Welcome!

Time Series Analytics

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Examples of Time Series Models

- Random Sample
- Random Walk
- Autoregression
- Moving Average
- ARIMA (Autoregressive Integrated Moving Average)

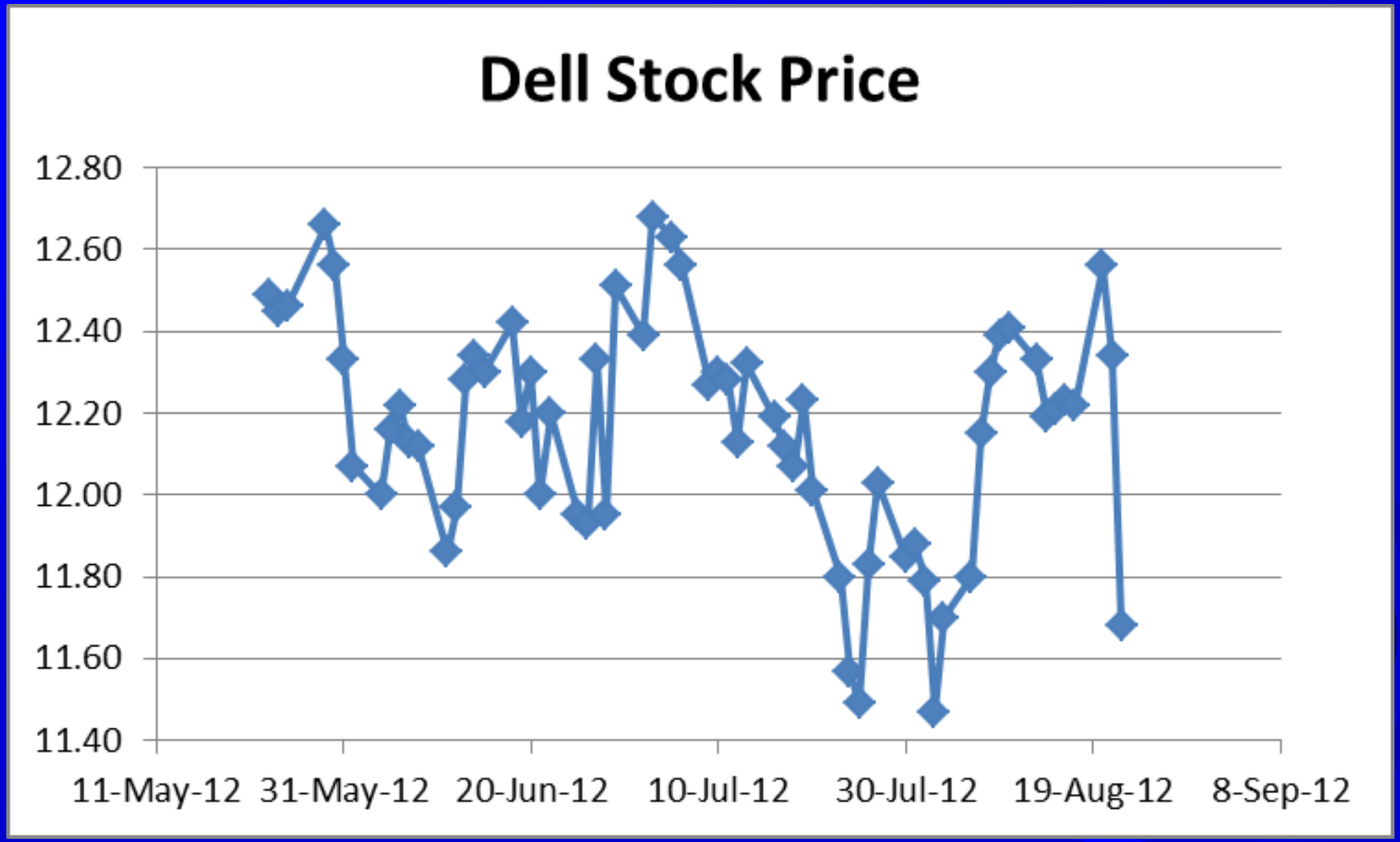
Key Modeling Steps

1. Propose
2. Validate
3. Use

Definition of Random Walk

- A *Random Walk* (RW) is a time series in which the period-to-period changes are a Random Sample.

