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Arbitrage Trading Strategies

Agenda

Exchange Arbitrage and Statistical Arbitrage

Index Arbitrage

Stat Arb Opportunities and Challenges

Learning Objectives

- Understand the steps in executing an exchange or statistical arbitrage
- Identify the the components and infrastructure needs of an index arbitrage strategy
- Understand the opportunities and limitations of statistical arbitrage

Exchange

Sell something on NYSE for 100.10 right now that you can buy on NASDAQ for 100 right now

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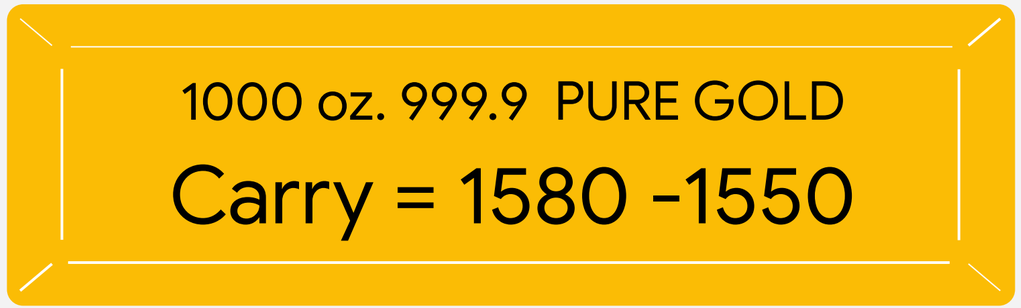
Carry Arbitrage

Pay 1550 for gold in the spot market (immediate delivery) and simultaneously short gold futures for delivery in one year at 1580

BUY 1000 oz. SPOT @ 1550 ⇆ **SELL 1000 oz. FUTURE @1580**



Stat Arb: Mean Reversion

Stock A is observed to have an average price of 100 with a variation of ±5% during the previous 100 trading days.

1. Buy when A reaches 95
2. Sell or short when A reaches 105

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1. Buy when A reaches 95
2. Sell or short when A reaches 105
3. ? when A reaches 110 or 90

Pairs Trading

Stocks A & B both trading at 100

Assume same industry, size, and volatility

Trading Rules:

1. Go Long A – Short B at cost ≈ 0
2. When A - B = 10, Sell A & Buy back B

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Pairs Trading

How to Choose A and B?

- Fundamental Valuation
- Historic returns and correlations

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Pairs Trading

1. Sell A at 110, Buy back B at 100 - Immediate 10 profit
2. When they return to avg prices (A - B = 0), again go Long A and Short B

Because A & B tend to move together in the long term, market risk exposure is limited (hedged)

