STAT 100 Chance and Data Analysis Sept. 13, 2002

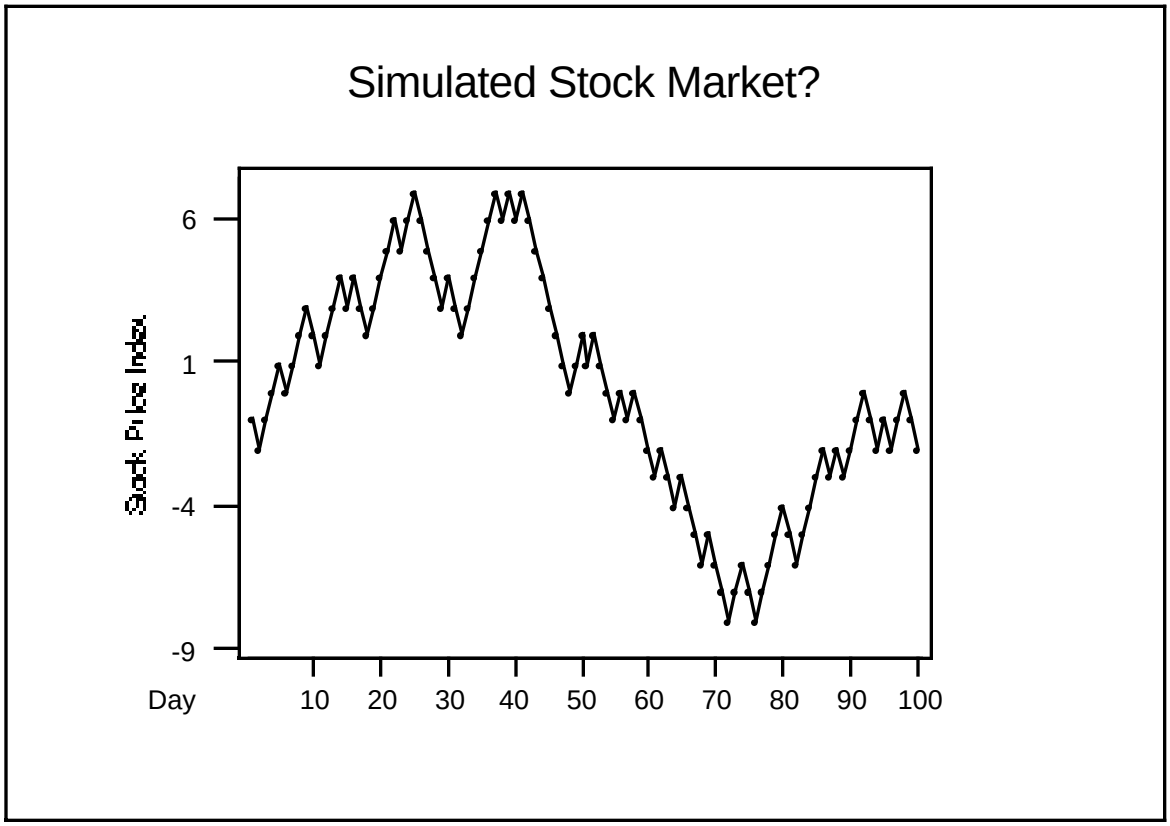
Today: More about stock market simulation, and quasi-experiments
More about interpretation of sports league standings
Bit About Smoothing
Brief feedback survey on course content so far.

I will be posting these at the end of the class …..

