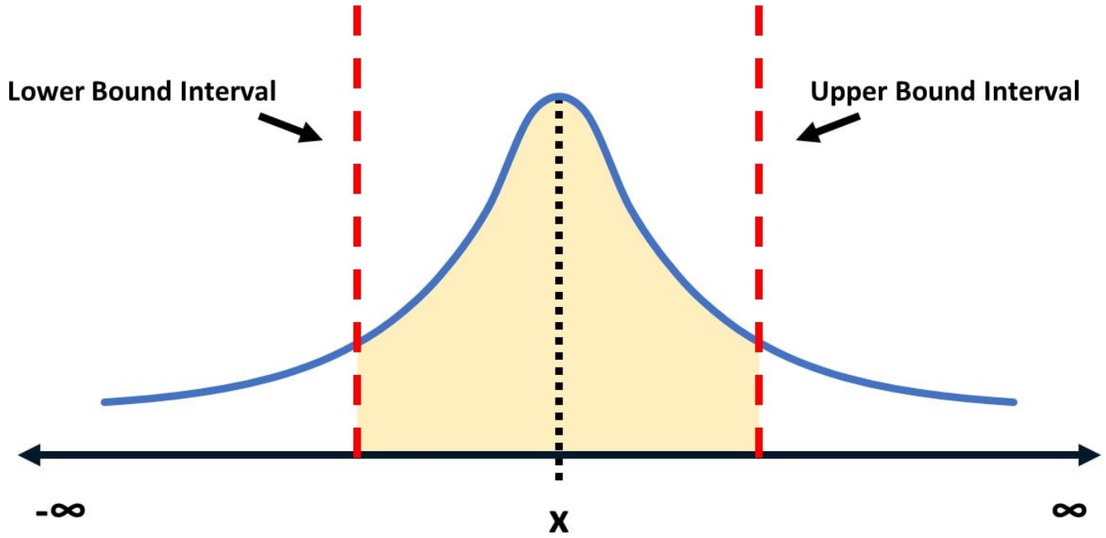
[1] https://www.census.gov/retail/sales.html

That's a bit biased...

Bias is the distortion of forecasting results from of the way the analysis was set up.

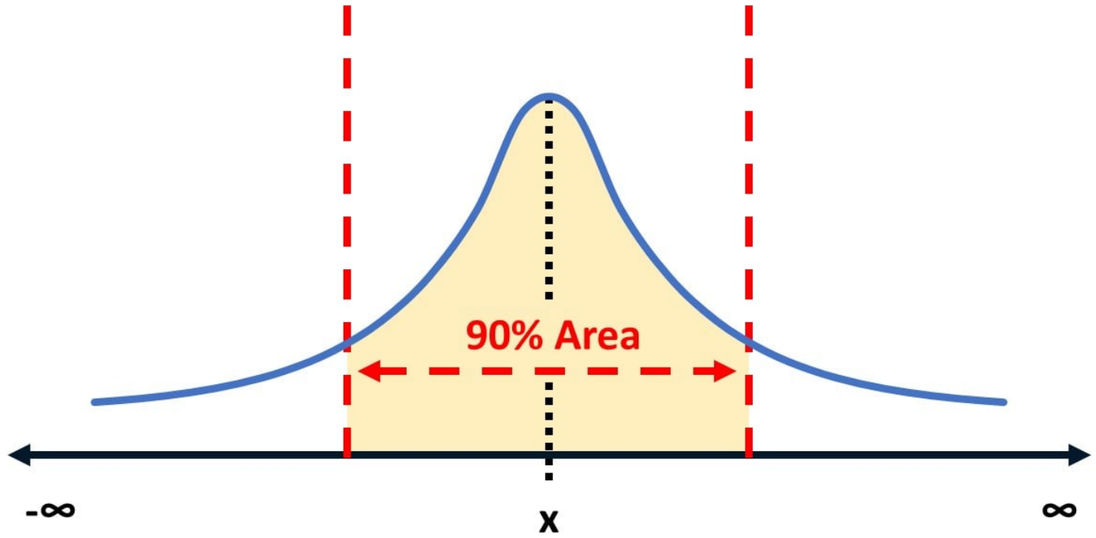
1. **Sampling bias:** data is collected in a way that is not representative
2. **Confirmation bias:** only accepting results that the analyst already believes to be true
3. **Anchoring bias:** failing to adjust adequately for new data or changing trends

