Strategy Optimization Report: Multi-Timeframe EMA-ADX Trend Strategy

1. Objective

To evaluate the performance of the original EMA-ADX multi-timeframe strategy using historical backtest data, identify limitations in trade frequency, and optimize parameters to improve signal quality and execution volume.

2. Backtest Periods Explanation

Start Date	End Date	Description	Market Nature	Key Metrics & Trends
2020-02-15 00:00	2020-06-30 23:59	COVID Crash & Recovery	Panic followed by V-shaped rebound	S&P 500 fell ~34% (Feb–Mar 2020), then surged ~70% by end of 2020
2020-07-01 00:00	2021-03-31 23:59	Post-COVID Stimulus Rally	Liquidity-fueled bull market	Global GDP rebounded 5.9% in 2021; U.S. inflation rose from 1.4% to 7%
2021-04-01 00:00	2021-12-31 23:59	Inflation Fears Begin	Overheating concerns, supply chain stress	CPI inflation peaked at 9.1% (June 2022); Fed began rate hikes
2022-01-01 00:00	2022-09-30 23:59	Rate Hike Cycle Starts	Tightening phase, risk-off sentiment	Fed raised rates 11 times (Mar 2022–Jul 2023); peak rate: 5.25–5.50%
2022-10-01 00:00	2023-06-30 23:59	Bear Market & Repricing	Valuation reset, tech under pressure	S&P 500 down 25% (Jan–Oct 2022); Nasdaq -33%; MSCI World -17.7%
2023-07-01 00:00	2024-03-31 23:59	Sideways & Recovery	Stabilization, sector rotation	Inflation fell to ~3%; AI and tech led gains; Hang Seng and Kospi rebounded
2024-04-01 00:00	2024-12-31 23:59	AI Boom & Rotation	Speculative surge in tech, stretched valuations	AI sector grew 40–55% YoY; S&P 500 forward P/E hit 21x; Generative AI funding: $25B

3. Original Parameters and Observations

Parameter Name	Type	Value	Description
emaVeryFastPeriod	int	20	Very fast EMA period
emaFastPeriod	int	25	Fast EMA period
emaSlowPeriod	int	50	Slow EMA period
adxPeriod	int	50	ADX calculation period
adxThreshold	double	40	ADX strength threshold
enableCrossoverFilter	bool	TRUE	Optional EMA crossover filter
crossoverLookback	int	20	Lookback period for crossover detection
barsLookbackBool	bool	TRUE	Enable bar lookback logic
barsLookBack	int	500	Number of bars to look back
lotSize	double	0.01	Trade lot size
pRange	double	4	Price range threshold
lRange	double	2	Lower range threshold

Rationale

Used an arbitrary ADX Threshold above 25 to confirm trend breaking outside of consolidation zone and confirming strong trend by being far away from crossovers.

3.a Original Results

Pass	Result	Profit	Expected Payoff	Profit Factor	Recovery Factor	Sharpe Ratio	Custom	Equity DD %	Trades	periodSelector
0	80.00	0.00	0		0	0	80	0.00	0	0
1	80.00	0.00	0		0	0	80	0.00	0	1
2	80.00	0.00	0		0	0	80	0.00	0	2
3	80.00	0.00	0		0	0	80	0.00	0	3
4	80.00	0.00	0		0	0	80	0.00	0	4
5	75.05	-4.95	-0.35357	0.77199	-0.36996	-5.00000	75.05	15.13	14	5
6	80.00	0.00	0		0	0	80	0.00	0	6
7	80.00	0.00	0		0	0	80	0.00	0	7

Observation

- The strategy executed very few trades over the backtest period.
- Most candles failed to meet the ADX threshold, and EMA crossovers were rare under the original configuration.
- This suggested the filter conditions were too strict for the selected timeframe and market.

