
PYTHON FOR
INVESTING 101
by INVESTIC

Instructor

Vithan (อั้น) Minaphinant

Founder BottomLiner
Founder Investic ML Lab for investment
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High experienced in field of Big Data, AI, Quantitative Strategy, Multi-Asset Strategy, Portfolio Management.

Guest Speakers

เสฏฐวุฒิ ประสบพิบูล

Former Quantitative Researcher,
Former Investment Analyst,
Quantitative Developer at *Citadel*

ณัฐธกรณ์ อินทราชา

Quantitative Analyst
Intern at *Axima*, USA
Data Scientist, *Securities Company*

Agenda

Python Basic

+ สำหรับผู้ที่ยังใหม่กับ python หรือยังไม่คล่อง แนะนำให้ดูคลิป และทำโจทย์ไ สำหรับโลกลงทุนมาให้

Python Numpy and Pandas

+ สำหรับคนที่ไม่คุ้นเคยกับ Numpy และ Pandas เราเลือกเท่าที่จำเป็นสำหรับ เป็น Library หลักที่เราใช้จัดการกับ Time Series Data"

+ Python for Investing

+ More on Python

+ Algorithmic Trading

+ Intro to Machine Learning for Investing

+ Intro to Quantitative Portfolio Management

Every Friday Night 19.00 - 21.00

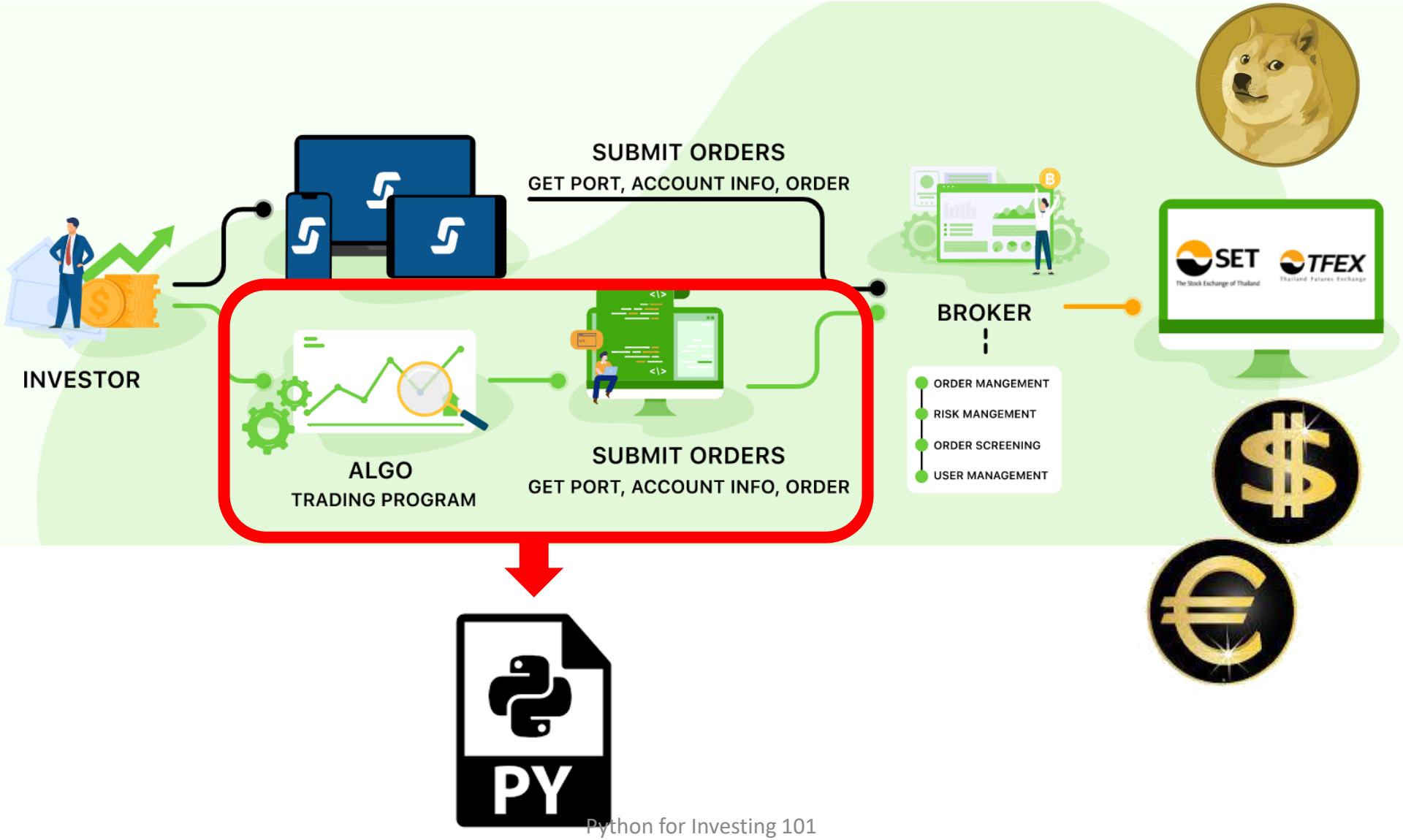
How to ...

- Python Basic 0/8
  - 1.1 What is Python — Preview
  - 1.2 Basic Python — Preview
  - 1.3 Basic Operation
  - 1.4 Number
  - 1.5 String
  - 1.6 List
  - 1.7 List Method
  - 1.8 Dictionary
- + Python Numpy and Pandas 0/8
- + Python for Investing 0/7
- + More on Python 0/6

What is Python

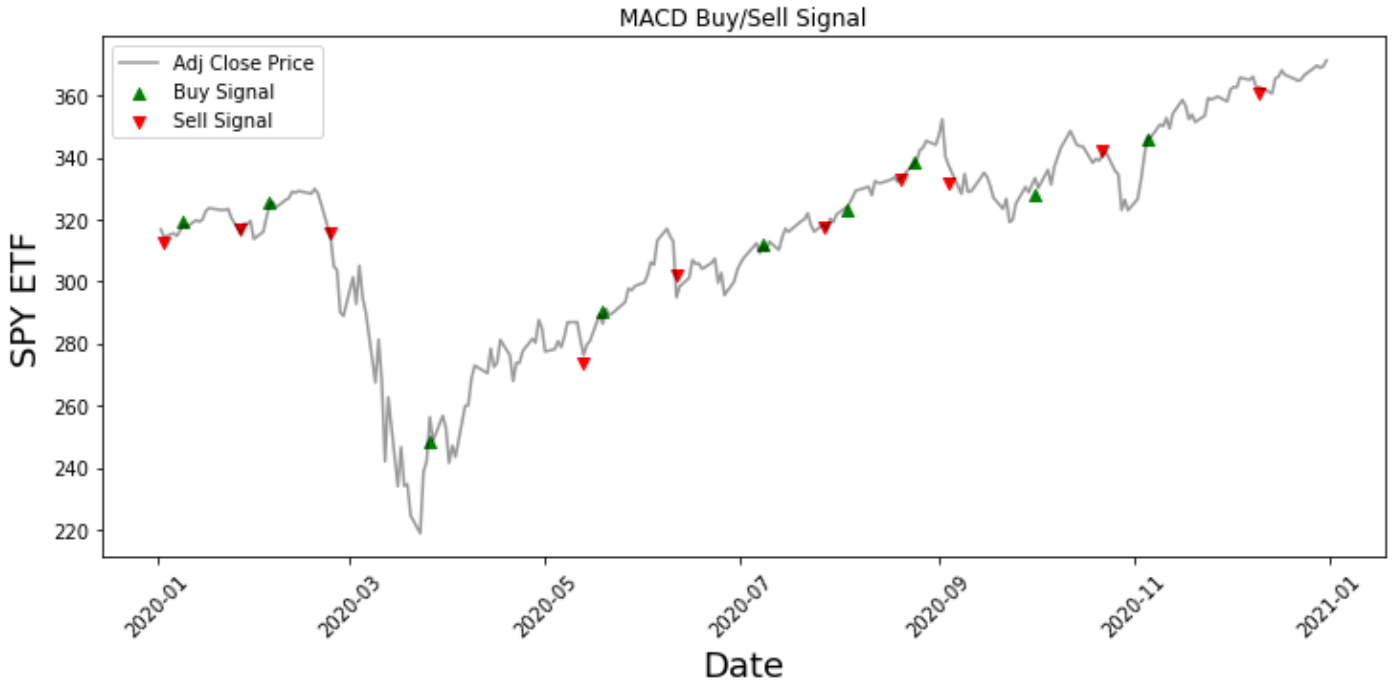
ในบทนี้ จะพาทุกท่านไปรู้จัก Python ภาษาเขียนโปรแกรม ที่เรียนรู้ได้ง่ายสุดๆกัน

Program Trading



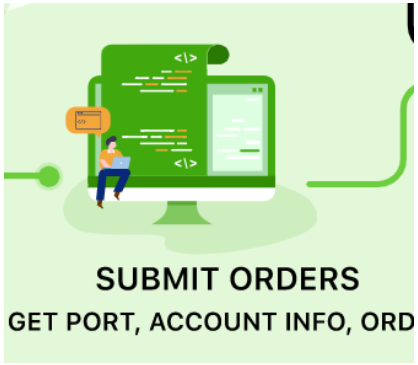
Strategy

```
[26] plt.figure(figsize=(12,5))
     plt.scatter(spy.index, spy['Buy_Signal_Price'], color='green', label='Buy Signal', marker='^', alpha=1)
     plt.scatter(spy.index, spy['Sell_Signal_Price'], color='red', label='Sell Signal', marker='v', alpha=1)
     plt.plot(spy['Adj Close'], label='Adj Close Price',color='black', alpha=0.4)
     plt.xticks(rotation=45)
     plt.title('MACD Buy/Sell Signal')
     plt.xlabel('Date', fontsize=18)
     plt.ylabel('SPY ETF', fontsize=18)
     plt.legend(loc='upper left')
     plt.show()
```



