The Business of Quant

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Administrivia

- **Jan 21, 28 (Thu), 4-5:30pm**
- **Location**: Zoom
- **TA**: Kylie Ying
- Non-Credit course
- All are welcome: no prerequisites
- Please do give feedback! http://tiny.cc/quant2021

- Contacting the instructor: Rohit Singh (rsingh@mit.edu)

Guest Speakers

Ross Garon
Global Head of Quant Strats
Millennium Partners
Jan 21st

Sanjiv Kumar
Co-founder and CIO
FORT LP
Jan 28th

Recapping Last Week

- Investing is about having a view
- Quant investing is all about having a precise view. Specifically,
  - Alpha
  - Risk
- Systematic views are good
  - Diversification
  - Calibrate your probabilities
- Shorting and leverage aren’t dirty words

Building Quant Strategies

From Views to Strategies

- Views are ideas
- Strategies are action-plans
  - What, how much, when in, when out?

Can every view be implemented as a feasible strategy?

- Performance not good enough after costs
- Can’t make a business out of it

Breaking Down a Strategy’s Edge

Two way to look at this: 1) Source of the alpha 2) What separates you from others

Breaking Down the Edge: Source

- Informational
- Fundamental
- Risk re-distribution
- Structural (e.g., arbitrage or market-making)
- Flow

Breaking Down the Edge: Why You?

- **Brains**: You know something others do not
- **Brawn**: You are able to do something others can not
- **Bravery**: You are willing to do something others are not

Brains: Know What Others Don't

Find an alpha that only a limited set of participants (ideally, just you!) know of

Can be from a variety of sources:

- Fundamental
  - Low volatility, Accruals & Earnings Quality
- New data source
  - Credit card receipts, Satellite images
- Behavioral patterns
  - 13F filings
- Structural
  - Index rebalance
- Flow
  - Order book info

Pros & Cons of a Brains Edge

?

Pros

- Uncorrelated, typically
- Untapped capacity
- Feasible to get a higher Sharpe than peer strats
- Really fun to work on!

Cons

- Eventually dies out
  - Markets are efficient
  - Others might figure it out
- When it doesn't work, hard to explain to others

Brawn Edges: Do What Others Can't

Infrastructural Edge

- Geographic connectivity: arbitrage between distant places
  - Brazil vs US
  - FX market across geographies
  - Various crypto exchanges
- Fast Connectivity: be the first
  - Chicago to New York: SPY vs E-minis

Legal Edge

- Designated market-makers
- Local domicile regulations
  - China A-shares vs H-shares
  - India

Pros

- Won't necessarily go away
- Business model advantages

Cons

- Edge is public knowledge
  - Arms Race
- Rules might change

Bravery: Do What Others Will Not

- Take pain that others are not willing to suffer. Be rewarded for it
- Low Sharpe strategies
  - Value investing, with its risk of
    - Buying value traps and
    - Doing *really* badly when the market's doing badly
  - Small losses on many days, big gains on a few days
    - Out of the money put options buying

Pros / Cons ?

The Customer’s View of Your Strategy

Evaluating a Strategy as a Customer

Questions your customer will ask:

- How much money will I get back?
- What are the chances I'll take a loss?
- How much money can you handle?

The Customer's Dilemma

Pick any two (sometimes, just one)

- Risk
- Return
- Capacity

Strategy	Risk	Return	Capacity
T-bills			
S&P 500			
Factor Investing	?	?	?
Statistical Arbitrage	?	?	?
High Frequency Trading	?	?	?

The Sharpe Ratio

$$Sharpe\ Ratio = \frac{R_p - R_f}{\sigma_p}$$

R_p = Return of portfolio

R_f = Risk-Free rate

σ_p = Standard deviation of portfolio's excess return

Same sharpe, but different risk and returns

http://www.moneychimp.com/articles/risk/sharpe_ratio.htm
https://www.ig.com/au/trading-strategies/the-sharpe-ratio-explained-190117

Missing piece: Correlation

- Your offering needs to fit into the customer's overall allocation
- Certain types of quant strategies explicitly aim to be diversifiers
- Might actually have to leave some alpha on the table...

Other missing pieces?

Taxes

The Fundamental Determinants of Performance

$$\frac{(\text{Return per bet}) \times (\text{\# of Simultaneous bets})}{(\text{Duration of each bet})}$$

Examples of Strategies & Views

Breaking Down the Edge: Source

- Informational
- Fundamental
- Risk re-distribution
- Structural (e.g., arbitrage or market-making)
- Flow

Informational Edge: Predicting Future Business Performance

- Many strategies try to read the tea leaves of the next quarter
  - Satellite images of parking lots or drilling rigs
  - Credit card receipts
  - Foursquare foot-falls
- Alternative data is huge now
  - Need to watch for the regulatory issues: don’t get non-public info

Informational Edge Case Study
Credit Cards

- What's the edge: correctness or speed?
- Data sources?
- Coverage?
- Alpha Pitfalls and Business Risks?

https://www.gsam.com/content/gsam/global/en/market-insights/gsam-insights/quantinomics/credit-card-data.html

Informational Edge Case Study
Google Trends

- Coverage?
- Alpha Pitfalls & Business Risks?

Google

Informational Edge Case Study
Satellite Images

- Coverage?
- Alpha Pitfalls & Business Risks?

https://www.theatlantic.com/magazine/archive/2019/05/stock-value-satellite-images-investing/586009/

Informational Edge Case Study

Processing Quarterly Filings

from 1995-2014, we show that when firms make an active change in their reporting practices, this conveys an important signal about future firm operations. Changes to the language and construction of financial reports also have strong implications for firms' future returns: a portfolio that shorts "changers" and buys "non-changers" earns up to 188 basis points in monthly alphas (over 22% per year) in the future. Changes in language referring to the executive (CEO and CFO) team, regarding litigation, or in the risk factor section of the documents are especially informative for future returns. We show that changes to the

Lazy Prices

2019 Academic Research Colloquium for Financial Planning and Related Disciplines

90 Pages • Posted: 14 Aug 2010 • Last revised: 28 Mar 2019

Trying your ideas…

Caveat: This is not investment advice!!

- Get closing prices data. from Yahoo Finance (Python package ‘yfinance’)
  - Remember to use the “Adjusted Close” column!
  - Compute forward returns as *log(p1/p0)* or *(p1-p0)/p0*
- Get company filings from SEC (Google “SEC EDGAR”):
  - Get the 10K or 10Q filings
  - Come up with a hypothesis and fit to forward return
- Gotchas:
  - 1) Avoid lookahead bias, 2) Lag your data, 3) Don’t Overfit!

Tesla 10Q (2020-Q3)

Production Location	Vehicle Model(s)
Fremont Factory	Model S and Model X Model 3 and Model Y
Gigafactory Shanghai	Model 3 Model Y
Gigafactory Berlin	Model Y Model 3
Gigafactory Texas	Model Y Cybertruck
U.S location(s) TBD	Tesla Semi Tesla Roadster

Filing Detail

SEC Home » Search the Next-Generation EDGAR System » Company Search » *Current Page*

Form 10-Q - Quarterly report [Sections 13 or 15(d)]:

Filing Date
2020-10-26
Accepted
2020-10-26 06:06:44
Documents
100

Period of Report
2020-09-30

Interactive Data

Thank You!