Welcome to Wharton!

Topics

Management take-away point

– Difficulty in prediction/extrapolation of financial returns

Statistical take-away point

– How easy it is to be fooled when you have lots of chances for success.

– Problem of "multiplicity"

Along the way…

– Style of a "typical" class

– Combine technology, data resources, interactive software with statistical analysis of problems from business.

Overview

Question

– Can't we use these fancy computer modeling tools (e.g. neural nets) to predict the direction of returns in today's unsettled financial markets?

– Can make **$¥£**'s if we can predict that the markets will go up or will go down, so it's a very tempting enterprise (technical trading).

Analysis

– Historical perspective from the long-run behavior of the stock market.

– Gather some data on-line, with several choices to explore:

Yahoo!	very current
NYSE	nice, clean design
WRDS	Wharton data base

We'll use several pre-built data sets used in Statistics 603 (pre-term).

– Try a retrospective analysis
See how well we can predict returns in, say 1999, from using prior data.
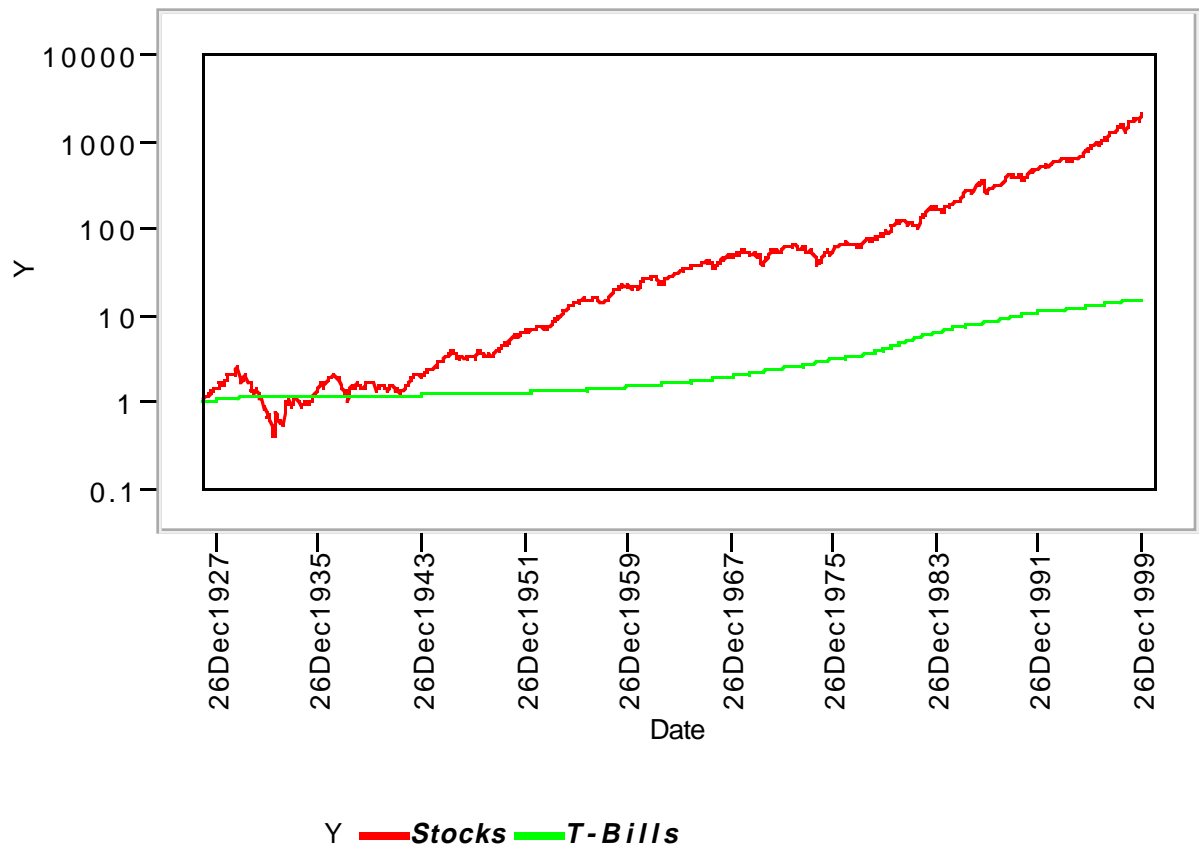
A Look at the History of the Market

Software

– Use specialized software designed for modeling rather than Excel.