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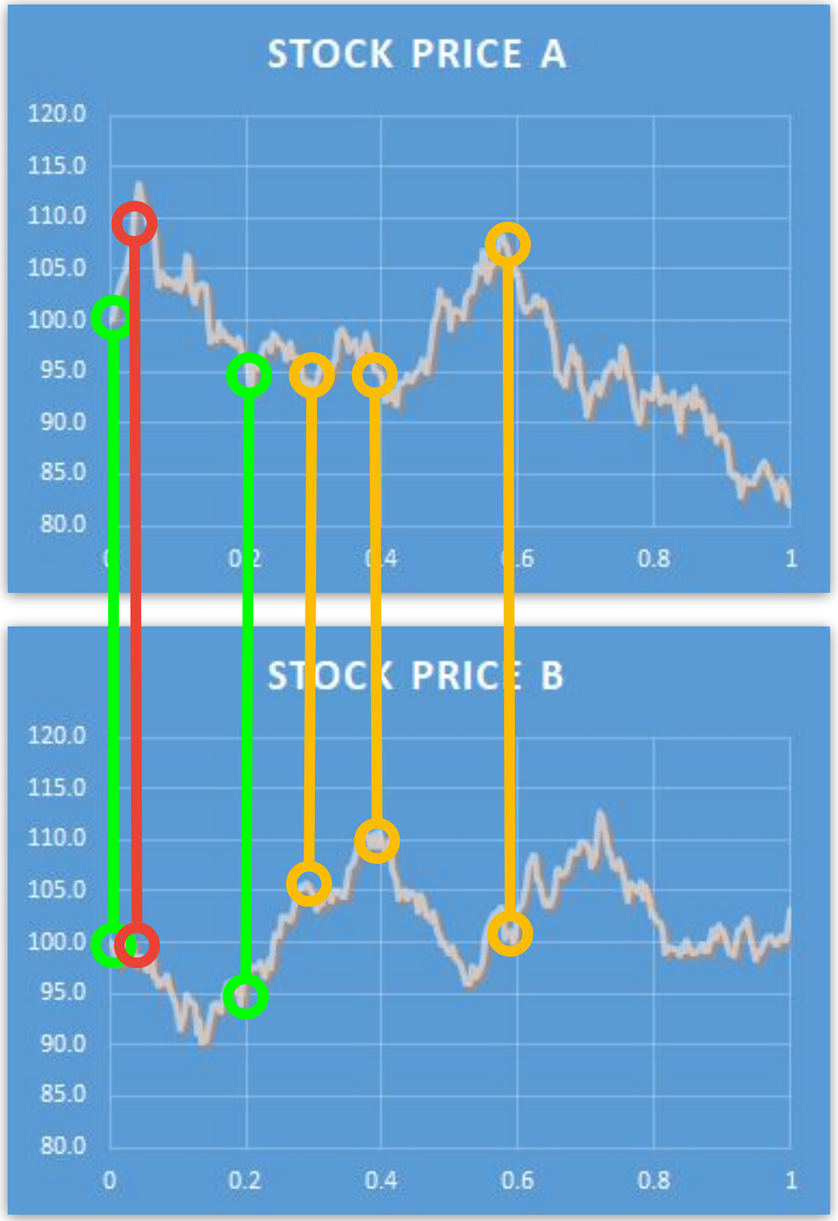

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1. Sell A at 110, Buy back B at 90 - Immediate 10 profit
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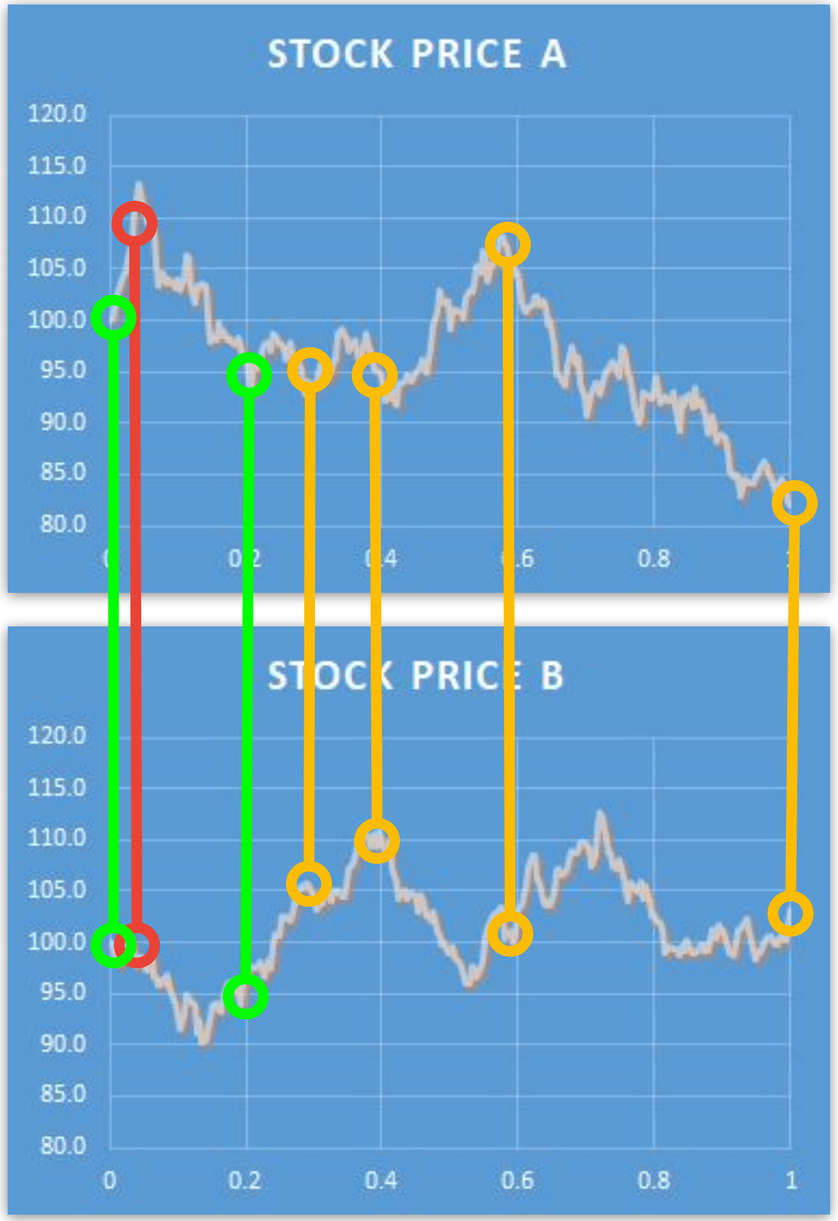

