Not Over Thinking

Momentum Factor Effect in Country Equity Indexes

Algorithmic Trading Strategy with Full Code

Haixiang

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hxyan.2015@gmail.com | github.com/hxyan2020

STRATEGY & ECONOMIC RATIONALE

The investment universe consists of ETFs (funds) which invest in individual countries' equity indexes. The top 5 countries with the best X – month (where X depends on investors choice, studies show X to be best as 10-12) momentum are chosen as an investment, and portfolio is rebalanced once in a month.

BUY	SELL
top 5 countries with the best X – month momentum	The reverse

PARAMETER & VARIABLES

PARAMETER	VALUE
MARKETS TRADED	Equity
FINANCIAL INSTRUMENTS	ETFs, funds
REGION	United States
PERIOD OF REBALANCING	Monthly
NO. OF TRADED INSTRUMENTS	5
WEIGHTING	Equal Weighting
LOOKBACK PERIODS	Depends
LONG/SHORT	Long Only

ALGORITHM

```
from AlgorithmImports import *

class MomentumFactorEffectinCountryEquityIndexes(QCAlgorithm):

    def Initialize(self):
        self.SetStartDate(2000, 1, 1)
        self.SetCash(100000)

        # Daily ROC data.
        self.perf = {}

        self.period = 6 * 21
        self.SetWarmUp(self.period, Resolution.Daily)

        self.symbols = [
                        "EWA",  # iShares MSCI Australia Index ETF
                        "EWO",  # iShares MSCI Austria Investable Mkt Index ETF
                        "EWK",  # iShares MSCI Belgium Investable Market Index ETF
                        "EWZ",  # iShares MSCI Brazil Index ETF
                        "EWC",  # iShares MSCI Canada Index ETF
                        "FXI",  # iShares China Large-Cap ETF
                        "EWQ",  # iShares MSCI France Index ETF
                        "EWG",  # iShares MSCI Germany ETF
                        "EWH",  # iShares MSCI Hong Kong Index ETF
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                    "EWI",  # iShares MSCI Italy Index ETF
                    "EWJ",  # iShares MSCI Japan Index ETF
                    "EWM",  # iShares MSCI Malaysia Index ETF
                    "EWW",  # iShares MSCI Mexico Inv. Mt. Idx
                    "EWN",  # iShares MSCI Netherlands Index ETF
                    "EWS",  # iShares MSCI Singapore Index ETF
                    "EZA",  # iShares MSCI South Africe Index ETF
                    "EWY",  # iShares MSCI South Korea ETF
                    "EWP",  # iShares MSCI Spain Index ETF
                    "EWD",  # iShares MSCI Sweden Index ETF
                    "EWL",  # iShares MSCI Switzerland Index ETF
                    "EWT",  # iShares MSCI Taiwan Index ETF
                    "THD",  # iShares MSCI Thailand Index ETF
                    "EWU",  # iShares MSCI United Kingdom Index ETF
                    "SPY",  # SPDR S&P 500 ETF
                    ]

        self.traded_count = 5

        for symbol in self.symbols:
            data = self.AddEquity(symbol, Resolution.Minute)
            data.SetFeeModel(CustomFeeModel())
            data.SetLeverage(5)

            self.perf[symbol] = self.ROC(symbol, self.period, Resolution.Daily)

        self.recent_month = -1

    def OnData(self, data):
        if self.IsWarmingUp:
            return

        if not (self.Time.hour == 9 and self.Time.minute == 31):
            return

        if self.Time.month == self.recent_month:
            return
        self.recent_month = self.Time.month

        sorted_by_momentum = sorted([x for x in self.perf.items() if x[1].IsReady and x[0]
in data and data[x[0]]], key = lambda x: x[1].Current.Value, reverse = True)
        long = []

        if len(sorted_by_momentum) >= self.traded_count:
            long = [x[0] for x in sorted_by_momentum[:self.traded_count]]

        # trade execution
        invested = [x.Key for x in self.Portfolio if x.Value.Invested]
        for symbol in invested:
            if symbol not in long:
                self.Liquidate(symbol)

        for symbol in long:
```

```
            self.SetHoldings(symbol, 1 / len(long))

# Custom fee model
class CustomFeeModel(FeeModel):
    def GetOrderFee(self, parameters):
        fee = parameters.Security.Price * parameters.Order.AbsoluteQuantity * 0.00005
        return OrderFee(CashAmount(fee, "USD"))
```