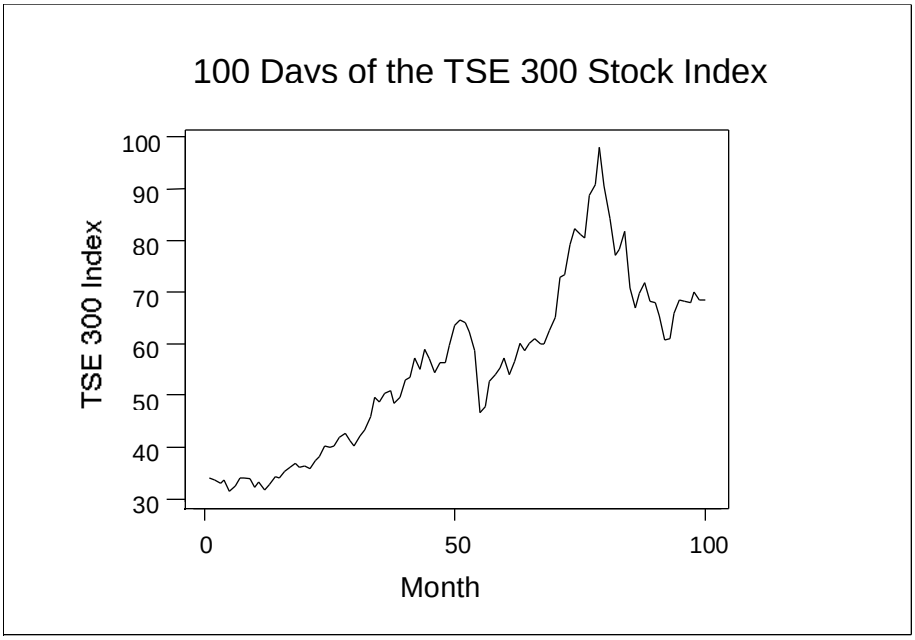
1. What is the most useful or interesting concept so far in the course?
2. What is the most confusing concept?
3. What topic would you like to see more about?

Follow up about stock market - TSE graph

We had a "random walk" with ± 1 steps.

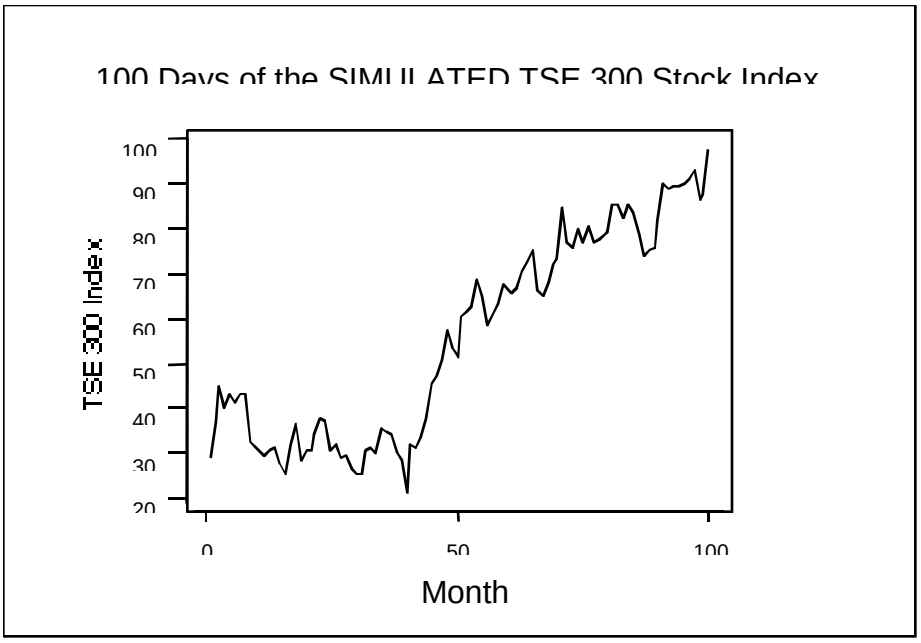


Like real world?



Nature of this time series is different. Our simulation does not work very well yet.

A slight modification works better - we allow steps to vary in size.
We allow step size to be selected at random from:

