Automated Trading System Basics

PyData Berlin Meetup
18.01.2017

Why trade a system?

Less emotions, more discipline

Backtesting

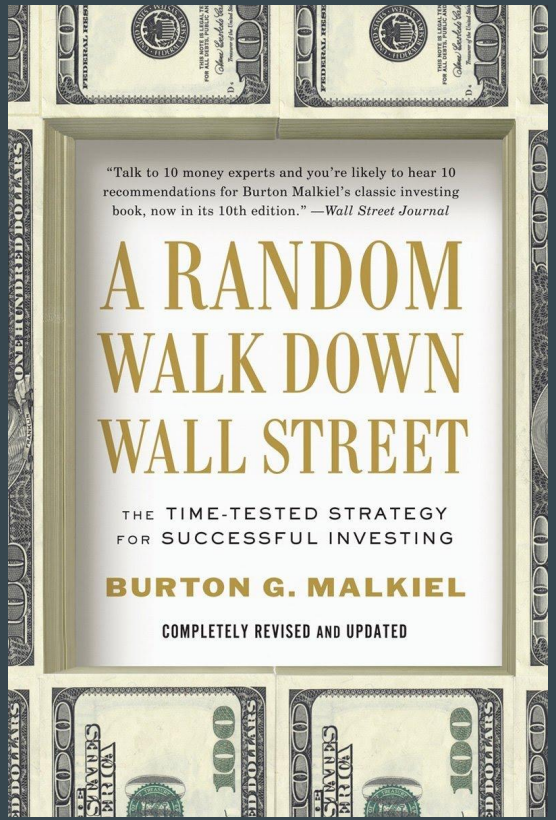
Optimization of Costs

Order speed

Expectations

This is easy!

This is impossible!



Reality

This is not easy!

This is not impossible!

This is the most efficient market in the world

Don’t expect quick results

What to trade?

Asset classes

Stocks

Stock Indices (ETFs)

Foreign Currencies (ETFs)

Commodities (ETFs)

Derivatives

Derivatives

Derives its value from the performance of the underlying asset

ETFs	Options
CFDs	Futures

Leveraging possible

Understand what you are getting into

Other factors playing into the valuation, fees apply

Notes

Keep liquidity and market impact in mind

Short selling is a risky option

When to buy and sell?

Trading Strategies

Based on

- Mispricings
- Fundamentals
- Price/Volume
- News/Sentiment
- Seasonality
- ...

Timeframes

Market/Asset

Classic examples

(Deterministic) Arbitrage

Exploiting market inefficiencies

- Different prices for same asset on different exchanges
- Derivative not tracking underlying asset correctly

Requires very high infrastructure investments (HFT)

Stock pairs

Market neutral

Find two companies that are very much alike

Verify that their prices are highly correlated

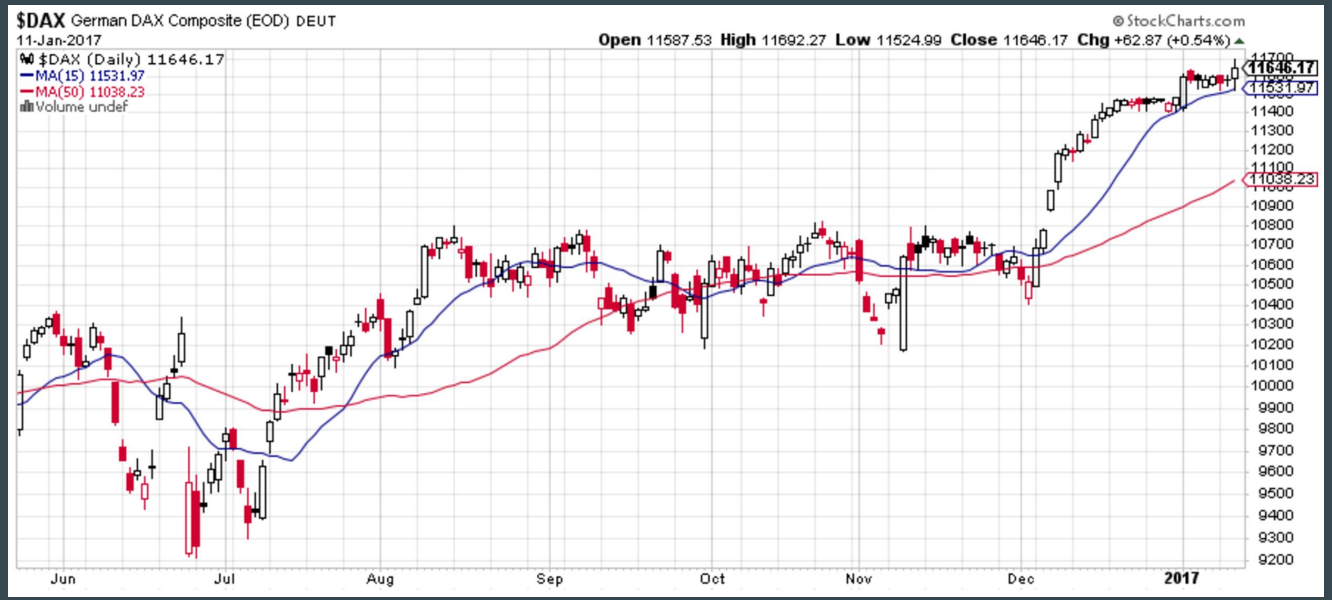
Classic: Coca Cola and Pepsi (~0.8)

Buy underperformer, sell overperformer when correlation weakens

Moving Average Crossover

Short-moving average crosses Long-term moving average

Classic combinations: MA15 and MA50 or MA50 and MA200



How to find them?

Start with the simple ones

Decide on timeframe and asset that make sense for you

Backtest and Benchmark

Paper trade

Backtesting best practices

In-sample/out-of-sample testing to avoid overfitting

Be mindful of timeframe selection

Aim for statistical significance

Use normalized data (survivorship bias, stock splits, dividends etc.)

Model transaction cost and slippage

Benchmark

- Choose appropriately
- Use attainable asset

Notes

Simpler is better

Puzzle

- Understand why your strategy makes money or why not
- Use this knowledge to apply the right strategy in the right place
- What does work now might not work in the future (and vice versa)

Don’t just look at returns

What tools to use?

Tools

Platforms

Libraries

Data

Brokers

Communities

Platforms

Quantopian (Python)

QuantConnect (C#)

Libraries

Backtesting + Live trading

- Zipline
- PyAlgoTrade
- Backtrader

Statistical Analysis

- Statsmodels
- SciPy
- scikit-learn

Data

Current Data

- Yahoo Stock API
- Google Stock API

Backtesting

- QuantQuote
- Kibot
- Quandl (alternative data)

Brokers

Interactive Brokers

Communities and Resources

Quantopian Forum

Quant.stackexchange.com

Quantocracy

(Forums like EliteTrader)

Closing notes

My ~~advice~~ opinions

Start with something that you know or understand very well

Understand why and how strategies (don’t) work

You will loose on at least some trades

Questions?