

Βιβλίο Forecasting: Principles and Practice, <https://otexts.com/fpp3/>

Κεφάλαια 1, 2 (κυρίως 2.8, 2.9)- αυτοσυσχέτιση

Κεφάλαιο 3 (3.1, 3.2, 3.3)- χρονοσειρές, απομόνωση τάσης και περιοδικότητας

Κεφάλαιο 5 (5.1 μέχρι 5.4)- απλά μοντέλα προβλέψεων

Κεφάλαιο 5 (5.6)- ακρίβεια προβλέψεων)

Κεφάλαιο 7 (7.1 μέχρι 7.6)- γραμμική παλινδρόμηση

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Z και T tests

Intro to Z-Tests and T-Tests

What are they?

Both **z-tests** and **t-tests** are **hypothesis tests** used to determine whether a sample mean (or proportion) is significantly different from a population value or another sample.

Z-Test: Use when...

- You know the **population standard deviation (σ)**
- Your sample size is **large** (typically $n > 30$)
- You're working with **means** or **proportions**

Common uses:

- Checking if a factory fills enough product on average
- Testing if a poll result (proportion) is different from 50%

Example Formula (mean):

$$z = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}}$$

✓ Z-Test for One Proportion

$$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$

Where:

- \hat{p} = sample proportion (e.g., 0.52 if 52% support)
- p_0 = hypothesized population proportion (e.g., 0.50)
- n = sample size

T-Test: Use when...

- You **don't know** the population standard deviation (you estimate it from the sample)
- Your sample size is **small** ($n \leq 30$)
- You're comparing **means**



Types:

- **One-sample** t-test: compare sample mean to a fixed value
- **Two-sample** t-test: compare means of two independent groups
- **Paired t-test**: compare before-and-after from the same group

Example Formula (one-sample):

$$t = \frac{\bar{x} - \mu}{s / \sqrt{n}}$$

Key Difference:

Test	Population σ known?	Sample size	Distribution used
Z-test	 Yes	Large	Normal (Z)
T-test	 No	Small	Student's t

■ Margin of Error for a Proportion

$$ME = z^* \cdot \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

...

■ Margin of Error for a Mean

$$ME = z^* \cdot \frac{\sigma}{\sqrt{n}} \quad (\text{if } \sigma \text{ known})$$

$$ME = t^* \cdot \frac{s}{\sqrt{n}} \quad (\text{if } \sigma \text{ unknown})$$

- σ = population standard deviation (use z)
- s = sample standard deviation (use t)
- n = sample size