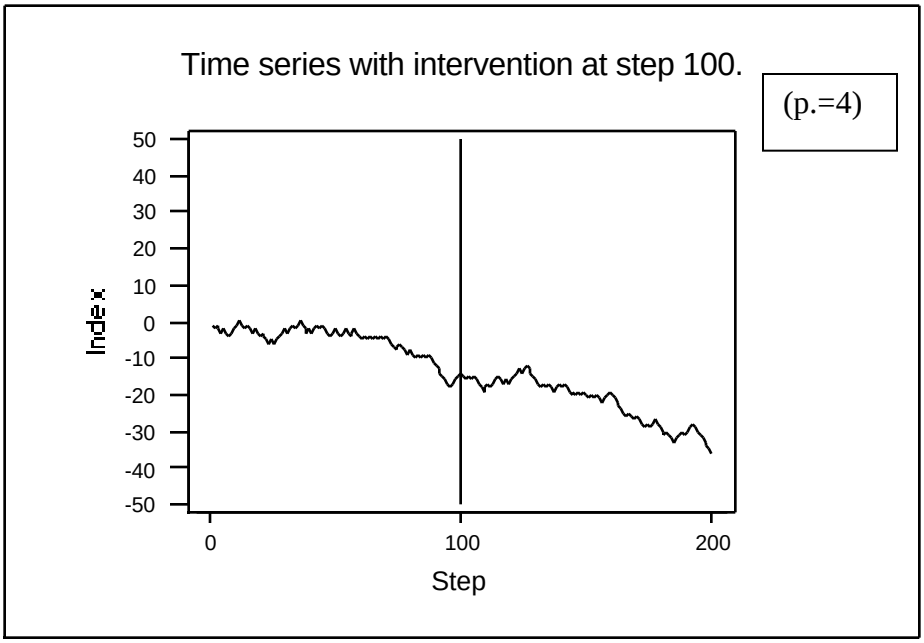


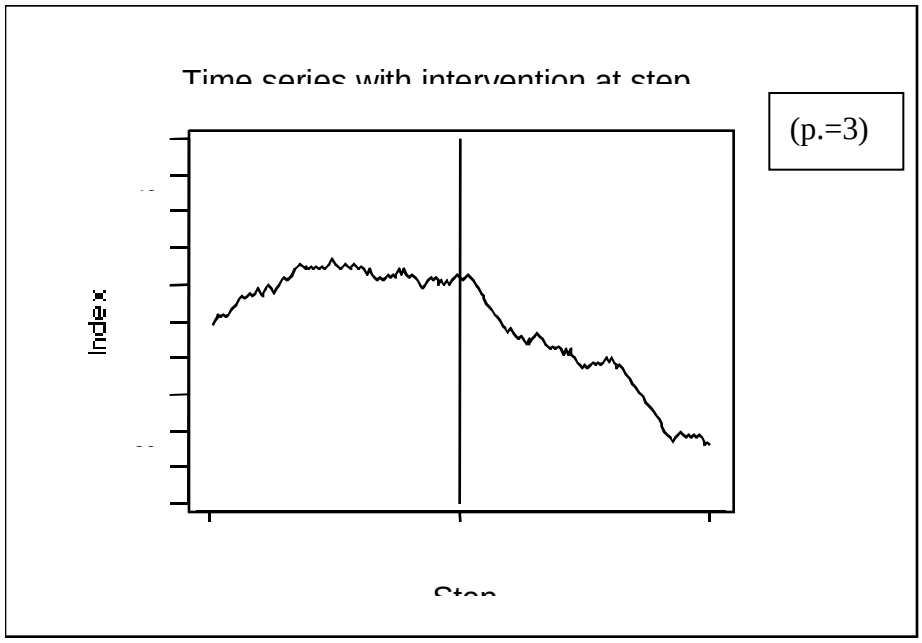
The fact that the trend is the same is accidental. But the variability does seem similar.

What does this tell us? That the TSE trend could have occurred when the series had no predictable trend at all - because the simulated series was designed to have no predictable trend.

Quasi-experiments:

Time series with an intervention - does the intervention have an effect?





Detection of the effect depends on the relative size of the step-to-step variability.

Back to the 20 soccer teams. They had played about 12 games and the team scores ranged from a high of **23 to a low of 7**. Compare this with five simulations of this league: They show that, assuming all teams equal, ranges would be

27 to 7
30 to 4
24 to 7
24 to 9
26 to 7

These simulations allowed 20% ties.

Note that the range of scores from the simulations is not less than the range from the real-world league. This suggests that the ranking in the real-world league could result when all teams had the same chance of winning (i.e. all teams of equal quality). This is surprising!

Technical Note: We used range to summarize variability. Is this OK? Why?

(By the way - same simulation for 5 teams yielded spans as follows:
12 to 4
7 to 3
9 to 2

7 to 3
12 to 2)

Economic Indicators Article (Tanur pp227-238):

Important Idea of Smoothing of a Time Series:

Recall gas consumption data:

How was the trend curve produced?

Possibilities: eyeball - subjective
Moving average – objective but crude
More sophisticated objective methods like “Lowess”.

How is “seasonal adjustment” accomplished: idea is simple, implementation can be complex. Just look at how season (or month) data relates to annual, and adjust to a common level. What is left is seasonally adjusted.

On a scrap of paper, please write 1.,2.,3., with your answers to:

1. What is the most useful or interesting concept so far in the course?
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This is the distribution I suggested for sampling step sizes that were not necessarily limited to be +1 or –1, in the random walk. The fact that it looks bell-shaped is no accident, as will be explained later in the course.