4. Modifications 1: Parameters and Observations

Parameter Name	Type	Value	Description
emaVeryFastPeriod	int	20	Very fast EMA period
emaFastPeriod	int	25	Fast EMA period
emaSlowPeriod	int	50	Slow EMA period
adxPeriod	int	50	ADX calculation period
adxThreshold	double	32	ADX strength threshold
enableCrossoverFilter	bool	TRUE	Optional EMA crossover filter
crossoverLookback	int	20	Lookback period for crossover detection
barsLookbackBool	bool	TRUE	Enable bar lookback logic
barsLookBack	int	500	Number of bars to look back
lotSize	double	0.01	Trade lot size
pRange	double	4	Price range threshold
lRange	double	2	Lower range threshold

Rationale:

Reduced ADX threshold: Allowed more trades during moderate trends.

4.a Modification 1 Results

Pass	Result	Profit	Expected Payoff	Profit Factor	Recovery Factor	Sharpe Ratio	Custom	Equity DD %	Trades	periodSelector
0	80.00	0.00	0		0	0	80	0.00	0	0
1	72.41	-7.59	-0.05383	0.950223	-0.2132	-5	72.41	32.96	141	1
4	72.19	-7.81	-0.11657	0.903497	-0.37032	-5	72.19	26.29	67	4
2	68.50	-11.50	-0.41071	0.636651	-0.54067	-5	68.5	24.62	28	2
3	66.95	-13.05	-0.18913	0.832757	-0.52034	-5	66.95	27.25	69	3
6	51.32	-28.68	-0.58531	0.54360	-0.91953	-5.00000	51.32	38.12	49	6
5	48.77	-31.23	-0.6246	0.561253	-0.81075	-5	48.77	44.13	50	5
7	4.91	-75.09	-0.20916	0.824412	-0.79994	-5	4.91	95.03	359	7

Interpretation:

- The modified strategy significantly increased trade frequency compromising profitability greatly.
- Drawdown increased drastically exceeding acceptable bounds.
- The equity DD% suggests that upon entry the movement is against the trend.

5. Modifications 2: Parameters and Observations

```
40          if (PositionsTotal() == 0) {
41             if (bullishTrend) {
42                ExecuteTrade(false);
43                Print("Bullish trend confirmed across all timeframes. Consider Sell.");
44             } else if (bearishTrend) {
45                ExecuteTrade(true);
46                Print("Bearish trend confirmed across all timeframes. Consider Buy.");
47             }
48          }
49       }
```

Rationale:

Place Counter Trend Positions: There are large movements against the trend at the point of trend confirmation (minimum 20 bars after crossover)and so placing positions against the trend.

5.a Modification 2 Results

Pass	Result	Profit	Expected Payoff	Profit Factor	Recovery Factor	Sharpe Ratio	Custom	Equity DD %	Trades	periodSelector
0	80.00	0.00	0		0	0	80	0.00	0	0
1	52.54	-27.46	-0.20191	0.821781	-0.47109	-5	52.54	69.24	136	1
2	89.26	9.26	0.29871	1.335143	1.163317	29.60711	89.26	8.85	31	2
3	75.54	-4.46	-0.05310	0.95133	-0.16965	-5.00000	75.54	30.88	84	3
4	72.28	-7.72	-0.10873	0.908303	-0.20505	-5	72.28	40.84	71	4
5	98.47	18.47	0.439762	1.438822	1.764088	11.62097	98.47	12.69	42	5
6	92.86	12.86	0.2572	1.258805	1.090755	12.765	92.86	14.01	50	6
7	93.00	13.00	0.026694	1.024298	0.239411	2.258923	93	61.88	487	7

Interpretation:

- The strategy demonstrates limited reliability, primarily due to significant drawdowns and sensitivity to varying market conditions.
- Achieving a maximum return of approximately 25% required a high number of trades and exposed the account to drawdowns of up to 70%, which exceeds the acceptable risk threshold for a 1:500 leverage profile

5. Conclusion and Next Steps

- The original parameters were too conservative for the selected timeframe and symbol.
- Adjusting EMA and ADX thresholds unlocked more trading opportunities while preserving trend-following logic.

Next Steps:

- Test on additional symbols (e.g., EURUSD, NASDAQ).
- Add volatility filters (e.g., ATR) to avoid choppy markets.
- Explore dynamic parameter tuning based on market regime.