Confidence intervals



- **Confidence intervals** are the range within an actual outcome is likely to occur
- **Confidence level**: the probability an actual outcome is likely to fall within the intervals

Confidence intervals



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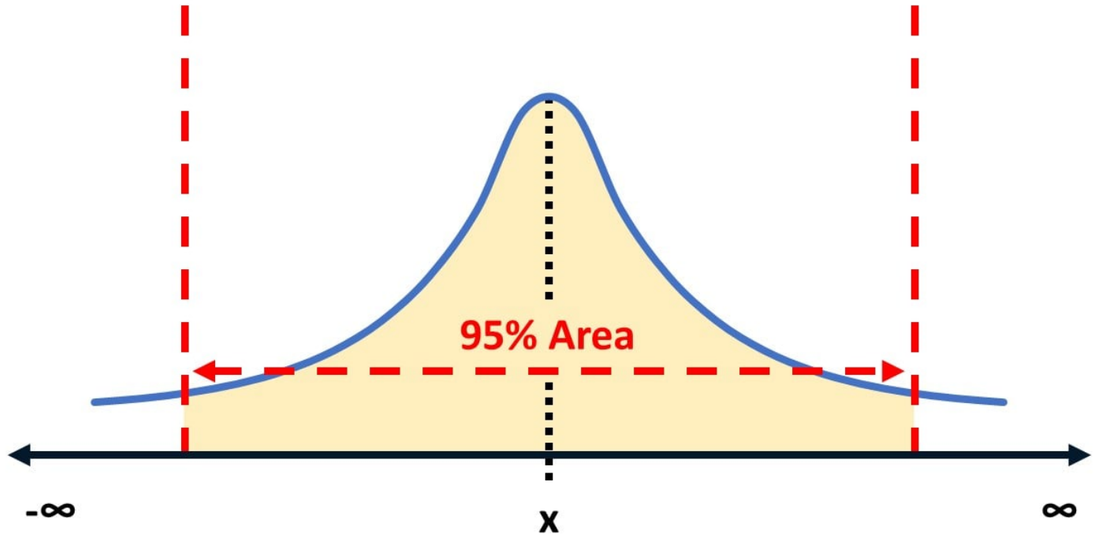