– Software features interactive plots and sophisticated analysis methods.

– Available all around Wharton facility in computing labs.

Historical trends

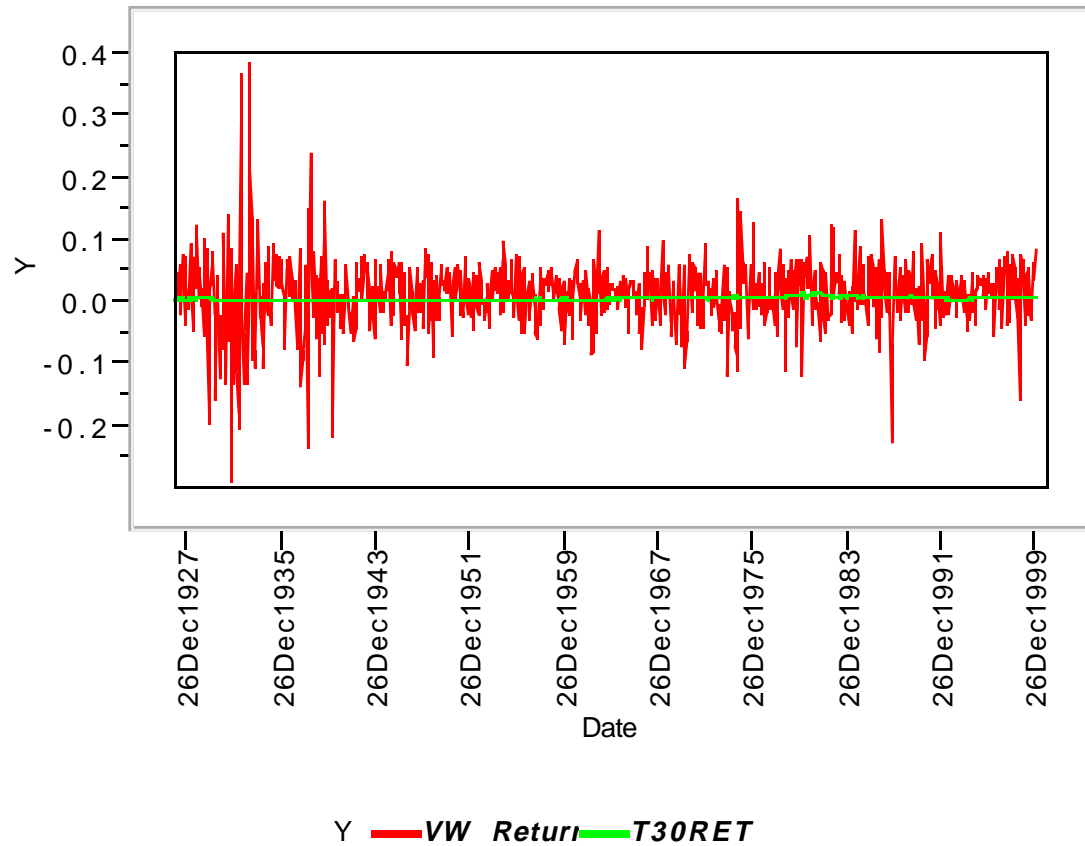– Growth in an investment in the stock market over the last century…

Volatility

– Growth has come with *volatility.*

– The volatility becomes more apparent if we look at the *returns* on the market rather than just the market itself.