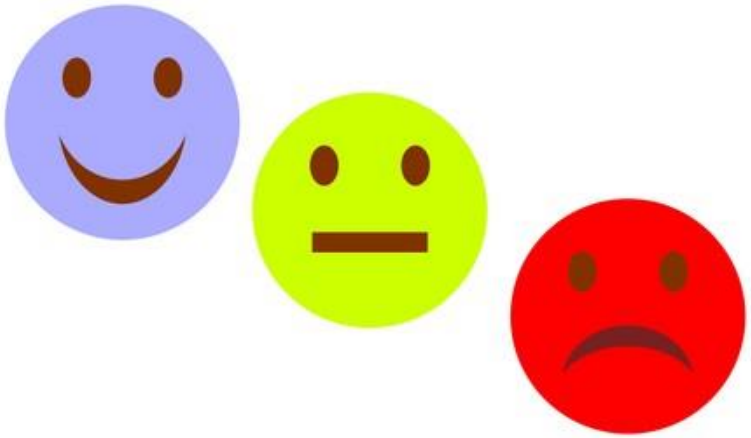
Two Parts

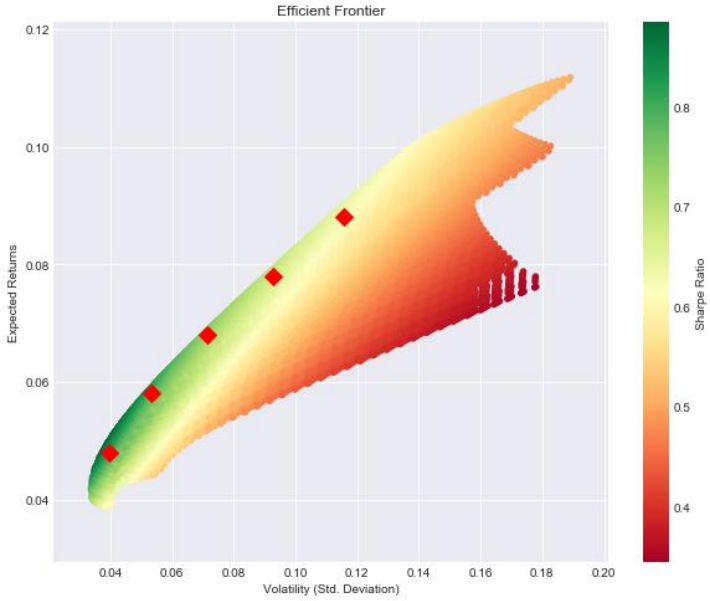
Strategies



Executions

What Python CAN
–



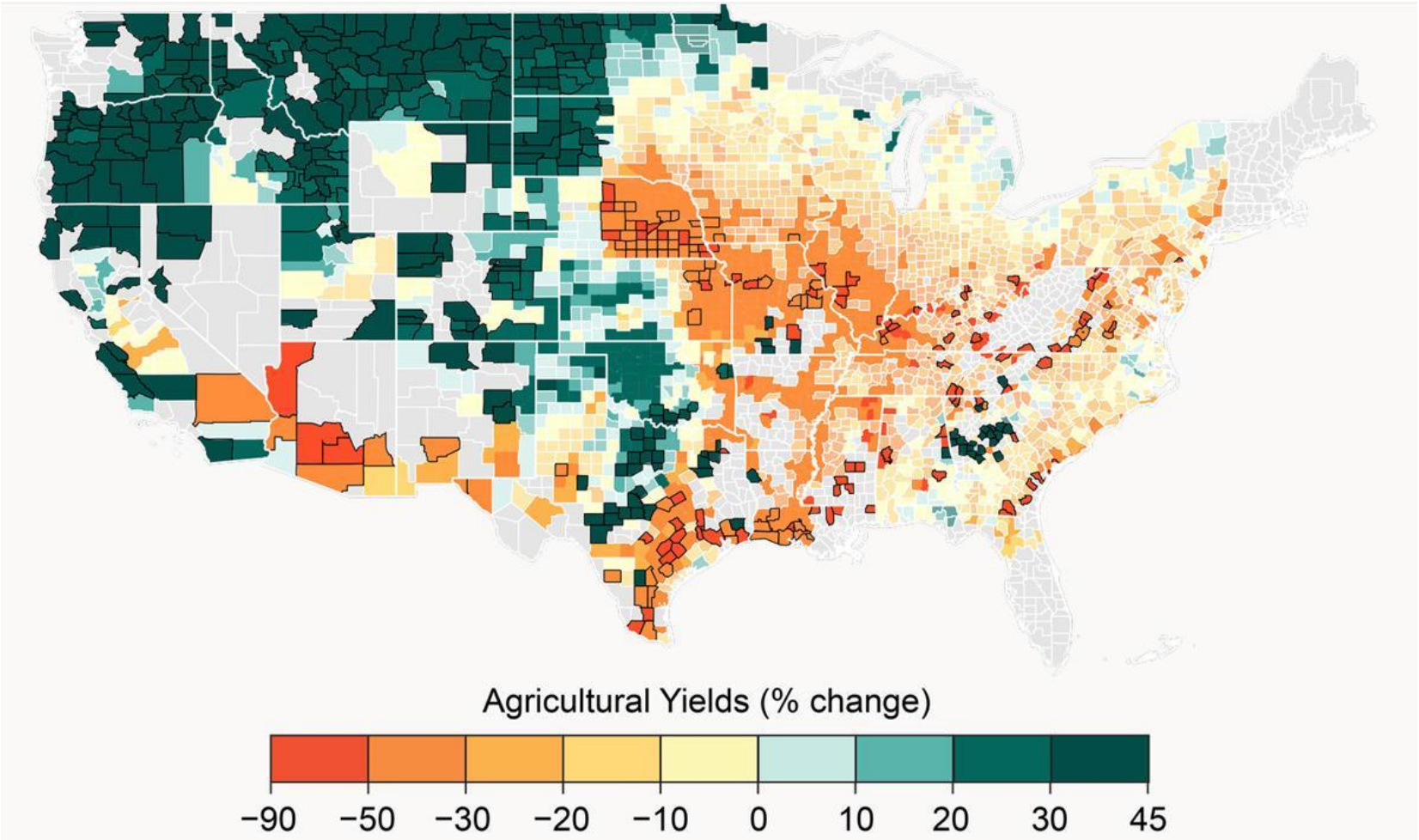


Exchange	FOREX
Symbol	AUDJPY
Interval	15 Min
Pattern	Falling Wedge
Identified Time	01-30 12:30
Length	28 Candles
Direction	▲
Trend Change	Continuation
Quality	
Initial Trend	
Uniformity	
Clarity	
Breakout	
Forecast Price	81.39

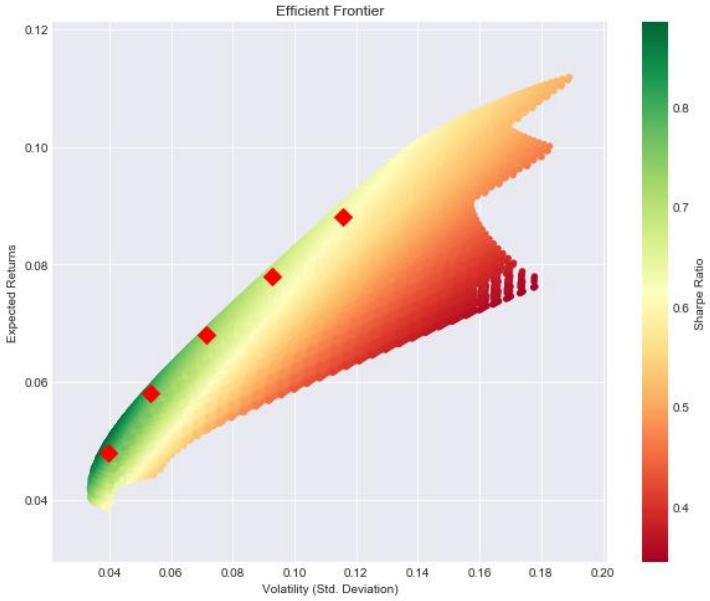
Price Movement | Volatility Analysis

What Python CAN
–

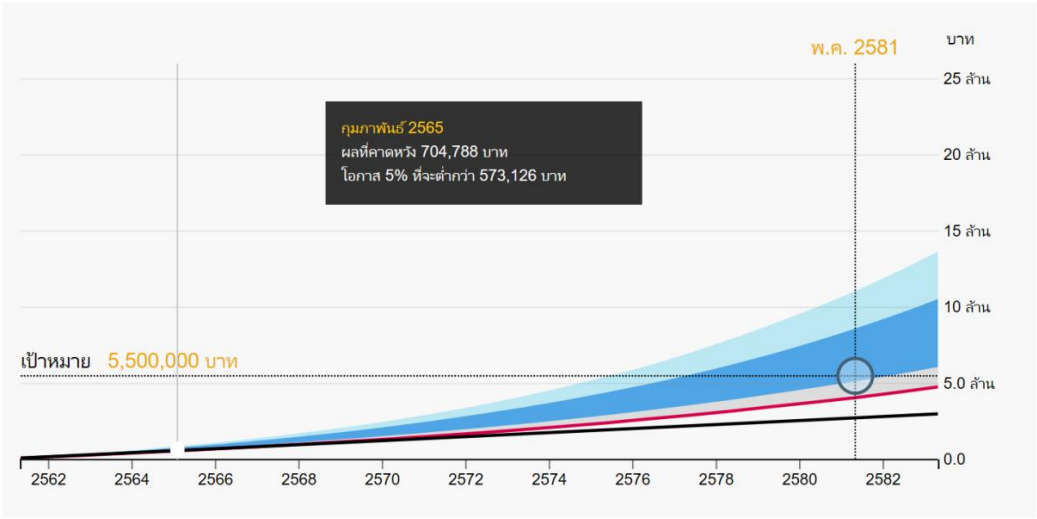
Temperature Forecast ??



RoboAdvisor ??

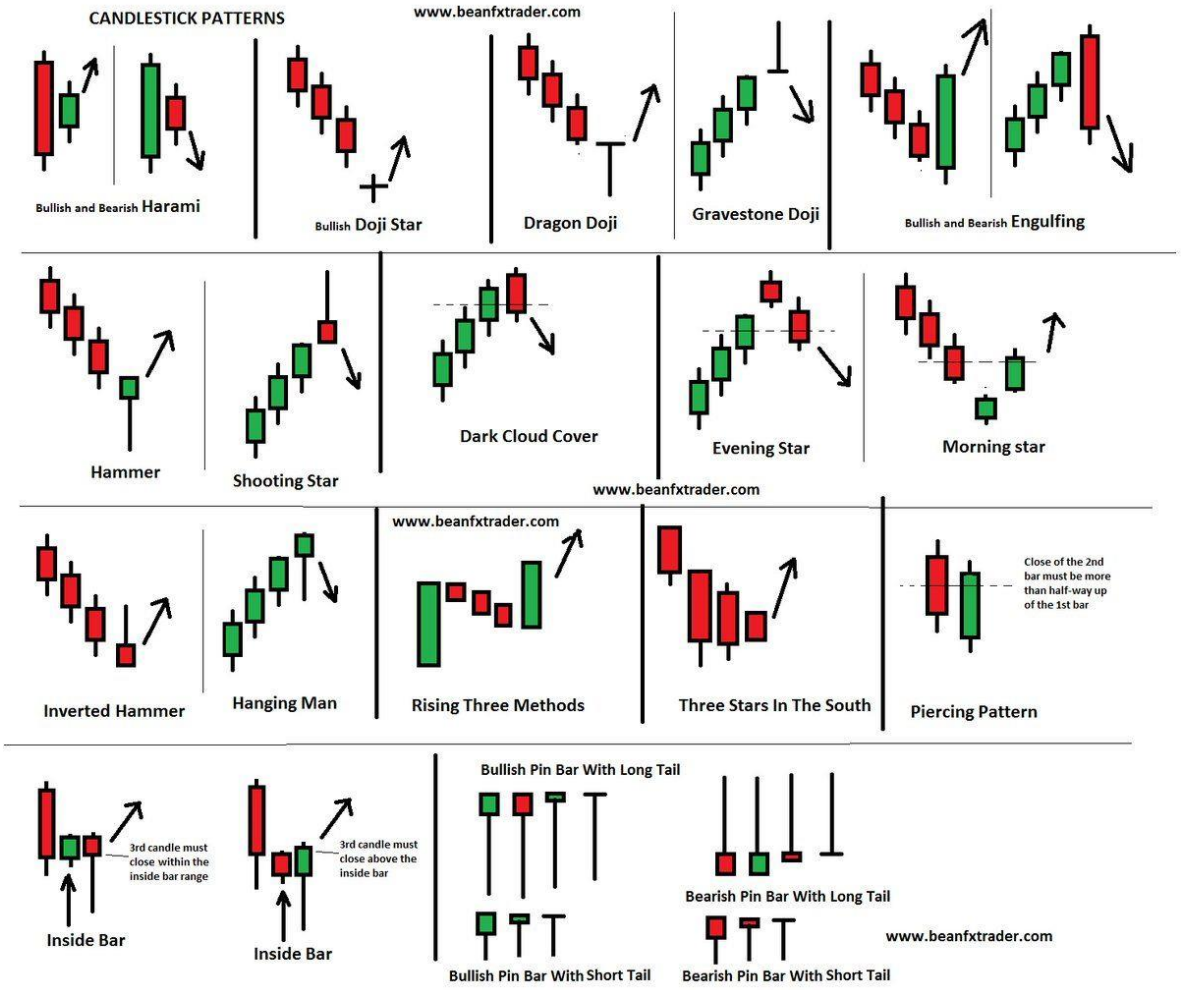


FINNOMENA



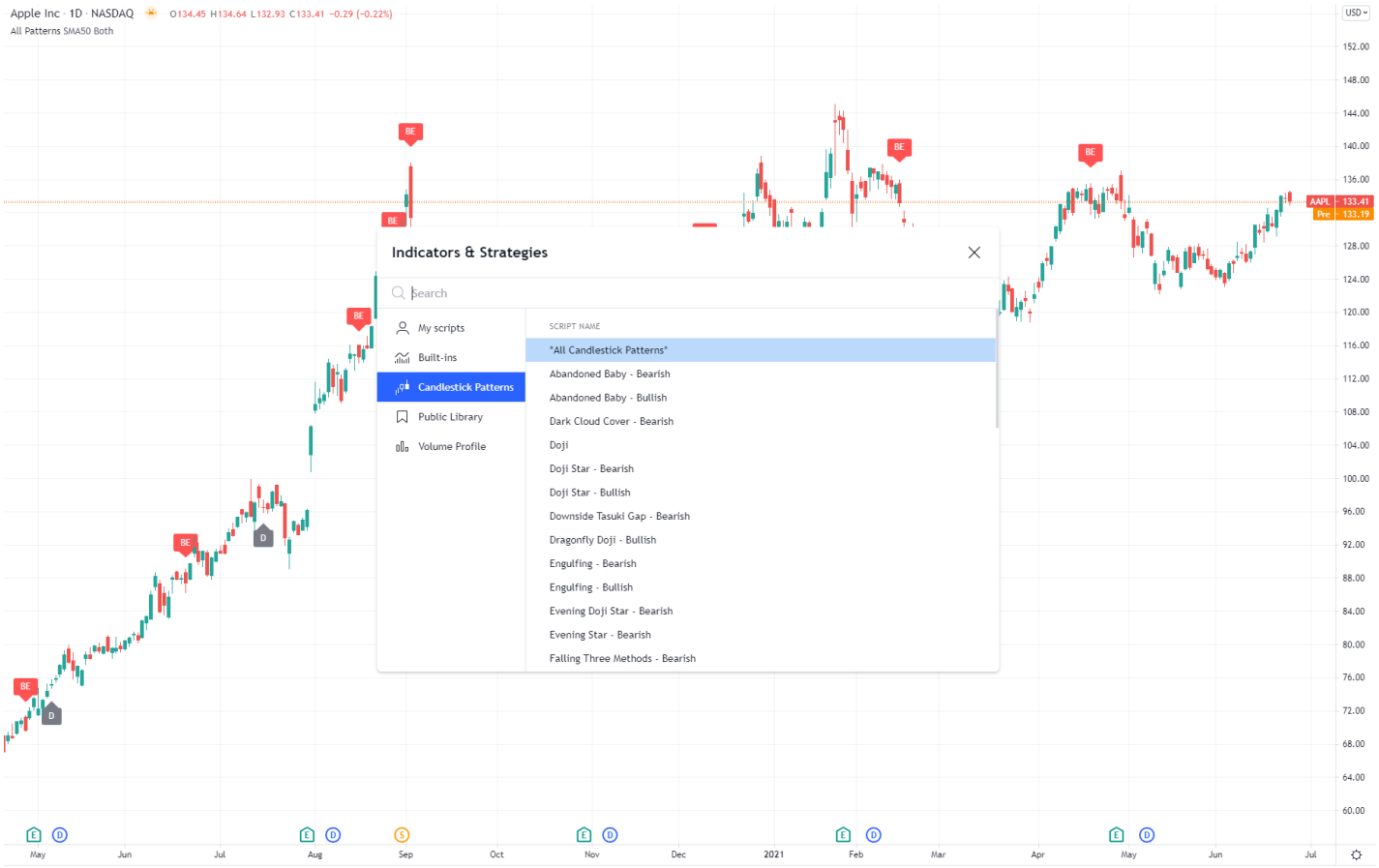
Finding Patterns?