BACKTESTING PERFORMANCE

Fig 1. Overall Performance

PSR	0.000%	Sharpe Ratio	0.218
Total Trades	1859	Average Win	0.67%
Average Loss	-1.05%	Compounding Annual Return	3.298%
Drawdown	65.400%	Expectancy	0.077
Net Profit	112.438%	Loss Rate	34%
Win Rate	66%	Profit-Loss Ratio	0.64
Alpha	-0.011	Beta	0.904
Annual Standard Deviation	0.184	Annual Variance	0.034
Information Ratio	-0.145	Tracking Error	0.112
Treynor Ratio	0.044	Total Fees	$1477.46
Estimated Strategy Capacity	$120000.00	Lowest Capacity Asset	EWO R735QTJ8XC9X

Fig 2. Performance Metrics

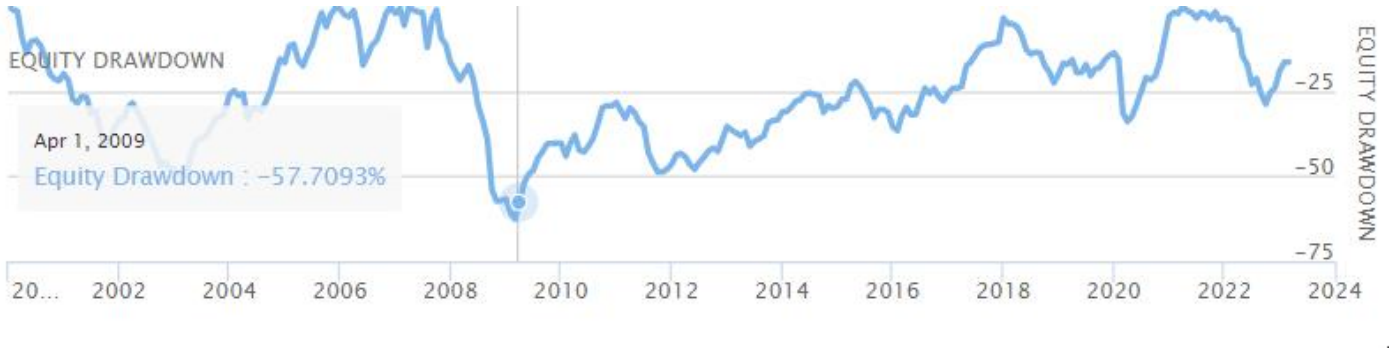

Fig 3. Drawdown

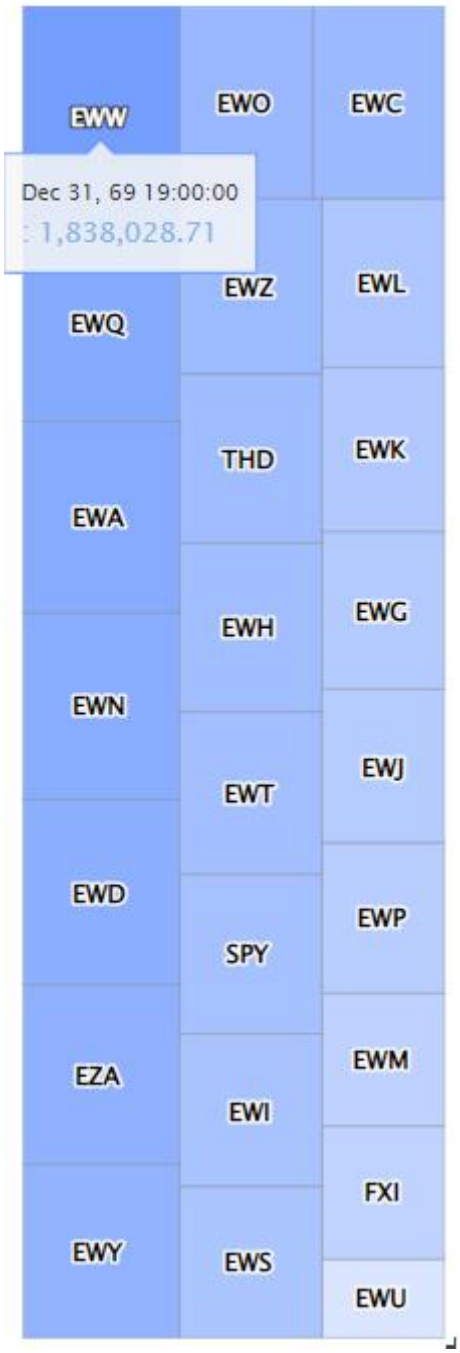

Fig 4. Assets Sales Volume