TEAM WORLDWIDE TRADERS

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Our Team

WORLDWIDE TRADERS

Ching Han Ong

Primary Role:
Business Analyst
Financial Analyst

Vincent Shi

Primary Role:
Developer
Business Analyst

Bobby Jiang

Primary Role:
Developer
Business Analyst

Winson Lau

Primary Role:
Financial Analyst
Developer

Executive Summary

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Issues

1 Difficulties in making timely trades.

2 Difficulties in maximising total profit and loss.

Objective

To forecast future market expectations of the SPY ETF Trust with a trading algorithm, and make accurate, time-sensitive trades that maximise our profits.

Solution

Implement numerous trading strategies and fit them to a trading hypothesis, back tested against historical data.

```
# The function which signals when to buy & sell the asset/stock/ETF
FUNCTION buy_sell(data):
    sigPriceBuy <- []
    sigPriceSell <- []
    flag <- -1
    shares_trans <- 1000 # amount to buy per transaction
    capital <- 1000000 # starting capital of $1 million
    shares_traded <- 0
    shares_owned <- 0

    for i in range of data:
        IF current 'SMA30' > 'SMA100' AND 'ETF'-'VWAP' <= 5:
            IF flag != 1:
                ACTION: BUY
                OUTPUT "buy signal + amount"
            ELSE:
                ACTION: NO ACTION
            ENDIF
        ELSE IF current 'SMA30' < 'SMA100' AND 'VWAP'-'ETF' <= 5:
            IF flag != 0:
                ACTION: SELL
                OUTPUT "sell signal + amount"
            ELSE:
                ACTION: NO ACTION
            ENDIF
        ELSE:
            ACTION: NO ACTION
        ENDIF
    ENDFOR
    RETURN (buy & sell signals, capital, shares_owned, shares_traded)
```

Discovery Phase

To develop an accurate trading algorithm, the team underwent a discovery phase to better understand existing models and trading strategies.

Assumptions

No recessions in the future.

Prioritise total profit & loss over all other metrics.

Only take Long positions.

No Trading fees.

Once a day trading period.

Potential Strategies

Trend Following Strategy
- **Trading based on market momentum**

Trading Range
- **Trading between range of prices.**

Percent of Volume (POV)
- **Execute order quantity as percentage of total volume traded.**

Investment Idea

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The team will develop a trading algorithm which enacts the following strategy with the appropriate predictor variables and iterative testing phases.

STRATEGY

Moving Average Crossover
- **Using two moving averages to determine buy/sell signals**

Weighted Average Strategy
- **Additionally, took into consideration TWAP and MVWAP periods as buy/sell indicators**

PREDICTOR VARIABLES

Simple Moving Average (SMA)
- **Identify performance in range**

Volume Weighted Average Price (VWAP)
- **Benchmark with insight into trend, volume, and value.**

Time Weighted Average Price (TWAP)
- **Dissect large orders into smaller orders.**