Easier one



Pattern Recognition

Easy jobs



What Python CANNOT … or very hard for now

–

Investment Style

Fundamental Analysis

Technical Analysis

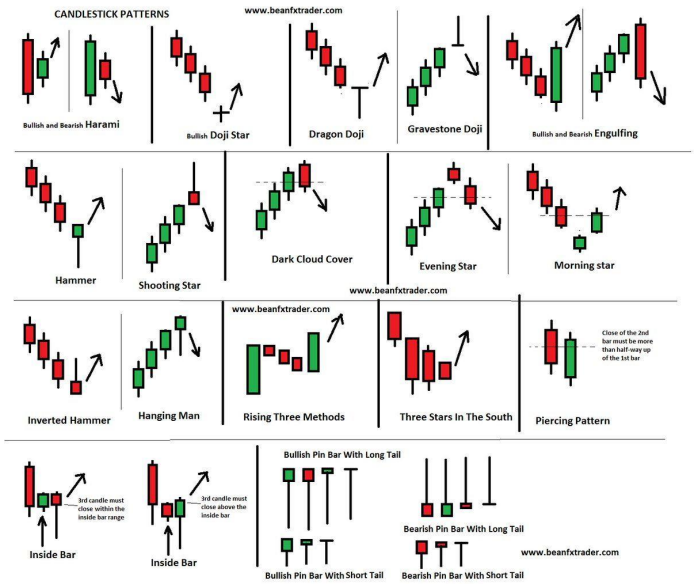
Fundamental vs Technical Analysis

Biden Expands Trump-Era Ban on Investment in Chinese Firms Linked to Military

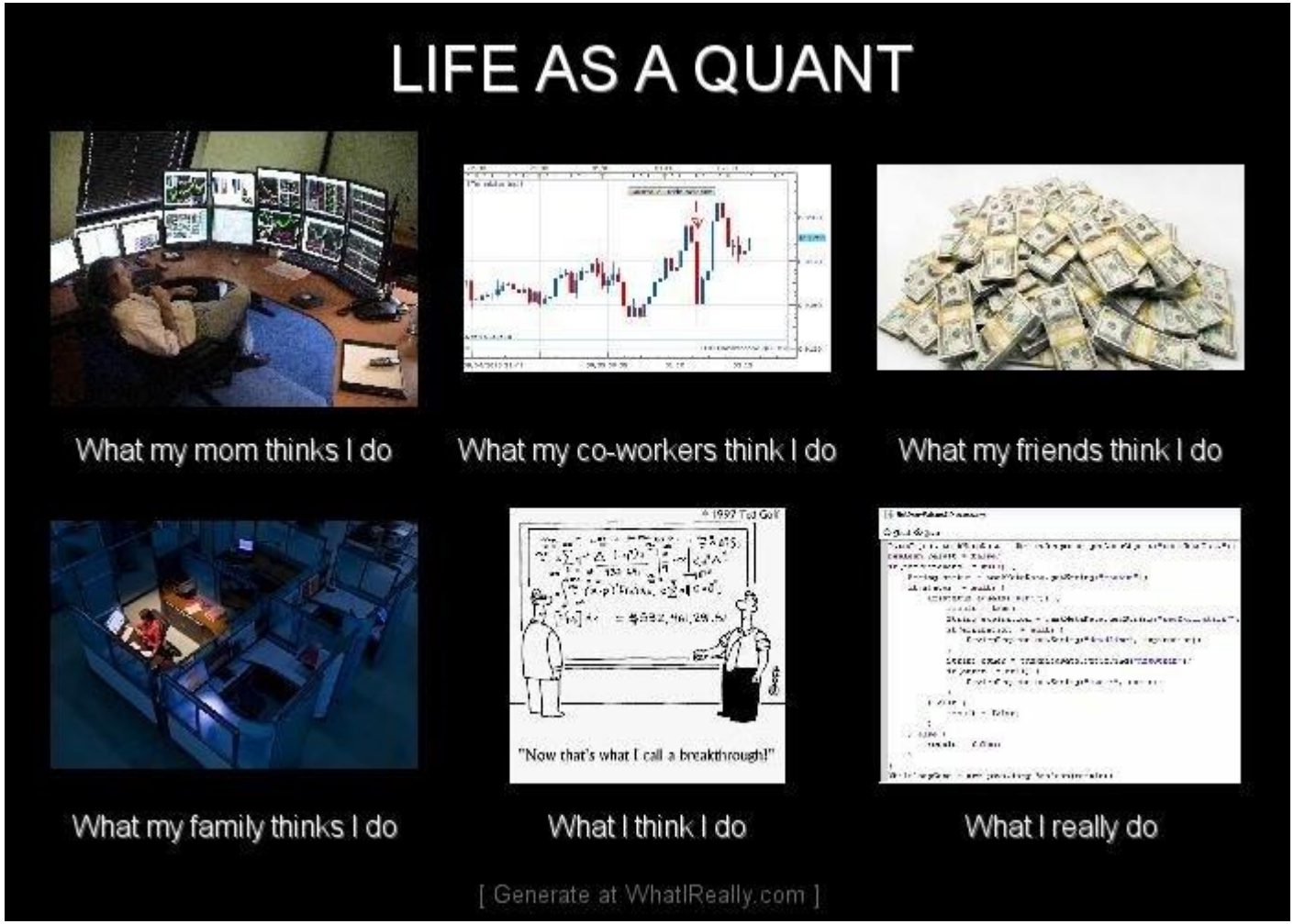
Financial Results

Quarterly Trends | Annual Trends — View in (Million) — Prior Period

(In Cr.)	2017	2016	2015	2014	2013
Income Statement					
Revenue	38,540.42	29,810.62	32,502.41	28,536.53	2,187.92
Other Income	9,704.92	8,823.82	2,008.86	1,817.06	341.99
Total Income	48,245.34	38,634.44	34,511.27	30,353.59	2,529.91
Expenditure	-34,461.04	-28,395.21	-27,876.20	-26,355.49	-1,855.78
Interest	-3,896.16	-3,541.36	-3,655.93	-3,564.96	-469.23
PBDT	13,784.30	6,697.87	2,979.14	433.14	204.90
Depreciation	-2,986.29	-1,217.97	-1,011.67	-1,504.79	-147.91
PBT	10,798.01	5,479.90	1,967.47	-1,071.65	56.99
Tax	270.69	-8.02	-40.27	2,147.74	63.78
Net Profit	11,068.70	5,471.88	1,927.20	1,076.09	120.77
Equity	296.50	296.50	296.50	296.50	86.91
EPS	29.04	18.45	6.50	3.67	1.39
CEPS	47.40	22.56	9.91	8.70	3.09
OPM %	35.77	34.35	20.41	14.01	30.81
NPM %	28.72	18.36	5.93	3.77	5.52



Quant … long time ago

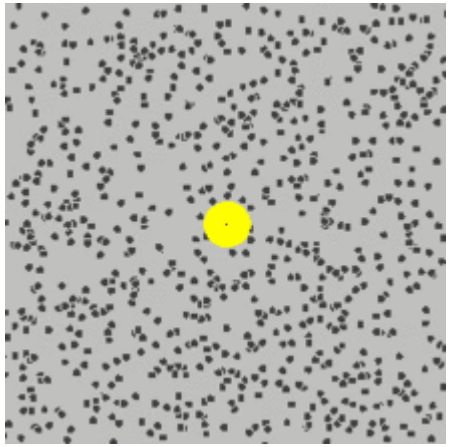


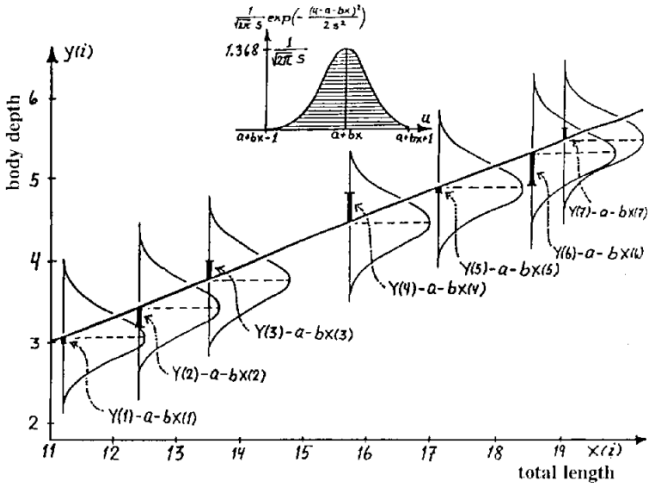
More about mathematic – quant key concept

What quant theorist do

Random Walk with Drift ($Y_t = \alpha + Y_{t-1} + \varepsilon_t$)

From Brownian Motion to stochastic to price prediction





It's about statistics

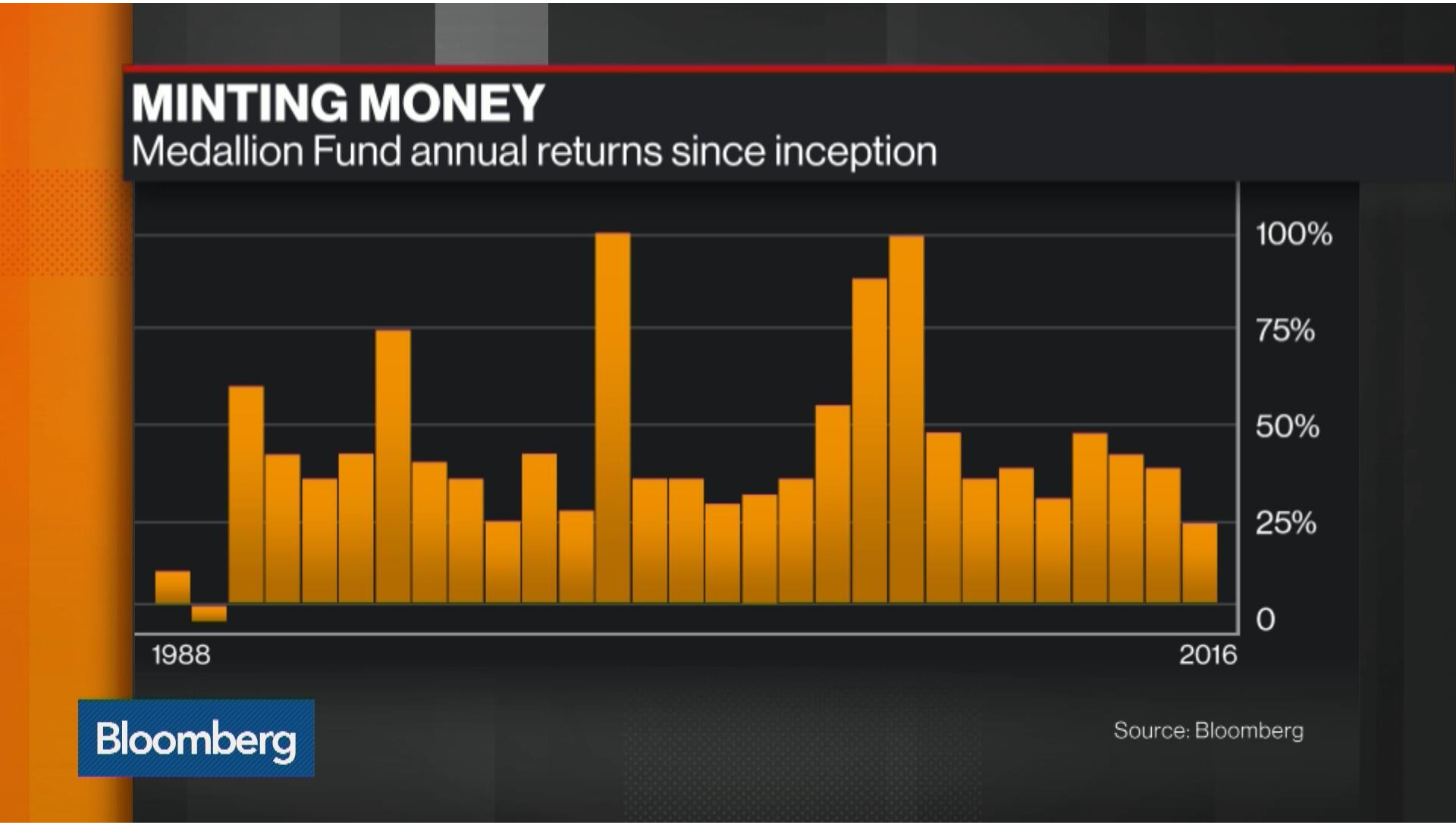
S&P 500 & Memorial Day Week Since 1971

	Friday Before Memorial Day	Tuesday	Wednesday	Thursday	Friday
No. of Returns	50	50	50	50	50
Average Return	0.09%	0.19%	0.06%	0.18%	0.09%
Median Return	0.14%	-0.14%	0.11%	0.11%	0.19%
Percent Positive	58.0%	44.0%	60.0%	62.0%	60.0%
Std. Deviation	0.72%	1.19%	0.97%	0.62%	1.07%

S&P 500 Daily Returns Since 1971

	Monday	Tuesday	Wednesday	Thursday	Friday
No. of Returns	2412	2551	2554	2504	2490
Average Return	-0.02%	0.06%	0.07%	0.03%	0.04%
Median Return	0.03%	0.03%	0.08%	0.04%	0.07%
Percent Positive	51.7%	51.9%	55.3%	52.9%	54.0%
Std. Deviation	1.26%	1.08%	1.03%	1.06%	1.00%

