

Summary and Random Thoughts

Abandon Financial Astrology

Maybe astrology helps with your personal relationships. But whenever some suggests that I incorporate Gann, Fibonacci, or moon phase, I ask for precise definitions that do not repaint, then require thorough testing. None of these have yet passed my filters.

Become a Competent Programmer

You must be able to design, program, debug, and operate your own programs. Do not rely on a black box or a consultant.

Best Estimate

If the data used to populate the best estimate set is badly biased, then augmented by realized trades, the distribution is a mixture of two different processes. The result is more uncertain than if the prior is assumed to be random.

Bad data is worse than no data.

Broad Principles

Think probabilistically.

Forecasts can change. They get better with experience and new information.

Data

If the data series fails the risk test, there is no model that works.

Degree of Belief

When a gambling analyst tells us that the probability of the ball landing in a red pocket of a fair roulette wheel is 18 out of 38, or 47.4%, that probability can be verified experimentally with repeated trials. As the number of trials grows very large and approaches infinity, the proportion of those trials where the outcome was red approaches 47.4%. This is a frequentist interpretation of probability.

When a political analyst predicts a 30% probability of a candidate winning, the 30% value is not the result of repeating an experiment many times and counting the proportion where she won. It is a statement of the degree of belief that she will win.

From the frequentist perspective, the data is seen as random with fixed parameters to be estimated. Sampling is infinite, and decision rules can be sharp. Studies can be repeated. There is no information prior to the specification of the model.

From the Bayesian perspective, the data is seen as given. The parameters are unknown and random, and are updated as additional data is observed. Studies cannot be repeated. Prior information is important and useful.

Use whichever tools are helpful in solving the problem or establishing the confidence you need.

Discard Harmful Biases

Nostalgia is fine for antique furniture. But not for techniques for trading.

Embrace Monte Carlo

Use Monte Carlo simulation and analysis to study relationships and alternatives.

Feature Engineering

A simple algorithm with refined data usually outperforms a complex algorithm with raw data.

Gambling

Trading systems are not like roulette. Roulette has no model that works.

Trading systems are like blackjack. There is a model that works under some conditions. We want to recognize the conditions and play correctly. Stand aside otherwise.

Impartial Goal

List all subjective constraints, planning to exclude any system that violates any of them.

Consider all remaining systems impartially. Normalize for risk, then use those that have the highest account growth.

Is It Broken?

Make certain you can tell when your system performance is deteriorating. Take drawdowns as early warnings to reduce position size.

Learn the Mathematics

You must understand the mathematics that is the foundation of both trading systems and trading management. You must be able to assess program operation and results.

Learning and Model Complexity

Training data

- Guide the learning
- In-sample

Testing data

- Test whether learning happened
- Out-of-sample

Learning

- The model fits the training data, and also gives accurate predictions for test and live data.

Overfitting

- The model fits the training data, but gives inaccurate predictions for out-of-sample data.
- Make the model less complex, or replace it.

Not learning

- The model does not fit the training data. (Hence, cannot be trusted no matter how it fits the out-of-sample data.)
- Make the model more complex, or replace it.

Model

The whole purpose of the model is to identify the signal.

Model and Data

We are fitting a model to data so we can use the model to make predictions. Our first prediction is the direction of price change. Our confidence in that prediction is expressed in the size of the position taken.

Nothing is Stationary

Nothing about financial data or trading systems is stationary.

Every tool and technique you use must deal with changes in relationships.

Physical Laws

There are no physical laws governing the behavior of financial markets. If there were, new information would not matter much, and there would be little profit opportunity.

Position Sizing

Given a trading system that issues buy and sell signals, the only tool available for managing trading of that system is trade by trade position sizing.

Position size cannot be a component of the trading system's model. Putting it there removes it from trading management, assumes it is stationary, and assumes systems never fail.

Prediction

Are we predicting? Yes! The model is identifying, in advance, profitable trading opportunities. It is predicting them.

Quantify Your Risk Tolerance

I am trading a \$100,000 account, and forecasting two years. I want to hold the probability of a drawdown greater than 20% to a chance of 5%.

Use your risk tolerance to normalize results for comparison.

Read, Read, Read

This field is changing with astonishing speed. Subscribe to discussion forums, read research journals, watch lectures. Stay current. Your competition is.

Regime Switching

CAR25 is a universal objective function. It is the estimated growth rate of the trading system, normalized for risk. Absent reasons not related to the performance, CAR25 can be used to rank alternative systems in

a regime switching *portfolio of systems*. (This is an interesting project, already ongoing, and profitable.)

Risk

- Personal
- Data
- System

Small safe-f

The value of safe-f is related to the expected drawdown in the entire balance of the account trading the system—both the portion in shares and the portion in ballast funds. If the recommended value of safe-f is small, drawdowns in the portion in shares will be much larger than your stated tolerance. This much larger: $1.00 / \text{safe-f}$.

Stationarity

Nothing is stationary.

- Not prices.
- Not detrended prices.
- Not differenced prices.
- Not volatility.
- Not indicator signal frequency.
- Not trade frequency.
- Not trade profitability.
- Not position size.

Deal with the non-stationarity. Treating financial data and trading systems with tools that assume stationarity guarantees failure.

System Evaluation

The system results in an equity curve. Analysis of the equity curve determines the goodness of the system. That is, what is the terminal wealth and what is the drawdown.

Given two systems, compare them by normalizing the risk, then comparing the terminal wealth. Does anything else matter?

The Data Is What It Is

Financial data does not follow Normal distribution. Do not assume that it does, nor try to force it to be, nor naively use techniques that assume Normality.

ToDo List

There is much more that can be done. For example:

- Short / flat systems

- Pairs trading
- FOREX
- Futures
- Intra-day entries and exits
- Regime switching
- Consensus models
- Automated trading

Perhaps in the next book.

Use the Entire Distribution

Understand and use cumulative distribution functions and their charts.

When You Have Enough, Quit

No matter how profitable, consistent, and safe your system appears, there is always a non-zero probability of an account destroying black swan event.

Why This Is So Hard

You are competing one-on-one with Goldman Sachs. There are no handicaps and no mulligans.