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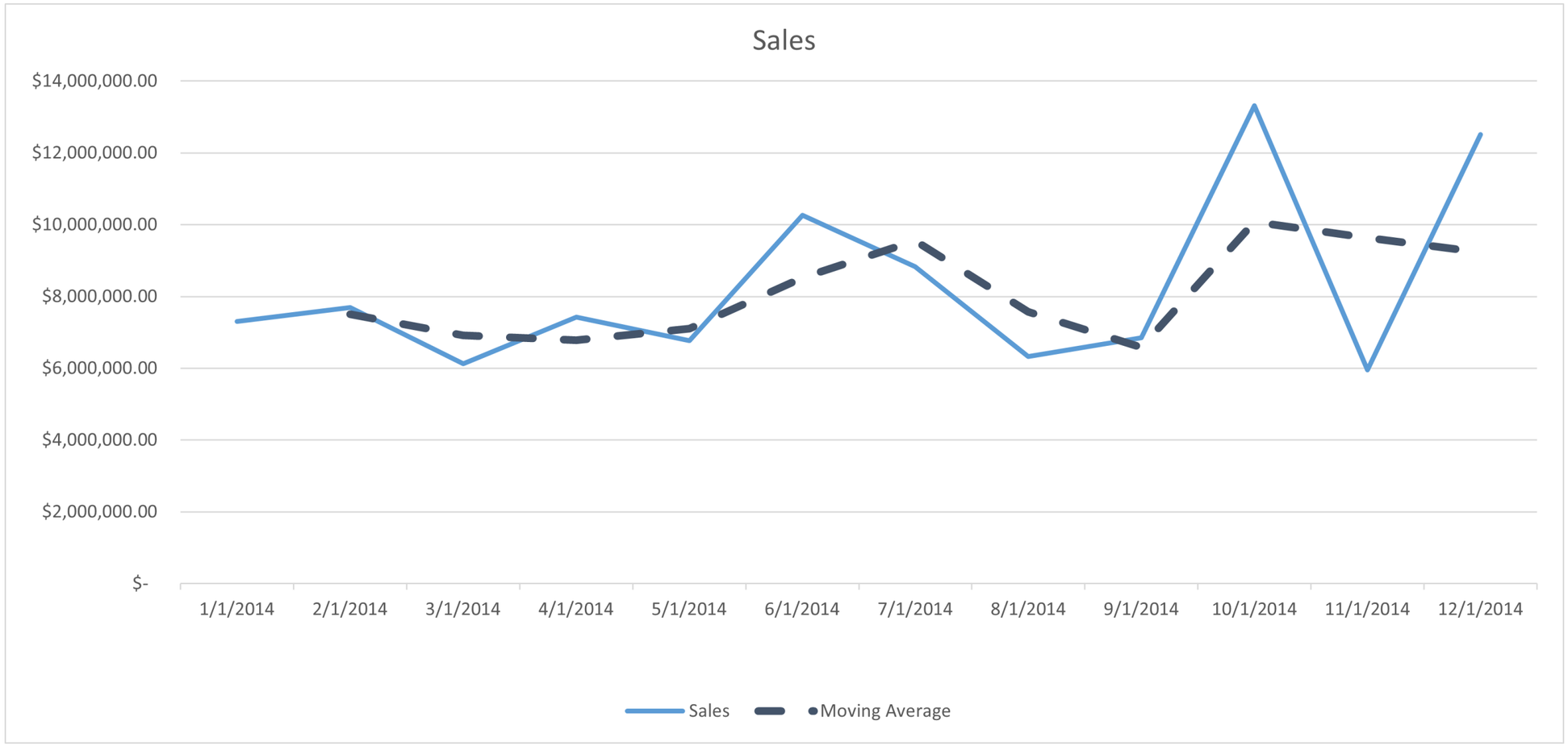
Moving averages



Weighted averages

Weighted moving average

- Multiplies the values in a data series by their assigned importance

$$WMA = \frac{\sum_{i=1}^{n} w_i X_i}{\sum_{i=1}^{n} w_i}$$

where:
x = value in period
w = weighted value
n = total variables

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Example find the weighted average

Values	Weights
2	0.15
3	0.35
4	0.50

```
[(2 x 0.15) + (3 x 0.35) + (4 x 0.50)]/
(0.15 + 0.35 + 0.50)
```

```
3.6/1 = 3.6
```

Let's practice!

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Forecasting techniques in Excel

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Let's practice!

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Congratulations!

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Chapter 1: Exploring data with PivotTables

- You performed exploratory data analysis with PivotTables
- Created Calculated Columns
- Used grouping features to organize and segment data
- Added data and timeline slicers to filter data

Chapter 2: Intermediate logical functions

- Used logical functions like `SWITCH()`, `IF()`, `IFS()` and `CONCAT()`
- Created nested statements and customer segments
- Used logical aggregate functions like `SUMIF()` and `SUMIFS()`
- Created sales summaries for various customer groups
- Made comparisons and found insights into customer groups

Chapter 3: What if analysis

- Learned about the importance of asking what if
- Created scenarios for projected sales
- Used the Goal Seek, Scenario Manager and Data Table tools

Price Sensitivity

Supply \ Demand	1,000	2,000	3,000	4,000	5,000
1,000	$ 5.00	$ 10.00	$ 15.00	$ 20.00	$ 25.00
2,000	$ 2.50	$ 5.00	$ 7.50	$ 10.00	$ 12.50
3,000	$ 1.67	$ 3.33	$ 5.00	$ 6.67	$ 8.33
4,000	$ 1.25	$ 2.50	$ 3.75	$ 5.00	$ 6.25
5,000	$ 1.00	$ 2.00	$ 3.00	$ 4.00	$ 5.00

Chapter 4: Forecasting

- Used 5 different forecasting techniques:
  1. Simple moving average
  2. Weighted moving average
  3. Trendlines
  4. `FORECAST.ETS()` and `FORECAST.ETS.CONFINT()`
- Learned about the importance of confidence intervals and bias

Best of luck!

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