Quant Products

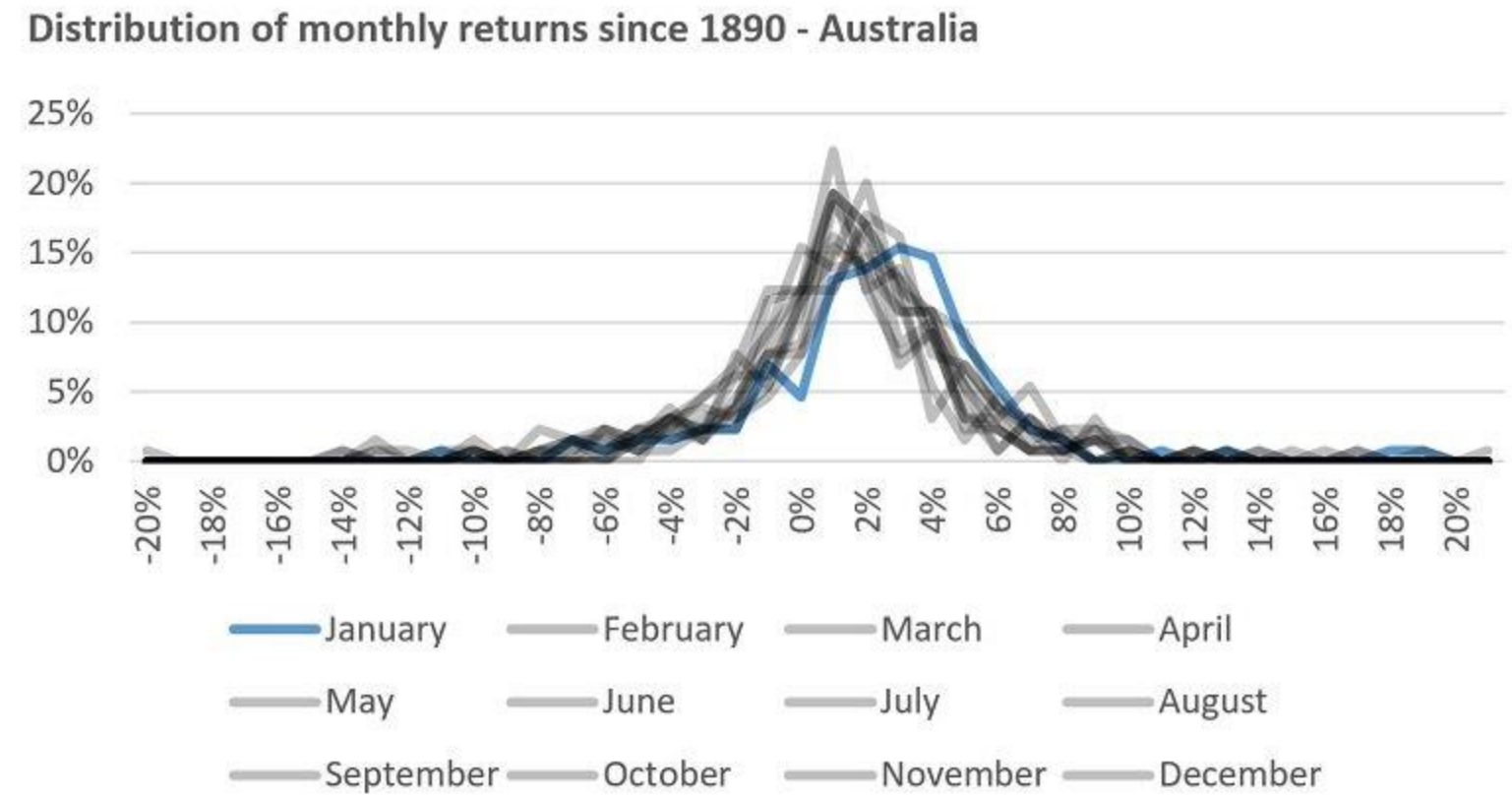


Down Friday then what about Monday??

ChristopherCarrollSmith published on TradingView.com, December 15, 2020 10:46:20 EST
TVC:SPX, 1D 3666.8 ▲ +19.3 (+0.53%) **O:**3666.4 **H:**3678.0 **L:**3660.8 **C:**3666.8

TradingView

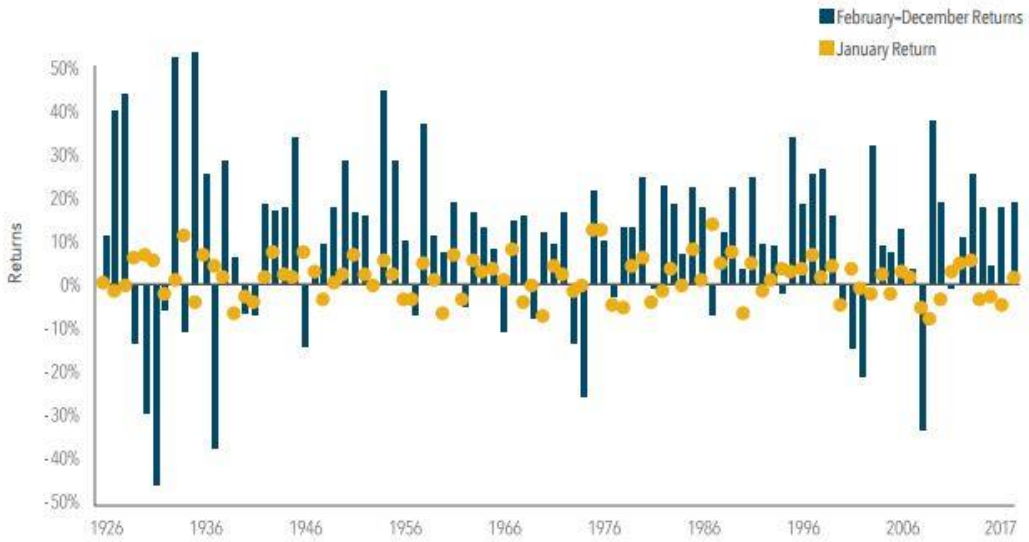
January the best?



Source: Global Financial Data, Refinitiv and Schroders. Data to December 2019.

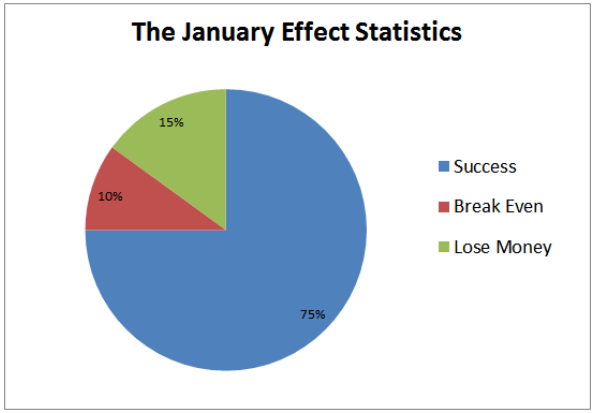
January the best?

Exhibit 1: January Return vs. Subsequent 11-Month Return of the S&P 500 Index
1926–2017



In US dollars. S&P 500 Index data provided by Standard & Poor's Index Services Group.

Past performance is not a guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio.



Research?? Easy

Journal of Financial Economics 8 (1980) 55–69 © North-Holland Publishing Company

STOCK RETURNS AND THE WEEKEND EFFECT

Kenneth R. FRENCH*

University of Rochester, Rochester, NY 14627, USA

Received October 1979, final version received February 1980

This paper examines two alternative models of the process generating stock returns. Under the calendar time hypothesis, the process operates continuously and the expected return for Monday is three times the expected return for other days of the week. Under the trading time hypothesis, returns are generated only during active trading and the expected return is the same for each day of the week. During most of the period studied, from 1952 through 1977, the daily returns to the Standard and Poor's composite portfolio are inconsistent with both models. Although the average return for the other four days of the week was positive, the average for Monday was significantly negative during each of five five year subperiods.

1. Introduction

The process generating stock returns has been one of the most popular topics of research in finance since Bachelier's pioneering article, published in 1900.[1] Although many authors have addressed this issue,[2] several questions have not been resolved. One of these is whether the process operates continuously or only during active trading. Since most stocks are traded only from Monday through Friday, if returns are generated continuously in calendar time, the distribution of returns for Monday will be different from the distribution of returns for other days of the week. On the other hand, if stock returns are generated in trading time, the distribution of returns will be the same for all five days of the week.

Several researchers have examined this issue by studying the variance of price changes. For example, Fama (1965) tests the hypothesis that returns

I would like to thank Michael Bradley, Peter Dodd, Martin Gruber, Michael Jensen, Richard Leftwich, Wayne Mikkelson, Charles Plosser, Richard Ruback, Clifford Smith, Jerold Warner, the members of the Finance Workshop, Graduate School of Management, University of Rochester, and the referee, Eugene Fama, for comments on previous drafts. I am especially indebted to G. William Schwert for his generous guidance. Financial assistance was provided by the Managerial Economics Research Center and the Center for Research in Government Policy and Business.

[1] Bachelier (1900).

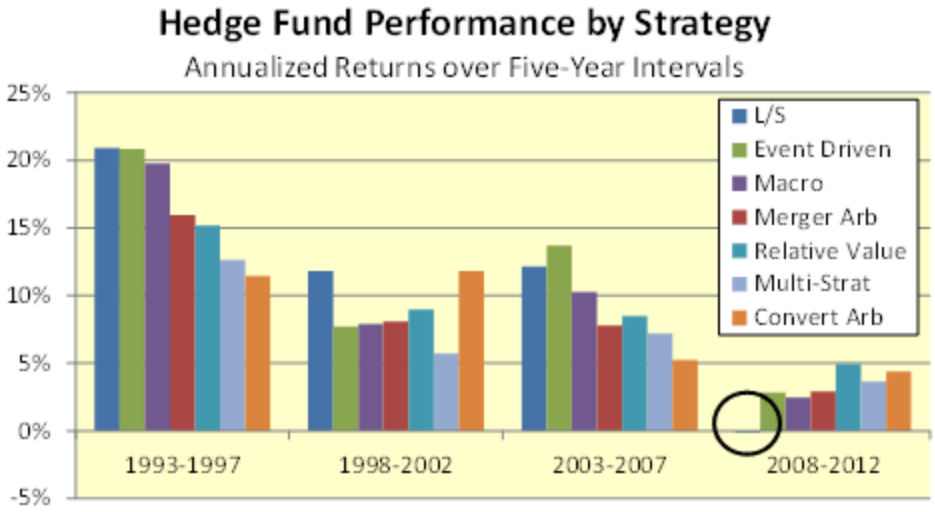
[2] See, for example, Cootner (1964), Clark (1973), Oldfield, Rogalski and Jarrow (1977), Fama (1965, 1970, 1976), and Officer (1972).

Quant Products

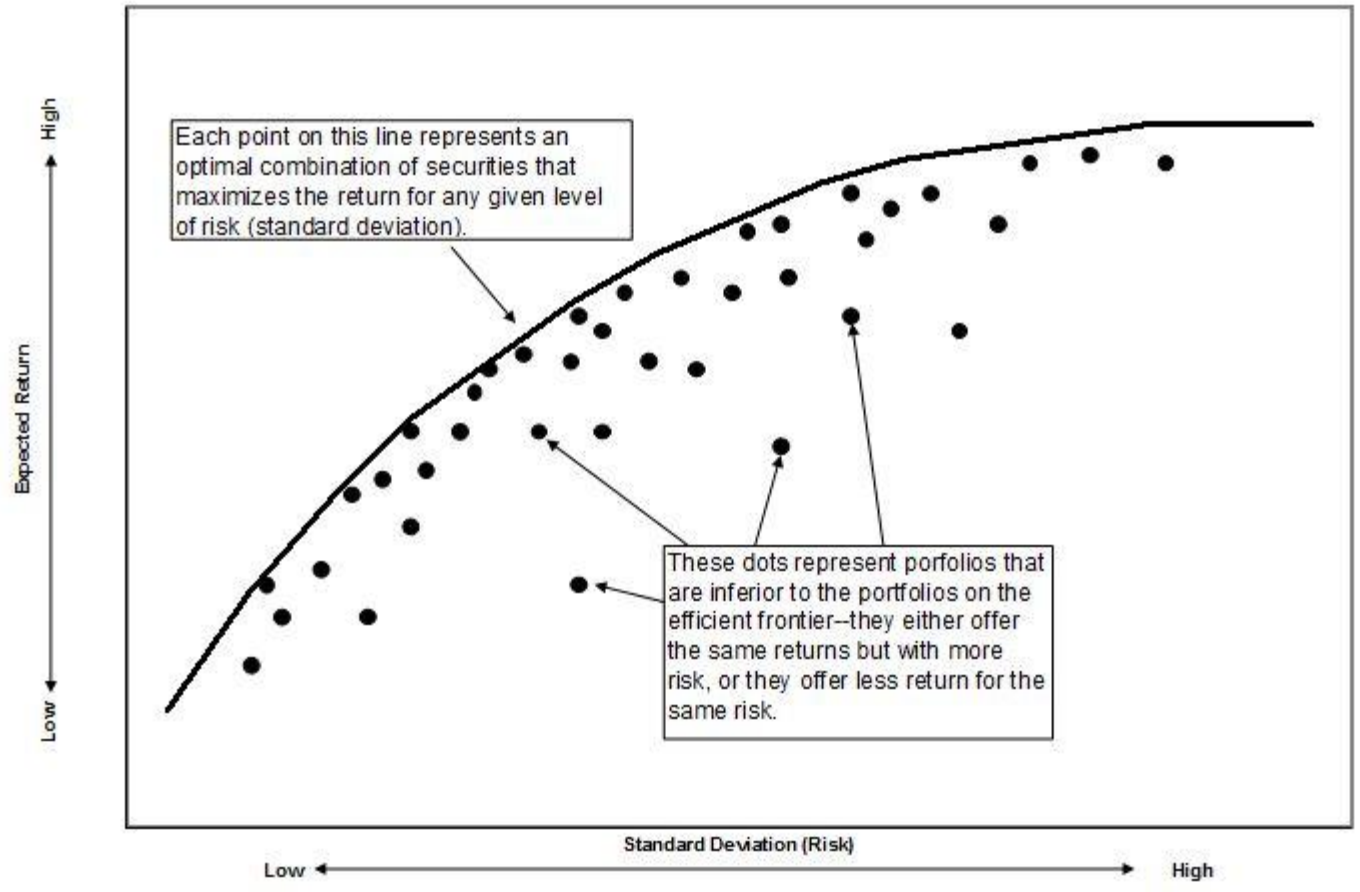
SECTOR BREAKDOWN (%)

