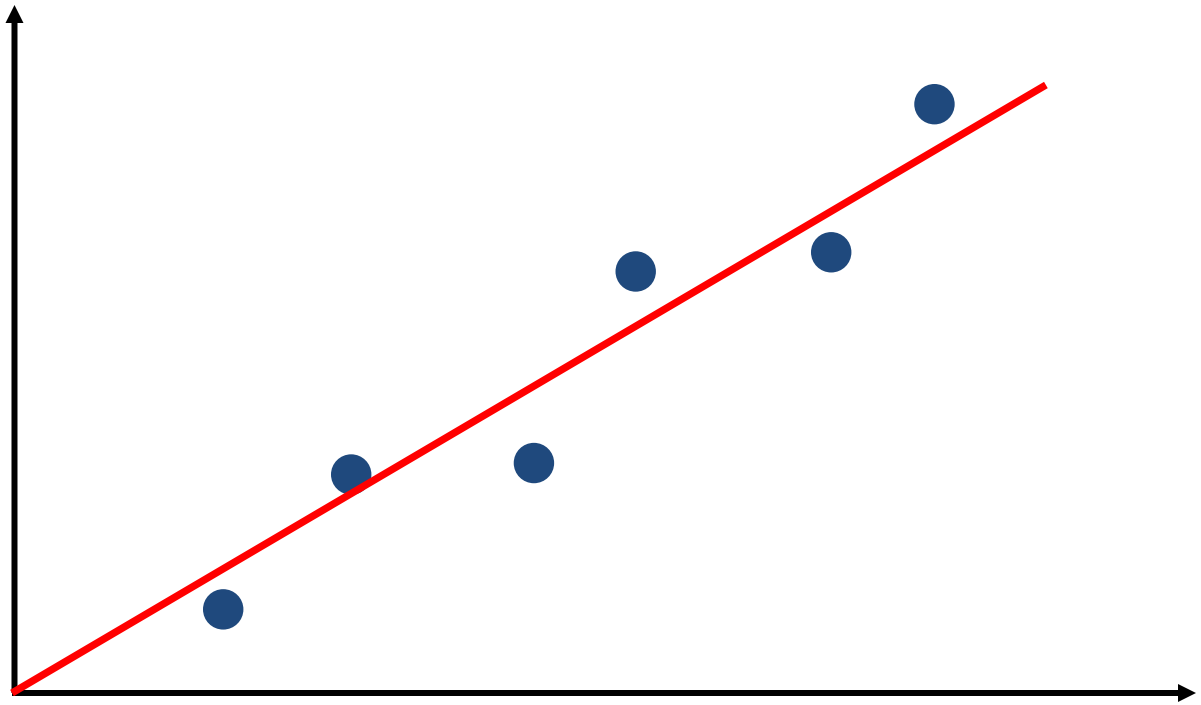
Quantitative Techniques



Let's get more quantitative about this…

Quantitative Techniques

Simple Growth Rate Models…

What did you sell last time? N_t

And the time before that? N_{t-1}

- *Estimate sales next time based on the rate of change…*

$$N_{t+1} = N_t \left(\frac{N_t}{N_{t-1}}\right)$$

Reasonably effective if sales are uniform and non-seasonal.

Business folks call this a "naïve" forecast model – probably because of its simplicity.

$$N_{Dec} = 6100\ units$$

$$N_{Nov} = 5810\ units$$

$$N_{Jan} = 6100\left(\frac{6100}{5810}\right) = 6405\ units$$

Quantitative Techniques

Moving Average Models…

What did you last 3 periods?

Average those…

This becomes your forecast for the next period.

As your forecast becomes an ”actual”, use this for the next forecast...

The averages “move” with the addition of each new actual datum.