Historical Returns

Definition

$$\text{Return}_t = \frac{\text{Value at end of month } t \ - \ \text{Value at start}}{\text{Value at start of month } t}$$

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Volatility = Risk

– Simple example
Start with \$100 and get +10% on first day then –10% on the second.
Where are you after two days?
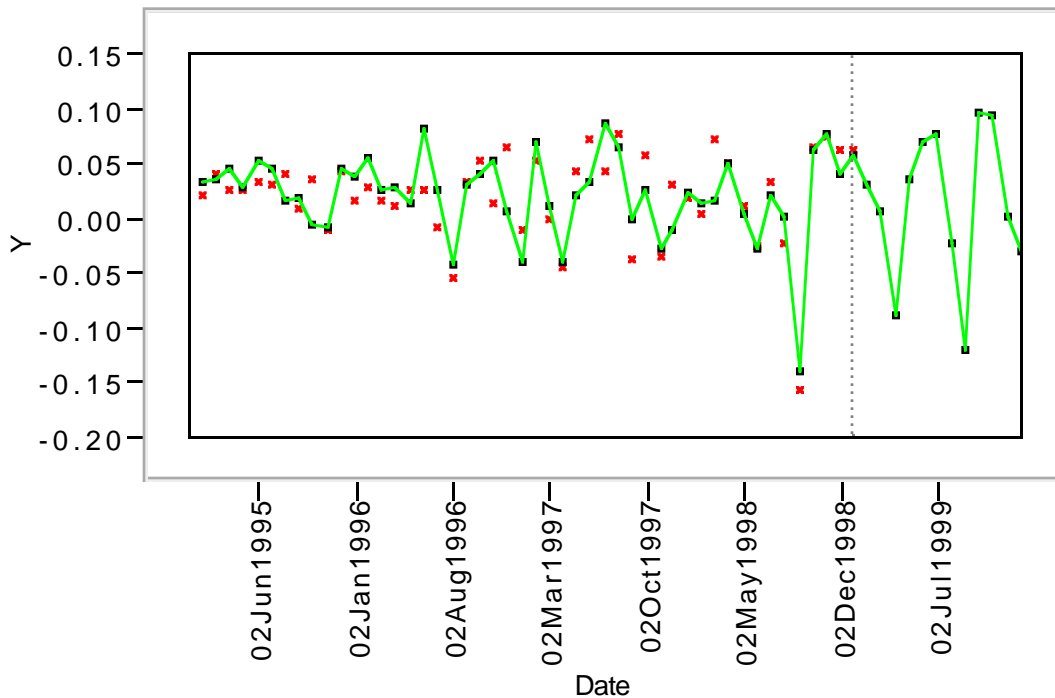
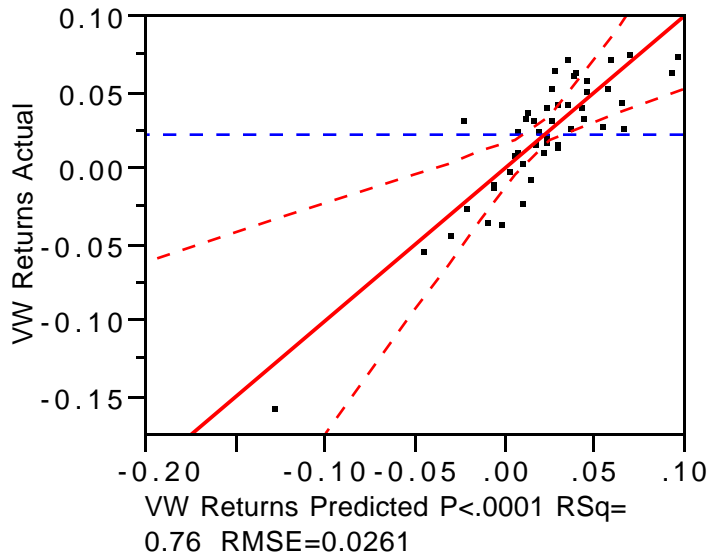– Reduce risk
Predict future returns…