	Long	Short	Net
Health Care	29.60	-25.78	3.82
Information Technology	47.14	-44.67	2.46
Real Estate	34.43	-33.87	0.56
Utilities	23.58	-23.07	0.50
Consumer Discretionary	48.73	-48.31	0.42
Other	0.02	0.00	0.02
Telecommunications	3.76	-3.78	-0.02
Energy	13.97	-14.34	-0.36
Consumer Staples	17.55	-18.48	-0.93
Industrials	53.00	-54.01	-1.00
Materials	19.04	-20.07	-1.04

Quant Products

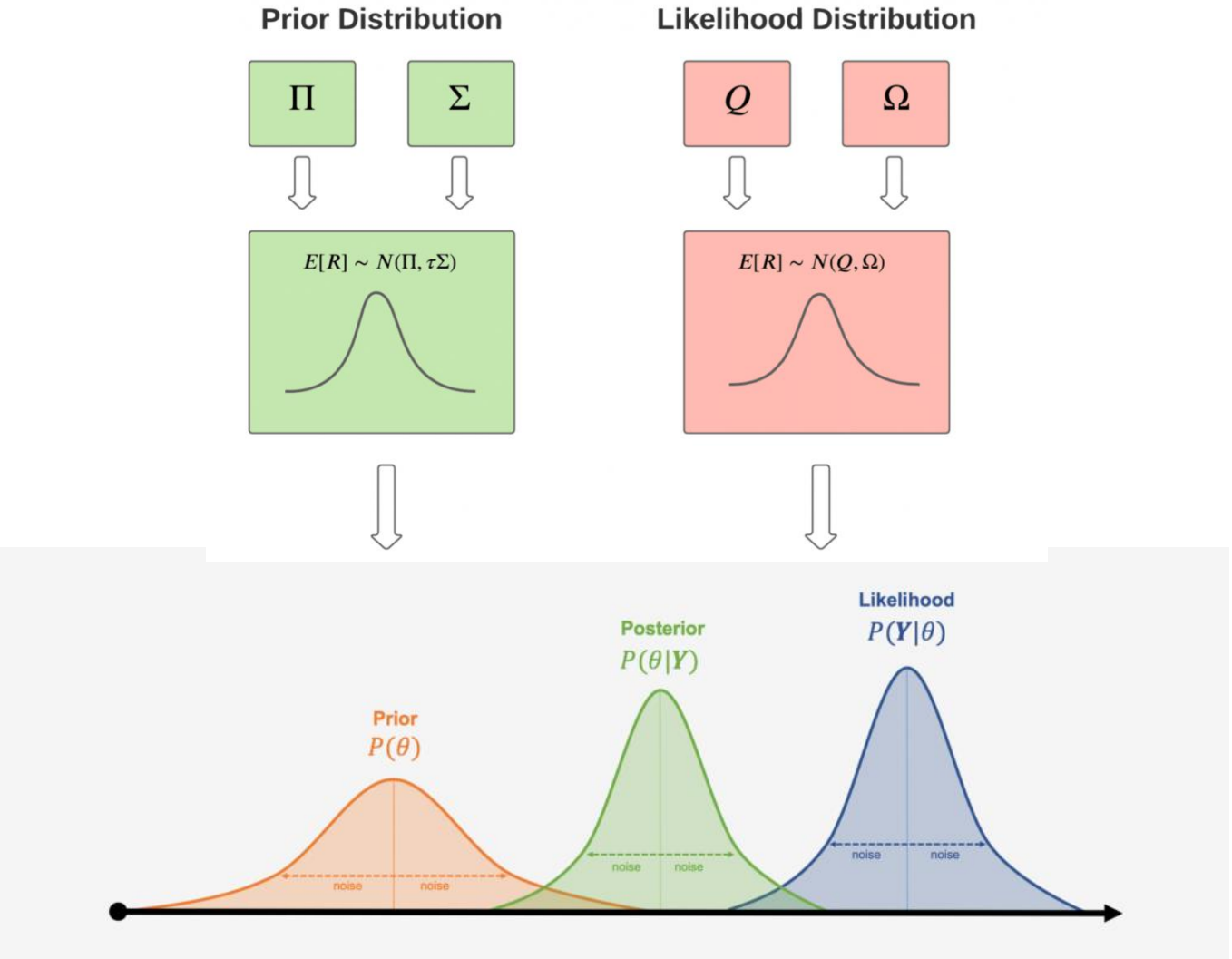


Traditional

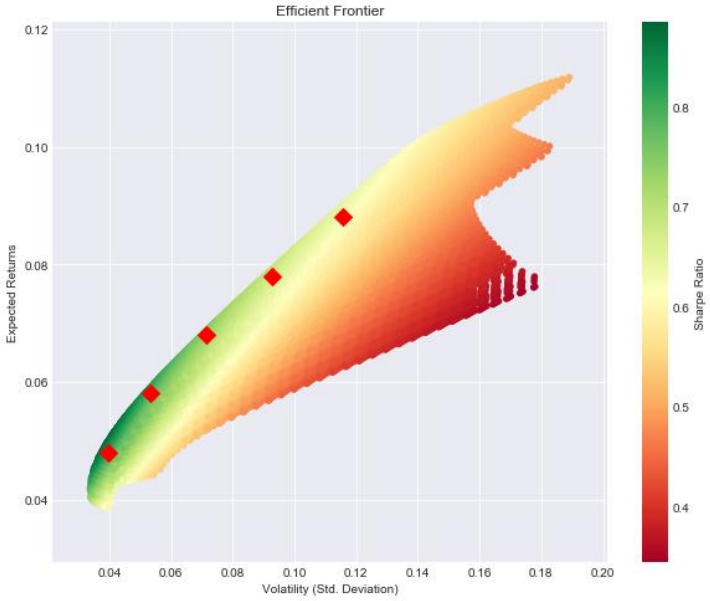


Something more Quants

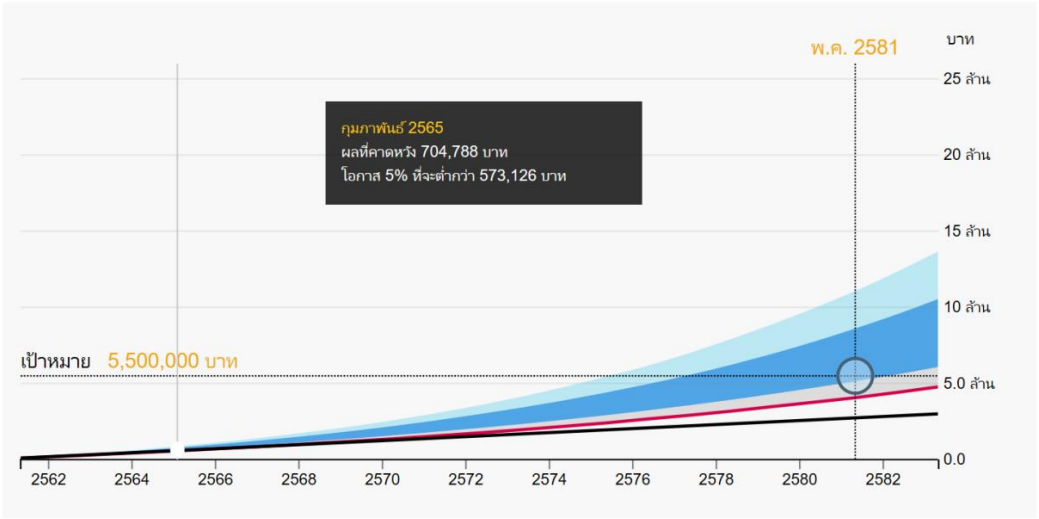
What quant theorist do



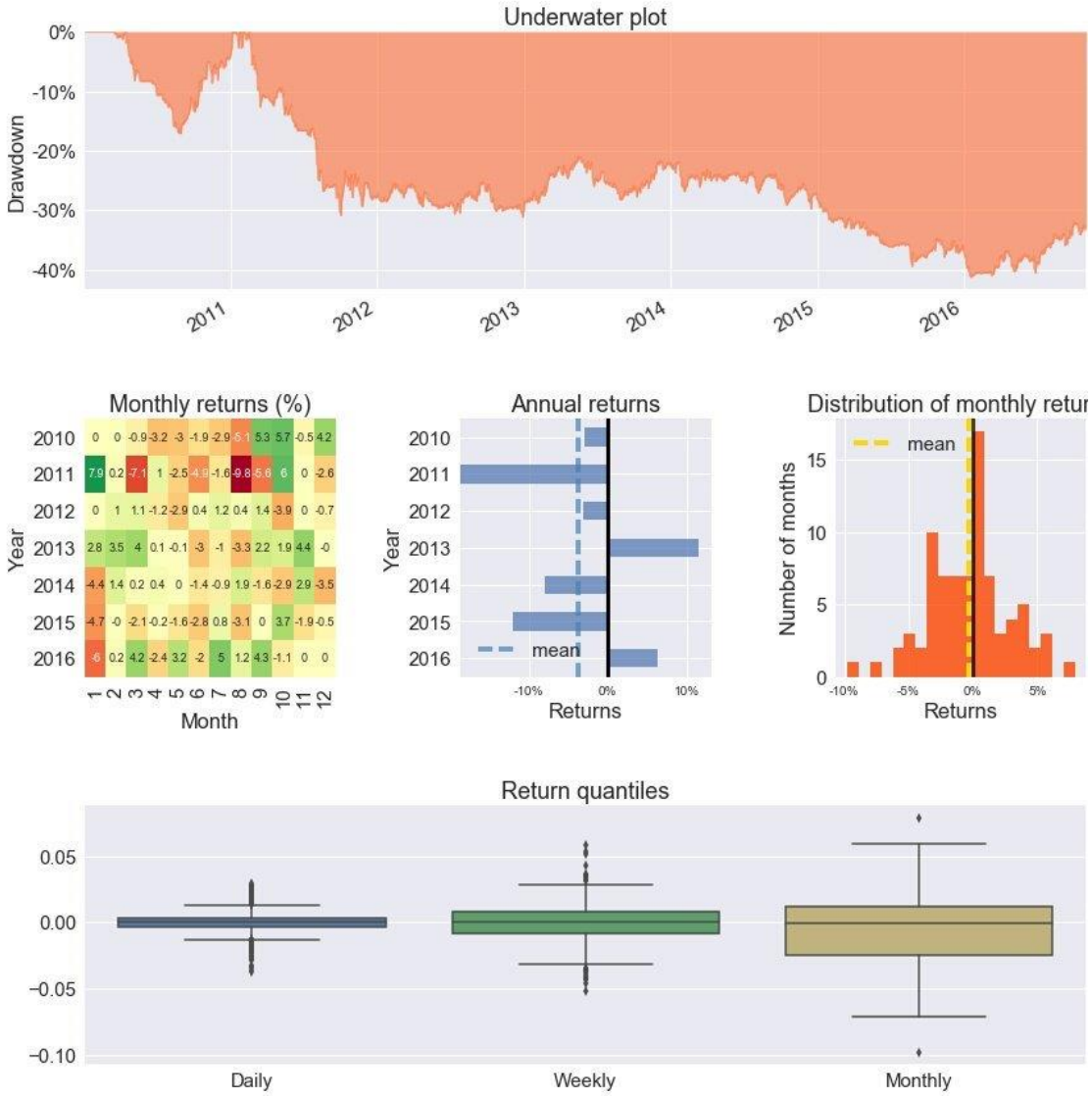