Month	Unit Sales (Actuals)
Jan	46
Feb	54
Mar	53
Apr	46
May	58
Jun	49
Jul	*?*

Quantitative Techniques

*This is an example of a **3-Month Moving Average**… but you can have how ever many periods you want. It comes down to deciding how relevant are the old data compared to more recent data.*

Moving Average Models…

Month	Unit Sales (Actuals)
Jan	46
Feb	54
Mar	53
Apr	46
May	58
Jun	49
Jul	*?*

$$July = \frac{46 + 58 + 49}{3} = 51$$

Month	Unit Sales (Actuals)
Jan	46
Feb	54
Mar	53
Apr	46
May	58
Jun	49
Jul	54 (!)
Aug	*?*

$$August = \frac{58 + 49 + 54}{3} = 53.6 = 54$$

Quantitative Techniques

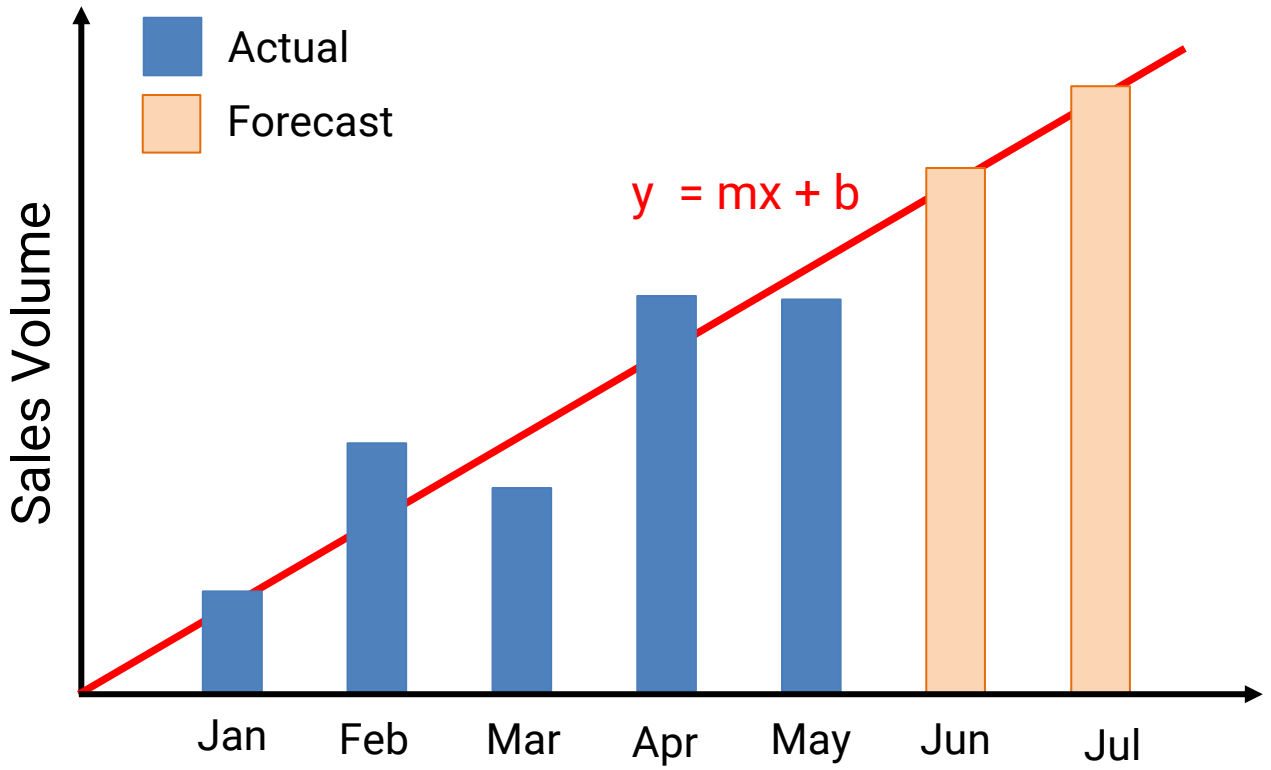
Linear Trend Analysis…

Take the actual data you have…

Plot those out (in excel…)

Conduct a linear regression analysis (why we do it in excel…)