Automated Modeling

Setup

– Get to use data for 1995-1998

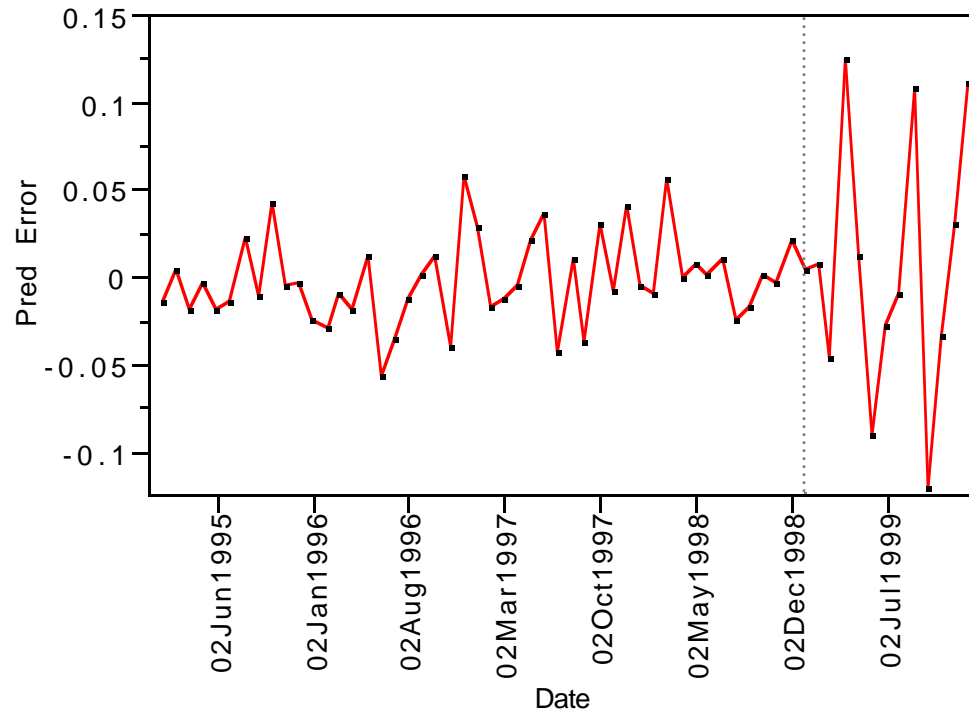– Try to predict 1999 and see how well we do

Use set of 10 predictors

– Automated modeling finds most predictive combination of factors.

– Claims to do a very nice job… Even "predicts" the big drop in the returns.

Confronting Reality

Actual prediction errors not so rosy...

– Model fits pretty well up to the time we start doing real forecasts, then does very poorly.

What are those predictors?

– Random noise!

How was the modeling software fooled?

– Traditional statistical analysis of this model says it looks real (i.e., the results are "statistically significant" by the usual measures)

– Claims there is no way these results could be produced by chance.

Issues of Multiplicity

Examples

– Connecting with the most clairvoyant student in class.

– "Birthday" problems

– *National Enquirer* fortune tellers

– Best mutual funds

– Cancer clusters

Coincidences

– Is the pattern real, or is it a random coincidence?

– The more chances there are for something to happen, the more likely it is that we'll observe it.

– The automated statistical model chose the best fitting model after examining many, many choices. The traditional summaries are fooled and think they have found something real, when it's really nothing at all.

Wrap Up

Lessons learned

– Question claims of those who predict the market.

– Guard against over-interpretation of random coincidences

Taste of statistics courses

– Real data analysis, done live in class.

– Interpretation and decision making, not formulas

– Linkages to other courses

– Leveraging technology
…on-line notes, interactive software, data downloads

Want to know more?

See you in August…