Quant Products



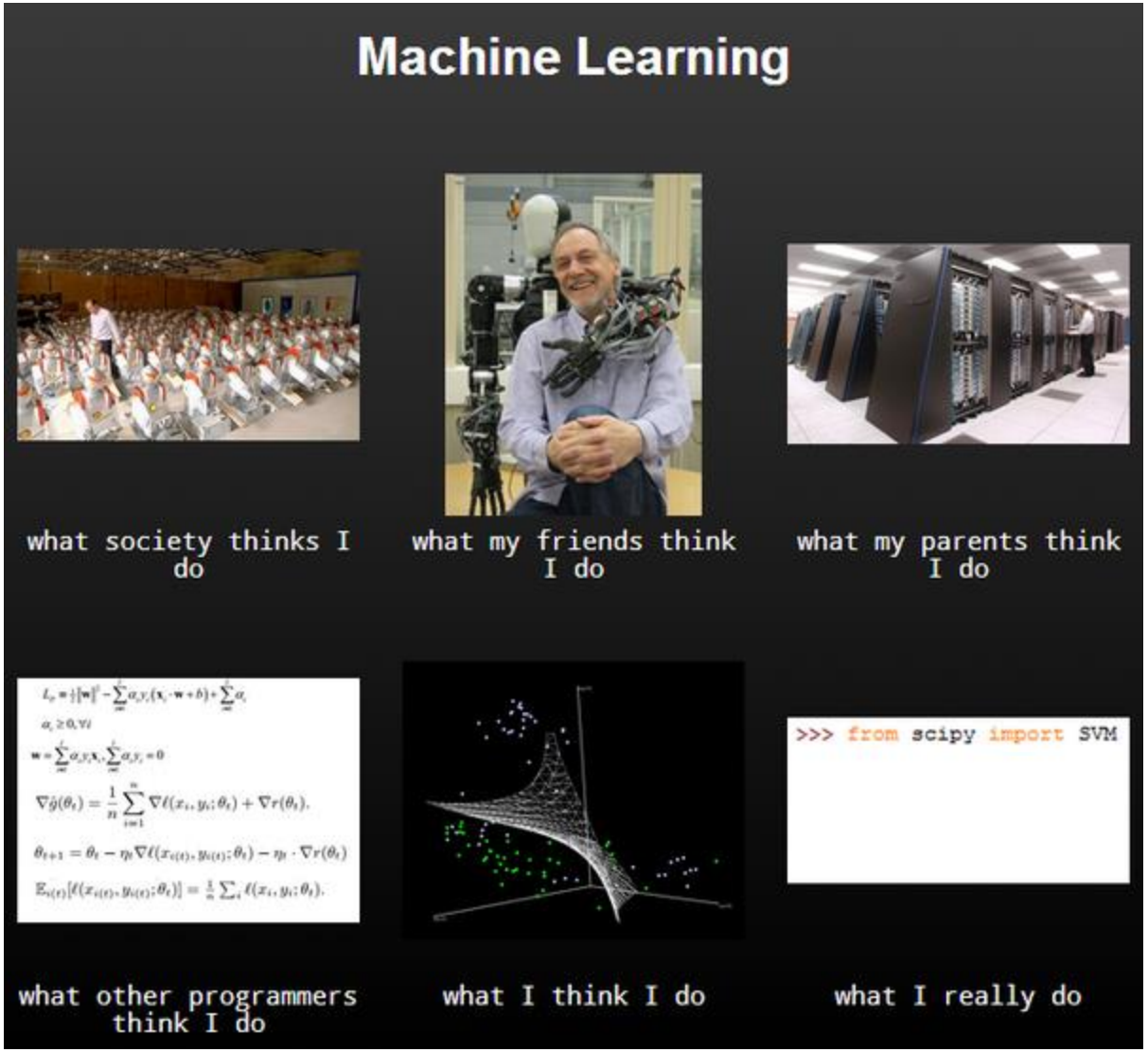
FINNOMENA



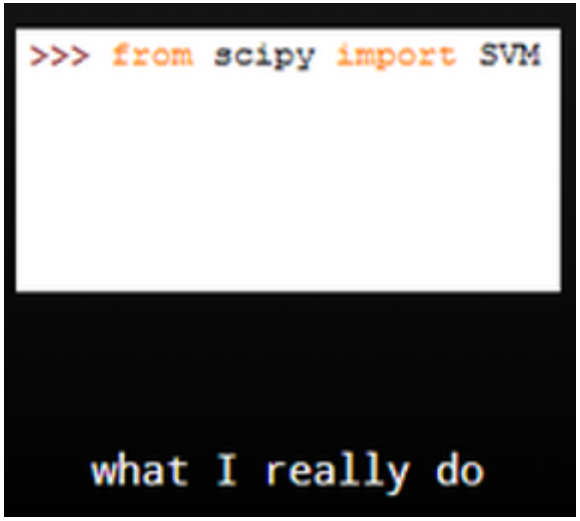
Example of Evaluation



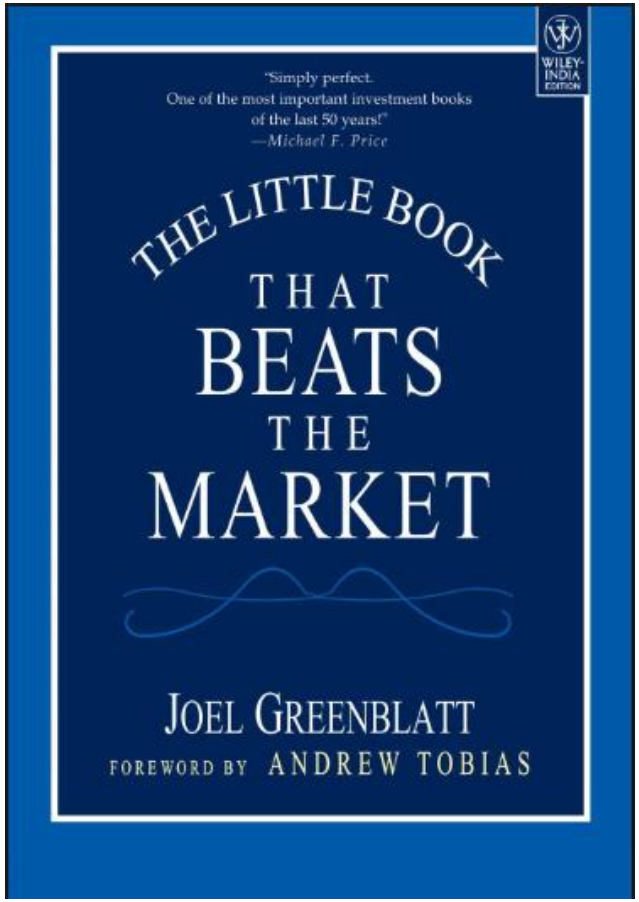
Quant ... now

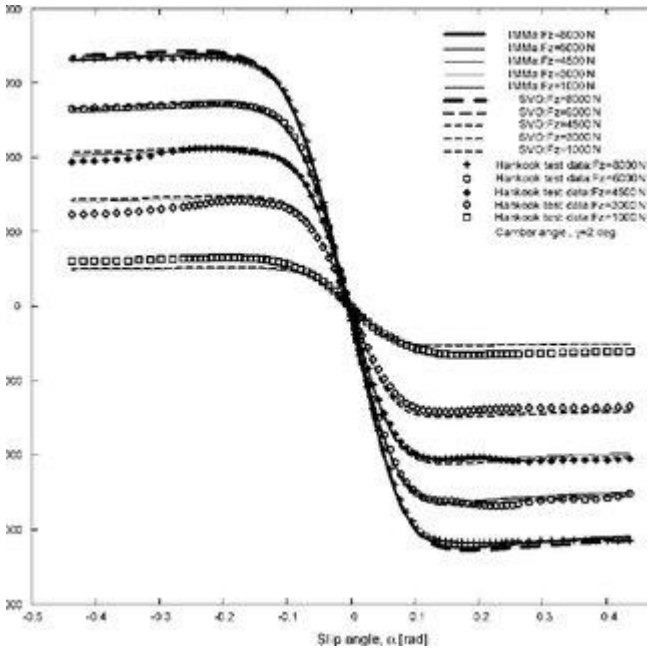

Machine Learning
what society thinks I do
what my friends think I do
what my parents think I do
what other programmers think I do
what I think I do
>>> from scipy import SVM
what I really do

Fear not .. freshies

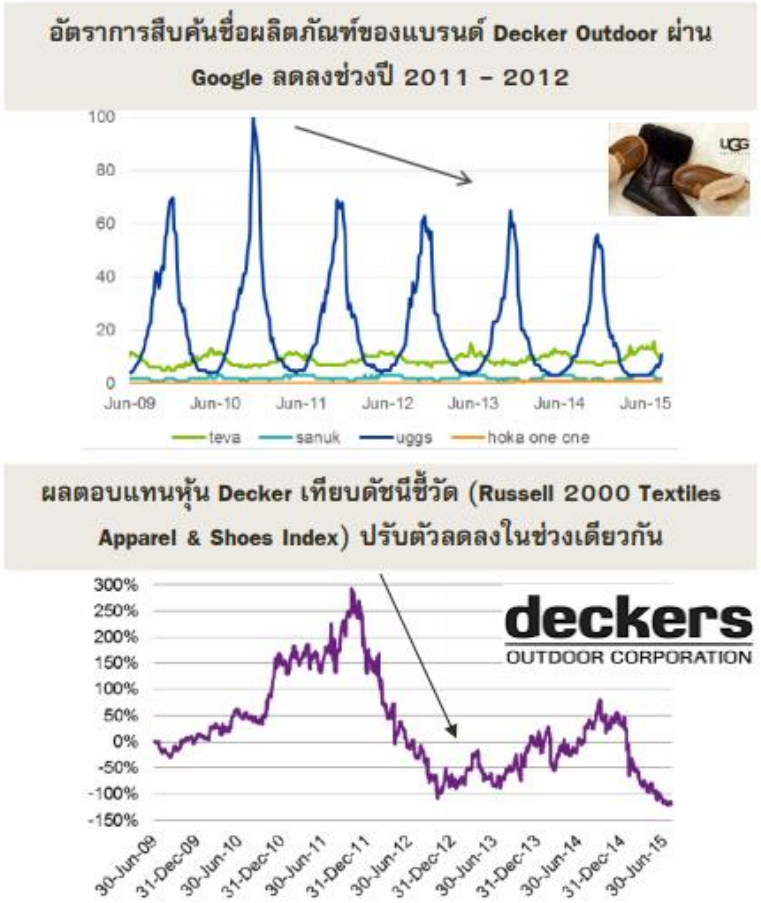


Machine Learning to learn best Parameter setting??



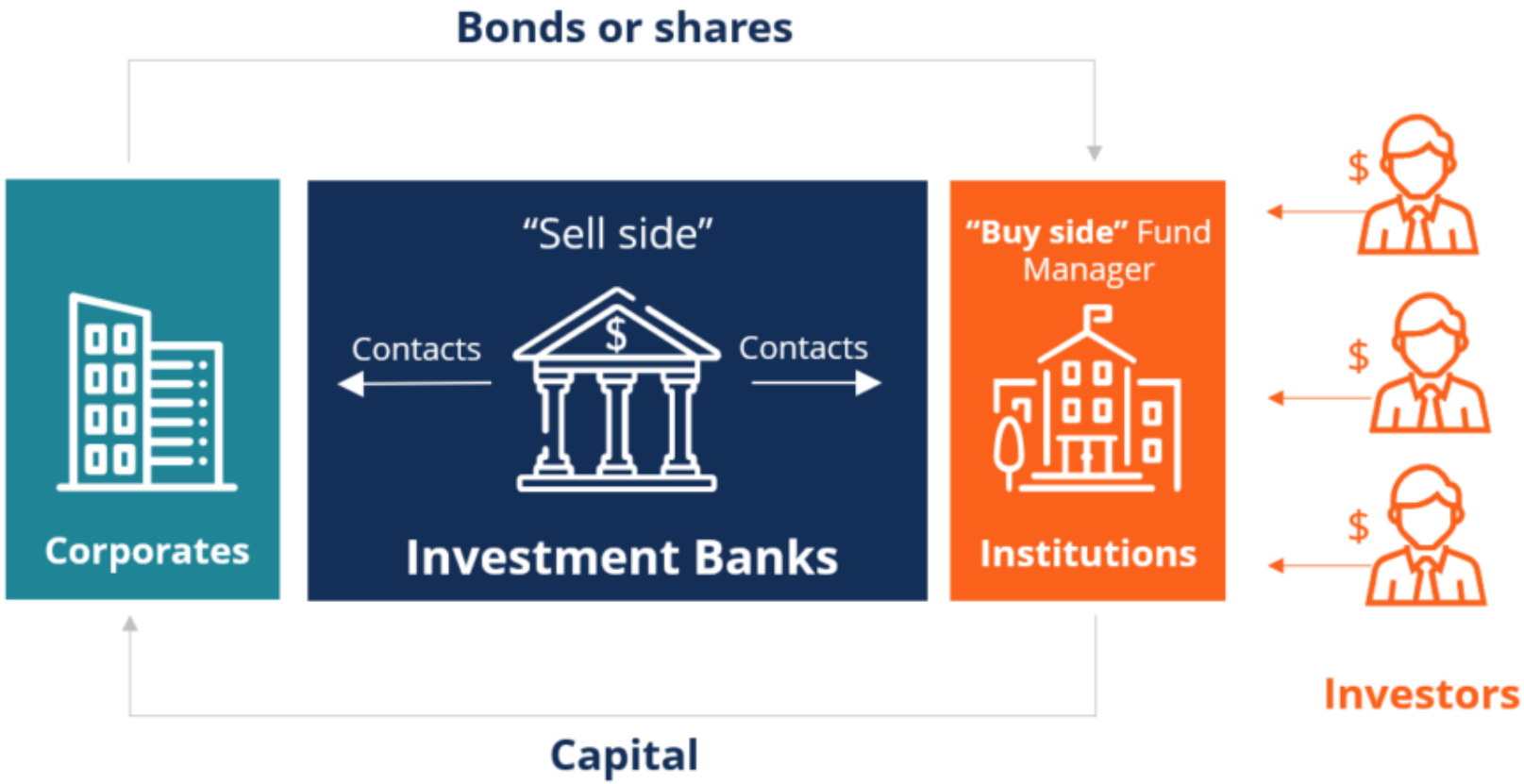


Beware !!

