Python for Finance

Momentum Trading Strategy Backtest

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Outline

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Module Content Overview

- A good mix of Python and Finance (slightly biased towards coding)

Week	Lecture	Tutorial	Quiz
1	L1. Basics of Python I		
2	L2. Basics of Python II		
3	L3. Linear Regression	T1. Basics of Python	
4	L4. Factor Investing	T2. Linear Regression	Q1
5	L5. Cointegration and Pairs Trading	T3. Factor Investing	Q2
6	L6. Option Pricing	T4. Pairs Trading	Q3
7	L7. Sentiment Analysis with Text Mining	T5. Option Pricing	Q4
8	L8. Intro to Machine Learning I	T6. SA with Text Mining	
9	L9. Intro to Machine Learning II	T7. Intro to ML	
10	L10. Revision (+ mock exam solutions)		

What is a Trading Strategy?

Trading strategy is a detailed plan/method of buying and selling assets based on set of rules for making decisions.

- We will be focusing on the systematic trading strategies (rather than on discretionary ones).
- Advantages of systematic trading include: ability to backtest, elimination of human factor/bias, scalability, diversification.
- Trading strategies are based on some kind of intuition:
  - today's focus is on Momentum factor;
  - module covers more factor-based strategies (HML, SMB, CMA, RMW, Mom, reversal, volatility etc.) and statistical arbitrage strategies (pairs trading).

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Momentum Trading Strategy*

Momentum

'the phenomenon that stocks which have performed well in the past relative to other stocks (winners) continue to perform well in the future, and stocks that have performed relatively poorly (losers) continue to perform poorly. (AQR)

- Double digit returns.
  - 12.01% average annual excess return for US equities in the paper.
- Great for diversification.
- Pervasive.
- Simple.

So, it definitely works, but why?

- Investor *under*reaction (delayed reaction).
- Investor *over*reaction.
- Tracking error.

*Based on Jegadeesh and Titman (1993).

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Momentum Trading Strategy - Main Risk: Reversal

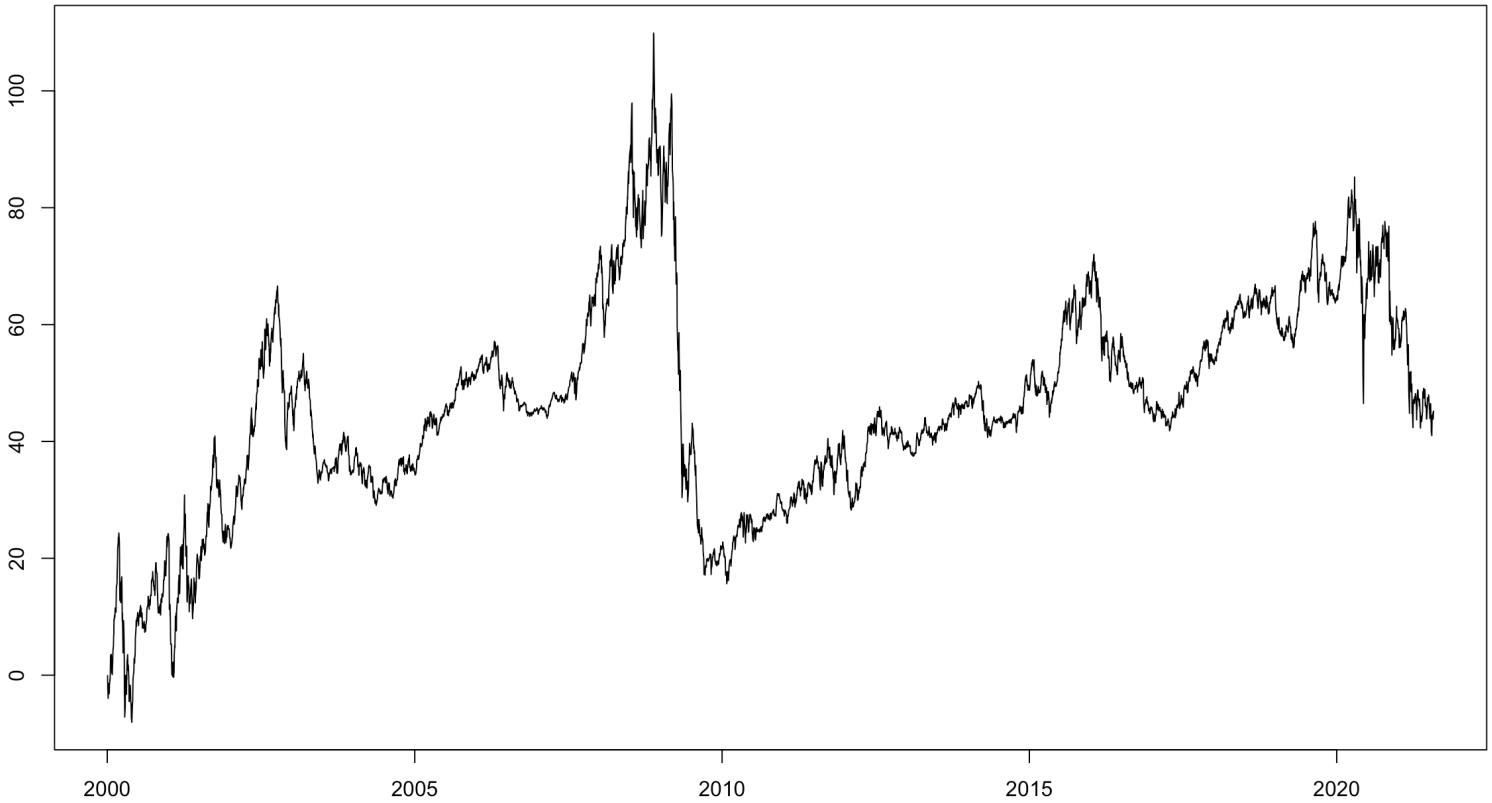

Figure: Momentum Crash 2009

- Momentum lost 83.36% in 2009 (most of which happened over a 3-month period).
- One needs to gain 100% return for 3 years straight just to recover the original investment.

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Momentum Trading Strategy - Implementation

Formation period - selecting stocks

1. Define the stock universe.
2. For each stock calculate past **J**-months returns (**J**=3, 6, 9, 12 months).
3. Sort stocks in ascending order based on past returns and divide them into 10 decile groups.
4. Voila! Group 1 is your 'losers' portfolio (short leg) and Group 10 is your 'winners' portfolio (long leg).

Trading period - buying and selling stocks

1. Go long the 'winners' and go short the 'losers' that you selected in the formation period.
2. Hold this portfolios for the following **K** months (**K**=3, 6, 9, 12 months).
3. Compute return on each leg of the strategy as equally weighted average of returns on stocks inside the leg.
4. Keep monitoring the stocks and rebalance monthly.[†]

Go to Notebook

[†] In the paper J&T use monthly rebalancing. But in the industry, different rebalancing frequencies are used.

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