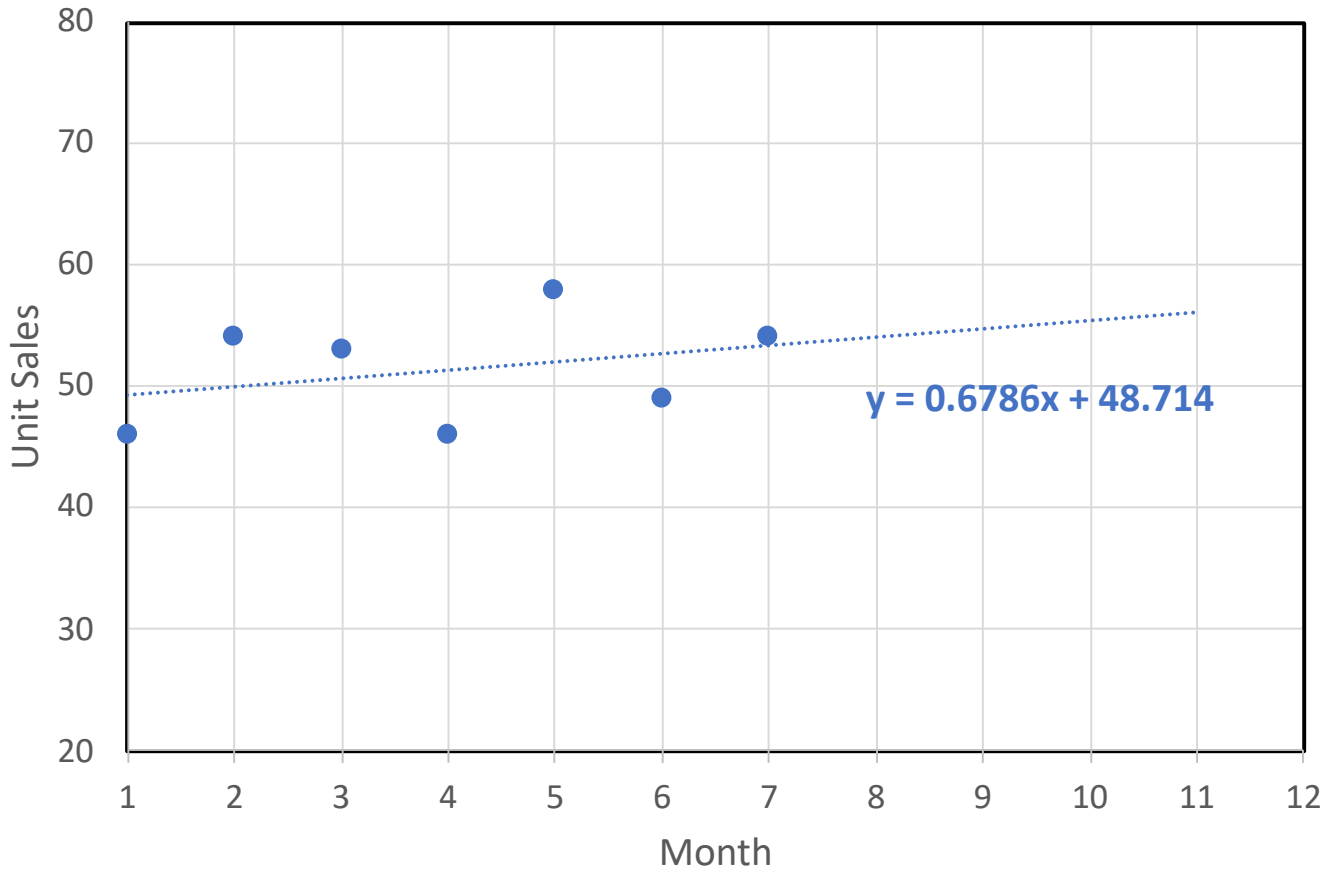
From your trend line, estimate future sales.



Quantitative Techniques

Linear Trend Analysis…

Month	Actuals
1	46
2	54
3	53
4	46
5	58
6	49
7	54
8	*54.1*
9	*54.8*
10	*55.5*
11	*56.2*
12	*56.9*