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Statistical Arbitrage (Pairs Trading)

- Most commonly exploiting correlations between stocks (correlations may vary by timeframe)
- Can extend to other asset classes, such as bonds, options, commodities, futures, options on futures, etc.
  - 30-Year T-Bond vs 10-Year T-Note
  - Oil vs Gasoline and Heating Oil

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Exchange Arbitrage and Statistical Arbitrage

Index Arbitrage

Stat Arb Opportunities and Challenges

Index Arbitrage

S&P 500 (SPY)

Nasdaq 100 (QQQ)

Dow 30 (DIA)

... ETFs, sector funds, etc...

Index Arbitrage

- High Frequency Trading
- Based on index weights and individual stock prices
- Sell QQQ, buy the 100 components (or vice versa)

Index Arb Infrastructure Needs

- Real-time data feeds with tic by tic prices and size
- High-speed computers
- Co-location that places your trading computers as close as possible to the exchange servers to further reduce time delays

Agenda

Exchange Arbitrage and Statistical Arbitrage

Index Arbitrage

Stat Arb Opportunities and Challenges

Stat Arb Opportunities

Universe of potentially profitable arb trades is almost limitless

~3,000 liquid stocks → ~4.5 million stock pairs

Can also arb between different asset classes

…different markets

…different trading hours

Stat Arb Challenges

- Trading, clearing, and exchange fees
- Risk-based charges
- Short sale interest, assets on “special”
- Paying for liquidity

Trading Profits

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Stat Arb Challenges

Constant Need for Real-time Data

- Delayed or infrequent – essentially free
- Direct market feeds – $2,000+ per month

Stat Arb Challenges

Liquidity

- Can you trade?
- Not all stocks and relatively few bonds trade every day
- Globally, less than 800 stocks trade “actively”

Stat Arb Challenges: Time Frames

Timeframes

- The longer your timeframe, the more external influences can impact your correlations
- Shorter timeframes reduce risk and produce steady profits but they incur much higher trading costs

Stat Arb Challenges

Changing Correlations and Markets

- When you trade a spread or a correlation, you also change its market
- Prices and liquidity change in response to your trade
- Competing traders may notice an order pattern, and trade it too
- Correlations lose their profit potential if traded long enough or large enough