Code Implementation - Pseudocode

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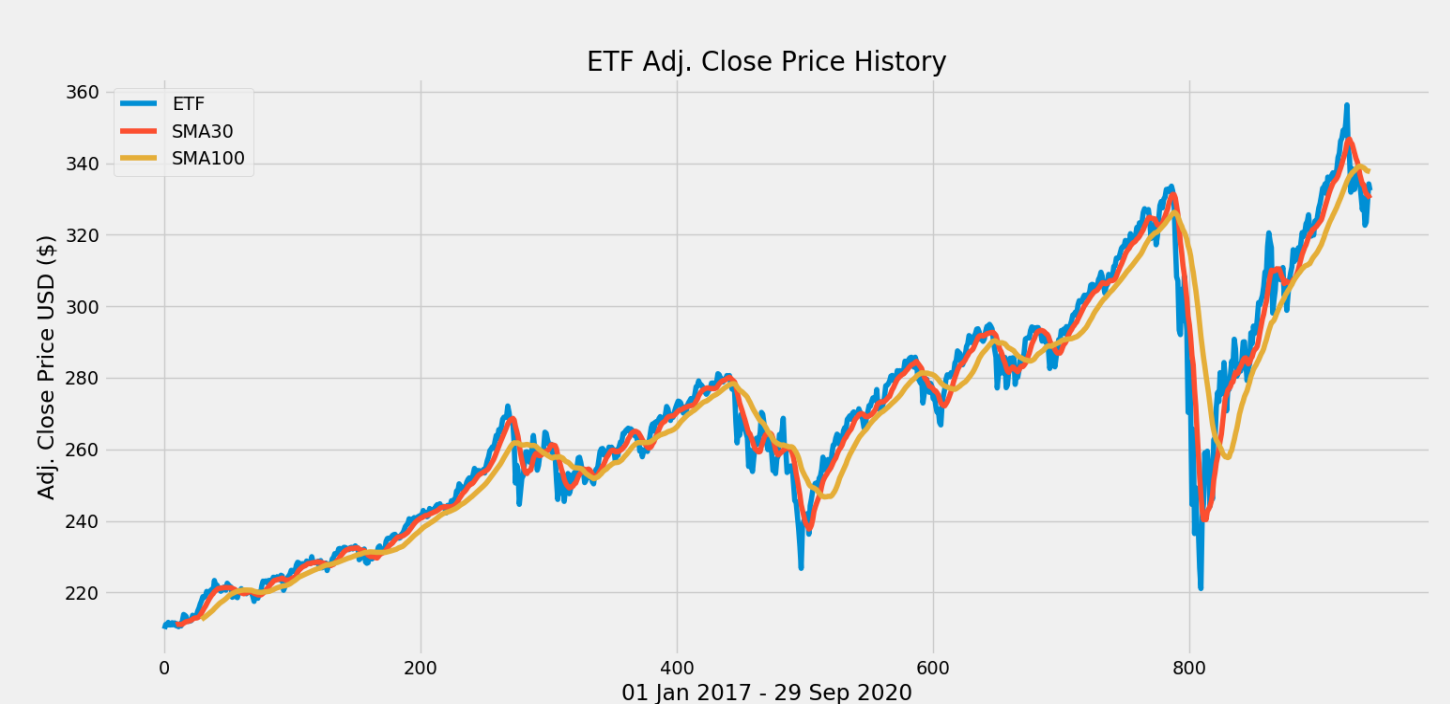
We implemented appropriate code based on our researched trading strategies and investment hypothesis.

```
# The function which signals when to buy & sell the asset/stock/ETF
FUNCTION buy_sell(data):
    sigPriceBuy <- []
    sigPriceSell <- []
    flag <- -1
    shares_trans <- 3000 # amount to buy per transaction
    capital <- 1000000 # starting capital of 1 million
    shares_traded <- 0
    shares_owned <- 0

    for i in range of data:
        IF current 'SMA10' > 'SMA30' AND 'ETF'-'VWAP' <= 1:
            IF flag != 1:
                ACTION: BUY
                OUTPUT "buy signal + amount"
            ELSE:
                ACTION: NO ACTION
            ENDIF
        ELSE IF current 'SMA10' < 'SMA30' AND 'VWAP'-'ETF' <= 1:
            IF flag != 0:
                ACTION: SELL
                OUTPUT "sell signal + amount"
            ELSE:
                ACTION: NO ACTION
            ENDIF

        ELSE:
            ACTION: NO ACTION
        ENDIF
    ENDFOR
    RETURN (buy & sell signals, capital, shares_owned, shares_traded)
```




```
if short-term avg > long-term avg and stock_price is close to vwap:
    execute buy order

else if short-term avg < long-term avg and stock_price is close to vwap:
    execute sell order
```

Results

Visualisation of our following trading algorithm and its trading decisions.


```
buy 217.665451
sell 264.641724
buy 263.304688
sell 268.66247599999997
buy 252.50624100000002
sell 276.766571
buy 281.100769
sell 285.465851
buy 291.129669
sell 290.65918
buy 293.337402
sell 308.433655
buy 270.759888
sell 334.190002

Starting Capital = 1000000
Ending Capital = 1477046.053
Shares owned = 0
Shares traded = 21000
ETF current trading price: 332.369995
Net value = 1477046.053
Total profit = 477046.0530000001
Return on investment: 47.70460530000001%
```

Calculated Annualized Return: 13.88%

Looking Forward

The following are identified improvements that can be made to our algorithm to further improve accuracy and performance.

Objective

To forecast future market expectations of the SPY ETF Trust with a trading algorithm and make accurate, time-sensitive trades which maximises our profits.

WWT V2

Risk Mitigation

Account for market volatility and risks in making trading decisions.

Volume Control

Increase priority on utilising volume to gauge market sentiment.

Trade Frequency

Increase trading frequency between dedicated trading window.

Trade Effectiveness

Compare performance through rigorous testing and comparable indices.


Thank You!