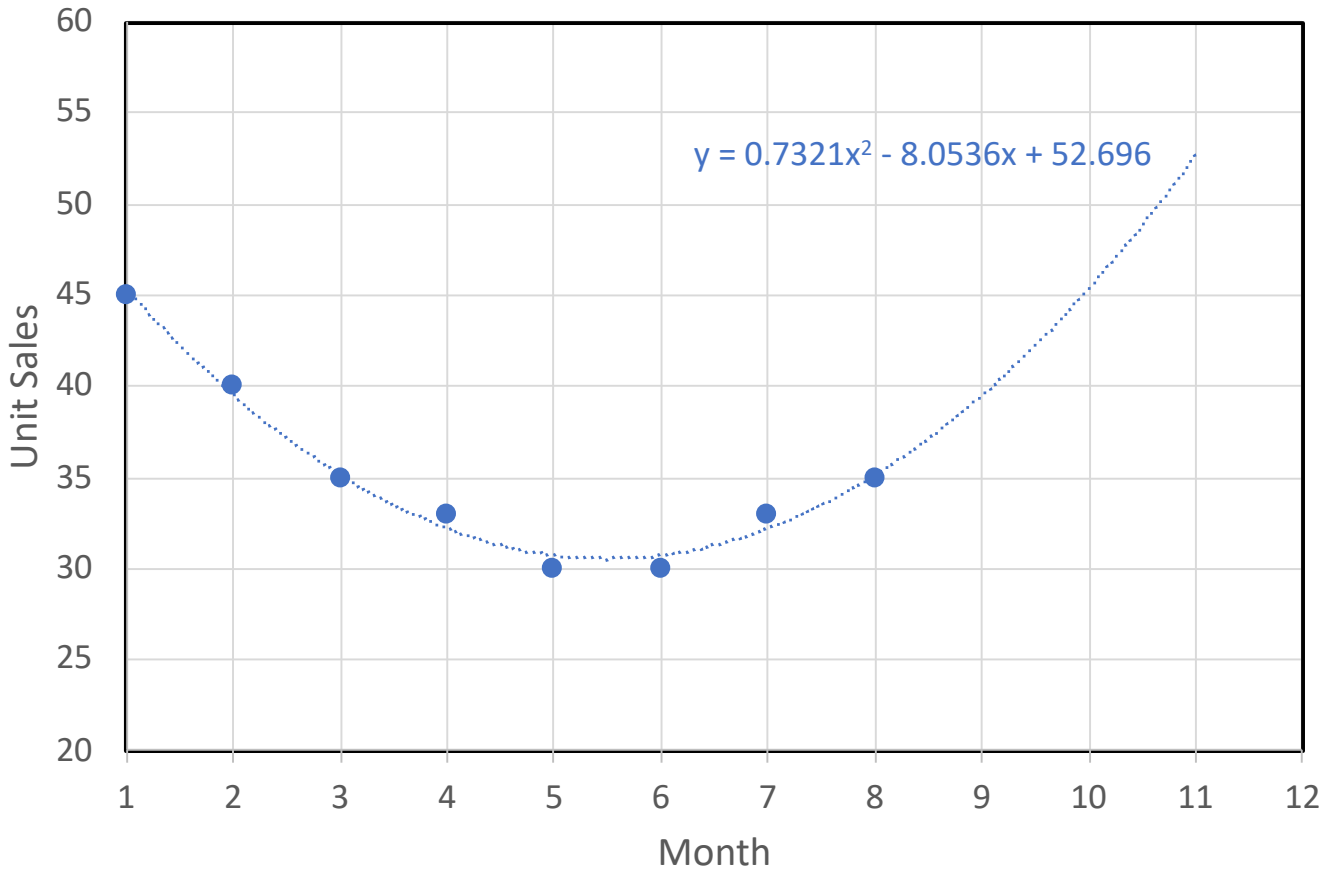


Quantitative Techniques

An even more reasonable approach when you know you have seasonality.

Non-Linear Trend Analysis…

Month	Actuals
1	45
2	40
3	35
4	33
5	30
6	30
7	33
8	35
9	*39.5*
10	*45.4*
11	*52.7*
12	*61.5*



Challenges in Forecasting…

Unusual factors impacting sales (Covid 19…)

Taking competition into account (they launch a competitive product)

Other market trends (RIM Blackberry vs. Apple iPhone)…

What if I'm a startup and have no history of sales? What do I do now?

Forecasting always involves uncertainty (business risk).

Techniques are available to mitigate this risk.

More on that next time…

Main Takeaways…

Budgeting is the process to establish the plan for the upcoming year.

While estimating costs is relatively easy, forecasting revenues is definitely more challenging!