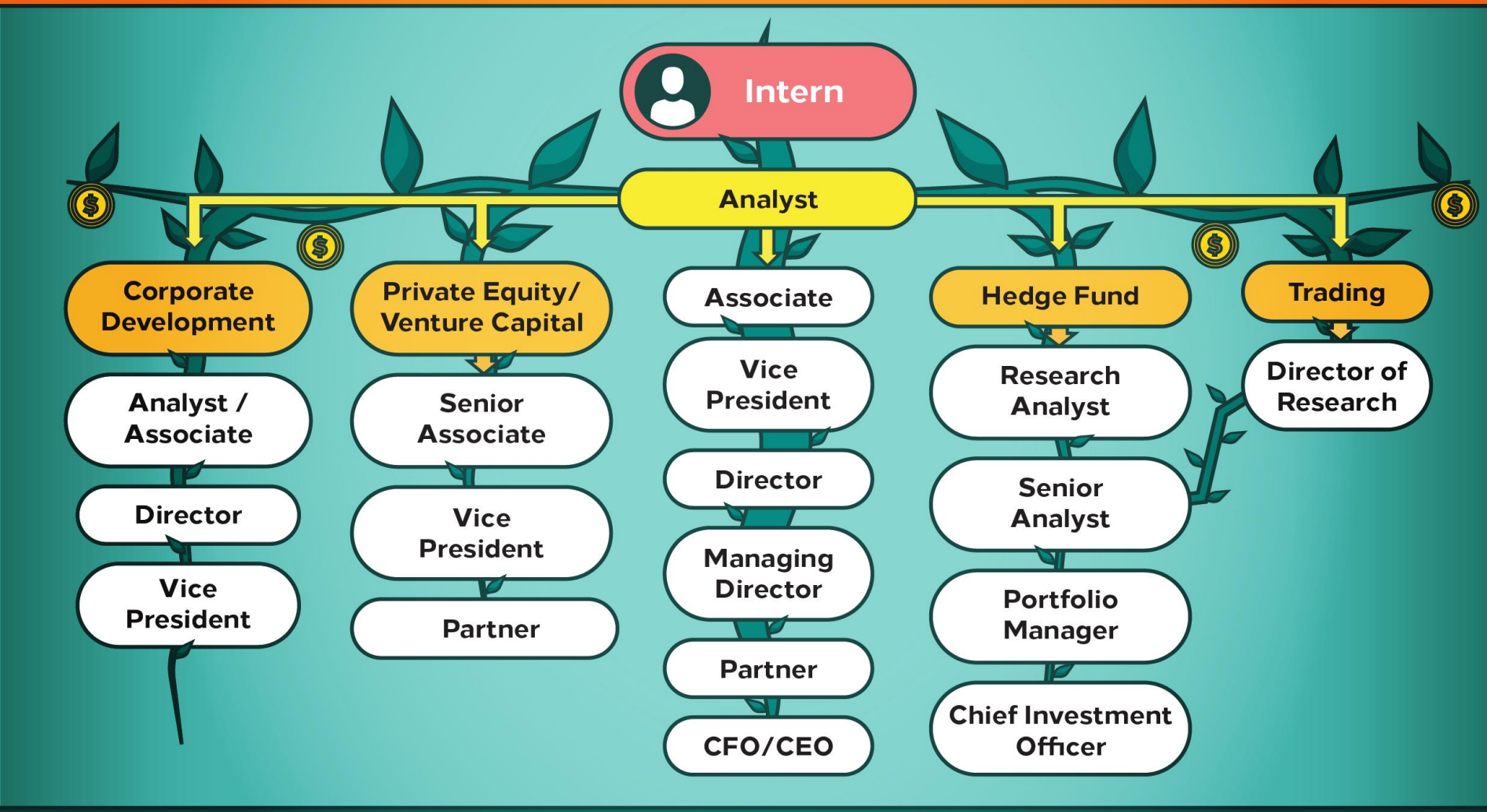


รูปที่ 1 กราฟแสดงผลการสืบค้นสินค้าของแบรด์ Decker Outdoor กับราคาหุ้น : ที่มา K-ART Pitch Book บลจ. กสิกรไทย ข้อมูล ณ ก.ค. 2560

Careers Guide: Overview

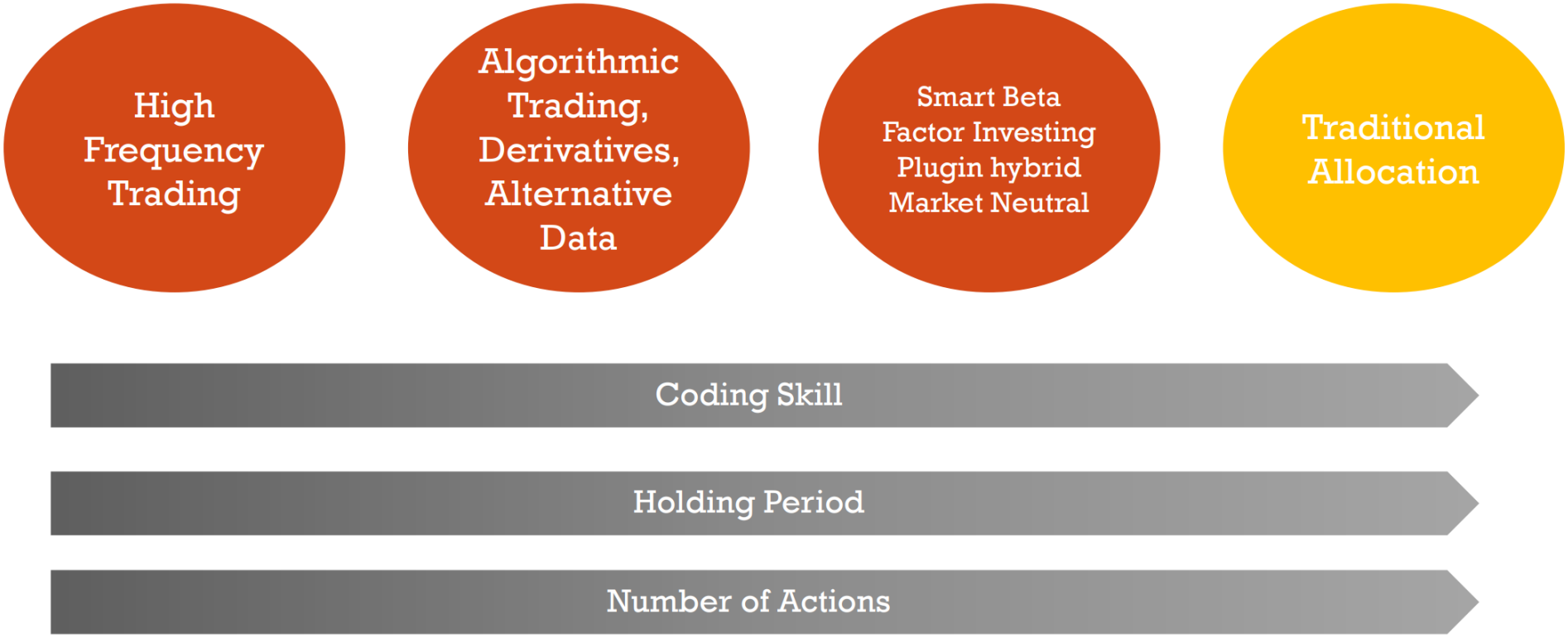


Investment Banking Career Paths

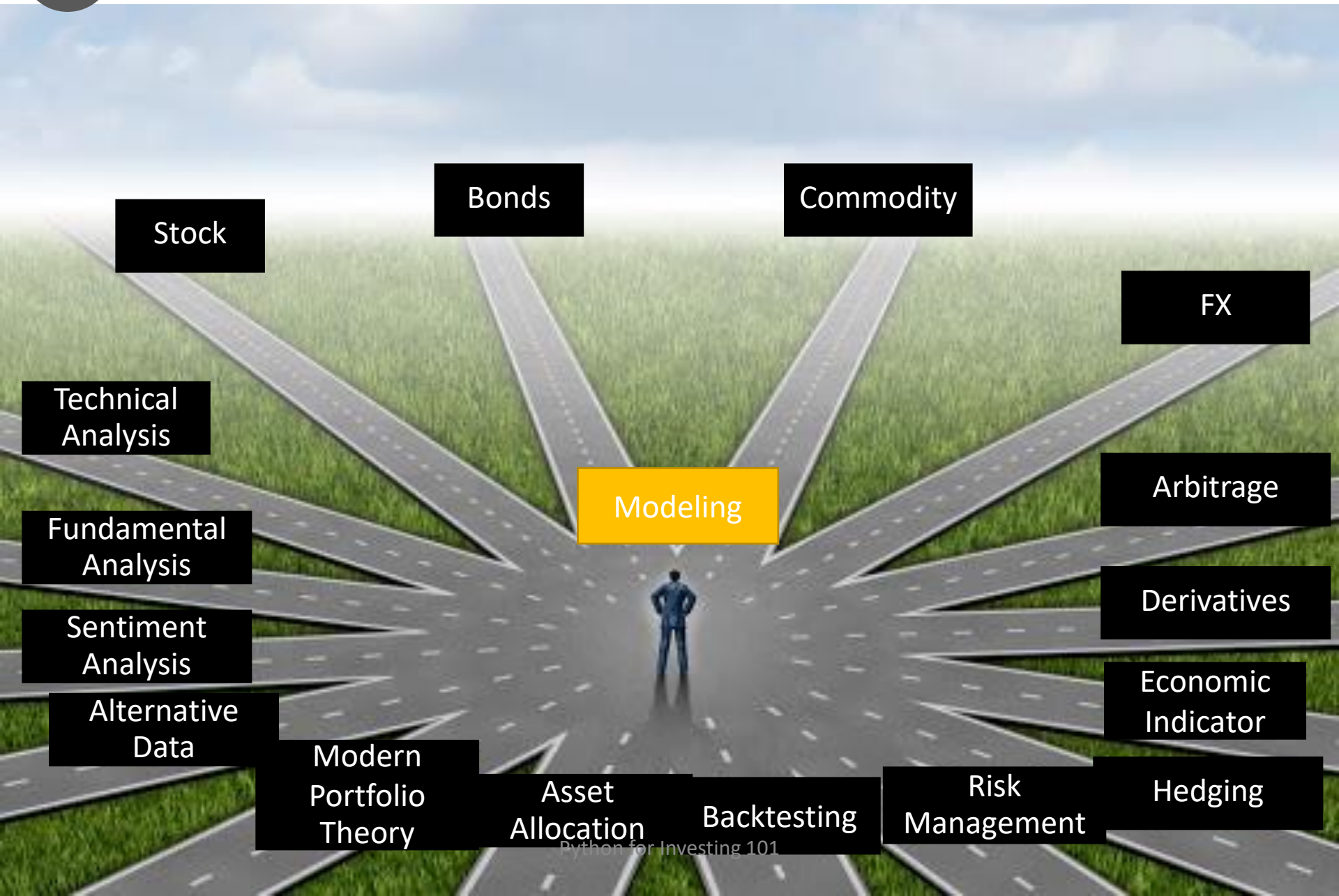


Sources: Investopedia, TheStreet, Corporate Finance Institute

Careers Guide: Quantitative Parts



Path


Stock
Bonds
Commodity
FX
Technical Analysis
Modeling
Arbitrage
Fundamental Analysis
Derivatives
Sentiment Analysis
Economic Indicator
Alternative Data
Modern Portfolio Theory
Asset Allocation
Backtesting
Risk Management
Hedging

You can switch

IC (Quant Strategist)
Multi-Asset
Wealth Management

Fintech
Startup

Data Scientist

Quant Strategist
Multi Asset
Robo-Advisor

Fund Manager

Blogger
Single Stock mostly ..
Alternative Data

KBANK PRIVATE BANKING

KASIKORNTHAI
บริการทุกระดับประทับใจ

FINNOMENA

BOTTOMLINER Academy

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INVESTIC

So which is which???

IC (Quant Strategist)
Multi-Asset
Wealth Management

Fintech
Startup

Data Scientist

Quant Strategist
Multi Asset
Robo-Advisor

Fund Manager

Blogger
Single Stock mostly ..
Alternative Data

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Traditional Allocation

FINNOMENA

Smart Beta
Factor Investing
Plugin hybrid
Market Neutral

Algorithmic Trading, Derivatives, Alternative Data

Smart Beta
Factor Investing
Plugin hybrid
Market Neutral

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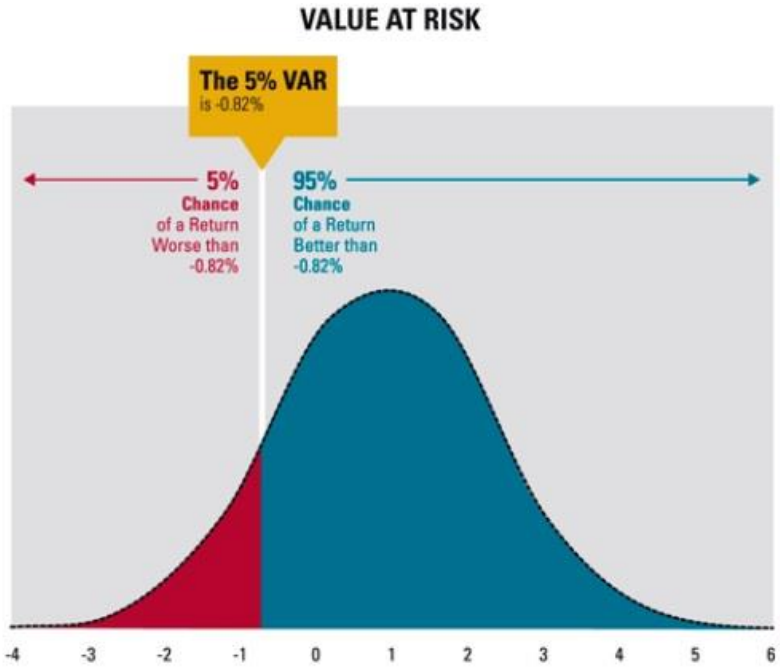
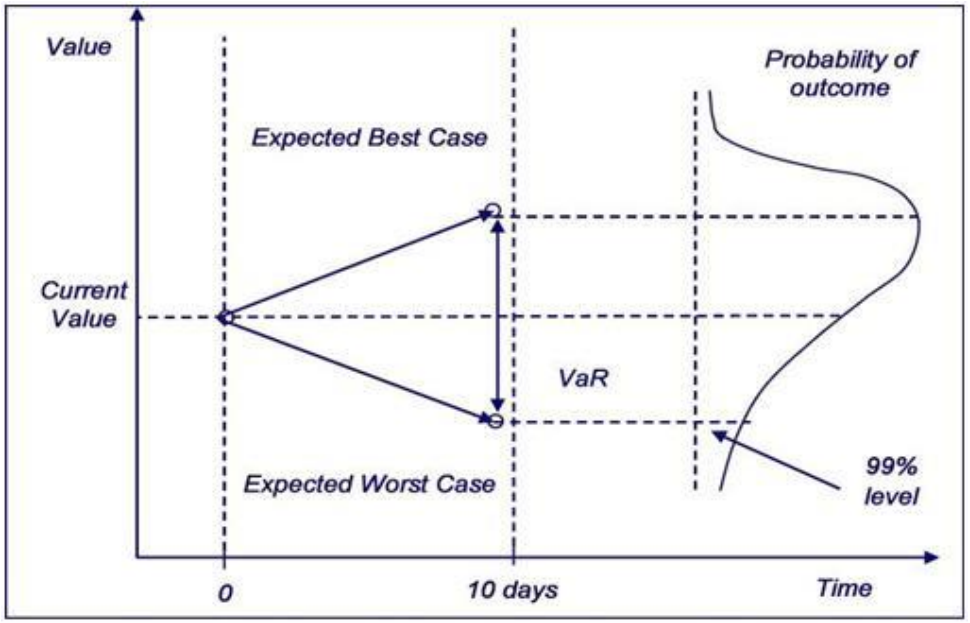
INVESTIC

Do you need to be stats expert?