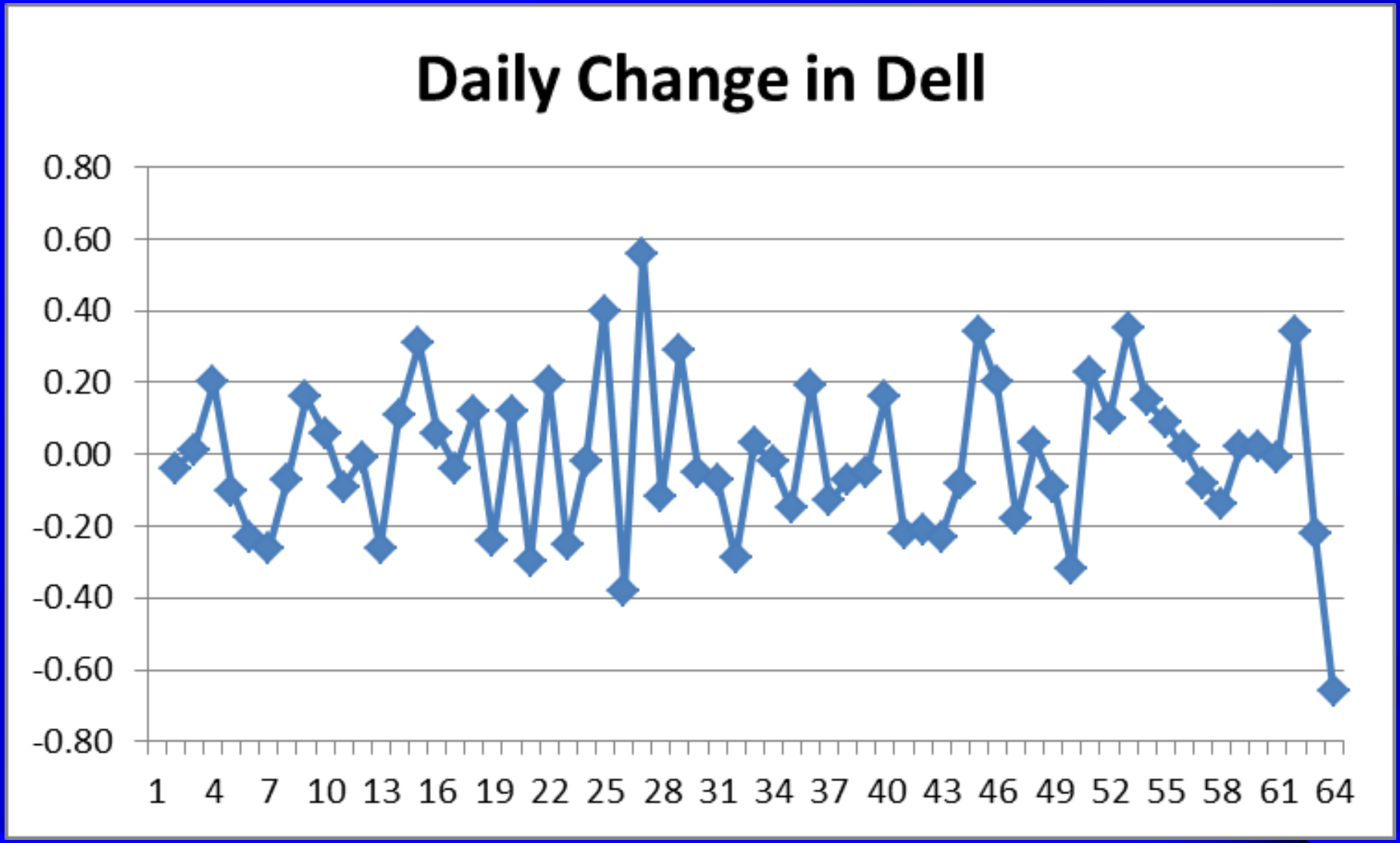
A Real Random Walk



How to identify a Random Walk

- Calculate the period-to-period changes
- Test whether the changes are a Random Sample
  - ✓L – Is the timeplot level?
  - ✓H – Is the timeplot homoscedastic?
  - ✓I – Is the autocorrelation close to zero?

Changes in a Real Random Walk



How to forecast the next value of a Random Walk

- A Random Walk looks – and is – erratic.
- But there is an island of stability hidden within: the changes, which are a Random Sample.
- So forecast the changes.

How to forecast the next value of a Random Walk

- Next value = current value + next change

$$Y_{t+1} = Y_t + (Y_{t+1} - Y_t)$$

- Forecast next change = mean change
- Forecast of
  next value = current value + mean change
- Average margin of error = ± stdev of changes