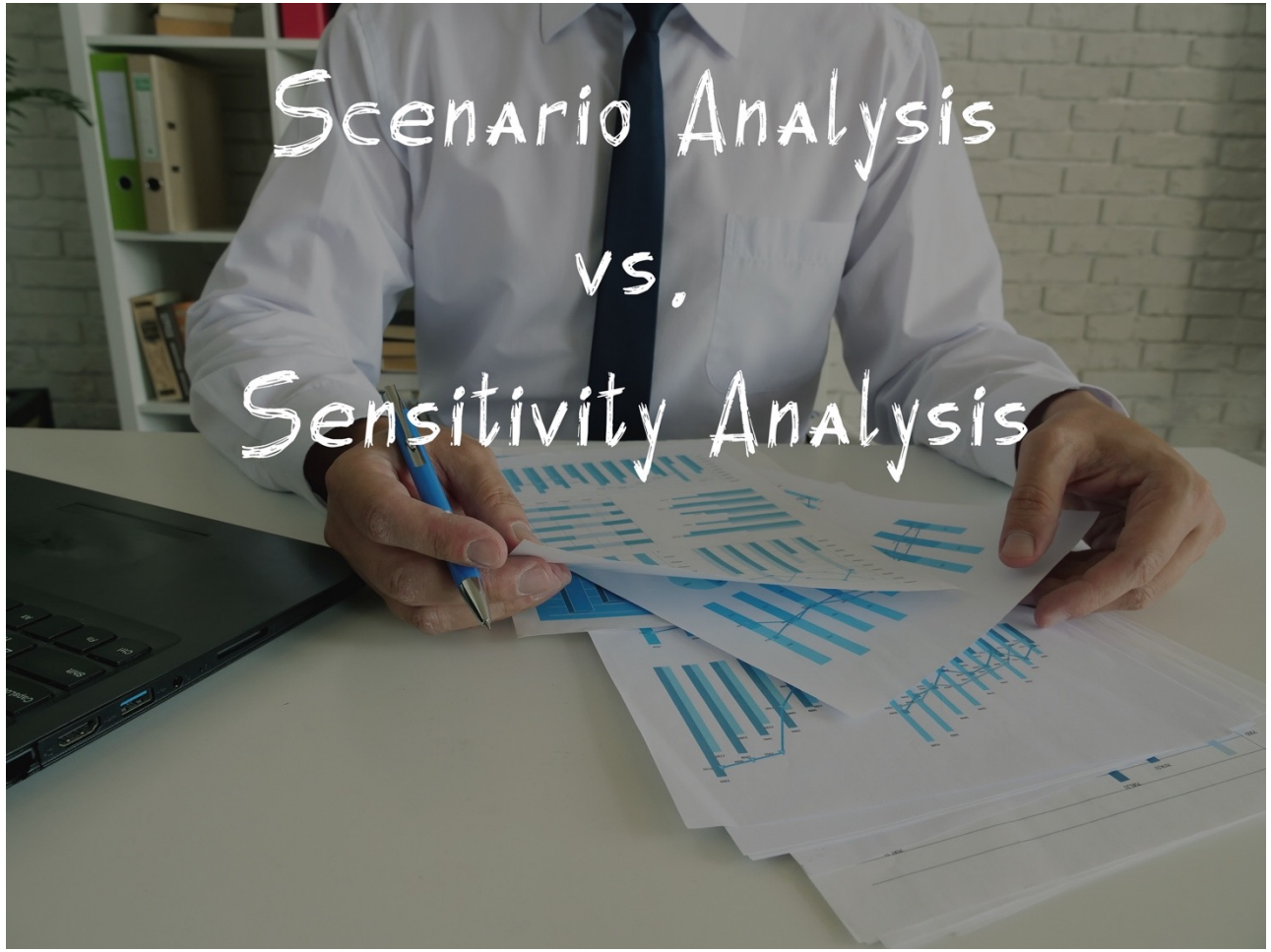
Both qualitative and quantitative analyses can be employed, each with their advantages and disadvantages – but all are very intuitive.

Using multiple methods to get the team to agree to a forecast is beneficial.

And then create some additional models around the “most likely” scenario - just in case!

Next Time…

Risk Management Techniques



Credits & References

Slide 10: Financial concept about Scenario Analysis vs. Sensitivity Analysis with inscription on the piece of paper by Yurii Kibalnik, Adobe Stock (399001250.jpeg).