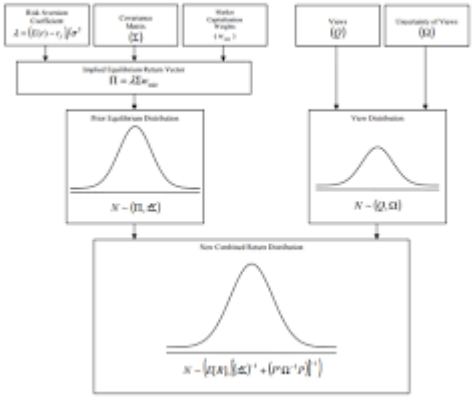




Beware !!

This is for Data Engineer

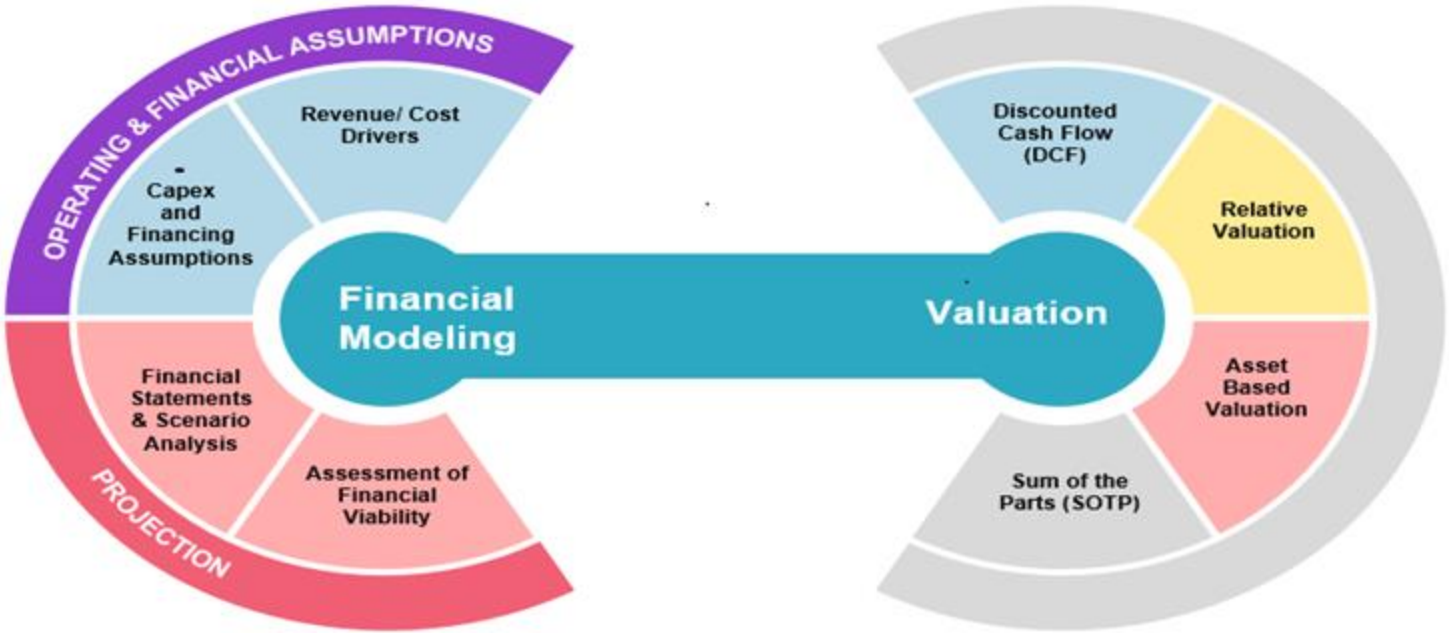
Say yes



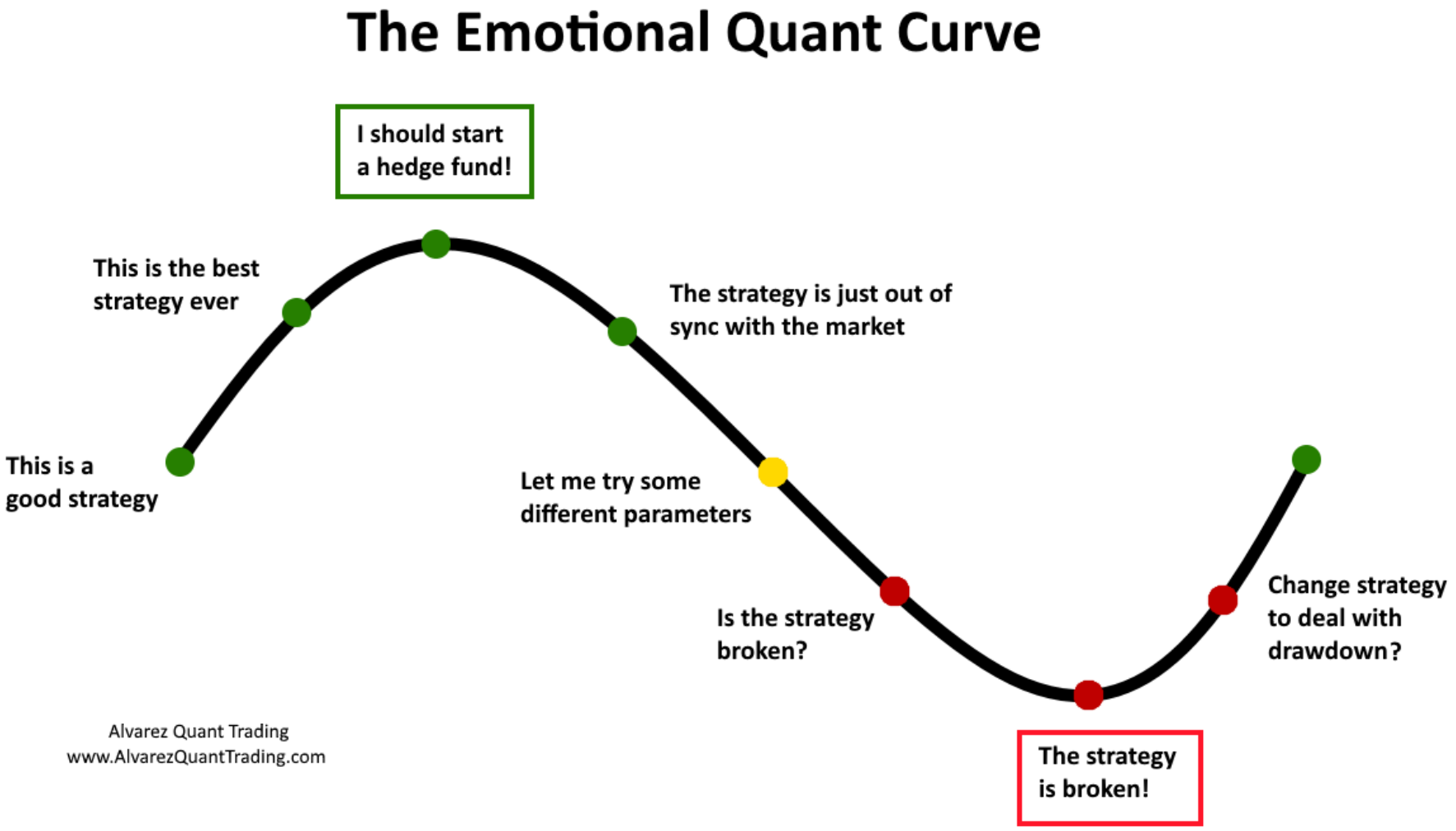
$$\mathbf{X} = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix} \qquad \Pi = \begin{bmatrix} r_1 \\ r_2 \\ \vdots \\ r_n \end{bmatrix} \qquad \mu = \mathbf{X}^T\Pi = \begin{bmatrix} x_1 & x_2 & \dots & x_n \end{bmatrix} \begin{bmatrix} r_1 \\ r_2 \\ \vdots \\ r_n \end{bmatrix} = x_1r_1 + x_2r_2 + \dots + x_nr_n \qquad \Theta = \begin{bmatrix} \theta_{11} & \theta_{12} & \dots & \theta_{1n} \\ \theta_{21} & \theta_{22} & \dots & \theta_{2n} \\ \dots & & & \\ \theta_{n1} & \theta_{n2} & \dots & \theta_{nn} \end{bmatrix}$$

$$\sigma^2 = \mathbf{X}^T\Theta\mathbf{X} = \begin{bmatrix} x_1 & x_2 & \dots & x_n \end{bmatrix} \begin{bmatrix} \theta_{11} & \theta_{12} & \dots & \theta_{1n} \\ \theta_{21} & \theta_{22} & \dots & \theta_{2n} \\ \dots & & & \\ \theta_{n1} & \theta_{n2} & \dots & \theta_{nn} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix} = \theta_{11}x_1^2 + \theta_{22}x_2^2 + \dots + \theta_{nn}x_1^2 + 2\,\theta_{12}\,x_1x_2 + 2\,\theta_{13}\,x_1x_2 + \textit{etc. etc.}$$

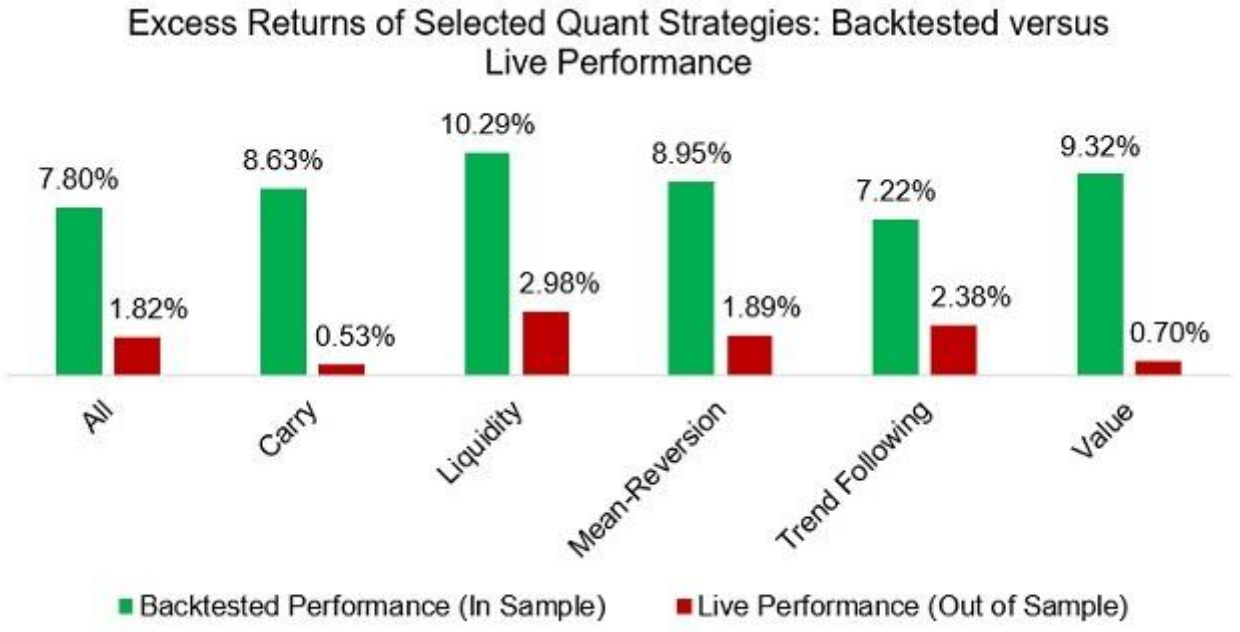
Say yes if ...



This is for Analyst, Fund Manager


The Emotional Quant Curve
I should start a hedge fund!
This is the best strategy ever
The strategy is just out of sync with the market
This is a good strategy
Let me try some different parameters
Is the strategy broken?
Change strategy to deal with drawdown?
Alvarez Quant Trading
www.AlvarezQuantTrading.com
The strategy is broken!

Never get excited with your backtest



Longer Term backtest is ok